FOREWORD

I am very pleased to welcome you to the latest OPA. This issue presents three very interesting articles focussing on technological research from archaeological and ethno-archaeological case-studies. From a specific and poorly-known technological phase such as the forming technique of Bronze Age Crete to experimental archaeology and the different phases of the pottery production, vessel distribution and consumption in modern Ghana and Pakistan.

Looking forward to receiving your comments, suggestions and ideas for the future issues.

Michela Spataro

VILLAGE POTTERS OF BANNU DISTRICT, KHYBER-PAKHTUNKHWA, PAKISTAN: OBSERVATIONS ON A CRAFT TRADITION IN DECLINE

Kenneth D. Thomas
Institute of Archaeology
University College London
Email: k.thomas@ucl.ac.uk

Farid Khan
Pakistan Heritage Society
Peshawar, Pakistan

Introduction
The pioneering study of traditional pottery techniques of Pakistan by Owen S. Rye and Clifford Evans (Rye and Evans, 1976) not only produced a record of the diversity of techniques and skills used by potters in Pakistan, it also laid down a methodology for future work. Their work also demonstrated the huge potential for more detailed regional studies in Pakistan, as has subsequently been shown by Michela Spataro’s (2004) study of three pottery making centres in Sindh Province and a preliminary study of potters in Peshawar District by Carl Knappett (1994). In this paper we report some preliminary observations of a range of potters’ workshops in five villages in Bannu District in the province of Khyber-Pakhtunkhwa (formerly the North West Frontier Province) of Pakistan (Figure 1).

Records of craft practices are not only important in their own right as accounts of what are all-too-often declining traditions and skills, but also because they document the complex economic and social relations of craft production, and yield insights into perceptions and practices of divisions of labour (particularly gender-specific ones), and the social reproduction of craft skills, in local and small-scale production systems. We cannot claim to have produced in-depth information about these issues in our short and rather unsystematic study, but feel it worth while recording what we have observed and, in particular, what the various potters have told us.

The Bannu Potters Survey
Our observations were made at the villages of Bharat, Mandeo, Nurar, Gandi Khan Khel and Shabaz Azmat Khel in Bannu District (Figure 1), as well as in the pottery bazaar located just outside the Railway Gate of Bannu City (Figure 2a). The study was undertaken over six days (from 20th to 25th December 1991) at the end of a season of archaeological field work. We cannot claim to have been wholly inclusive or systematic in our work, selecting villages and potters to be visited on the basis of local information, mostly gained from the shops in the pottery bazaar in Bannu City. The villages selected were identified as the principal potters’ villages in the District at that time. There had once been potters at the villages of Bazaar Ahmad Khan and Sher Ahmed Kala, and the only remaining potter in Mama Khel had recently died. There were

In This Issue

Village potters of Bannu District, Khyber-Pakhtunkhwa, Pakistan: observations on a craft tradition in decline, by K.D. Thomas and F. Khan Page 1

What’s in a forming technique? An investigation into wheel-throwing and wheel-coiling in Bronze Age Crete, by I. Berg Page 9


Conference Diary Page 17
still potters in Hawed and one in Nawazabad, who had set up a workshop there having moved from Mandeo. This was the only example we found of a new pot-producing workshop having been established, otherwise the picture was of numerical decline. At the time of our survey there were 6 potters’ workshops in Nurar, while previously there had been at least 10. Seven potters’ workshops had closed in Shabaz Azmat Khel, although in Gandi Khan Khel (known locally as ‘the village of the potters’) there were still 70 surviving workshops, while previously there had been almost 90.

We believe that we have visited and recorded a series of examples which are representative of the main pottery making traditions in the District, and which demonstrate the various problems faced by potters seeking to earn a living in an uncertain and changing economic arena. The criteria for selecting which potters to visit and interview were: (a) the type of pot-making technology known to be practised by particular potters and (b) if there had been a decline in the numbers of potters in a village and, if so, to discern what economic or other social factors lay behind this.

Observations and questioning were focussed towards gaining information on the issues considered under the various headings below. In retrospect, we are aware that other questions might have posed, and also that our questioning of individual potters did not always conform to a ‘structured’ format. We were fortunate in that most of the potters were very forthcoming with information, especially with their personal views on life as village-based potters. A more formal question-and-answer approach would probably have stifled the open spontaneity of our sources.

