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Late Roman Coarse Wares, Cooking Wares and Amphorae in the Mediterranean

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This paper will examine the relationship between shapes, functions and fabrics of Late Antique Near Eastern ceramic through the case study of a Northern Syrian cooking ware, the so-called Brittle Ware. Since the Hellenistic period, Eastern Mediterranean cooking wares share common characteristics in shapes and fabrics. Vessels are wheel-thrown, with thin walls and globular in shape for the closed vases. Fabric consists of iron-rich clay, red or black in colour, with abundant mineral inclusions. Brittle Ware also shares these technical and morphological features with the cooking wares from the neighbouring areas. It is furthermore widely distributed and produced by several workshops from the Roman to the medieval period. Therefore, this paper will explore different questions raised when examining such a long-lasting production. The main issue concerns the debate on technological properties of cooking pottery: can the technological homogeneity observed in the Levant reflect a deliberate choice, answering physical necessity? Theoretical archaeometric studies will be briefly reconsidered and confronted with anthropological and archaeological works. In addition, the alternative choices existing in terms of raw material nature and preparation will be examined by reviewing the cooking ware traditions in Syria before and after the Brittle Ware. This paper will draw attention to the contradictions stemming from theoretical studies on technological properties of cooking wares and stress the importance of the geographical and social environment on the technological choices.

KEYWORDS: COOKING WARE, BRITTLE WARE, SYRIA, NEAR EAST, LATE ANTIQUITY, FABRICS, TECHNOLOGICAL CHOICES, PHYSICAL PROPERTIES, SOCIO-CULTURAL ENVIRONMENT, ALTERNATIVE CHOICES, PRODUCTION AND EXCHANGES.

INTRODUCTION

This paper will explore the relationship between shapes, functions and fabrics of Late Antique Near Eastern ceramic through the case study of a Syrian cooking ware, the so-called Brittle Ware. Late Antique Eastern Mediterranean cooking wares share common characteristics in shapes and fabrics. Since the Hellenistic period, cooking vessels are wheel-thrown, globular in shape (for the closed vases), with thin and often ribbed walls. Fabric consists of iron-rich clay (that is a clay that will fire red in oxidising atmosphere or black in reducing atmosphere), with abundant mineral inclusions. The Brittle Ware does not stand as an exception to this phenomenon: it is mainly red in colour, the fabric is sandy and the cooking pots are globular with corrugated, thin walls. Brittle Ware is furthermore highly standardised and widely distributed. Therefore, the study of this long-lasting production brings us to the question of standardisation and technological choices in the manufacture of cooking wares.

The influence of nature versus culture on the technological choices is a long-debated issue among anthropologists (Lemonnier 1993). The so-called techno-functionalist approach according to which technological behaviours are driven by physical necessities and tend to develop linearly towards the most performing technological achievement is now strongly criticised (van der Leeuw 1993; Gosselain 1998, 2002; Loney 2000 and Berg 2007). Therefore, bringing the subject of cooking wares technology might appear as flogging a dead horse to more than one anthropologist. Nevertheless, I believe worth examining it in this book devoted to Late Antique common wares, cooking wares and to “archaeometric studies”, by qualifying the theoretical views with information collected from the anthropological and ethno-anthropological works. Given their historical background, classical anthropologists, as opposed to prehistorians, more rarely turn towards anthropology. Moreover, pottery technology is sometimes still considered as a specific “scientific field”. This is due to the fact that technological analyses are in the hands of specialists in laboratory because of the specific skills and equipment they require. As a consequence, fabric analysis remains mainly confined to provenance study and too often consists of a technological appendix to the main typological work. However, determining the type of clay used in pottery, enable us to reconstruct the first step of the pottery manufacturing process (chaîne opératoire): the raw material selection and preparation. This first stage should be examined as part of a whole process and should not be separated from the shaping of the vessel (or its typology). Although it might be difficult to make direct comparisons between e.g. modern artisans in Cameroon or Mexico and Roman pottery, we should keep in mind that anthropological studies demonstrated that practices and technical behaviours are a way of investigating the historical, economical and cultural environment. Therefore, there is more to learn of clay analysis than the provenance sources or their physical properties.

I shall thus examine here the technology of Late Antique cooking wares, by comparing the archaeological facts viewed at different geographical and temporal scales with the theoretical studies and the anthropological works on pottery technology.

1. BRITTLE WARE, COOKING WARE OF SYRIA

Brittle Ware is the cooking ware of Syria from the Roman (ca. 1st c. A.D.) to the Abbasid period (ca. 10th c. A.D.). It can be defined as a mass production, characterised by its shapes, its distribution and its fabrics. The repertoire consists of open and closed vases for the preparation of stewed or boiled meals, as well as jugs. The distribution of Brittle Ware corresponds approximately to the inner part of the Roman and Byzantine provinces of Syria, comprising thus modern Syria, Southern Turkey and North-Western Iraq. It is absent from the coast and from Southern Syria. There in the Hauran, a local production
using basaltic clay has been identified. It is moreover characterised by a totally different repertoire, more similar with that of Northern Jordan (Wilson and Sa’d 1984; Orssaud 1985). From the published data, Brittle Ware appears to be the only cooking ware produced and used in Inner Syria, from the 3rd c. A.D. probably to at least the end of the Umayyad period.

