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The pots and potters of Assyria : technology and organization of production, ceramics sequence and vessel function at Late Bronze Age Tell Sabi Abyad, Syria

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APPENDIX G
FUNCTIONAL PROPERTIES OF SELECTED SHAPE GROUPS.

Carinated bowls (rim types 111, 112)

Percentage of all rims (levels 6-3):

111	33.8%
112	1.1%
Total:	34.9%

Function-related properties

Fabric and inclusions

The greater majority of the carinated bowls (97.4%) is made of the normal ware with fine organic inclusions (ware group Y, including wares H, I, J, G). The use of a clay with organic inclusions is most probably not related to the function of the bowls, but rather to the shaping technique. Fine wares without organic inclusions were only used for a few small and middle-sized type 111 bowls (0.5%).

Shaping methods

Carinated bowls were thrown from the cone. The larger sizes may also have been thrown from a single piece of clay. The result of these quick shaping techniques is a generally rather carelessly shaped vessel, including especially base cracks and a slanting shape (see below). Approximately 27% of all completely preserved carinated bowls have base cracks, often running through the vessel wall and making the bowl unsuitable for liquids. In some cases (approximately 9% of all carinated bowls with base cracks) these cracks were “repaired” by the potter after firing, by smearing the crack with a gypsum/lime paste or, more rarely, with bitumen. This suggests that the users of the bowls sometimes did care about the presence or absence of base cracks in their bowls. About 1% of all carinated bowls has other cracks as well, mainly in the rim or in the vessel wall parallel to the throwing ridges. These tension cracks most probably originated during the drying or firing stage, and are due to the leanness of the clay combined with the shaping methods.

Shape

These bowls have an open shape in which the contents are very easily accessible. The rim diameter is also the maximum vessel diameter. The smaller bowls are slightly deeper than the larger, flatter bowls. The ratio between vessel height and rim diameter is

Small size:	mean ratio 0.41 (between 0.27 and 0.60)
Middle size:	mean ratio 0.35 (between 0.23 and 0.52)
Large size:	mean ratio 0.33 (between 0.14 and 0.44)
All bowls:	mean ratio 0.37 (between 0.14 and 0.60)

All vessels are very easily transportable, but transport is practical only for very short distances. All vessels can stand without support. However, many are very slanted due to the cutting from the hump in the throwing process. This will sometimes lead to the vessel tipping over or, in extreme cases, to the contents spilling out, especially in the case of liquids. Other bowls are oval in shape, also due to the shaping process. These features are usually seen as characteristic of the Middle Assyrian carinated bowls and around 19% of these bowls was noted to be slanted, oval or otherwise deformed during shaping. Apparently, this was not deemed disadvantageous for the intended function of the bowl. Bowls with a ring base (13% of all carinated bowls; a ring base is in itself already more stable than a flat base) are less often deformed than bowls with a flat base cut from the cone without further treatment. Apparently, in applying the ring base and perhaps scraping the base, care was taken to correct any deformities.

It has been suggested (Pfälzner 1995: 246, abb. 144) that the carinated rim was meant to facilitate the stacking of these bowls in mass quantities. However, the slanting shape makes the stacking of many bowls difficult because the stack starts to lean over to one side and becomes unstable (fig. VI.15). When stacked the bowls tend to rest mostly on their bases and not on the carinated part of the rim (as suggested by Pfälzner),

which also makes the stack rather unstable. If there are any functional aspects to the carinated rim shape they may be related to a better grip on the bowl by the user.

Size

Carinated bowls were shown to exist in three size groups according to the rim diameter (Appendix B, fig. B.1, B.2):

Small (appr. 20%):	111a: rim diameter < 115 mm, mean rim diameter = 91 mm (CV = 10.9%).
Middle (appr. 26%):	111b: rim diameter \geq 115 mm and < 175 mm, mean rim diam. = 143 mm (CV = 11.0%).
	112a: rim diameter < 170 mm, mean rim diameter = 137 mm (CV = 10.6%).
Large (appr. 54%):	111c: rim diameter \geq 175 mm, mean rim diameter = 216 mm (CV = 12.4%).
	112b: rim diameter \geq 170 mm, mean rim diameter = 206 mm (CV = 11.6%).

Each larger size group is about 1.5 times larger than the group immediately below.

Capacity

The capacity was measured for 64 carinated bowls of all size groups. Capacity in litres (measured to the rim) is:

Small	mean capacity 0.09 (between 0.03 and 0.14; CV = 24.1 %)
Middle	mean capacity 0.31 (between 0.13 and 0.60; CV = 39.1 %)
Large	mean capacity 1.05 (between 0.55 and 1.60; CV = 27.3 %)
All bowls	mean capacity 0.33 (between 0.03 and 1.60; CV = 119 %)

Each larger size group has a capacity approximately three times larger than the capacity of vessels in the group below. The capacities could very roughly coincide with the Assyrian measures of 1/10, 1/3 and 1 *qû*. It is clear that the Coefficient of Variation (CV) for capacity in each size group is much larger than the CV for the rim diameter. This may suggest that the potter was not interested in the exact capacity of a carinated bowl, and that he did not aim to make vessels with a standard or fixed capacity. In addition, it is highly unlikely that carinated bowls were meant to function as ration bowls (cf. Pfälzner 1995: 243), since the variation of their capacity even within one size group is much too large and rations of 1 *qû* and smaller are very small portions.²⁴²

Surface treatment

Carinated bowls have untreated surfaces only smoothed by the wet hands of the potter during shaping. Often the wet fingerprints of the potter are still visible on the outside surface. Burnishing and the application of a slip are very rare (0.2% and 0.1% respectively). Burnished or slipped bowls may have had a more representative character than the normal, untreated bowls.

Decoration

Decoration is extremely rare among carinated bowls. Very rarely, painted or incised lines occur (only 0.1%). So it seems that stylistic, decorative or display functions were not among the purposes of the carinated bowls.

²⁴² Furthermore, it may be doubted whether rations were distributed per person on a daily basis to the hundreds of dependents at the site, or even only to the staff at the dunnu. This would involve an enormous crowd gathering daily at the offices to receive a small ration. It would be much more efficient when an individual or the head of a group of people (family?) would receive the rations for a set period of time (weekly, monthly?). Indeed, in the early 1990s Syrian family heads would collect the flour and sugar distributed to them by the government for the whole family on a monthly basis, although the amounts were calculated per person/child per day (personal observation). Although the Assyrian texts list the rations per day per person, they do not provide any clues as to how the distribution actually took place (F.A.M. Wiggermann, personal communication).

Special features

Eight carinated bowls (0.8%) have one or two holes made on purpose in the base. Half of them were made when the clay was still plastic, before firing, and therefore were related to the intended function of the vessel. They are exclusively present in the smallest carinated bowls (type 111a) and measure about 5 mm in diameter. The other half was drilled or cut into the base after firing, and may be related to a secondary use. The diameter of these holes is between 10 and 27 mm. They are also found in larger bowls. The holes are positioned off-centre in the base, and once in the lower vessel wall. It is clear that carinated bowls with base holes made before firing were not meant to contain liquids. Perhaps they were meant as lids for other vessels, with the holes providing some air circulation, or as a kind of strainers.

Potters' marks and signs

Four carinated bowls show potters' marks, one of which has cuneiform signs written on the upper vessel wall (fig. IV.43.j), and a second is impressed with a stamp seal (P01-122, fig. E.4). The others show an incised cross and incised lines (fig. IV.99.al, see also Chapter V and Appendix E). The bowl inscribed with cuneiform signs may have been meant for a specific purpose. The inscribed word could have been a personal name (see Appendix F).

Use-related properties*Burning traces*

A total of 255 carinated bowls (6.7% of all carinated bowls) shows traces of burning, either related to the use of the vessel or to depositional or post-depositional circumstances. Burning traces are present mostly on small bowls (53% of all bowls with burning traces), and much less on large bowls. Many of the burning traces, especially on the smaller bowls, are situated on or at the rim of the bowl. This could suggest that small bowls were used in an activity that left burning traces on the rim, for example in the use of the bowl as an oil lamp. Indeed, small bowl P92-21 was stuck inside another lamp-shaped bowl and used as a lamp (fig. VI.16). The presence of a base hole in some of these bowls, however, suggests that not all small bowls with burning traces could have been lamps. The majority of the burning traces (53.3%) are located on the inside of the bowls.

	On the rim	Elsewhere
Small bowls	51.1%	48.9%
Middle bowls	31.6%	68.4%
Large bowls	4.1%	95.9%

Table G.1: The location of burning traces on carinated bowls

Remains of contents

A few bowls contained the charred seeds of grains, and once a carinated bowl was found with charred garlic inside (in an area probably used by the baker). Bowl P97-91 (fig. IV.40.j) has a thicker crust of carbonized material on the inside. Middle-sized and large bowls were sometimes used for the preparation of a gypsum/lime paste, most probably used in the repair of other vessels in the workshop of the potter (fig. IV.40.m, n, fig. IV.42.n, q, fig. IV.43.g, i, fig. IV.114.aa, fig. VI.5). Similarly, some bowls were used for the preparation or use of bitumen, which left a black and shiny layer on the inside of the bowl and sometimes dripped over the rim to the outside surface (fig. IV.38.l, IV.99.ak). Two bowls have an unidentified grey-white concretion sticking to the inside, two have a yellowish or orange crust stuck to the surface. One bowl was used for a dark-red kind of paint or colorant, which stuck to the inside surface (M12 4-12:1), while about a dozen bowls have reddish, bluish, greenish, orange or brownish discolourations and stains on the inside surface, possibly connected to their ancient contents.

Traces of use

The fragmentarily preserved bowl P97-208 and sherd K8 102-214:7 have a rim that was cut and severely abraded after firing. These sherds were probably used secondarily as some kind of scraping tool. Other middle-sized and larger carinated bowls show traces of abrasion as well, on the inside or outside surface. They may partly be connected to the use of the bowl for stirring or crushing the contents. About ten bowls

have inside or outside surfaces that are flaking off. This may be connected to their use or contents, but may also be related to post-depositional processes.

Remarkable archaeological context

Carinated bowls are found in large numbers in all contexts all over the settlement. Find contexts that are of special interest here include the find of small carinated bowls used as lids on large or middle-sized jars, mostly in burials (see Chapter VI). Also in burials, carinated bowls are the exclusive ceramic burial gift, next to jewellery and other personal objects. Other bowls were found inside a large jar that was part of some kind of installation of an as yet undefined nature (P93-219, P03-317 (fig. IV.15.a)), or were discarded in the fill of pottery kilns (kiln H, kiln K).