Figure 1. Map showing the location of Bannu District in north-west Pakistan (inset) and of the six villages at which studies were made of potters and their workshops. The base maps are images derived from Google Earth™.
Figure 2. Some products of the Bannu potters’ workshops: (a) a range of pots on sale in the pottery bazaar, outside the old Railway Gate in Bannu City, and (b) the range of ceramic wares produced by Umar Khan’s workshop in the village of Mandoz: (i) globular water jar (matteya), (ii) water pitcher (garrai); (iii) small narrow-necked cooking pot (dagai); (iv) spouted water vessel (keeza); (v) shallow flat-bottomed dishes (kundail) for mixing and shaping flat bread (roti/chappati); (vi) round-bottomed serving dish (kunali); (vii) milling bowl (braghiyeh); (viii) pounding vessel for spices (batal); (ix) handled cups (gadiwa); (x) moated water vessel (tasht), for providing water to chickens or keeping food safe from ants; (xi) lid (barghala), produced in various sizes to fit cooking and water storage vessels; (xii) flat tray (thaiba), see also Figure 3a, b, & c. [The photographic images here and in all subsequent Figures are by Kenneth D. Thomas].
The Old Potter’s Almanack

The range of pots and other ceramic products
The principal types of pots produced by most workshops are shown in Figure 2a and 2b. Other ceramic products include flower pots (Figure 4a), the bodies of hubble-bubble pipes (Figure 4b), ceramic ‘files’ for removing foot calluses, and ceramic ‘mills’ for de-husking rice [as illustrated by Rye and Evans (1976, p. 233, fig. 32 a-c)]. In Bannu it is not possible to conceive of a meal without bread, therefore thaibi, trays for cooking flat breads (Figure 2h.xxi, Figure 3a-c), are widely produced in large quantities because high rates of breakage during use lead to a regular demand for these ceramics. The principal types of pottery products shown in Figure 2b are traditional forms which show only slight variations in size and surface decoration of each type. Thus there is a high level of conservatism in terms of the pottery product range and in only one instance did we observe innovation in production of ‘new’ types of ceramic vessels. Musam Khan, an enterprising potter in Gandi Khan Khel, includes two types of vessels (Figure 3d) in his product repertoire which he makes solely for use by Afghans living in a nearby refugee camp. One is a jar (kurmutul) for churning yogurt and the other a dish (jagai) for preparing yogurt balls (kurut), which are dried in the sun for storage. Both are made in the same fabrics as his traditional pots and it is fascinating to consider how any future archaeologist might seek to ‘explain’ the occurrence of such ‘new’ vessel types coexisting with an otherwise ‘established’ ceramic tradition.

The sources of clay, temper and pigments used
Clay deposits are abundant throughout most of Bannu District, although potters often have to pay land owners a fee for digging up the clay they need, a situation also reported by Spataro (2004) in her study of pottery workshops in the Thar Desert in Sindh Province. The banks of the river Tochi are a source of clay for some potters, but for many the Tochi is valued for its clean sands used as tempering. All the pigments used to decorate vessels are naturally-occurring minerals, derived from various localities either within the District or further afield. For example, the bright red pigment used by Umar Khan on some of his pots (Figure 2 ii, iii & v) is an ochreous clay (srni khatra) derived from deposits near Mir Ali, some 25 kilometres to the west of Umar Khan’s village of Mandeo.

Musam Khan’s clay source is near a water tank some 1.4 km from his village (Gandi Khan Khel). His source of clean sand is 7 km away. He uses red, white and black pigments to paint his pots. These are all minerals that mostly come from deposits in the hills fringing the east of Bannu District, although black comes from Karborgha (in Kohat District, north of Bannu District), which Musam Khan obtains when he and a group of fellow potters go on pilgrimage to an important ziarat (saint’s tomb).

Thaibi have particularly high levels of tempering in their fabric (usually more than 50%, by volume). Traditionally, this temper has been of crushed pottery (grog), ancient pottery occurring on the surfaces of archaeological sites being sometimes preferred (particularly the very fine wares found on Bronze Age sites). Mir Paliodad (Bharat) uses brick dust from a nearby brick works as a temper for thaibi, but the products are of lower quality (more brittle and with inferior heat transference and retention). Spataro (2004) observed that the chapatti baking pans made in the Thar Desert incorporate two types of temper: grog in the bottom and sand in the rim.

The range of manufacturing techniques
i. Shaping the clay
Thaibi are made entirely by hand on a bed of temper on a clean floor, while most other ceramic products are made on a foot-operated ‘kick wheel’ (Figure 4a and b). Water storage and cooling jars (matteya) are shaped on the wheel, then finished by hand using a dabbber and a paddle over a dish of clean coarse sand (Figure 4c and d), to thin out and shape the vessel, and to incorporate sand into the outer surface to enhance its water cooling properties. Umar Khan (village Mandeo) informed us that, once formed, these water jars are left to dry in the sun “for as long as possible” because the better they are dried, the less chance there is of them cracking during firing.