Reperoire and distribution

The diversity of the Brittle Ware repertoire and its chronology reflects the current state of the archaeological publications in Syria. Several sites have a well-documented terminus ante quem provided by the Sassanian attacks from the mid 3rd c. A.D. (Zeugma, Dura-Europos or Ain Sinu), while most of the major excavation sites gave mainly 6th-7th c. A.D. occupation and destruction levels (Apamea, Dehes, Andarin, Dibsi Faraj, Resafa, Halabiyya, etc.). Early Roman occupation levels, as well as 4th c. ones, remain poorly documented. Nevertheless, it is possible to draw a rough sketch of the Brittle Ware evolution.

The first clearly attested Brittle Ware form appears in the course of the 1st c. A.D. It is a cooking pot with a triangular rim and angular handles, known from Apamea and Dibsi Faraj (Fig. 2.1 and also Schneider et al. 2007, 718, fig. 4, 2) but also in Qara Qozaq on the Euphrates (González and Matilla 1994, fig. 3, 5) and in Resafa (Konrad 2001, pl. 84, 2).

From the 3rd c. A.D. onwards, shapes are standardised and the same kitchen set is found on many contemporary sites from inner Syria. The Roman repertoire, dating from the 3rd and probably 4th c. A.D., consists of a cooking pot, a casserole and a jug (Fig. 2). The cooking pot is globular in shape, with an everted rim and two handles starting from the mouth (Fig. 2.2). The casserole is characterised by a carinated body. A frequent type shows a plain rim with a grooving (Fig. 2.4), a second has a horizontal and elongated rim (Fig. 2.3). The typical jug has a pear-shaped body and a corrugated, convex neck (Fig. 2.7). This cooking set is known among other sites- from Zeugma (Gschwind 2006, fig. 14, 3-4, fig. 15, 5 and fig. 16, 5; Martz 2007, fig. 1, fig. 2, 14, 16 and fig. 2, 12), Aleppo (Schneider et al. 2007, fig. 4, 3; Tell Sheikh Hassan (Bartl 1999/2000, fig. 12, 2-4 and 1), Dibsi Faraj (Harper 1980, fig. C. 54; Schneider et al. 2007, fig. 4, 4), Resafa (Konrad 1992, fig. 8, 15), Dura-Europos (Dyson 1968, fig. 14, 433 and 426, fig. 19, III.D4, III.B2 and III.C10), Tell Barri (Amodoi 2007, fig. 1, Tipo IVF, fig. 7, Tipo IA and fig. 5, Tipo VA), Ain Sinu (Oates and Oates 1959, pl. 58, 81-84, 77-79 and 85) and Tell Sheh Qubba (Campbell 1989, fig. 5. 5, 59 and 61). On some 3rd c. A.D. sites, a flat-bottom dish is also found (Fig. 2.5-6). It is shallow and has a flat base with a moulding at the junction with the wall, the latest being either plain or ribbed, e.g. in Zeugma (Gschwind 2006, fig. 13, 3-6 and Martz 2007, fig. 2, 23), in Tell Ahmar (Wightman 1990, fig. 50, 5) and in Dura-Europos (Dyson 1968, fig. 19, 1-2).

While the 5th c. A.D. types are not well-known, apart from a carinated cooking pot (Fig. 3, 1), the typical 6th and 7th c. A.D. repertoire also consists of a complementary set with a cooking pot, a casserole and a jug (Fig. 3). The most common cooking pot has a long neck with either a triple folded rim (Fig. 3, 3) or a triangular rim (Fig. 4, 1). Since the 5th c. A.D., the handles are attached to the shoulders. The typical casserole is hemispherical with a triangular rim and two grooves below it (Fig. 3, 2), while the most common jugs have an elongated shape with a folded rim (Fig. 3, 4) or a globular body with a tubular neck and a concave rim (Fig. 3, 5). Once again, these types are widely found on 6th c. sites such as Zeugma (Martz 2007, fig. 1, 8-10), Dehes (Orssaud 1980, fig. 307, Types 5a-5b, 8 and 9; fig. 308, Type 3a), Apamea (Vokaer 2007, fig. 2) Andarin (Vokaer 2007, fig. 2), Dibsi Faraj (Harper 1980, fig. C, 56 and fig. D, 62-64; Vokaer 2007, fig. 2), Halabiyya (Orssaud 1991, fig. 122, 16-18 and 20) or Resafa (Konrad 1992, 332 fig. 8, 1-6) (see also distribution map in Vokaer 2007, fig. 4). At Apamea, one also finds a type of frying pan (Fig. 3, 6). So far, this type does not seem to be present on other sites, but it remains difficult at this stage to explain this difference.