Suggestions for function and use

- Multi-purpose bowls with a variety of different functions and uses, available in 3 non-standardized size groups.
- Serving / consumption of food (display is a minor aspect); not always suitable for liquids.
- Short-term dry storage during food-preparation or other domestic or craft activities.
- Processing of small quantities of food or other materials (gypsum, bitumen, etc.).
- Lids for jars.
- With base holes: strainers?
- Lamps.
- Burial gifts.
- Ritual?
- Secondary use of sherds as scraping tools?

Carinated bowls with a long vessel wall above the carination (type 113)

Percentage of all rims (levels 6-3): 1.8%

Function-related properties

Fabric and inclusions

As with most other pottery, type 113 bowls are mostly (93.8%) made from a clay with fine organic inclusions (ware group Y, including wares G, H, I, J). For many sherds in ware group Y it was noted that the inclusions are very fine, while 4.8% of these bowls are made from a fine clay without any inclusions or with fine sand inclusions (ware group X). The use of organic inclusions is most probably more related to the raw materials and shaping methods than to the function of the vessel. However, a clay with finer inclusions seems to have been desirable more often than usual.

Shaping methods

Most likely, these bowls were thrown from one lump of clay. The initial shaping, secondary shaping and further surface treatment are generally more careful than for the carinated bowls type 111. Base cracks or other cracks caused during the drying or firing stage hardly occur (1.5%), suggesting that the potter took good care to press the air out of the base during shaping. Once, a crack in the vessel wall was “repaired” after firing with some gypsum/lime paste. All except one complete bowls have a carefully shaped ring base, lending more stability to the bowl. The application of a ring base is more labour-intensive than simply cutting the bowl off the wheel.

Shape

These bowls have an open shape in which the contents are easily accessible. The rim diameter is also the maximum vessel diameter. The mean ratio between vessel height and rim diameter is 0.37 (between 0.29 and 0.46). The bowls are markedly deeper than the larger carinated bowls type 111c. The bowls are easily

transportable, but transport is only practical over very short distances. Type 113 bowls are very stable, due to their relatively broad ring bases.

Size

No size groups can be made. The rim diameters vary between 110 and 370 mm, with a mean rim diameter of 253 mm.

Capacity

The capacity was measured (to the rim) for 13 completely preserved bowls.

Mean capacity in litres = 2.45 (between 1.60 and 4.77; CV = 36%).

The high Coefficient of Variation (CV) shows that a standardized capacity was not aimed for.

Surface treatment

A large proportion (21%) of the bowls have a surface that is carefully burnished, most probably by hand (without using the fast rotation of the wheel). Both in and outside surfaces were burnished or, more rarely, only the inside surface. Bowls that were not burnished generally have a more carefully smoothed surface than usual, giving the bowls a pleasantly soft “touch”. Burnishing makes the surface more watertight, and has aesthetic qualities as well.

Decoration

These bowls are relatively often decorated, either with incised horizontal lines under the rim or at the carination (6.3%), or with carefully impressed and incised circles and triangles inlaid with a white paste (9.2%). Bowls with incised lines were mostly buff, orange or reddish in colour. While the horizontal incised lines were probably quickly applied on the wheel, the execution of the white-filled impressed decoration must have required quite some time, effort and skill. This white decoration, applied almost exclusively on bowls with dark (brown, black, grey) colours, has a great effect on the viewer (especially in the absence of decoration on pottery in general). The display of these bowls must have been one of the primary functions.

Firing

The rather low firing temperatures and the mostly incompletely oxidizing or reducing atmospheres in which these bowls were fired had a profound effect on the surface colours. Although orange, red and buff vessels do occur, many have dark colours and it seems that darker colours were aimed for. Perhaps this was done for aesthetic reasons.

Use-related properties

Burning traces

Traces of burning are very rare on these bowls (3.9%) and occur on both inside and outside surfaces. They are most probably related to depositional processes.

Traces of use

Three (1.4%) unburnished, undecorated bowls have abraded outer surfaces, mostly near the base. This is most probably due to (secondary?) use of the bowl, but it is not clear what caused the surface damage.

Suggestions for function and use

While one thin-section sample (no. 16, Appendix D) suggests that these bowls were produced locally, the careful shaping methods, surface treatment and decoration indicates that these bowls were not part of the bulk production of the *dunnu*. Possibly they belong to a different production tradition?

- Serving and presentation; visibility and decoration are important.
- Short-term dry storage?
- (secondary?) use in an activity that damages the outer base surface.

Small and large straight-sided bowls (types 131, 132, 143)

Percentage of all rims (levels 6-3):

131	7.1%
132	2.1%
143	1.4%
Total:	10.6%

Function-related properties*Fabric and inclusions*

Almost all of these bowls were made of a clay with organic inclusions (ware group Y, 99.7%). The very rare exceptions were made of a clay with organic and coarser sand inclusions, as well as of a fine ware without any organic inclusions. The use of organic inclusions is most probably more related to the properties of the raw materials and to the shaping methods than to the function of the vessel.

Shaping methods

Although smaller bowls may have been thrown from the cone, the middle and larger sizes were most probably thrown from one piece of clay. The quick shaping techniques, as well as the properties of the raw materials, led to the forming of base cracks during the drying or firing stage in approximately 20% of all cases. Other cracks in the rim or vessel wall occurred in about one out of ten bowls. Almost half of these cracks were “repaired” by the potter with a gypsum/lime paste. The existence of cracks was therefore probably not much appreciated by the users. Occasionally the potter tried to re-shape a damaged rim before the clay was dry. The addition of ring bases, and the scraping of the base, were secondary steps in the shaping process. However, ring bases were often added rather carelessly.

Shape

These bowls have an open shape, and the contents are easily accessible. The rim diameter is also the maximum vessel diameter. The mean ratio between vessel height and rim diameter is 0.34 (between 0.21 and 0.50). They are easily transportable, but transport is only practical over short distances.

The bowls can stand without a support, and most are stable. Slanting shapes due to oblique cutting from the wheel occur only rarely. Two-thirds of these bowls have a ring base, providing for extra stability. The rims that are bent over outwards (types 131, 143) provide a good grip for lifting or tilting the bowl, especially when hands are slippery. Rims that are thickened on the inside (types 132, 143) provide a practical inner edge that prevents the contents from spilling (for example when moving the bowl). It also prevents the contents from being pushed out easily (for example when scooping up morsels of food with bread or a spoon).

Size

This group of deep bowls with straight walls cannot be divided into different size classes on the basis of their rim diameters or vessel heights. A tentative grouping in smaller and larger bowls was tried only for type 132 (Appendix B). Generally, type 132 bowls are smaller than type 143 bowls, while type 131 encompasses the whole range of diameters.

Type 131	mean rim diameter = 300 mm, (between 140 and 560 mm; CV = 20.0%).
Type 132a	rim diameter < 250 mm, mean rim diameter is 206 mm.
Type 132b	rim diameter ≥ 250 mm, mean rim diameter is 308 mm.
Type 143	mean rim diameter = 327 mm (between 150 and 450 mm; CV = 20.4%).
Whole group:	mean rim diameter 295 mm (between 100 and 560; CV = 22.2%).

Capacity

The capacity was calculated for 32 complete bowls of all sizes. The mean capacity for all bowls is 3.46 litres (between 0.49 and 10.76 litres, CV= 89%). Tentatively, three capacity groups can be discerned that loosely relate to the total vessel height:

Small	capacity < 2 litres, vessel height < 90 mm. Mean capacity = 0.99 litre (between 0.49 and 1.94 litres; CV = 40%)
Middle	capacity > 2 litres and < 6 litres, vessel height > 90 mm and < 160 mm. Mean capacity = 3.82 litres (between 2.50 and 4.87 litres; CV = 21%)
Large	capacity > 6 litres, vessel height > 160 mm. Mean capacity = 8.97 litres (between 6.10 and 10.76 litres; CV = 19%).

The mean values for capacity seem to suggest that these groups would represent bowls of roughly 1, 5 and 10 *qû* in size. The CV values, however, are high and it is not likely that precise capacities were aimed for.

Decoration

Two large bowls were covered in a green glaze. This decoration is unique at Sabi Abyad and for the period in general, and the thin-section analysis of one of them shows that glazed pottery was most probably imported (sample no. 23, Appendix D). These very special bowls indicate that presentation, display or serving may have been among the functions of large deep bowls.

Use-related properties

Burning traces

About 4% of all deep straight-sided bowls show traces of burning, mostly inside or both in and outside, and hardly ever on the outside only. The records do not say anything about a preferred location of the burning traces on the vessel. Most probably, these burning traces are largely due to depositional processes.

Remains of contents

Hardly any visible traces of the original contents were reported. Two vessels seem to have contained bitumen, or were used in the preparation of bitumen, and are completely covered with tar on the inside and partly also on the outside (cf. fig. IV.49.c). Some bowls have orange-reddish stains inside, perhaps remains of contents. A greenish-grey crust occurs sometimes.

Traces of use

About 10% of all bowls has a severely abraded or damaged inside (or rarely outside) surface. Once, a larger damaged part was repaired with a gypsum/lime layer. It seems that some of these bowls were used for activities that damaged the surface, perhaps using stone or metal tools to stir, grind or mix.

Remarkable archaeological context

These bowls generally occur all over the settlement. Only in one case did the pottery database make a remark about the find context. This type 131 bowl (fig. IV.48.q) was used as a lid, upside down covering the rim of a large jar that was placed deliberately inside a deep pit and supported with mud bricks.

Suggestions for function/use

The large size range and capacity range suggests that these bowls may have had multiple functions. Possibly, three size groups are present but precise capacities were not aimed for. Display seems to have been a minor aspect.

- Serving and consumption of food.
- Short-term dry storage.
- Processing of food or other materials (e.g. bitumen, washing?), sometimes with hard tools.
- Lid or cover.

Deep bowls and straight-sided pots (types 141, 142, 221a, 222)

Percentage of all rims (levels 6-3):

141	2.3%
142	1.0%
221a	2.4%
222	2.2%
Total:	7.9%

This group includes deep bowls and open pots with almost vertical walls, all with hammer-shaped rims. Although a distinction was made in the type numbering between bowl and pot on the basis of the direction of the wall and proportion of vessel height and rim diameter, this distinction seems less useful from a functional perspective. The bowls and pots of very large size will be discussed separately below.