ii. The types of kilns used
Thaibi are usually fired in simple rectangular kilns such as that of Mir Paliodad (Figure 3b), which is built against the wall of his house. This kiln can fire up to 300 thaibi at a time. Sloping kilns, examples of which are shown in Figure 5a and b, allow the fire to spread quickly from its starting place at the entrance of the kiln, ensuring a more even firing of all the vessels stacked in the kiln. The village of Shabaz Azmat Khel had the most sophisticated kilns encountered in our survey (Figure 5c and d). These circular updraft kilns and the associated pottery production system of the potter Mir Shad were described in detail by Rye and Evans (1976, 43-9). We examined the kiln of Said Ghani, but it was full of cooling fired water pots at the time of our visit, so the internal structure could not be examined directly. It is, however, similar to that illustrated by Rye and Evans (1976, p. 48, fig. 11).

iii. Loading and firing the kilns
Firing is usually started with dried maize stalks or processing debris from rice, although some potters
now use kerosene to start the burn. The principal firing fuel in open kilns is dung cakes, made from cattle and water buffalo dung mixed with chopped straw and chaff and dried in the sun (Figure 6a and b). The stacking of pots in open kilns is generally as shown in figure 6c. The firing time for open kilns varies between 4 and 9 hours. Kilns are left to cool for at least 24 hours before the fired pots are removed.

By contrast, the fuel used in the updraft kilns of Shabaz Azmat Khel is solely of large sheaves of the reed mace (*Typha latifolia*), known locally as *deelai*. Up to 900 spouted water pots are loaded into the kiln. These are covered with piled-up flat dishes. The lot is then covered in a layer of *deelai* and sealed with a layer of mud plaster into which numerous holes are punched. *Deelai* sheaves are fed into the fire hole under the kiln, with the fire burning for up to 13 hours (9 hours minimum), consuming up to 50 sheaves of *deelai*

### iv. Rates of wastage during firing

The amount of wastage during firing, resulting from breaking, cracking or over-firing, varies according to kiln type, the types of pots being made, the rate of firing (too fast a burn leads to more cracked or over-fired pots) and the weather (e.g. too rapid cooling in rainy conditions). *Thaibi* made in simple rectangular level kilns have a wastage rate of some 40-50 in 300. In sloping kilns, 500 or even 600 pots can be fired at a time, with breakage/cracking often ruining some 50 – 100 pots, but this is unpredictable and can be much higher. More than 900 pots can be fired at a time in the enclosed circular updraft kilns, with breakage rates being variable but usually low (although a bad firing can lead to 30% wastage). Further losses can occur by breakage during transport (Figure 6d). Not all of this is total waste, some cracked pots are crushed for use as temper, while larger pots can be used as construction materials in walls (including the walls of kilns).

### Seasonal aspects of pottery production

Two main factors control the times when pots are manufactured:

- **Demand for particular types of pots.** While many types, such as *thaibi* for cooking flat breads and pots for carrying and storing water, are needed all year round, others vary in demand according to the religious calendar (e.g. at *Eid* times, various types of large vessels are required for cooking and serving large feasts), the agricultural calendar (e.g. milling vessels required for crop processing) or the social calendar (most marriages occur in the spring season, when larger water pots and large dishes for the preparation and serving of food at wedding feasts are in demand).

- **Climate and weather.** Potters seek to avoid firings during rainy periods because it is more difficult to initiate and sustain the firing of a kiln, and breakage and cracking rates are much higher. Very large water storage pots are mainly made in March-April time, before the onset of the very hot weather.

### Social aspects of pottery production and the social reproduction of knowledge and skills

In most villages we visited, pottery production occurs wholly in the family workshops within the walled courtyards of houses. The village of Gandi Khan Khel is an exception to this, with 18 kilns being located in public spaces, each being shared by between 3 and 6 families of potters (there being 70 surviving pot-making workshops in the village).

Virtually the whole process of pot making in Bannu District is a male preserve, although women can undertake the shaping of *thaibi*, although not usually their firing. The knowledge of pottery manufacture is passed down from father to son. In one case we visited a workshop in which the father had died before passing on his knowledge, with the result that much of the equipment (wheel, paddles and dabbers, mortars for producing pigment powders, etc.) lay unused. The only ceramic production in this household was the making of *thaibi*, which was undertaken by the women of the family. Pot making is a completely family-based activity and there seemed to be no possibility that the untrained older son of the family could become apprenticed to another potter in order to learn the craft that his father had not been able to pass on.