Some forms of the Byzantine cooking set, such as the globular cooking pot with a triangular rim or a triple folded rim, are still produced at the beginning of the Umayyad period (Fig. 4, 1). A slightly different type is characterised by a more elongated neck and less rounded handles (Fig. 4, 2), while the hemispherical casserole has now a rim that is concave on the top (Fig. 4, 3). At the end of the Umayyad period or at the beginning of the Abbasid period, a new type of cooking pot appears. It is usually called holemouth pot, given the absence of a neck (Fig. 4, 4-5). Some exemplars have a square shape and vertical walls that highlight the resemblance with soft-stone vessels from the same period (Fig. 4, 6) (see below). At the Abbasid period, the distribution of the Brittle Ware is even wider than during the Byzantine period. The typical holemouth pot is indeed found from Tarsus in Turkey (Toskay Evrin 2005, fig. 2 type 2) to Abu Sarifa in Southern Iraq (Mc Adams 1970, fig. 5; see also distribution map in Vokaer 2007, fig. 5).

If we now consider the technological aspects of the Brittle Ware, a similar standardisation can be observed. Brittle Ware is manufactured in several workshops, mostly located in Western Syria. The term workshop should be understood with its broadest meaning and could also designate several nucleated workshops working in one area. At least three important workshops were active during the Roman, Byzantine and Early Islamic periods. They produced the same shapes (the kitchen sets) and sold these mostly to the same markets. The Roman workshop, Workshop 3 was identified on several sites from Zeugma, Dibsi Faraj to Ain Sinu (Schneider et al. 2007, 717-718, for Zeugma see Martz in this volume). The clay is rather rich in iron and composed of a large mineralogical cortege that can be associated with the Euphrates sediments. Inclusions are naturally present. Workshop 1 is the most widely distributed, active from the Roman to the Abbasid period (Schneider et al. 2007, 718-719 and Vokaer 2007, 704, see also Martz in this volume). Workshop 4 is active from the Roman to the Mameluk period but mainly distributes its Brittle Ware in the region of Apamea (Schneider et al. 2007, 718-719 and Vokaer 2007, 704). Finally, Workshop 6 mainly produces during the Umayyad and Abbasid times (Schneider et al. 2007, 718-719 and Vokaer 2007, 704). As opposed to Workshop 3 products, which are red-brownish in surface with minerals of various colours, vessels from Workshops 1, 4 and 6 cannot be differentiated by eye and use the same type of clay (a terra rossa, derived from the weathering of a limestone, with quartz). Nevertheless, Workshops 1, 4 and 6 show distinct chemical compositions and differ petrographically by the shape, the size and the sorting of the quartz inclusions (Schneider et al. 2007, 716-717 and Vokaer 2007, 702-704).

Brittle Ware originates thus from several workshops in Western Syria and along the Euphrates, that used two types of raw material: terra rossa and alluvial clays from the Euphrates. Although these “workshops” have not be uncovered yet, they shared a common “savoir-faire” in the shaping and firing techniques, so that all products display a very similar visual aspect. These workshops manufactured a well-standardised, widely distributed product that reached the limits of the Roman
Empire. Furthermore, Brittle Ware had the monopoly of the Syrian market during the Roman and Byzantine periods. The large distribution and long-standing success (a thousand year for Workshop 4) of an utilitarian product offers an image contrasting with the primitivist idea of non-luxurious artefacts produced and distributed locally. In the case of Brittle Ware, one must now understand how this phenomenon can be explained with a socio-cultural and economical perspective. In order to do so, one must consider the case of Brittle Ware at a wider geographical and chronological scale. Therefore, my first approach will consist in characterising the cooking wares productions around Syria during the Roman and Byzantine periods.

2. COOKING WARES PRODUCTION IN THE LEVANT DURING ANTIQUITY

Although Brittle Ware can be seen as a typical Syrian product, it belongs to a wider cooking ware tradition that can be followed in the whole Eastern Mediterranean. Similar cooking vessels, characterised by iron-rich clay with abundant mineral inclusions, are manufactured and used in many regions of the Late Antique Near East (see also Reynolds and Waksman 2007 for a discussion on the evolution of the cooking wares shapes). I will present here a selection of some productions, focusing on those that are clearly associated with a “workshop” such as, Dhiorias in Cyprus, Beirut in Lebanon, Aqaba and Jerash in Jordan and Kefar Hananya in Israel. I do not aim at presenting here a detailed synthesis on cooking ware production in the Levant and one should therefore keep in mind that other local productions have been identified in these various regions.