Function-related properties*Fabric and inclusions*

Vessels of this type were made exclusively of a clay with organic inclusions (ware group Y). This is mostly related to the used raw materials and shaping methods. A porous fabric suitable for the cooling of liquids may have been one of the additional advantages.

Shaping methods

Most of these deep vessels were thrown from a single piece of clay. In some cases, an extra layer of clay with many organic inclusions was added at the inside of the base, to obtain a more even base thickness and prevent base cracking. After the vessel and rim had been shaped, and after a short drying period, the vessel was placed upside down on the wheel and the base was scraped. Then a ring base was attached. The extra treatment of the base (turning and application of a ring base) has prevented the occurrence of base cracks: no base cracks are reported for these shapes, and they are therefore very well suited to contain both dry and liquid materials. Cracks in rims and walls, most probably caused during drying or firing, are present in 1% of all fragments. All these cracks were “repaired” by the potter with a gypsum/lime paste; it is likely that cracks in the vessel wall were not appreciated by the users.

Shape

These vessels are deep open shapes in which the contents are easily accessible and easily retained. The rim diameter is also the maximum vessel diameter. The vessel height is smaller (in the case of bowls) or just as large as the maximum vessel diameter. The ratio between vessel height and rim diameter is:

Small	mean ratio = 0.88 (between 0.70 and 1.08; CV = 13%)
Large	mean ratio = 0.84 (between 0.39 and 1.01; CV = 14.5%)
All	mean ratio = 0.85 (between 0.39 and 1.08; CV = 14.4%)

All vessels can stand without support, and are fairly stable due to the generally low point of gravity. Only 2.7% of all complete vessels were reported to be slightly slanting, due to the fact that the vessel was cut obliquely off the wheel or due to the application of an off-centred ring base. Some vessels show slightly oval rims (0.9%), which came about by pressing the walls too much when the clay was still plastic (when lifting the vessel from the wheel or when turning it over to prepare the base; a few show thumb impressions about 10 cm below the rim). All except one of these vessels have ring bases lending them extra stability. Rims have a clearly defined hammer shape, providing a good grip when carrying or lifting the vessel, and providing an edge that can be used when tying a cover over the opening with rope. The vessels can be transported, but over long distances the large opening would be impractical.

Size

Although size groups could hardly be established on the basis of rim diameter per rim type (Appendix B), two groups become apparent when we put all four types in one functional group and look at the relation between rim diameter and vessel height (cf. also fig. B.20).

Small	rim diameter < 280 mm; vessel height < 240 mm (including rim types 141, 142 and 222). Mean rim diameter = 228 mm (between 90 and 270 mm; CV = 15%)
Large	rim diameter > 280 mm; vessel height > 240 mm (including rim types 142, 221 and 222). Mean rim diameter = 338 mm (between 290 and 500 mm; CV = 11%)

The rims of the large vessels are roughly about 1.5 times wider than the small ones.

Capacity

Capacity in litres was calculated for 8 small and 11 large vessels. Measured to the rim, the capacity is:

Small	mean capacity = 2.84 litres (between 1.10 and 4.58 litres; CV = 51%).
Large	mean capacity = 12.5 litres (between 9.94 and 18.10 litres; CV = 20%).

It seems as though these capacities may be roughly related to measures of 3 and 15 *qû*, but the large CV indicates that a precise capacity measurement was probably not aimed for.

Surface treatment

The surface of these vessels was smoothed during the shaping on the wheel, and not treated further.

Decoration

A small portion (3.4%) of all vessels is decorated with simple incised lines on the upper vessel wall under the rim. One or two horizontal lines, wavy lines and combinations of horizontal and wavy lines all occur. Rarely, the incision is placed on top of the rim. Visibility may have been a minor aspect of the function of these vessels.

Potters' marks and signs

On one deep pot (type 222, fig. IV.70.o), two crossing lines were incised before firing just under the rim of the pot. For a more detailed discussion of potters' marks, see Chapter V and Appendix E.

Use-related properties

Burning traces

Traces of burning were recorded on 3.3% of all fragments in this group, on both the inside and the outside surface of the sherds but not in a specific location on the vessel. They are most probably related to depositional processes rather than to the use of the vessel.

Remains of contents

Only very few vessels show any visible traces of possible contents, including black, brown, orange/red and greenish discolourations or stains on the inside surface. One vessel has a thick bitumen crust on the inside, possibly to improve impermeability. Other artefacts found inside these vessels include a small carinated bowl and a basalt stone (in fig. IV.27.c); a seal, a polished stone and many shell fragments (in fig. IV.27.d); and a lot of colourful stones (fig. IV.32.a).

Traces of use

One large vessel (P92-81) has a hole (18 mm diameter), drilled in the centre of the base after the vessel had been fired. Apparently the user was in need of a vessel with a hole in the base. None of the other vessels of this type has holes in the base. In six mostly large vessels, the inside surface was noted to be severely abraded. This may have been caused by the repeated use of a hard tool, in stirring, mixing, and so on.

Suggestions for function and use

The possible existence of two capacity groups (small and large) may be related to function and use. They are generally deep, stable, multifunctional vessels.

- Short-term dry and liquid storage.

- Long-term dry and liquid storage.
- Short-distance transport (of water)?
- Processing of food or other materials, sometimes with hard tools.

Closed cooking pots (types 211, 212, made of cooking wares)

Percentage of all rims (levels 6-3):

211	0.03%
212	0.34%
Total	0.37%

Function-related properties

Fabric and inclusions

These pots are all made of coarse wares. The coarse non-plastic inclusions are mostly (82%) coarse calcite, coarse sand (or crushed basalt) or a combination of these (thin-section analyses in Appendix D showed that a distinction between these inclusions was largely impossible in the field). About 18% also had some organic inclusions, although not many. Coarse inclusions are thought to improve the thermal-shock resistance of a cooking pot (see Chapter VI for a more elaborate discussion). Thin-section analysis of two of the Middle Assyrian sherds and several sherds from level 7 have indicated that some clays used for cooking pots could have been found regionally while other pots must have come from further away. P93-308 (fig. IV.62.a) was tempered with steatite and came from the Ugarit region (Appendix D). One rim fragment (fig. IV.25.g), identified as a cooking pot on the basis of vessel shape, surface treatment and firing temperature, was made of a clay with finer sand inclusions. Perhaps this was a local imitation of imported cooking pots. A completely preserved handmade pot with thick vessel walls and with a lot of organic inclusions may have functioned as a cooking pot as well (fig. IV.61.k).

Shaping methods

Cooking pots were most probably all shaped by hand, by coiling or slab building and/or with the help of a mould (in the case of P93-308, a mould was certainly used for the shaping of the base part). The shaping method resulted in a very even and rather thin wall thickness, and a very regular globular shape. Thin walls conduct the heat better than thick walls do (see Chapter VI).

Shape

Only one pot has been preserved well enough to allow for a reconstruction of the complete shape including the base (P93-308). This severely limits our data on shape and especially size and capacity. Most pots seem to have had a roughly globular slightly closed shape. The contents are easily accessible but the incurving rim prevents spilling when contents are stirred or when they are boiling. No flat or ring base fragments in cooking ware have been found, suggesting that these pots had rounded bases that were not always recognized as such among the body sherds. The rims are rolled over and provide a thin ledge for better grip when moving the pot. Handles are either completely absent, or are small rounded lug handles with elaborate appliqué decorations (only 2 examples, fig. IV.62.a-b). Since only one complete example was found, the ratio between vessel height and maximum diameter is not known. The maximum diameter is below the rim but in the upper half of the vessel.

Size

Rim diameters vary widely between 170 and 430 mm. The mean rim diameter is 260 mm (CV = 28%). Size groups could not be distinguished.

Capacity

The capacity of P93-308, by far the largest cooking pot found at the site, is 43.56 litres (measured to the narrowest point at the rim). This roughly corresponds with a capacity of 50 *qu*. If we indeed reconstruct the general vessel shape of other fragments as a globular pot, we can calculate a rough estimate for the capacity of these pots. For pot I11 27-61:6 (sample J730 in Appendix D, fig. IV.62.i), with a rim diameter of 210 mm and a reconstructed vessel height of 223 mm, this reconstructed capacity is 8.27 litres. For pot K13 4-5:12 (fig. IV.62.j), with a rim diameter of 240 mm and a reconstructed vessel height of 305 mm, the reconstructed capacity is 18 litres.

Surface treatment

Only three out of 28 cooking-pot rim fragments (10.7%) were burnished carefully on both the in and the outside. Burnishing of cooking pots, especially of the outside surface, is said to reduce the permeability of the vessel wall. The remaining pots were carefully smoothed. It is not known nor has it been analysed whether these pots were treated with some kind of organic resin or coating to reduce permeability.

Decoration

One pot has an incised line just under the rim. The appliqués at the handles of two pots are probably largely decorative as well. Nevertheless, display does not seem to have been among the primary functions of these pots.

Firing

All cooking pots have been fired at rather low temperatures. Partly this is due to the kind of non-plastic inclusions used: when calcite is heated to too high a temperature (above approximately 700 °C), the pot will disintegrate. In other pots not tempered with calcite, for which a low firing temperature is technically not necessary, the low firing temperature may be related to a general tradition or idea about the desired colour and look of a cooking pot. Low firing temperatures yield dark, brownish surface colours.

Use-related properties*Burning traces*

A relatively very high proportion of 26.8% of all fragments shows traces of burning. Mostly these traces were found on the outside surface or, less often, on both the in and the outside surface of the (rim) sherd. The high proportion of sherds with burning traces supports the identification of these vessels as cooking pots used over or in a fire.

Remains of contents

No information about any residues or contents is available. This is probably mainly due to the fact that most are rather small rim fragments.

Traces of use

For several pots it was recorded that the inside surface was very damaged. Perhaps this was caused by stirring with a hard tool? The outer base surface of P93-308 is also abraded by use; this probably was the part that would be standing in the fire. The cooking pots studied in thin section (see Appendix D) show that tiny cracks between the larger inclusions in the clay, resulting from repeated heating and cooling, can make a cooking pot unusable or cause it to break (see also Chapter VI).

Remarkable archaeological context

P93-308 was found in the fill of a small hearth or oven (Y) in square K9, which supports its identification as a cooking pot. The room contained more of these ovens, as well as other vessels with a special shape, including “pilgrim flasks” and bowls with a spout and handles, and was tentatively identified as the staff kitchen (Akkermans and Wiggermann in press).