### The economic context: competing technologies and alternative sources of income

The increasing availability throughout Pakistan of mass-produced implements, such as metal cooking pots and bowls, water containers, cups, and so on, made of plastics has had a marked impact on demand for ceramic vessels. The competing materials are less efficient in many ways. They are a little more expensive, but they require replacing far less frequently. In addition, they are seen as being ‘modern’ and therefore more desirable than traditional pottery vessels. Equally, if not more, important is the rise of competing sources of income. People in Bannu, as elsewhere, are much more mobile than they once were and the possibility of moving away to find work, and to earn ‘good’ money, is seen as increasingly attractive to the sons of potters. Many who might have learned the potter’s craft, and lived a life of relative poverty, have become labourers on roads, canals and building developments. Some have become migrant workers, commonly seeking employment as labourers in the Gulf States. They send a high proportion of their
Figure 3. (a) Flat baking trays (thaibi) made in Umar Khan’s workshop (village Mandeo) for cooking bread (naan and chapattis); (b) simple kiln (2.4 × 2.4 m) built against the wall of the house of Mir Pa’iyodad (village Bharat) for firing thaibi; (c) thaibi on top of an elaborate cooking hearth (bāt), with cooked cornmeal naan, in Umar Khan’s courtyard (village Mandeo); (d) wares produced by Musam Khan (village Gandi Khan Khel) and used by Afghans in the nearby refugee camp for processing yogurt (as described in the text): left: kurtmal, right: jagai.
Figure 4. Techniques of pottery production: (a) Gul Nawaz (village Nurar) throwing a flower pot on his foot wheel (note the drying thaibi in the background); (b) Habibullah Khan (village Nurar) at his foot wheel throwing the body of a chilum (a bubble-bubble pipe, completed examples of which are drying behind him); (c) Musam Khan (village Gendi Khan Khel) beating out a water pot (matteya) over a bowl of coarse clean sand, using a dabber and paddle; (d) a range of dabbers and paddles used by Umar Khan (village Mandeo).
Figure 5. Range of pottery kilns (see also the simple kiln for firing thaibi, in Figure 3b): (a) a communal horse-shoe shaped sloping kiln (9.5 m long by 2.8 m wide, height ranging from 0.6 to 1.5 m) located in an open space in the village of Gandi Khan Khel; (b) double kiln in the courtyard of Gul Nawaz (village Nurar), the larger one (7.8 x 3.0 m; from 0.4-0.8 m high) is for firing a range of pots, while the smaller one (3.8 x 2.0 m; from 0–0.45 m high) is for firing thaibi; (c) circular updraft kiln (outer diameter 3.5 m, inner diameter 2.1 m, outside height 1.2 m) in the courtyard of Said Ghani (village Shabaz Azmat Khel); (d) Said Ghani’s updraft kiln loaded with water pots.

Figure 6. (a) Firing of kilns is usually started using dried maize stalks or straw from the processing of the rice crop, while the main heat is provided by burning dung cakes (made from mixing water buffalo dung with chopped straw and chaff and dried in the sun); (b) dung cakes are made and stored throughout the non-firing season (they are also an important fuel for cooking); (c) a layer of dung cakes is placed on the bottom of the kiln, with the dried pots carefully stacked on top, with bits of dung cake packed in the spaces; flat dishes are placed on the top, covered by a layer of straw (note: this has been partially reconstructed as a demonstration for us, using already fired pots); (d) fired pots are usually packed onto the back of a lorry for transport to the main sales outlets (mostly in the pottery bazaar in Bannu City (Figure 2a).
earnings home to their families in the villages, but none return to learn the potter’s craft.

Conclusion
We hope that these observations of traditional potters and pot-making techniques in Bannu District have revealed the potential for further systematic study there, as well as showing the diversity of techniques and technology used by potters in this small area. Sadly, there can be little doubt that the future of the Bannu potters is rather bleak. External and internal pressures, outlined above, have caused numerous families to abandon the making of pots, or to specialise in producing a restricted range of types of ceramic (notably thaibi, the much-in-demand cooking trays for flat breads). A few have responded to new opportunities by making different types of ceramics, such as the yogurt-processing pots used by Afghan refugees, or by moving their workshops to villages which have lost their own potters. All these aspects highlight the need for further work in this area, both to document more fully the surviving traditions, and their social contexts, as well as to investigate the socio-economic dynamics underlying innovations in pottery production.

As a postscript: there was an intention that, some 10 years on (i.e. in December 2001), we would revisit the villages and potters observed in this brief initial study to find out how they had fared in the intervening interval, how many were still in business and what range of wares they were producing. This was not to be, because events following the 11th September 2001 atrocities in the USA, which have reverberated throughout the region ever since, have made it impossible for us to undertake any kind of field work in Bannu District.

Acknowledgements
We would like to thank the many potters in Bannu who admitted us into their workshops, provided hospitality and information, and permitted photographs to be taken; Mr M. Naeem for practical assistance; and Dr Michela Spataro and Caroline Cartwright for encouraging us to resurrect our long-abandoned field notes and photographs, and to prepare our observations for publication.

References


WHAT’S IN A FORMING TECHNIQUE?  
AN INVESTIGATION INTO WHEEL-THROWING AND WHEEL-COILING IN BRONZE AGE CRETE

Ina Berg  
University of Manchester

Introduction
Clay vessels can be made with a wide variety of individual techniques or combinations of two or more techniques. The most common ways of making pots are wheel-throwing, coiling, slab-building and mould-making (Rice 1987). While most techniques are classified by archaeologists as either wheelmade or handmade, there is at least one set of techniques, called wheel-coiling, that combines the two at different stages of the manufacturing process. It is this technique, and its relationship with wheel-throwing, that is the primary interest of this paper.