2.1. Cooking wares in Lebanon

Cooking ware production is attested in Chhim (see this volume) and in Beirut. There, local manufacturing of common wares and cooking wares has been identified since the Hellenistic period, but the workshops have not been discovered yet (Aubert 2002, 74 and Pellegrino 2007, 145-147). Beirut production is characterised by the use of iron-rich clay (terra rossa?) with variable amounts of poorly-sorted quartz and lime (Reynolds and Waksman 2007, 61). The Hellenistic production seems to be a slight increase in reduced-fired wares. According to A. Vokaer (2007, 147), while the existence of a Byzantine local production was chemically confirmed by Y. Waksman, some cooking vessels matching medieval pottery found in kilns (François et al. 2003, 327-329 and Waksman et al. 2003, 318).

The Hellenistic and Roman repertoire consists of globular cooking pots of varying sizes with handles on the rim and a rounded bottom, large ledged casseroles with an elongated rim and a rounded bottom and flat-bottomed cooking dishes (Reynolds 1997-1998; Aubert 2002 and Pellegrino 2007) (Fig. 5, 1-4). The cooking dishes seem to be locally produced and are already found in contexts from the end of the 2nd c. and the beginning of the 1st c. B.C. (Aubert 2002, 79). E. Pellegrino (2007, 151) notices that the shape is a clear imitation of Campanian types and is found as early as the Augustan period. The Byzantine repertoire locally produced is also composed of cooking pots and casseroles. One finds neckless cooking pots with a thick rim or collar-rim cooking pots and sliced-rim casseroles, the latest type being also known among the imported productions, from the 3rd c. A.D. onwards (Reynolds and Waksman 2007, 64).

The location, size and number of the workshops as well as the distribution of Beirut cooking ware (did it only supply the city?) are unknown. It seems that, in Beirut during the Roman period, the local production composes most of the common wares repertoire (Pellegrino 2007, 147) while, from the 4th c. A.D. onwards and mostly during the 6th and 7th c. A.D., imported cooking wares are present in greater number (Reynolds 2003, 542; Reynolds and Waksman 2007, 61). Among them, stands out “Aegean” cooking wares (Waksman and Tréglia 2007), but especially a group defined as “Workshop X”, probably originating from Northern Palestine and widely represented within the assemblages (Waksman et al. 2005, 311; Reynolds and Waksman 2007). Although this goes beyond the topic of this paper, it is worth noting that “Workshop X” also exported some of its products in Syria, since it has been found in several 6th and 7th c. A.D. levels, at Apamea, Andarin and Dibsi Faraj (see Workshop 5 in Vokaer 2007, 704).

2.2. Cooking wares in Palestine

Palestine has the best-documented cooking ware production site, thanks to the work of D. Adan-Bayewitz (1993 and 2003) that successfully combined scientific analysis with archaeological and historical data. From the mid 1st c. BC to the early 5th c. A.D., cooking ware was produced in the village of Kefar Hananya in Upper Galilee. Several kilns, clay pits and thousands of misfired vases were found on the site. It thus appears that the village was specialised in cooking ware production. The repertoire is composed of the usual and complementary cooking vessels, jugs and of one type of storage jar. We find globular cooking pots, deep and carinated casseroles and dishes with flaring walls (Fig. 5, 5-7). The raw material used consists of a local terra rossa naturally mixed with dust-blown sand (quartz). Although with a different origin, the fabric is visually similar to the Brittle Ware group 1.

Kefar Hananya distributes its ware in several cities and neighbouring villages, supplying both Jewish and Gentile consumers as far as the northern coast of Palestine and the Golan. As we move away from the production site, other cooking wares replace the Kefar Hananya Ware (Adan-Bayewitz 1993, 212-213). The author has indeed identified a production centre in the Golan, manufacturing vessels similar to the Galilean types but distributed on a much smaller scale (Adan-Bayewitz 1993, 170).

2.3. Cooking wares in Jordan

Few productions sites are published in Jordan. Pottery kilns were found in Jerash, dating to the end of the Byzantine and to the Umayyad period (Ball et al. 1986; 355-356; Gawlikowski 1986, 117-118 and Uscatescu 2003, 553). They contained various vessels types and among them several cooking pots and pans with lids. The vases are made of iron-rich, fine clay with abundant quartz (Schaefer and Falkner 1986, 429). Among them, one recognises the sliced-rim casserole (Fig. 5, 10) and a straight collar cooking pots with handle attached to the rim. Most of the shapes do not change from the Byzantine to the Umayyad or even to the Abbasid period, although there seems to be a slight increase in reduced-fired wares. According to A. Uscatescu, Jerash productions which also comprise lamps and fine wares, are also found in Amman, Mt Nebo, Madaba or Pella (Uscatescu 2003, 553; for Pella see also Watson 1992, 237).