Suggestions for function and use

The shaping techniques and raw materials used suggest multiple regional and supra-regional origins for these pots. Either they were imported because of their superb qualities as a cooking pot (or perhaps for their

contents?), or they could have been brought to the site by immigrants from different places as part of their household equipment (deportees? local women married to Assyrian staff?).

- Cooking liquid or semi-liquid food.
- Processing of liquid or semi-liquid materials over a fire (e.g. in perfume preparation)?

Closed pots (not cooking pots, type 211a, 212a)

Percentage of all rims (levels 6-3):

211a 0.17%

212a 0.53%

Total: 0.7%

A rather diverse group of pots with a closed shape.

Function-related properties

Fabric and inclusions

The greater majority (98%) of all pots was made of a clay with fine organic inclusions (ware group Y), just like the bulk of the pottery at the site. This is most probably related to the raw materials and shaping techniques that were used. A more porous fabric suitable for cooling liquids may have been one of the additional advantages. Only one vessel (P93-446, fig. IV.63.c) was made of a fine ware with many fine-sand inclusions (ware C). The fabric as well as the shape suggest that this vessel was not made at Sabi Abyad itself.

Shaping methods

Most have been thrown from a single piece of clay, although handmade shapes (built in coils) are also present in this collection. It seems that generally these pots were rather carefully made. When bases are preserved, it is clear that the bases were turned or scraped and that ring bases were carefully attached. Appliqué decorations are rather special and perhaps not part of the local production tradition.

Shape

Closed or slightly closed shapes, mostly with a roughly globular vessel shape, sometimes a bit more squat. The contents are easily accessible and easily retained inside. Vessels that have their bases preserved are stable. The ratio between vessel height and rim diameter could only be calculated for 6 vessels. The mean ratio is 1.06 (between 0.87 and 1.33; CV = 15%), illustrating the globular shape. The maximum vessel diameter is below the rim but mostly in the upper half of the vessel. The mean ratio between vessel height and maximum vessel diameter is 0.87 (between 0.59 and 1.03; CV = 17%).

The vessels that are preserved completely can stand easily without support and are rather stable. If bases are preserved, they are always ring bases (and once a rounded base, on a handmade pot, fig. IV.61.k). The incurving rims prevent spilling of the contents. The rims are thickened on the outside or clearly bent outwards, providing a practical ledge to increase the grip when carrying the pot. In addition, the rim shape may have made it easier to tie a cover over the opening with rope. The pots are transportable, but the relatively large vessel opening make transport over large distances impractical.

Size

It was not possible to discern size groups based on the rim diameter or other measurements. Rim diameters vary widely. The mean rim diameter is 216 mm (between 120 and 350 mm; CV = 21%). The mean maximum vessel diameter is 314 mm (between 245 and 397 mm; CV = 20%).

Capacity

The capacity could only be calculated for 5 vessels, and varies widely. The mean capacity is 9.7 litres (between 5.14 and 14.2 litres, CV = 35%). It seems that a certain capacity was not a primary focus of the potter when shaping these vessels.

Surface treatment

All but one vessel were just smoothed and surfaces were not treated further. One vessel was carefully burnished on the in and the outside surface. The shape and colour (brownish) of this vessel (fig. IV.25.g) reminds us a lot of the cooking pots, and perhaps it was tried to imitate a cooking pot in local materials (without coarse mineral inclusions, cf. also Daszkiewicz et al. 2006 for this phenomenon at Iron Age Tell Sheikh Hamad).

Decoration

A relatively high proportion of 28.6% of these pots is decorated in some way. In most cases the decoration consists of simple horizontal or wavy incised lines or a combination of these, or a combination of incised lines with an appliqué rope imitation. Applied decorations include rope imitations with finger impressions, vertical lugs at the rim (see below) and a spectacular applied naturalistic scene with several animals (fig. IV.64.b). Visibility and display were certainly among the functions of several of these pots.

Special features

Three examples of a globular pot with inward-sloping rim and rather thick vessel walls have vertical lugs attached to the rim and shoulder of the vessel. There are 4 to 8 lugs on a vessel. It seems that these lugs are partly decorative and partly functional. The lugs do not seem to fit in the Sabi Abyad tradition; perhaps these pots came from elsewhere. Two other vessels have handles attached to the rim and upper body of the vessel, one handle on each side. Next to the handles is a small “ear-shaped” lobe attached to each side. These vessels are deep pots with a decorative band on the outside between the handles. They seem foreign to the Sabi Abyad tradition as well, which is also clear from the comparisons found at sites along the Euphrates (see Chapter IV). One special vessel has a spout plugged with a gypsum plug. It probably also had at least one handle. This vessel is reminiscent of a similar shape at Hadidi on the Euphrates (see Chapter IV).

The handles may have facilitated lifting and tilting or pouring out of the contents. They may also partly have been decorative. The spout would definitely assist in the pouring out of liquids. The fact that the wide spout was later plugged with a pierced gypsum plug would indicate that the pouring from this vessel had to be slow, or that any coarser particles floating on the liquid were not meant to be poured out as well. The spouted vessel may have had similar functions as the spouted bowls with handles discussed below.

Use-related properties*Burning traces*

Only one vessel showed burning traces on the outside surface (fig. IV.61.e, one of the vessels with vertical lug handles), perhaps related to the use of the vessel over a fire.

Remains of contents

Very few remarks were made about the presence of any visible residues or contents. These remarks referred to a vessel with dirty green-brown crusts and stains, a vessel with a yellowish colour on the inside, and a vessel with a blue-grey crust on the inside (fig. IV.61.g, one of the vessels with vertical lugs).

Traces of use

For one vessel (K12 18-29:19) it was remarked that the inside surface had been abraded, possibly through the use of a hard tool in stirring or mixing the contents.

Suggestions for function and use

This is a rather heterogeneous group of vessels, suggesting that multiple functions and uses may be thought of. Visibility and display seem to be relatively important. A relatively large number of vessels was possibly imported from elsewhere (also contributing to the heterogeneity of the group).

- Short-term dry and liquid storage.
- Handling of liquids.
- Long-term dry and liquid storage.
- Processing of foods or other materials, sometimes with hard tools?
- Imitation cooking pots?

Small jars (type 311)

Simple jars in three size classes.

Percentage of all rims (levels 6-3): 5.6%

Function-related properties

Fabric and inclusions

The greater majority (98%) of all jars is made of a clay with fine organic inclusions (ware group Y). This is most probably related to the raw materials and shaping techniques used. A more porous fabric suitable for cooling liquids may have been one of the additional advantages. For a few vessels only, a sandy fabric without any organic inclusions was reported.

Shaping methods

Very small vessels were possibly thrown from the cone, while the small and large jars would have been thrown from one lump of clay. Some vessels show dents in the wall or slightly oval rims, caused by the pressing of the shape while it was still soft (when taking it off the wheel?). After shaping, the jars were simply string-cut off the wheel. Or the base was scraped at a later stage and the shape of the base reworked into a disc shaped flat base or into a pedestal base, or a ring base was added. A rather high percentage of completely preserved jars shows cracks in the base (12%). They seem to be present mostly in the very small jars, which supports the idea that they may have been thrown from the cone (this technique often results in base cracks). The cracks are never repaired. In two bases of larger jars, an extra layer of clay with many organic inclusions was added on the inside of the base, to prevent drying cracks. Other cracks in the vessel wall also occur occasionally, and some are repaired with a bitumen paste. This suggests that some care was taken to prevent cracks in small and larger jars and repair them with watertight material if they did occur.

Shape

The jars have a closed shape in which the contents are not very easily accessible unless by pouring or drinking. A closed fist does not fit into the openings of very small and small jars, and retrieving the contents with the hands or with a scoop would have been impossible in smaller jars and awkward in all. The vessel shape is oval or more globular, with the maximum vessel diameter usually at the middle or at the lower half of the vessel. Larger jars are more slender, and the maximum vessel diameter is a bit higher up. The rims are simple and rounded and always a bit bent outwards, facilitating the pouring of liquids or the drinking from the rim. A cover could be tied over the rim and fastened with a rope, but no special ledge was provided for this. The jars are transportable. The ratios between vessel height and rim diameter, and between vessel height and maximum vessel diameter are:

Very small	Mean ratio (height/rim diameter) = 2.03 (between 1.56 and 2.60; CV = 16%). Mean ratio (height/vessel diameter) = 1.49 (between 1.12 and 1.49; CV = 10%).
Small	Mean ratio (height/rim diameter) = 2.14 (between 1.57 and 2.75; CV = 10%). Mean ratio (height/vessel diameter) = 1.43 (between 1.17 and 1.62; CV = 7%).
Large	Mean ratio (height/rim diameter) = 3.03 (between 2.0 and 3.91; CV = 17%). Mean ratio (height/vessel diameter) = 1.60 (between 1.33 and 2.02; CV = 17%).

Very small jars mainly have ring bases (63.6%) or flat bases (18.2%). Small jars, on the contrary, have mainly pedestal bases (41.9%) or flat bases (44.2%), while only a few have ring bases (11.6%). Larger jars mainly have ring bases (86.7%) or flat bases (13.3%); pedestal bases do not occur in this group. Very small vessels and large vessels are rather stable and can stand without support. The small vessels are less stable, with their relatively small base diameters compared to the vessel height. This is especially true for jars from level 4 when they have predominantly narrow pedestal bases instead of flat bases (cf. Chapter IV). These jars are unstable without support and many of them cannot easily stand alone. However, ceramic pot stands for small jars are absent from the site (although they could have been made from a perishable material like wood; cf. also Chapter VI).

Size

Small jars can be divided into three size groups based on the vessel height and the maximum vessel diameter:

Very small	311x: vessel height < 160 mm, maximum vessel diameter < 120 mm. Mean vessel height is 122 mm (between 100 and 150 mm; CV = 12%). Mean maximum vessel diameter is 98 mm (between 87 and 111 mm; CV = 7.3%).
Small	311a: vessel height > 160 mm but < 250 mm, max. vessel diam. > 120 mm but < 180 mm. Mean vessel height is 193 mm (between 149 and 230 mm; CV = 8%). Mean maximum vessel diam. is 136 mm (between 125 and 153 mm; CV = 5.5%).
Large	311b: vessel height > 250 mm, maximum vessel diameter > 180 mm. Mean vessel height is 355 mm (between 270 and 460 mm; CV = 19%). Mean maximum vessel diameter is 221 mm (between 199 and 262 mm; CV = 9%).