The forming techniques
Wheel-throwing can be defined as a technique that uses the potter’s wheel as its only means to create the vessel shape. Depending on a vessel’s height, shape and the particular stage of the forming process, speeds can be as low as 40 rpm or as high as 130 rpm. This contrasts with wheel-coiling which uses the potter’s wheel merely to facilitate the joining, thinning or smoothing of a pre-shape that was built using the coiling technique. As rotation can be utilised at different stages of the wheel-coiling process (Courty & Roux 1995; Roux & Courty 1998; then still called wheel-shaping), speeds can vary depending on its application and overlap with those recorded for wheel-throwing (Figure 1).

At first glance, the end-products of the two techniques look the same. They both display the existence of rilling around the interior and/or exterior, concentric striations on the base and compression ripples around the neck. On closer inspection, minor differences emerge: for example, the rilling is continuous for wheel-throwing, but discontinuous for wheel-coiling (Courty & Roux 1995; Roux & Courty 1998). It is mainly by using X-radiography to reveal the internal structure and physical characteristics of the clay matrix that wheel-throwing and wheel-coiling can be clearly
distinguished (Berg 2008, 2009). In particular, as a consequence of pulling the vessel upwards during manufacture, the X-ray fingerprint for wheel-throwing is characterised by a diagonal alignment of voids and fissures. In contrast, wheel-coiling can be identified by the combination of macroscopic features from wheel-throwing (i.e. rilling or ripples on the interior and/or exterior surface, compression marks around the neck) with the X-ray fingerprint (i.e. horizontal alignment of voids and fissures) from coil-made vessels (Figure 2).

How easily we pottery specialists can be misled by the expertise of ancient potters who used the wheel-coiling technique is demonstrated in Table 1. Having inspected pottery macroscopically two months prior to X-radiography analysis, I was able to compare my original conclusions – as well as those recorded by the original pottery specialist– with those based on the analysis of the X-radiographs. The results show clearly that a) pottery specialists do not necessary agree with one another about the type of technique used when inspecting a vessels visually, and b) all of them can be misled by the expertise of ancient potters especially in relation to wheel-thrown vs. wheel-coiled (Berg 2009).

Why forming technique is important
But why, one may ask, is it so important for us to know the difference between those two techniques? After all, both utilise the potter’s wheel to a lesser or larger degree and indicate the acquisition of a new and different set of motor skills that required a long and dedicated apprenticeship. The answer is that the two techniques indicate different degrees of the utilisation of the potter’s wheel. Wheel-coiling – because it requires the construction of a coiled shape first – is an intermediate stage between handmade and wheel-thrown pots. Not surprisingly, it also occupies an intermediate skill level between the two techniques. Due to the need for constructing coils first, it only marginally speeds up the production...
process when compared to exclusively handmade vessels. Roux (2003: 18; Roux & Court 1998:750) estimates that wheel-coiling speeds up production by 25%. However, wheel-coiling has two major advantages that may explain its continuing popularity. First, it resembles the wheel-throwing technique - a potentially valuable cultural commodity - visually. An example of its value is the use of the potter's wheel in Phylakopi, Melos, where copies of Cretan vessels signalled the introduction of a new imported drinking and feasting tradition (Berg 2007). Second, wheel-coiling allows potters to build vessels up in stages and can thus be adapted to a variety of manufacturing settings and equipment types – as is explored in the following section.

Figure 2c: Enhanced radiograph of a Middle Minoan IIB conical cup showing a diagonal alignment of voids characteristic of the wheel-throwing technique (Berg 2009; catalogue no 51).

Figure 2d: Outside view of same conical cup.

The potter’s wheel in Bronze Age Crete
A case study from Bronze Age Crete demonstrates that the development of wheel-coiling may have been an ingenious solution to the limitations imposed on potters by the potter’s wheel that was available during the Bronze Age (for full details of this study, see Berg 2009).

Figure 3: Reconstruction of Minoan potter’s wheel with clay wheel head (after Evely 1988, 2000; Morrison & Park 2007/8; http://www.spiritofgreece.gr/).