Umayyad pottery kilns were also uncovered in Aqaba and contained cooking vessels similar in shape to those from Jerash and described as made in red firing clay (Melkawi et al. 1994). Among them, one finds the sliced-rim casserole with its lid. Finally, let’s also mention that Byzantine cooking vessels made of iron-rich clay with well-sorted sand was recognised in Deir Ain Abata (Monastery of St Lot), but the origin of the production remains unidentified so far (Joyner 2005, 553).
2. 4. Cooking wares in Cyprus

Dhiories in North-Western Cyprus was excavated in the sixties. Several pottery kilns and associated structures (clay pits, storage areas) were found and dated to the 7th and 8th c. A.D. It seems that the site was essentially devoted to the production of cooking wares (Catling 1972). The clay fabric is described as “granular” and mainly red in colour (Catling 1972, 58). The repertoire is composed of globular cooking pots with a sagging base, deep casseroles, frying dishes, lids and potstands (Fig. 5, 8-9). The distribution of Dhiories production is unknown.

In summary, Roman and Byzantine (and even Early Islamic) cooking ware productions in the Levant tend to use a similar raw material and to share a common technology. Vessels are all made of red-firing (non-calcareous) clays with abundant mineral inclusions (usually quartz). Although their colour can fluctuate in hue, most of the cooking wares are very similar to the Syrian Brittle Ware, hence the confusing term “Brittle Wares” sometimes used for several cooking wares traditions in the Levant (Bartl et al. 1995, Reynolds 2003 or Schneider et al. 2007). On the contrary, the shape repertoire varies according to the areas studied. None of the neighbouring areas possess the same types as the Brittle Ware and, inversely, the Brittle Ware repertoire, especially in the Byzantine period, is different from the surrounding regions. One type however, the sliced-rim casserole, is common to several regions and is manufactured by different workshops in Jordan and Lebanon and Palestine (“Workshop X”). This casserole is also manufactured by Brittle Ware Workshop 1, but only rarely found on Northern Syrian sites.

It appears in conclusion that the use of an iron-rich and sandy clay, fired preferably in an oxidising atmosphere stands as the favourite recipe during Antiquity in Syria, Cyprus, Lebanon, Jordan and Palestine. Can this homogeneity be explained by technical reasons? Is iron-rich, sandy clay the best material to make cooking pots? Was this deliberate technological choice answering to physical necessities?

3. PHYSICAL PROPERTIES OF COOKING POTS

Most of the studies on cooking ware technology investigate the efficiency of their physical properties. Of all the categories of vessel, cooking wares present indeed the closest relationship between shapes and function. Because of their regular use on the fire, cooking pots are subject to repeated variations of temperatures. It is usually said that an efficient cooking pot requires two specific properties: resistance to thermal shock and heating efficiency. According to certain authors, successive heating and cooling would require specific shapes, fabrics and/or firing procedures. Therefore, the physical properties of cooking pots have been the subject of many studies in archaeometry (for Neolithic Near Eastern cooking wares see Le Miére and Picon 1999, for the Bronze Age see Schneider 1991 and Broekmans et al. 2004, for Brittle Ware see Bartl et al. 1995, 171-172 and Daszkiewicz et al. 2000 and 2007). Most of these studies were undertaken on the basis of experimental work in laboratory and not on ethnographic observations. We do not know, for instance, the range of temperatures that cooking pots undergo when used in a “traditional kitchen” (Gosselain 2002, 9), which in my opinion, casts some doubts on the efficiency of the laboratory tests on thermal shock resistance all the more so temperatures reached with a kitchen fire would never exceed the temperature of the original pottery firing.

3.1. Thermal shock resistance

Thermal shock resistance is the ability of a pot to withstand repeated cooling and heating. Heating a vessel creates differences in temperature between the inner and outer surfaces, which provokes stresses and possibly cracks. Several factors influence resistance on thermal shocks: the shape of the vessel; the porosity; the inclusions (size, distribution and nature) and the nature of the clay (Rye 1976, 114 and 1981, 27; Bronitsky and Hamer 1986; Picon 1995, 283-284; Schneider 1991, 106; Tite 1999, 219-220 and Desbat and Schmitt 2003, 8 and 54).

Non-plastic inclusions and clays

It is often said that the non-plastic inclusions should be abundant, naturally present in the clay or added as a temper (Picon 1995, 283; Le Miére and Picon 1999, 17; Woods 1986, 170; Desbat and Schmitt 2003, 8 and Ikhéime 2005, 510). Some scholars add that the inclusions could be a source of stress if their thermal expansion is higher than that of the clay (Rice 1987, 229 and Tite et al. 2001, 316). O. Rye even provides a list of the “best temper” among which one finds grog, calcite, shell, zircon, rutile, feldspars and hornblende (Rye 1976, 116-117). Calcite, as one knows, needs specific treatments because it decomposes above 700°C into calcium oxides, while quartz, according to others, should be excluded due to its transformation from quartz α to quartz β above 573°C, provoking a large volume expansion (Rye 1981, 27 and 34; Schneider 1991, 106). Next to grog, having of course the same thermal expansion as the clay, shell is considered as the best temper because of its flat shape (for references, see Tite 1999, 219). As to the nature of the clay, one reads that calcareous clays should be avoided because of their high thermal expansion coefficient due to the decomposition of calcite or that they should be fired at a low temperature with abundant temper (Picon 1995, 284; Tite et al. 2001, 320 and Desbat and Schmitt, 2003, 8). Calcareous clays fired at high temperatures have a high thermal expansion coefficient and are moreover believed to be too rigid in texture (Picon 1995, 284) Non-calcareous (if not fired too high) and kaolinitic clays are considered as the most efficient materials for cooking wares (Picon 1995, 284; Desbat and Schmitt 2003, 8 and Waksman et al. 2003, 317).