Rim diameters overlap between groups:

Very small	311x: mean rim diameter is 59 mm (between 48 and 90 mm; CV = 19%)
Small	311a: mean rim diameter is 87 mm (between 67 and 110 mm; CV = 9%)
Large	311b: mean rim diameter is 125 mm (between 100 and 190 mm; CV = 9%)

The relatively small CV values indicate that the potter indeed meant to produce three size groups. The precise size was not very important, however. Each size group is roughly 1.5 times larger than the group below.

Capacity

Capacity in litres could be calculated for 40 vessels of all size groups. Capacities in litres (measured to the rim) are:

Very small	311x: mean capacity is 0.36 litre (between 0.20 and 0.71 litre; CV = 38%)
Small	311a: mean capacity is 1.26 litres (between 0.75 and 1.70 litres; CV = 18%)
Large	311b: mean capacity is 6.6 litres (between 4.55 and 9.37 litres; CV = 24%)

The capacity estimates are almost certainly too high, since the jars would not have been used while filled exactly to the rim. Small jars are roughly three times larger than very small jars, while large jars are roughly five times larger than small jars. The mean values could suggest that the groups would represent values of 0.5, 1.5 and 8 *qu*. However, the large CV values show that the potter probably did not aim at an exact capacity measure.

Surface treatment

The greater majority of all vessels was simply smoothed. Only two fragments show a slip on the outside of the vessel.

Decoration

Only 4.2 % of these jars show a simple decoration in the form of horizontally incised lines. The lines are placed on the neck at the transition to the rim, and only occur on the larger jars.

Potters' marks and signs

One jar (fig. IV.75.d) had five oval impressions on the rim, made while the jar was still wet. Another (fig. IV.108.d) had a crescent shape, painted with bitumen on the shoulder of the vessel. Cf. Appendix E and Chapter V for a discussion of the role of these marks or signs.

Use-related properties

Burning traces

Only about 3% of all jars showed traces of burning, mainly on both the in and the outside surface of the jar. Most probably these traces are related to depositional processes.

Remains of contents

Several vessels were completely covered in bitumen on the inside and partly also on the outside. Perhaps these jars were used to contain bitumen. Or perhaps the bitumen was applied to the surface of the jars to make them more watertight. One vessel had a gypsum/lime crust sticking to the inside. Another contained many small burnt bone fragments, charred seeds and charcoal (a sample of these has not yet been analysed). Charred seeds were found in small jars or amongst the fragments of small jars. Orange, buff-cream, brown and greenish stains occur on the surfaces of some jars, mainly on the outside. One jar contained a cremation burial.

Traces of use

A few jars had inside surfaces that were flaking or had eroded. In a few others the outside surface was flaking or abraded, mostly at the base. These damages may be due to the original use or contents (perhaps with a high acidity?), but could also be related to post-depositional processes. One jar showed vertical and horizontal traces of scraping at the inside surface.

Remarkable archaeological context

These jars were found all over the settlement and seem to form a normal part of the pottery inventory. A large jar (P93-134) was used in a cremation burial. One was found dumped in pottery kiln H, another in an ashy pit.

Suggestions for function and use

Jars meant for liquid, semi-liquid or dry (but pourable) contents, in roughly three size groups.

- Small jars: drinking jars (beer jars?).
- Short-term and long-term storage of liquid or pourable dry material.
- Large jars: cremation burials.

Medium-sized and large jars without necks (types 321, 322, 323)

Percentage of all rims (levels 6-3):

321	2.3%
322	10.2%
323	1.6%
Total:	14.1%

Function-related properties*Fabric and inclusions*

The greater majority of these jars (more than 99%) was made of a clay with fine organic inclusions (ware group Y). This is most probably related to the raw materials and shaping techniques used. However, a more porous fabric suitable for cooling liquids may have been one of the additional advantages of organic inclusions.

Shaping methods

These large jars were shaped in two parts that were later joined together. This method results in the regular ovoid shape and the rather low point of gravity. Bases were scraped and a ring base added after the top part had been added. It is very clear that the jar had to be centred a second time on the wheel for shaping the base: bases are often located out of centre compared to the rim, resulting in a slanting and instable vessel. Base cracks were avoided: only 3% of the complete jars have base cracks. Often it was clear that the potter had added a layer of clay with much organic material to the inside of the base, to cover the deep throwing ridges and to make the base thickness more even, to prevent base cracks. Base cracks mostly occurred when the turning of the base wall, on a not exactly centred vessel, resulted in irregular wall thicknesses. Cracks in the wall also occurred; in 2.5% of all fragments serious cracks in the rim and wall were noted. These were almost always repaired, with a gypsum/lime paste or with the more watertight bitumen. Repairs before firing, with some wet clay, were rare. Earlier gypsum/lime repairs that were unsuccessful were sometimes covered with a thick layer of bitumen in an attempt to keep the vessel for use. Apparently cracks were especially unwelcome, suggesting that the contents were often liquid.

Shape

These jars are tall closed shapes in which the contents are not easily accessible except by pouring. The rim diameters generally do allow contents to be reached or taken out by hand or with a scoop, but the depth of the vessel makes it sometimes difficult to reach the bottom. The vessel shape is a long-drawn oval, and the larger jars are generally a bit thicker than the medium-sized ones. The rims are rolled over and sit directly on the vessel shoulder. All rims provide a convenient ledge that is very well suited to tie a cover over the opening with rope.²⁴³ The maximum vessel diameter is mostly located in the middle of the vessel or a bit more to the top, providing a relatively low point of gravity. The greater majority of the jars have ring bases, but these are relatively narrow compared to the vessel diameter and height. Moreover, bases are often located off-centre or in a slightly slanted position with respect to the rim, suggesting they were not meant to support the vessel much. These vessels are not stable and can only rarely stand without support. Especially when full, the risk of tipping over is too big. This instability greatly facilitates the easy pouring out of the contents, and suggests that the vessels were designed for frequent pouring. However, with the help of a support (the wall, other vessels or pot stands; see below), the jars become much more stable and can easily be used for storage as well. In principle, the jars are transportable, and their slender shape facilitates lifting, pouring and carrying. However, when full, the weight of the vessel and contents of especially the larger jars must have been considerable.

²⁴³ That large jars were indeed sealed with a piece of cloth tied with rope, is proved by the reverse surfaces of several clay sealings found at Sabi Abyad. They will be published elsewhere (Duistermaat in prep.c). Large jars were also often closed with an unbaked clay stopper, of which many have been found at the site. The rims of the jars have left their impressions on the flat sides of these conical stoppers.

Medium	Mean ratio (height/rim diameter) = 3.47 (between 2.45 and 4.17; CV = 17 %). Mean ratio (height/vessel diameter) = 2.06 (between 1.35 and 2.36; CV = 18%).
Large	Mean ratio (height/rim diameter) = 3.96 (between 2.92 and 4.96; CV = 13%). Mean ratio (height/vessel diameter) = 1.88 (between 1.27 and 2.45; CV = 14%).

Size

Complete jars could be divided into two groups: medium-sized jars and large jars, on the basis of the vessel height. The relatively low CV values suggest that the potters indeed aimed at two general size groups. The rim diameters, however, are the same in both groups, so the majority of the jar fragments could not be classified in a size group.

Medium	vessel height < 500 mm, mean vessel height = 426 mm (between 368 and 474 mm; CV = 8%). Mean maximum vessel diameter is 211 mm (between 180 and 272 mm; CV = 15%). Mean rim diameter is 125 mm (between 108 and 150 mm; CV = 13%).
Large	vessel height > 500 mm, mean vessel height = 614 mm (between 525 and 680 mm; CV = 5.5%). Mean maximum vessel diameter is 333 mm (between 274 and 435 mm; CV = 13%). Mean rim diameter is 157 mm (between 129 and 190 mm; CV = 11%).
All jars	mean rim diameter is 145 mm (between 70 and 320 mm; CV = 13%).

Large jars are about 1.5 times higher than medium jars.

Capacity

The capacity in litres could be calculated for 23 large and 5 medium-sized jars (measured to the rim).

Medium	mean capacity is 7.16 litres (between 5.56 and 9.06 litres; CV = 18%).
Large	mean capacity is 29.53 litres (between 19.30 and 49.53 litres; CV = 31%).

The mean capacity values seem to suggest that perhaps the groups represent capacity measures of 10 and 35 *qu*. However, the CV values are relatively high and indicate that an exact capacity was most probably not one of the potters' aims.

Surface treatment

Virtually all (99.8%) vessels were simply smoothed during the shaping process. Very few vessels were noted to have a brownish slip; however, it is unclear whether this is a genuine slip.

Decoration

A very small percentage (3.2%) of all jars is decorated. Mostly the simple decoration consists of horizontal (or, more rarely, wavy) incised lines at the shoulder of the jar. Rare decorations are applied horizontal bands or painted surfaces on the upper half of the jar. The decorations were applied on the best visible part of the jar. However, the decoration does not seem to have been very important in the function of the vessel.

Potters' marks and signs

Most vessels that carry potters' marks that have been impressed or incised before firing, or signs painted on the surface after firing, belong to the group of large jars. Signs painted on the surface may be related to the storage function of the jars. For a more detailed discussion, see Chapter V and Appendix E.

Use-related properties

Burning traces

About 7% of all jars show traces of burning, either inside or on both the in and the outside surface. Although a large part of these are probably due to depositional processes, a relatively high proportion show burning traces located especially on the (inside of the) rim. What caused these localized burning traces is unclear. Perhaps, it is related to the use of a textile, flammable cover on the rim?

Remains of contents

Several times amounts of carbonized seeds (grain) were found inside or around a large jar, suggesting that they may have been stored inside. Other indications for ancient contents come from two jars with greenish-yellow stains on the inside surface (L9 62-132:13 and H8 28-207:30). Jar P96-528 (fig. IV.79.a) had a yellowish crust on the inside. These are perhaps residues of ancient contents.

Traces of use

Hardly any abrasions or damages possibly related to use were noted. Sometimes the outside surface and more rarely the inside surface shows traces of abrasion or flaking. A poorly understood phenomenon is especially apparent with these jars and other large storage vessels (see below): the inside surface of some vessels has become soft, chalky and white/pinkish in colour (cf. fig. IV.83.k, fig. IV.31.b). Whether this is due to the use of the vessel (perhaps related to acidic contents?) or whether it is related to processes in the fabric during firing, is uncertain.