The first appearance of the potter’s wheel on Crete can be dated to the MM I-II period. Evely (1988, 2000) has identified several dozens of wheelheads as well as other parts of potter’s wheels. Wheelheads are made of fired clay. They are large (25-75 cm in diameter) but their low weight (4-10 kg) makes it unlikely that they were able to store the momentum in the same way as heavy stone wheels (normally above 20kg; heavy ones may be up to 40kg in weight). Evely’s comprehensive catalogue of potter’s wheel devices and workshop settings (Evely 2000), as well as recent experimental work on Crete has clarified the potter’s wheel design (Figure 3) and capabilities. We now reconstruct the wheel’s axle to have been located in a shallow socket on the ground. A horizontal support half-way or two-thirds up the axle must have existed to give core stability to the device. Throwing experiments by two groups of scholars (Don Evely and Vasilis Politakis at Knossos, Jerolyn Morrison and Doug Park at Mochlos) have shown that the wheel could be used by the potter him/herself or with the help of an assistant to aid rotation of the wheel. The vessels that have been produced by the Mochlos team were small simple bowls and cups. Results from the Knossos experiments indicated that “speeds sufficient to permit throwing, centering, raising and shaping and finally turning were all readily possible for small and medium-sized pots. But this toil was always easier with the assistance of the second pair of hands. Larger vessels, or those made from heavier clays,
were better produced by coils and always needed the second person, and at times a considerable output of energy” (Evely, in: http://www.spiritofgreece.gr/; see also Evely, Politakis, Morrison & Doug 2008; Morrison & Park 2007-2008).

If the Cretan potter’s wheel could not maintain the momentum for long enough for large pots to be wheel-thrown, then wheel-coiling – a technique that did not require continuous high speeds, and which could produce a pot step-by-step by building it up from coils first which were then ‘thrown’ – offered a simple way to overcome these wheel technology limitations. Cretan potters were thus able to produce pots of almost any size, ranging from the very small cup to the 70 cm large storage jar by using either wheel-throwing (small vessels only) or wheel-coiling (any size). To the uninstructed eye, the latter pots would give the appearance of having been wheel-thrown in one piece, when in fact they are based on the coiling technique with rotation applied at different moments during the manufacturing sequence. These conclusions are fully and unanimously supported by the evidence from my own X-radiography project of Cretan vessels as well as an analysis of published pottery assemblages from Crete (Berg 2009). Without exception, all findings indicate that wheel-throwing was reserved for small vessels while wheel-coiling was used for all vessel sizes.

<table>
<thead>
<tr>
<th>Catalogue No.</th>
<th>Technique based on X-radiography</th>
<th>Technique based on visual inspection by author</th>
<th>Technique given in original publication</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Coiled (and wheel-shaped)</td>
<td>Uncertain</td>
<td>Wheelmade</td>
</tr>
<tr>
<td>17</td>
<td>Drawn, coiled (and wheel-shaped)</td>
<td>Handmade and wheel-shaped</td>
<td>Wheelmade</td>
</tr>
<tr>
<td>57</td>
<td>Coiled</td>
<td>Coiled</td>
<td>Wheelmade</td>
</tr>
<tr>
<td>63</td>
<td>Moulded or pinched (and wheel-shaped)</td>
<td>Moulded and wheel-shaped</td>
<td>Wheelmade</td>
</tr>
<tr>
<td>71</td>
<td>Coiled (and wheel-shaped)</td>
<td>Coiled and wheel-shaped</td>
<td>Wheelmade</td>
</tr>
</tbody>
</table>

Table 1: Comparative identification of primary forming techniques by X-radiography and visual inspection.

Thus, the invention of the wheel-coiling technique in Bronze Age Crete and its continued use over many centuries should be considered a clever solution to a technological problem rather than as an indicator of semi-competence whereby wheel-throwing is seen as the pinnacle of achievement. With potting having been a specialist production activity since at least the Early Bronze Age, this ingenious technique pays tribute to the skill and experience of the potters.

Bibliography


SOCIAL APPROACHES IN POTTERY DISTRIBUTION NETWORKS: THE CASE OF UPPER EAST GHANA

M. Calvo1, K. Gavua2, J. García Rosselló1, D. Javaloyas3, D. Albero1

1Arqueobalear Research Group, University of the Balearic Islands, Spain
2Department of Archaeology and Heritage Studies, University of Ghana

This paper is part of the Archaeology in the Upper White Volta (Ghana NE) project1. The project is a comprehensive ethnoarchaeological study that includes, among other things, the analysis of multiple aspects related to the production, distribution and use of ceramics. The study area is centred in the districts of Bunkpurugu-Yunyoo and Garu-Tempane, in northeast Ghana (Fig. 1). Different ethnic groups with varying cultural and linguistic characteristics (Mamprusi, Kusasi, Fulani, Komba, B’Moba and Busanga) live together in this region.

Pottery distribution studies have usually been focused on the economic value of the products (Vossen 1984), means of transport and communication (Vander Linden 2001), labour organization (Arnold III 1991, Costin 1990), or in the technological and typological characteristics of pots (García Rosselló 2008). From an ethnoarchaeological point of view, our work here attempts to emphasize how other variables, such as social relationships and ideology, are also involved in the creation of complex pottery exchange networks. These aspects are essential to achieve a deeper understanding of how north-eastern Ghanaian communities produce and use ceramics.