Vessel’s shape

Vessel should not have sharp changes in the orientation of the walls. Rounded shapes and thin walls are more appropriate (Tite et al. 2001, 316). Nevertheless, if the matrix has a lot of inclusions and is low-fired, the pottery should then have thick walls in order to reduce mechanical stress and the risk of breaking (Le Miére and Picon 1999, 17). Let us point out however that thick walls are more subject to thermal differences and then more stresses.

Porosity

High porosity (open clay texture) decreases the stresses and prevents the propagation of the cracks. Organic temper would be the best way to create voids but a flexible texture can also be obtained by low firing (Picon 1995, 283; Le Miére and Picon 1999, 17).

3.2. Heating efficiency

Heating efficiency requires a good thermal conductibility. But as rapid heating also means rapid cooling, some authors - as O. Rye (1981) - advocate then “intermediate conductibility”, without defining how to obtain it. Thin walls tend to provide a high conductivity (Rice 1987, 227, and 229) and so does a dense and vitrified body (Hamer and Hamer 1997, 337 and Ikhéime 2005, 511). However, a dense body does not allow for
a good resistance to thermal shocks. Finally, corragulation of the surface enables a better absorption of the heat, but also induces a weakness to thermal shocks.

In summary, it is first striking that laboratory experiments seem to be more deriving from material sciences applied to archaeological contexts than the results from experimental archaeological studies. The surface enables a better absorption of the heat, but also induces a good resistance to thermal and mechanical shocks. Resistance to thermal shock is inversely proportional to the physical strength of a pot (Schiffer and Skibo 1987, 599; Picon 1995, 284 and Hamer and Hamer 1997, 233). Heating efficiency (conductibility) and resistance to thermal shocks also need opposed requirements. To obtain an ideal cooking pot with good resistance to thermal and mechanical shocks, the potter would have to choose between one or another technical property. Therefore, choosing one technique over the other does not only depend on an ideal technical performance: socio-cultural factors intervene in the decision.

4. COOKING POTS STUDY IN ETHNOGRAPHY AND ARCHAEOLOGY

Theoretical and experimental studies indicate that various- and often contradictory- elements are required to make a "good" cooking pot. But the characteristics of cooking vessels in archaeology seem to encompass a variety of features whose raison d’être should not be necessarily be sought in terms of efficiency and technicality. Although the existence of technical constraints cannot be denied, we should keep in mind that, as demonstrated by ethn-archaeological studies, these are much more flexible than expected. Furthermore, some technological practices, that are obviously less successful than others, sometimes persist, despite the knowledge of existing alternatives (Lemonnier 1993). Unlike the tenants of a theoretical approach, researchers using ethnographic data stress the fact that technological choices depend on the geographical and social environment (van der Leeuw 1993; Gosselain 1998 and 2002; Gosselain and Livingstone Smith 2005).

When questioned superficially, modern potters generally consider that their behaviour is dictated by technical constraints and tradition. The first answer of the artisans concerning their way of making somehow meets the performance-oriented view of laboratory experiments. But further enquiries show that potters may have changed their technologies or be aware of alternative choices or even modify their clay preparation technique according to the customer. Recent studies point to the importance of the environment, the physical and social space, within which the technology is performed (Gosselain and Livingstone Smith 2005 and Gosselain in press). Thus the artisans’ conceptions and savoir-faire stand as different sources of information that must be taken into account, both being meaningful of social practices (Gosselain 1998). In that respect, archaeologists should also go beyond the simple technological question that is too often given as an explanation to every change or continuity observed in archaeology and that prevents us from addressing more important socio-cultural issues.

Some archaeological works leaving aside the techno-functionalist issues reached the same conclusions (Woods 1986 and Berg 2007). Woods’ study of Iron Age cooking pots in Britain demonstrated that the clay selection and preparation are initially determined by local availabilities in raw material. Similarly, Brittle Ware properties (or other similar neighbouring cooking ware productions) do not appear to be particularly adapted to an ideal recipe. Indeed the vessels possess some of the theoretical requirements (such as fine walls, rounded shapes and abundant inclusions) but also have, for the main Brittle Ware groups, a clay containing abundant quartz (Brittle Ware Workshops 1, 4, and 6) or calcareous fragments which are not considered “in theory” as the best temper (Workshop 3). Brittle Ware is also characterised by its corrugated walls and, in some cases, forms with sharp angles, which decrease the resistance to thermal shocks. The efficiency of Brittle Ware should not be questioned, however, since the long-life of the workshops already provides us with the evidence, de facto, that it fulfilled the requirements of the consumers. Unfortunately we know very little of the needs of the consumers. For instance, although this criteria remains inaccessible for the archaeologist, we should not underestimate the importance of the price, especially given the short life-time of a cooking pot - estimated to 1 to 3 years in ethnographic contexts (David 1972, 141; Mayor 1992 and 1994 and Orton et al. 2001, 207-209).