Remarkable archaeological context

These jars are very common all over the settlement. In burials they are sometimes used as a coffin for small children. Jar P93-132 was carefully placed in a circular pit of which the walls were covered with mud bricks. The function of this installation is unclear.

The bases of broken jars are sometimes reused as pots (cf. fig. IV.96.a), while the fracture is smoothed. Fig. IV.35.1 was used as a basin in some kind of installation with a mud platform in square K13. Rims from broken jars are sometimes used as pot stands.

Suggestions for function/use

- Long-term storage of liquid or pourable dry matter (grain?), with frequent pouring or access to contents.
- Closed with a flexible cover tied over the rim with rope, or with small bowls as a lid, or with a clay stopper.
- Used as a coffin for small children.
- Reuse as pots or pot stands.

Jars with a handle (type 333)

Percentage of all rims (levels 6-3): 0.1%

Function-related properties*Fabric and inclusions*

Out of 12 fragments of jars with a handle, five are made of a clay with organic inclusions (ware I). One is made from a rather coarse clay, and perhaps this is a cooking pot rather than a jar (fig. IV.119.b). The others are made of a more sandy clay without organic inclusions, one showing dark grey particles. Perhaps these were not made locally at the site (no thin sections were studied).

Shaping methods

Most probably these jars were thrown on the wheel. However, the shaping techniques were not studied separately. No cracks in bases or walls were noted.

Shape

These jars have a closed shape with rather restricted rim diameters, making the contents inaccessible with the hands. The attachment of a handle from the rim to the shoulder of the vessel indicates that pouring was the way to remove the contents. Rims are mostly simple and always bent outwards, facilitating pouring. A jar from a mixed context (fig IV.109.w) has a trefoil mouth that greatly facilitates pouring (trefoil mouths are

otherwise not attested at the site). A flexible cover could easily be tied to the rim with a rope. Not much can be said about the vessel shape, since only two vessels were preserved completely. They have an oval vessel shape, one with a ring base (fig. IV.89.d) and one with a pointed “amphora”-type base (fig. IV.89.c) that is unusual at Sabi Abyad. Indeed, the use of handles is rare at the site, and is another indication for the foreign origin or different production tradition from which these vessels came. The vessels are easily transportable and the relatively small rim diameters make them suited for transport over longer distances as well.

Size

The size of these vessels seems to vary. Rim diameters vary between 50 and 170 mm (mean rim diameter = 101 mm, CV = 37%). The height of the vessel was only measurable in two cases: 355 mm (fig. IV.89.d) and 630 mm (fig. IV.89.c).

Capacity

The capacity in litres could only be calculated (to the rim) for two vessels: fig. IV.89.d has a capacity of 6.4 litres, while fig. IV.89.c has a capacity of 25.88 litres.

Surface treatment

All jars were simply smoothed during the throwing on the wheel.

Use-related properties

Burning traces

Only one jar shows burning traces on the in and the outside surfaces, most probably due to depositional processes.

Remains of contents

A botanical sample from a jar with a handle (P01-131) was taken, but the results of analysis are not known as yet.

Suggestions for function/use

- Short-term storage and pouring of liquids
- Transport of liquids?

Goblets (types 411, 421)

Percentage of all rims (levels 6-3):

411 2.4%

421 2.7%

Total: 5.1%

Function-related properties

Fabric and inclusions

More than 95% of all goblets was made of a fine clay without any organic inclusions, and with only very fine mineral inclusions (ware group X, including wares A, B, C and N). Only 4.3% of the vessels was noted to contain some organic inclusions, but these are always very fine as well. As shown by the thin-section analyses (Appendix D), the clay was probably not much treated other than by removing the coarser inclusions (perhaps by sieving?), and for such thin-walled vessels relatively large particles have often remained in the clay. The absence of organic inclusions increased the risk of drying and firing cracks, and left the clay less plastic in shaping. This would have increased the amount of effort and skill needed to produce these vessels. Apart from the possibility of achieving a very thin wall thickness, the fine clay might

have been used as a special ware in distinction from the normal organically tempered wares, or in imitation of other materials (glass, faience?).

Shaping methods

The goblets were thrown from the cone in an elaborate shaping processes involving various steps (see Chapter V), demanding skill and effort. This method, together with a clay without any organic inclusions, caused (spiral) base cracks in approximately 7% of all goblets. These cracks were never repaired, because in many goblets they did not run through the whole vessel wall. Many goblets with base cracks were found among the pile of goblets and bowls in the workshop in square M11, where they were probably discarded because they were unacceptably damaged (see Chapter V). Cracks in the wall and rim also occurred among the goblets found in the waster pile in square M11. Small tension cracks in the lower wall are sometimes visible, but do not make the goblet unusable. Because the thin rim is very fragile when it is not yet dry, several goblet rims are more or less oval due to the pressure on the rim when lifting the vessel off the cone.

Shape

These small cups are called goblets because of their resemblance to drinking cups. They exist in two shapes: V-shaped goblets for which the rim diameter is also the largest vessel diameter, and the walls are more or less straight towards a pointed base; and S-shaped goblets with a curved wall and a globular body, with a maximum vessel diameter that is a little larger than the rim diameter. Both shapes have extremely thin walls and rounded rims, often turned outwards to facilitate drinking. The ratios between vessel height and rim diameter or maximum vessel diameter show that the proportions were usually similar, although goblets could vary in height.

V-shaped	mean ratio (height/rim diameter) = 1.16 (between 0.80 and 1.43; CV = 9%)
S-shaped	mean ratio (height/rim diameter) = 1.31 (between 0.94 and 1.90; CV = 12%)
	Mean ratio (height/max diameter) = 1.16 (between 0.92 and 1.36; CV = 10%)

Bases are pointed, and nipple or knob-shaped. These vessels cannot stand on their bases and need to be held in the hand or put into a support (like a small pot stand, a hole in the table, etc.). Small pot stands made of pottery have not been found. It is very well possible that the goblets were meant to be held in the hand when full (see also Chapter VI).

Size

Goblets are small vessels with very thin walls. There are no size groups.

V-shaped	mean rim diameter = 89 mm (between 60 and 160 mm, CV = 15.6%). Mean rim thickness = 2.6 mm (between 2 and 5 mm, CV = 23%).
S-shaped	mean rim diameter = 78 mm (between 45 and 130 mm, CV = 14.7%). Mean rim thickness = 2.7 mm (between 2 and 6 mm, CV = 24%).

Capacity

The capacity in litres was calculated (to the rim) for 42 completely preserved goblets (21 of each shape type). The capacity per type is:

V-shaped	mean capacity = 0.24 litre (between 0.10 and 0.35; CV = 25%).
S-shaped	mean capacity = 0.31 litre (between 0.16 and 0.50; CV = 28%).
All goblets	mean capacity = 0.28 litre (between 0.10 and 0.50; CV = 31%).

The capacities are almost certainly estimated too high, since the goblets would not have been filled exactly to the rim. The mean capacities suggest that goblets were meant to contain about 1/4 or 1/3 *qu*. However, the large CV values indicate that a standardized, precise capacity was not aimed at.

Surface treatment

Goblets were well-smoothed with wet hands during the shaping process. No further surface treatments were noted.

Decoration

Almost 3% of all goblets were decorated. In earlier levels (mostly levels 6 and 5) decoration consisted of painted horizontal bands, while in later levels (4 and 3) incised horizontal lines were used as well. Perhaps contrary to expectations, the decorative or display role of these drinking cups is not very large.

Special features

Three S-shaped goblets have a thin spout constructed at the belly (fig. IV.91.z-ab). These spouts have a circular section and a rather thin opening, smaller than 3 mm in diameter. One base, probably also from an S-shaped goblet, has a pointed base with a hole, perhaps functioning as a spout (fig. IV.91.af). It is perhaps comparable to the small bottle (fig. IV.31.f) with a spout as a base. These spouts could have been used for pouring small amounts of liquids in a very controlled manner, for example when the liquid was expensive (honey, perfume?). The spouted goblets could also have been children's feeding bottles. One large mug (fig. IV.91.ag) had a handle from rim to base.

Potters' marks or signs

One goblet base was impressed with a partial rolling of a Middle Assyrian cylinder seal. See Appendix E and Chapter V for more details.

Use-related properties

Burning traces

Burning traces occur very rarely (1.2%) on goblets, on both the in and the outside surfaces, and are most probably related to depositional processes.

Remarkable archaeological context

Goblets were found in the whole settlement. Four goblets were found in pottery kilns (K, H and AC/AI).

Suggestions for function and use

- Drinking vessels, especially for drinking while seated / reclining.
- With spout: children's bottle, or small pouring vessel.

Pot stands, pot stands with closed base (type 611)

Percentage of all rims (levels 6-3): 4.0%

Function-related properties

Fabric and inclusions

All pot stands were made of the normal ware with fine organic inclusions (ware group Y).

Shaping methods

Pot stands were thrown on the wheel, in two steps: first the rim was shaped, and after cutting the cylinder off the wheel the base rim was shaped. Some pot stands were cut a little obliquely off the wheel, resulting in a slightly slanting top rim. The overrepresentation of pot stands among wasters, and the relatively high temperatures at which pot stands were fired, suggests that these stands were placed low in the kiln during firing (see Chapter V). Already from the firing stage onwards these shapes had the role of support for other vessels. A small amount (1%) of pot stands has cracks in the rim or in the wall. The large pot stands with a closed base were most probably shaped by hand, with the coiling or slab-building method. Cracks in the walls of large pot stands were repaired with a gypsum/lime paste.

Shape

Pot stands are squat, cylindrical or slightly tapering shapes, open on two sides. The lower rim is wider than the top rim, making the stand very stable. Rim shapes vary from strongly bent over and triangular to more smooth, and the exact rim shape does not seem to have been important. The mean ratio between vessel height and rim diameter is 0.79 (between 0.49 and 1.12; CV = 13%).

A small number of large pot stands, shaped by hand, have a closed base and oval, triangular or rectangular holes cut out of the wall. These holes provide ventilation under the vessel, which is especially important if the vessel on top had a ventilation hole in the base.

Size

The mean top rim diameter is 198 mm (between 90 and 300, CV= 14.5%). The mean base rim diameter is 215 mm (between 170 and 390; CV = 14%). The rim diameters are similar to the lower vessel diameters of large jars (types 321, 322, 323). Large pot stands with a closed base are generally among the largest stands, with rim diameters larger than 280 mm, and vessel height generally over 270 mm.