In our case study the variables which simultaneously influence vessel distribution and consumption patterns are multiple: infrastructure of mobility (roads, means of transport), scale of production and qualities of pots, labour organization, territoriality and settlement (Fig. 2). Nevertheless, social and familial relationships, and also different social perceptions established between the various ethnic groups, are active agents that determine the distribution areas, networks and trade systems as well as the choices of consumers.

Only Komba and Kusasi women produce and distribute pottery. However, the consumer group is much larger, encompassing all ethnic groups living in the area, about 5000 km² (Figure 1). In this regard, we have to take into account: 1) the mechanisms underlying the establishment of distribution networks and 2) the existing exchange types. Both show two different strategies depending on whether they are Komba or Kusasi products.

Distribution patterns of Komba ceramics and types of exchange

The Komba production area is characterized by footpaths, a dispersed settlement with low population density and limited markets that are not too large. Mobility in the area is thus restricted, especially in the rainy season (from May to September). Also, the fabrication technology results in a reduced volume of production. All this restricts the pottery distribution area mainly to around production sites and nearby markets. In this context, we can establish two kinds of exchange: 1) the first is direct sale at markets, where the non-producer groups acquire the ceramics. 2) The second relates to social networks and family connections whereby sale is made directly at the production site on previous request. Sometimes, this kind of interchange can exceed those limits as discussed below.

Distribution patterns of Kusasi ceramics and types of exchange

The Kusasi production sites are located near to the Garu and Tempane markets. Gravel and partly-asphalted roads comprise infrastructure relating to mobility. This allows motor vehicle traffic all the year. The roads permit the transport of pottery by inter-city buses and trucks (Fig. 3a). At the same time, fabrication technology and the organization of labour enhance the production of a larger volume of pottery in a shorter time and a continuous supply of ceramics in a relatively large area. More vessels are therefore distributed in the Kusasi area than in the Komba area.

These factors have determined the existence of more dynamic and complex types of exchange. We have documented the presence of intermediaries and a system of direct selling in the markets, characterized by partnerships among potters. The distribution network is at two levels: the first one from the production site to nearby markets often using donkey-drawn carts (Fig. 3b), and a second level from the main market (Garu) to other markets, such as Nakpanduri, using motor vehicles.

In this sense we can identify and define the following exchange strategies:
1) Direct sale in markets: potters sell their products in the Tempane and Garu markets where they collectively set up selling points according to their area of origin and the types of the vessels they sell. Also, some potters individually sell their pots together with processed or agricultural products.
Figure 1: Geographic location of the studied area within north-east Ghana.
2) Sale in the production site: in this case intermediaries connected by family ties with potters acquire the vessels at the production site. Repeatedly, women of non-producing areas buy all the ceramics they need directly from potters who have contact with them through family ties.

3) Sale in markets by intermediaries: women, who were once potters but no longer make pots, or whose relatives are potters, often serve as intermediaries. They buy the products directly from potters and redistribute them in major markets like Nakpanduri, Garu, Bawku, and Binduri (Fig. 3c).

4) Sale from intermediary to intermediary: In some cases the intermediaries engage in the distribution from a stall in the main market of Garu where intermediaries from other localities, including Binde and Nagpanduri, purchase vessels to sell in communities where they live.

Discussion
Several scholars have argued that in semi-domestic production contexts, geographical proximity determines the distribution of pottery in a territory, both in the way it is distributed and its degree of variability (Arnold 2000; Livingstone-Smith 2000; García Rosselló 2008). However, as pointed out by Vander Linden (2001), approaching the understanding of ceramics distribution from only this viewpoint is reductionist. This point is reflected perfectly in the territory studied. Although the Komba production and distribution centres are located near the Mamprusi area (less than 30 km), the majority of pottery consumed by the Mamprusi is of Kusasi, and comes from more distant centres (Garu > 50 km, or Bawku > 80 km). This shows that other factors, such as social and family relationships, and consumer preferences, are affecting the distribution of ceramics.
Figure 3: A and B) Infrastructures of mobility: inter-city trucks and donkey-drawn carts (Gane). C) Direct point of sale in the market of Binduri. D) Komba pottery set belonging to a woman and acquired at the time of marriage (Tambi).

As an illustration of this dynamic we analyse two examples: family interactions in the acquisition of ceramics, and the influence of social value of ceramics on distribution.

Beyond pottery used daily for food preparation and consumption, the women of our study area own a set of large vessels in which they keep their personal belongings and store grains. The women usually acquire such ceramics in their birthplaces, have strong identity relationships with the vessels, attach high symbolic value to them, and hence use them throughout their lives. The pottery set is acquired by a bride or by her parents at the time of marriage, either when the bride moves to the husband’s home or after she gives birth to her first child. This is a clear example in which pottery distribution is articulated through social networks and not by geographical, economic, or mobility variables.