To change our perspective on cooking wares in the Levant, we need to consider their broader social and technical environment. To do so, I will widen the chronological scope and explore the alternatives existing to the Brittle Ware production and, quoting S. van der Leeuw (1993, 241) “investigating why things were done in a certain way and not in others”.

5. ALTERNATIVE CHOICES IN THE PRODUCTION OF COOKING WARES IN THE LEVANT

As said, most of the Roman to Early Islamic Levantine cooking wares were made in a red-firing, iron-rich clay and a first explanation for this technological homogeneity is the geographical environment. Indeed, Syria, Lebanon, Israel and Jordan are characterised by similar substratum: Terra Rossa soils and Basaltic Brown or Red Mediterranean soils (Avinoam 1999 and Shapiro 2006, 1170). Therefore, potters used a type of clay that was readily available in their nearest environment. Nevertheless, alternatives in terms of raw material nature and preparation did exist; this fact is clearly visible when examining the cooking wares traditions present in Syria before and after the Brittle Ware.

5. 1. Before the Brittle Ware

At the end of the Hellenistic period and during the first centuries of the Roman period in Syria, different types of cooking wares are found in Syria. Some do not belong to the Brittle Ware tradition, in terms of shape and fabric. In Zeugma, examples come from contexts from the second half of the 1st c. A.D., together with Eastern Sigillata A (Gschwind 2002 and 2006). The ware is described as friable, red-brown in colour, with abundant silver and golden micas in surface as well as various coloured mineral inclusions appearing in fresh break (red, white and opaque, black or brown) (Rothraune Ware; Gschwind 2002, 339 and 2006, 57). Shapes only consist of cooking pots with rather thick walls, an everted neck with a groove made for receiving a lid (Gschwind 2002, fig. 8, 97-98) (Fig. 6, 3). According to M. Gschwind, similar clay fabrics, with minor various in the colour and the size of the inclusions, were used for some lamps and other common wares (Gschwind 2002, 340). From the Euphrates survey in Turkey, in the surroundings of Lidar Höyük, C. Gerber identified Hellenistic cooking wares, which he differentiates from the Roman Brittle Ware (Gerber 1996, 304-305). It is also characterised by cooking pots with plain rim and everted neck. The clay is described as well-fired, brown to red-brown in colour with mineral inclusions (not identified). This production is said to be similar to the Bronze Age and Medieval cooking ware traditions in the area (Gerber 1996, 305). Also along the Euphrates,
several examples of cooking wares dating to the Hellenistic period were published at Tell al-Sweyhat (Holland 2006) (Fig. 6, 1-2). One type is the everted-neck shape and the other one is a rather thick, holemouth pot, made in a coarse fabric and sometimes burnished on the outside (Holland 2006, pl. 316, 7-10) (Fig. 6, 1). The clay is not described in details, but appears to contain lime and micas. These holemouth shapes clearly derive from the Bronze Age and Iron Age ceramic traditions, characterised by non-wheel-thrown vessels (shapeing techniques have not been identified), burnished on the outside and tempered with organic fragments, basalt or calcite (for the Bronze Age see Schneider 1991, 106; Mason and Cooper 1999, 145; for the Iron Age see Mazzoni 1992, fig. 11). However, in Tell al-Sweyhat, this cooking ware is later replaced by Brittle Ware. In the Roman levels (dated by two coins around A.D. 350-400), cooking pots are the most common Brittle Ware type known on 3rd c. sites (Holland 2006, 12, 172 and pl. 335, 3-4, 6-7). Similarly, in Hamman al-Turkman on the Balkih, two cooking ware traditions were identified. The first tradition comes from levels dated to the 1st c. B.C. to 1st c. A.D. (Hamman X phase A) and is characterised by buff to orange colour and a clay fabric containing calcite or coarse sand (Lazarro 1988, 504 and pl. 170, 158). One type of cooking pot with an everted neck is illustrated. The second tradition comes from later levels, dated from the 2nd and 3rd c. A.D. (Hamman X phase B) and is made of a sandy red clay, identified by A. Lazarro as Brittle Ware (Lazarro 1988, 512 and pl. 170, 159-162).