Decoration

One elaborate and rather large stand (fig. IV.92.1) had holes cut out of the wall and thick appliqué decorations between the holes. Instead of a normal rim, the stand had a ledge on the top on which a vessel can sit. This stand is unique among the pot stands, which are normally undecorated.

Potters' marks

Two stands have several incisions at the rim. See Appendix E for a more detailed discussion of these marks.

Use-related properties*Burning traces*

Almost 3% of the pot stands has traces of burning, but they are most probably due to depositional processes. Many of the burning traces occur on the fractures of sherds as well as on the surfaces of the stand.

Traces of use

Less than 1% of the pot stands shows damages like flaking surfaces, while 1% has cracks in the rim or the wall. It is not clear whether these damages are due to the use of the stands.

Remarkable archaeological context

Pot stands are found all over the settlement. A large pot stand (fig. IV.111.n) was found in relation with a big storage vessel (fig. IV.106.f). It may be assumed that the two were used together.

Suggestions for function and use

- Support for large jars (type 321, 322, 323) and other larger, instable vessels.
- Large stands: support for large storage pots.

“Pilgrim flasks” (type 911)

Percentage of all rims (levels 6-3): 0.1%

Function-related properties

Fabric and inclusions

More than 75% of all flask fragments are made of a clay with a lot of fine or slightly coarser mineral inclusions, mostly sand. The rest is made of a clay with mineral inclusions and fine organic inclusions (ware group Y). Since the thin-section analysis (Appendix D) showed that most type 911 flasks do not come from Sabi Abyad but were imported from further away, it is unclear whether the used fabric and inclusions relate mostly to the shaping techniques or rather to the performance characteristics of the vessel. In any case, the vessels with mineral inclusions only have a very compact fabric that is less porous than the fabric of vessels made of clays with organic inclusions. This may have been required for long-distance transport of liquids.

Shaping methods

Type 911 flasks are shaped in a technique that is foreign to the shaping traditions used at Sabi Abyad. They were thrown closed, after which the spout and a handle were added at a later stage. Handles sometimes have organic inclusions while the vessels have not, a technique sometimes used to prevent different shrinkage rates. This is another indication for the foreign origin of these vessels, since the clays used at Sabi Abyad have similar shrinking rates whether they have organic inclusions or not (see Appendix D). The flasks were made very carefully, and cracks or other damages were never noted.

Shape

The flasks generally have a globular, very closed shape, which is not completely symmetrical (flattened). This is related to the shaping techniques (see Chapter V). A narrow spout and one handle are attached to the body. Contents are only accessible by pouring them out, and the flasks are not very easy to fill either. The rims are bent slightly outwards and are a bit thickened. The opening can be closed with a stopper or with a flexible cover tied over the mouth. The handle can be used as an aid in lifting the vessel, but is possibly not always strong enough to carry the vessel when it is full. Perhaps the handles were also used to tie the vessels during transport.

Size

There are two kinds of flasks: miniature flasks and normal-sized flasks. The miniature bottles, of which not many have been preserved, have a rim diameter around 20-26 mm and a vessel height of about 100-135 mm. The normal-sized flasks have a mean rim diameter of 61 mm (between 43 and 85 mm; CV = 24%). The mean vessel height (including the spout) is 359 mm (between 340 and 385 mm; CV = 5.3%).

Capacity

The capacity could be calculated for 5 flasks (measured to the rim). The only miniature flask among them has a capacity of 0.16 litre. The normal-sized flasks have a mean capacity of 7.29 litres (between 6.0 and 7.90 litres; CV = 12%). It seems that this capacity of about 9 *qû* was normal for these flasks, but the sample is small.

Surface treatment

In 38% of all cases the outer surface of the flask was carefully burnished. This was probably done to create a more watertight surface. It is not known whether the surfaces of flasks were treated with some kind of organic resin or coating to make them more watertight.

Potters' marks and signs

A body sherd of a pilgrim flask (K9 100-405:3) shows an incised cross (applied before firing, cf. Appendix E).

Use-related properties*Remarkable archaeological context*

Type 911 flasks were mainly found in level 5, and although fragments were found all over the settlement; most of the completely preserved ones came from squares K8 and K9. There they were associated with some other more peculiar shapes like a big cooking vessel and bowls with a spout and handles (see below).

Suggestions for function and use

- Long-distance transport of (imported) liquids.
- Storage of (imported) liquids.
- Miniatures: storage or transport of small amounts of (precious) liquids.

Strainers (type 511)

Percentage of all rims (levels 6-3): 0.4%

Function-related properties*Fabric and inclusions*

All strainers are made of the normal clay with fine organic inclusions (ware group Y).

Shaping methods

The strainers were first shaped like small bowls, thrown from the cone. Rims are simply rounded or sometimes a little bevelled. In a second step, the bowl was placed on the rim. The holes were punched from the outside and the base was turned or scraped into a rounded shape. The scraping was sometimes done after the holes had been punched, but mostly before. The mean diameter of the holes is 8 mm (between 5 and 11 mm), so the strainer could be used for straining rather coarse materials only, unless a piece of cloth was used inside. The irregular lumps of excess clay that formed at the edge of the holes on the inside of the strainer were rarely smoothed away. This leaves the inside surface of the strainer very rough. The rough surface may have been functional.

Shape

Strainers have an open, semi-spherical shape with a rounded base. They do not stand upright and tip over on their side when placed on their base. They may have been used as ladles to remove larger chunks from a liquid (although there are no handles), or they may have been used as strainers sitting on the rim of a jar. They may have been used upside down over the base holes of deep bowls. Especially when combined with a piece of cloth, they may also have been used to drain the liquid out of semi-solid foods, like cheese or curds.

Size

The mean rim diameter is 140 mm (between 80 and 200 mm; CV = 18%). This rim diameter is largely similar to the rim diameters of large jars (types 321, 322, 323), and perhaps strainers were used in combination with these or other jars.

Use-related properties*Remains of contents*

Only one strainer had orange/yellow stains on the in and the outside surface. It is not clear whether they are related to the use of the vessel.

Traces of use

One strainer was reused: after the rim had broken, the fractured edge of the remaining base was made smooth again and the base was reused as a strainer. Two rim fragments showed traces of abrasion on the outside.

Remarkable archaeological context

Strainer P93-179 (fig. IV.91.aj) was found among a group of cuneiform tablets in square K9. The presence of two strainers fixed rim-down over the base of a large bowl before firing (fig. IV.59.a, see also below) suggests that strainers may also have been used in conjunction with large bowls with base holes.

Suggestions for function and use

- Strainer for sieving larger fractions from liquids, in conjunction with large jars or large bowls with base holes.
 - Ladle for scooping out larger chunks from a liquid.
 - Straining the liquid from semi-solid foods like cheese or curds.
 - When using a cloth inside, they can be used for fine fractions as well.
-

Bowls with handles and a spout (type 151)

Percentage of all rims (levels 6-3): 0.1%

Function-related properties

Fabric and inclusions

All of these bowls were made of ware I, with fine organic inclusions. One thin-section sample (sample no. 08, Appendix D) showed that these bowls could have been made in the Balikh region. However, shape, shaping methods and surface treatment place the type outside the Sabi Abyad technical tradition.

Shaping methods

The bowls were most probably thrown from one piece of clay, although the shaping methods were not studied in detail. Spout, handles and a ring base were attached in a later step. In one bowl, the outside surface of the lower body seems to have been pressed or beaten with a blunt object, perhaps to improve the regularity of the wall thickness. Base cracks did not occur in these bowls.

Shape

The bowls have a deep open shape in which the contents are easily accessible. A spout, either cylindrical or pinched from the rim, provides a convenient way to pour the contents from the vessel in a controlled way. The spout would also allow the user to decant only the top of the liquid (including floating material or leaving heavier particles behind). The spouts are sometimes located at the rim, and sometimes a bit lower in the wall of the vessel. Because of that, the bowls could not have been filled to the rim with a liquid. At least one, and sometimes two, handles are placed on the upper vessel wall. If one handle is present, it is placed opposite the spout. When two handles are attached, they are not aligned with the spout. One handle is closer to the spout while the other is further away. This is probably related to a more comfortable body position when holding the vessel at the two handles and pouring the contents. The mean ratio between vessel height and rim diameter is 0.5 (between 0.48 and 0.55; CV = 5%).

Size

The mean rim diameter of these bowls is 345 mm (between 300 and 385 mm; CV = 9%).

Capacity

The capacity could be calculated (up to the level of the spout) for 5 bowls. The mean capacity is 6.35 litres (between 3.74 and 10.27 litres; CV = 40%). The variation in capacity, especially when compared to the similarity in rim diameters, indicates that a precise capacity was not very important.

Surface treatment

Most bowls were very carefully burnished on the in and the outside surfaces, suggesting that impermeability of the surface was desired. A comparable shape from Tell al-Rimah was glazed (Postgate et al. 1997: plate 25a).

Use-related properties*Burning traces*

Only one bowl shows traces of burning on both the in and the outside surface. It is not clear whether these can be related to the use of the bowl.

Traces of use

These bowls show very remarkable traces of use. In all of them the inside surface is completely abraded, so that the burnished top layer has been removed. This may have been done by heavy pounding or stirring with a hard tool. The abrasions are always present on the inside base, and in many bowls extend towards the upper vessel wall up to the beginning of the spout. They do not reach the rim.

Remarkable archaeological context

These bowls were found only in level 5, concentrated in squares K9, K8, L8 and H8. In square K9 they are associated with other peculiar shapes, like a large cooking pot and pilgrim flasks, which were imported from elsewhere.

Suggestions for function and use

- In food or craft production: the heavy stirring, pounding or mixing of materials and/or liquids, possibly separation of floating or heavier particles, and decanting liquids.

Large storage pots (types 212b, 213, 215, 145, 221b)

Percentage of all rims (levels 6-3):

212b	0.39%
213	0.1%
215	0.03%
145	1.1%
221b	0.61%
Total	2.23%

Function-related properties*Fabric and inclusions*

All large storage pots were made of the normal clay with fine organic inclusions. Probably this is not only related to the properties of the raw materials, but also to the fact that organic inclusions make the vessel lighter and more porous.

Shaping methods

These large vessels were hand-built. The round bases were possibly shaped with a mould. The walls were built with the coiling or slab-building technique, and some vessels gave clear information on the connections

between coils and slabs (see Chapter V). The technique allows the making of thick-walled, heavy and large vessels with regular wall thicknesses and relatively thin, rounded bases. Base cracks are only rarely noted.