The second example relates to the different perceptions that consumers have of Komba and Kusasi ceramics. The former are considered by consumers to be heavier, rougher and more fragile than the latter. Nevertheless, our analyses show that differences between both types of pottery are not large enough to support this view. Consumer preferences appear to be connected rather to the complex social, political and economic relationships established between the different ethnic groups. The rest of the ethnic groups in the study area often perceive the Komba people as traditional in their way of life and see their pottery in this light. This may partly explain the limited distribution and acceptance of Komba ceramics in the area.

We have attempted to show in this discussion that the variables involved in pottery movement and distribution are significantly complex and interconnected. Therefore, we cannot, as a general rule, account for the distribution of non-standard and semi-domestic pottery on the basis of only low mobility and strict local character. We must also consider that social relationships play a major structuring role in the formation of exchange types, organizational systems and scale of pottery distribution. Within the same territory, therefore, there may be different, overlapping and constantly changing distribution patterns.


References
**CONFERENCE DIARY**

**GlobalPottery 1st International Congress on Historical Archaeology and Archaeometry for Societies in Contact**  
**Barcelona, Spain 7th-9th May, 2012**

Up to now, there has been an important gap in the scholar community where specialists could discuss and define new trends on the field of ceramic studies in Historical Archaeology for societies in contact. This gap is even more evident considering the limited number of projects embracing archaeological and archaeometrical methodologies that could serve for the development of interdisciplinary based knowledge.

The aim of GlobalPottery is to fill this gap, providing scholars with a specialized international forum that deals with Historical Archaeology ceramic studies, primarily including the so-called topics of Post-Medieval Archaeology and Later Historical Archaeology or Industrial Archaeology.

More information about the conference can be found at: [http://globalpottery.ub.edu/](http://globalpottery.ub.edu/).

---

**Vienna II: Ancient Egyptian Ceramics in the 21st Century**  
**Vienna, Austria 14th - 19th May, 2012**

The scope of the conference is Egyptian pottery from the Neolithic to the Late-Roman Period, in Egypt as well as in neighbouring countries (Sudan, Palestine etc.). The focus is on new research and interdisciplinary approaches as well as scientific analysis are especially welcome.  
More information about the conference can be found at:  
[http://www.univie.ac.at/egyptology/Konferenz.html](http://www.univie.ac.at/egyptology/Konferenz.html)

---

**39th International Symposium on Archaeometry, “50 years of ISA”**  
**Leuven, Belgium 28th May - 1st June, 2012**

The aim of the Symposium is to promote the development and use of scientific techniques in order to extract archaeological and historical information from the cultural heritage and the paleoenvironment. It involves all Natural Sciences and all types of objects and materials related with human activity.  
More information about the conference can be found at:  

---

**OLD POTTER’S ALMANACK**

The deadline for copy for the next issue of the OPA is 31st March, 2012. Copy should be sent to the Hon. Editor:

Michela Spataro  
Hon. Editor of OPA  
Science Group  
Dept. of Conservation & Scientific Research  
British Museum  
London WC1B 3DG

Email: mspataro@thebritishmuseum.ac.uk

**Production Editor:**

Susan Pringle  
195 Ruskin Park House  
Champion Hill  
London SE5 8TN

Email: susan.pringle@lineone.net
Ceramic Petrology Group (CPG) Hon. President:
Louise Joyner

Ceramic Petrology Group (CPG) Hon. Treasurer:
Caroline R. Cartwright
Dept. of Conservation & Scientific Research
British Museum
London WC1B 3DG

CPG Hon. Secretary:
Alice Hunt
Institute of Archaeology
University College London
31-34 Gordon Square
London WC1H 0PY

Email: alice.hunt@ucl.ac.uk

ALL MEMBERSHIP ENQUIRIES SHOULD BE SENT TO ALICE HUNT

Prehistoric Ceramics Research Group (PCRG) Secretary:
Sarah Percival
NPS Archaeology
Scandic House
85 Mountergate
Norwich NR1 1PY

Email: sarah.percival@nps.co.uk

WEBSITES

Ceramic Petrology Group
http://www.ceramicpetrology.uklinux.net/

Prehistoric Ceramics Research Group
http://www.prehistoric-ceramics.org.uk

PCRG Treasurer:
Sandy Budden
Archaeology
University of Southampton
Avenue Campus
Highfield
Southampton
SO17 1BF

Email: S.A.Budden@soton.ac.uk

THE OLD POTTER'S ALMANACK is the joint letter of the Ceramic Petrology Group and the Prehistoric Ceramics Research Group. Please address any enquiries regarding OPA circulation to: Michela Spataro, Dept. of Conservation & Scientific Research, British Museum, London WC1B 3DG
email: mspataro@thebritishmuseum.ac.uk

Copy for future issues should be sent to her as Hon. Editor of the OPA.

All other enquiries should be sent to the relevant contact person in either the CPG or the PCRG as listed above.