Large vats took a long time to make, and were used for considerably periods of time. Cracks in the wall and rim that occurred during the use of the vessel (in about 2.5% of all vessels) were often repaired, with a gypsum/lime crust or with a bitumen paste. Sometimes the impressions of ropes are visible in the paste used for repair, suggesting that ropes were used to stabilize the vessel further. Perhaps large vats were not produced continuously by the potters, and damaged vessels had to be preserved for as long as possible until new ones could be obtained.

Shape

Large vats come in two basic categories: deep open shapes (types 145 and 221b) and deep closed shapes (type 213, 215 and 212b). The open shapes are large bowls or pots with slightly flaring or vertical walls. The contents are easily accessible, but the bottom of especially the very large and deep vessels may be difficult to reach. They have relatively thick walls and the upper vessel wall just under the rim is often thickened. Rims are thickened as well, perhaps to provide a good grip or to allow a flexible cover to be tied over the rim. At the junction of the upper slabs or coils often an appliqué band of rope-imitation was made, perhaps also providing a better grip on the vessel. All have ring bases and are stable when standing alone. About half of all completely preserved pots, mostly large ones, have a hole in the centre of the base. These holes were made before firing while shaping the ring base, and measure 18-24 mm. In two pots the holes were afterwards closed with a bitumen plug, in one with a gypsum/lime plug. The smaller pots (type 145) are transportable and can be lifted without problems. The larger pots (type 221b) are much heavier and were probably not meant for frequent lifting and transport, especially not when full. The mean ratio between vessel height and rim diameter is 0.89 (between 0.51 and 1.09; CV = 20%).

The closed pots have a roughly globular shape and incurving upper walls. The contents are less easily accessible, but it is still possible to reach the contents with the hands. Because these vessels are very deep, the bottom in particular would be difficult to reach. The vessels have relatively thick walls. The rims are thickened on the outside. They provide some grip on the vessel and a convenient ledge for tying a flexible cover over the mouth of the vessel. As with the open pots, many closed pots have a rope-imitation appliqué band at the upper vessel wall. Most closed vessels are so large and heavy that they were probably not lifted often. They were stationary storage vessels. In vessels with ring bases, the maximum vessel diameter is located low in the vessel wall, creating a low centre of gravity and more stability. In vessels with rounded bases, which were set into the floor of a room, the maximum vessel diameter is mostly located higher up in the vessel wall. The mean ratio between vessel height and rim diameter is 2.27 (between 1.98 and 2.63; CV = 10%) while the mean ratio between vessel height and maximum vessel diameter is 1.19 (between 1.09 and 1.27; CV = 6%).

Size

In the group of open shapes, the type 145 pots are usually smaller than the type 221b ones. For many fragments, rim diameters could not be measured with the diameter chart, which ran only up to 400 mm.

Open shapes (145):	mean rim diameter = 404 mm (between 260 and 740 mm; CV = 24%).
Open shapes (221b):	mean rim diameter = 736 mm (between 570 and 860 mm; CV = 14%).
Closed shapes:	mean rim diameter = 368 mm (between 260 and 750 mm; CV = 19%).

Capacity

The capacity in litres could be calculated (up to the rim) for 10 open shapes and for 8 closed shapes.

Open shapes (type 145):	mean capacity is 37.15 litres (between 11.31 and 64.47 litres; CV = 60%).
Open shapes (type 221b):	mean capacity is 151.40 litres (between 97.14 and 212 litres; CV = 32%).
Closed shapes:	mean capacity is 199.31 litres (between 106 and 293.2 litres; CV = 34%).
	Type 213 vessels generally have larger capacities than the other rim types.

The mean capacities suggest sizes of 50, 200 and 250 *qu* for these vessels. However, the CV values are very high and a precise capacity was probably not aimed for.

Surface treatment

All vessels were simply smoothed during the shaping stage. Four vessels, a closed type 213 pot (fig. IV.67.e) and three open type 221b pots (K8 65-142:6, M11 13-167:2 and P03-438 from N12), were covered on the inside (and the three open pots on the outside as well) with a thick layer of bitumen. The closed pot was incised with the sign for water. Pot P03-438 had a hole in the base that was closed with a bitumen plug. Possibly the coating with bitumen was meant to make these vessels more watertight.

Decoration

A very high percentage of almost 40% of these large pots shows some kind of decoration. Mostly (11%) the decoration consists of an applied rope-imitation band under the rim, often combined with a wavy incised line between application and rim. Appliqués only (11%) or wavy lines only (14%, perhaps the fragment was often too small to include the appliqué decoration) are popular as well. More rarely, combinations of horizontal and wavy incised lines were used. The decorations are always placed on the shoulder or the upper vessel wall, just below the rim, and were very well visible. This indicates that the vessels were probably often seen, and that display was of some importance. Applied decorations may have had an additional function in providing a better grip on the vessel. The association with a thick cabled rope may have given the vessel an impression of sturdiness.

Potters' marks and signs

Three fragments of large type 213 closed pots carry cuneiform inscriptions in a very large script. All three inscriptions can possibly be read as "water", indicating that these pots were meant for water storage. One large closed type 213 pot had a painted sign on the upper vessel body (fig. IV.67.d, Appendix E).

Use-related properties*Burning traces*

A small amount (4.8%) of the pots shows traces of burning, mostly on the inside or both the in and the outside of the vessel, sometimes at the base only and sometimes on the inside of the rim only. Most probably most of these traces are related to depositional processes.

Remains of contents

In two type 213 pots found in square H8 a large, heavy spherical stone was found inside. Perhaps this stone was used to weigh down a wooden or basketry lid on the mouth? Many of the vessels found in square H8 have a very thick, grey/whitish crust sticking to the inside, outside or even to the fractures of the vessels. Possibly this crust is related to the use of the vessels. Among the pots in square H8 many charred seeds (possibly of grain, fruits and sesame) were found, as well as charcoal wood fragments. Similarly, charred seeds were found in pots dug into the floor of a room in square M8.

Traces of use

As with the large jars (types 321, 322, 323) discussed above, many of these large pots have an inside surface that is soft and whitish or pinkish in colour. It seems as if the top surface has been abraded or come off. Perhaps this was caused by the (acidic?) contents or by stirring heavily with a hard tool or by cleaning the vessel wall with an abrasive tool. Vessels with this phenomenon are only of the types 145 and 212b. One type 145 pot had a damaged inside surface. In one type 213 pot (fig. IV.67.f), a 7 mm wide hole was drilled from both the in and outside into the lower vessel wall. Perhaps the contents of this large vessel with a rounded base needed extra ventilation.

Remarkable archaeological context

Fragments of large vessels are found all over the settlement. One remarkable findspot of numerous large completely preserved vessels is a small room in square H8. This room was most probably a storage room. Other complete vessels were found in squares K12-K13 and L11, L12, N12. A large open pot (fig. IV.106.f) was found together with the large pot stand in fig. IV.111.n, indicating that they were used together, most probably to provide some space and air under the base of the pot which had a base hole. Large fragments of these pots were sometimes used as a cover in adult burials.

Suggestions for function and use

- Long-term storage of dry and liquid goods in bulk (water, beer or grain?).
 - Perhaps used in the processing of food or other materials (pots with holes used in beer brewing?).
 - Reuse: large sherds were used as a cover in adult burials
-

“Grain measures”(type 225)

Percentage of all rims (levels 6-3): 0.3%

Function-related properties

Fabric and inclusions

Almost all of these vessels are made of the normal clay with fine organic inclusions (ware group Y). The use of organic inclusions is most probably more related to the properties of the raw materials and to the shaping methods than to the function of the vessel.

Shaping methods

All “grain measures” were thrown from one piece of clay. The ring bases were carefully finished. Once an extra layer of clay was added at the inside of the base, to create a more even base thickness. Base cracks never occurred. Once a small crack in the wall was repaired with bitumen.

Shape

The “grain measures” are easily recognizable and have a long cylindrical, open shape so that the contents are easily accessible. Their shape seems to stand somewhat apart from the rest of the corpus, and they represent the continuation of a long tradition starting in the Old Babylonian period. The rims are mostly thickened or squarish on the outside, providing some grip. The walls are relatively thin. The bases are wide compared to the maximum vessel width, so that these vessels are stable and stand easily without support. Not many vessels were completely preserved, so that the ratio between vessel height and rim diameter could only be calculated for four vessels. The mean ratio is 1.5 (between 1.32 and 1.67; CV = 12%).

Size

Two size groups were tentatively distinguished on the basis of the rim diameters. However, the rim diameters vary rather widely.

225a: rim diameter < 250 mm, mean rim diam. = 140 mm (between 80 and 220 mm, CV = 25.2%).

225b: rim diameter ≥ 250 mm, mean rim diam. = 287 mm (between 250 and 320 mm, CV = 11.5%).

Capacity

The term “grain measure” was originally coined by M. Mallowan (1936, 1946) and seems to imply that the vessels were used as a volume measure (see Chapter VI for further discussion). Capacities could be calculated for two completely preserved vessels at Sabi Abyad, but they do not show a unity of volume: 1.01 and 1.83 litres. However, when calculating the capacity of the vessels up to each horizontal incised line, it could be suggested that each vessel holds multiples of 1/2 or 1/3 *qû*. This could also be proved for fragmentarily preserved vessels (see fig. VI.17, no.12). A function as a measuring vessel for dry goods or liquids is therefore not precluded.

Surface treatment

Most vessels are just smoothed, only one has a burnished surface on the outside.

Decoration

A remarkably high percentage of these vessels are decorated: more than two-thirds show incised, painted or appliqué lines, mostly horizontal or in a combination of horizontal and wavy patterns. Some show the characteristic white-filled impressed decoration of lines and circles. Apart from the decorative value, especially the horizontally incised lines may have had a function as volume measuring lines (see above and Chapter VI).

Use-related properties*Remains of contents*

The vessel P93-198 contained many different pieces of colourful stones and glass, and was obviously used to store half products of a bead workshop (fig. VI.6). Two vessels contained a thick layer of gypsum/lime, and were secondarily used to hold this material in the pottery workshop in square M11 (fig. IV.72.a).

Remarkable archaeological context

“Grain measures” were found in many squares, but mostly in square K9, in association with the special function room (kitchen?) excavated there, containing other special shapes like “pilgrim flasks” and bowls with a spout and a handle.

Suggestions for function and use

- Short-term storage of dry goods, food and liquids.
- A measuring vessel suitable for measuring different fractions of the *qû*?