On the other hand, in early contexts in Zeugma, Tell Sheikh Hassan and Tell Barri, another cooking pot type is found: it has rather thick walls and a convex neck. The handle, characterised by an angular shape starts from the rim (to the exception of Tell Barri examples). Although we have no complete example preserved, it seems that the form is inspired by the Hellenistic chytra. In Zeugma, it is made in the same fabric as the everted neck cooking pots (Rotbraune Ware) (Gschwind 2002, fig. 8, 99-101; fig. 9 and fig. 10, 117 and 127; 2006, fig. 6) (Fig. 6, 4). In Tell Sheikh Hassan, where it is not precisely dated, one fragment has been identified as Brittle Ware (Bartl 1999/2000, fig. 12, 10) (Fig. 6, 7-8). It was chemically analysed by G. Schneider and belongs to Workshop 1 (Fig. 6, 8; Bartl et al. 1995, 173 and fig. 3,1). In Tell Barri, it is classified by M. Amodio among the Brittle Ware and dates to the 1st c. B.C. (Amodio 2007, 233 type IVG). Finally, a very similar type is also known from Apamea and Aleppo. While in Aleppo, it is not produced in a knon Brittle Ware fabric (Schneider et al. 2007, 718) (Fig. 6, 6), in Apamea it is manufactured by the Apamean workshop (Workshop 4) (Fig. 6, 5). It is found in association with an open shape with an inner groove for receiving a lid, comparable to a lopas. Although, few examples of these early types were recovered, the fact that some belong to Brittle Ware workshops indicates that Brittle Ware production began around the 1st c. B.C. As opposed to the Brittle Ware repertoire from the Roman and Byzantine periods, which is typical from inner Syria, this type of Helleanistic cooking pot is well attested in other regions. For instance, similar chytrae are known from Hellenistic contexts in Beirut (Aubert 2002, fig. 5 and for later contexts see Pellegrino 2007, 150, fig. 5, 1-3), in Ibn Hani (Boumni et al. 1976, fig. 28, 18), in Tell Ana (Berlin 1997, pl. 22, PW193) but also in Athens (Rotloff 2006, 275 chytra 7) or in Corinth (Edwards 1975, chytra II, pl. 27, 651).

This phenomenon of morphological standardisation is clearly visible in the Hellenistic Eastern Mediterranean. Furthermore, together with this technical homogenisation, E. Pellegrino (2007, 155) sees an “internalisation” of cooking habits that will slowly spread to most of the Mediterranean coastal cities during the Roman period. The change in cooking habits is, according to him, revealed by the appearance of open vessels among the cooking repertoire. There are indeed discussions about the different types of vessels and their influence: at Tell Anafa in Israel, for the Hellenistic and Early Roman periods, A. Berlin notes that casseroles are common in Greece and on Mediterranean sites where Greeks settled, while the pan seems to be more a Roman tradition, together of course with the importation of Pompeian Red Ware dishes (Berlin 1997, 21). In Beirut, the Roman repertoire, dating to the period of August and Tiberius, mainly consists of casseroles with various rim shapes and cooking dishes that are sometimes covered with a red slip, clearly inspired from the Campanium and Latium products (Pellegrino 2007, 151). As opposed to other late Hellenistic-Early Roman sites such as Anafa, Delos or Paphos, here in Beirut, dishes are locally produced (Pellegrino 2007, 153-154). Hence for the author, the evidence for a clear integration of Italian cooking practices, related to the strong presence of an Italian population in Beirut after the settling of August veterans following the Actium battle.

The issue of a change in cooking habits remains difficult to ascertain. Although it seems that in Syria, before the appearance of Brittle Ware the repertoire is only composed of closed vessels, we do not have enough published data so far on Hellenistic and early Roman sites in Syria to determine when open vessels started to be produced (or imported) and whether it can be associated with a change in cooking practices. We might also need to differentiate Hellenistic cities from Western Syria such as Apamea and Aleppo from smaller sites in Mesopotamia (Tell al-Sweyhat or Tell Sheikh Hassan).

5.2. After the Brittle Ware

As said before, from the 3rd to ca. the Early Islamic period, Brittle Ware is the only cooking ware used in Syria. During the Early Islamic period, other types of cooking vessels - that are not made of the typical Brittle Ware red clay - make a reappearance. These are dark, orange or pinkish in colour and tempered with calcite or basalt. Vessels are “handmade” and sometimes burnished. The repertoire consists of globular cooking pots with long and straight neck or holemouth cooking pots (Fig. 6, 10-11). A good example comes from Mayadin where, in the Abbasid level Ib, together with typical holemouth Brittle Ware pots, one finds moulded and neckless shapes, in a dark clay containing various mineral inclusions or tempered with basalt (Rousset 1996, 167-168 and pl. 56-57). The latest ones, as some of the Abbasid Brittle Ware types, imitate steatite vessels by their shape and decoration. One should note that the soft-stone vessel industry is well attested since the 3rd millennium B.C. in central Arabia but that it only seems to be imported Syria at the Umayyad period (Rousset 1996, 168). This transfer phenomenon is worth further comments. Stone cooking pots became popular in Syria during the Early Islamic times and they were first imitated in Brittle Ware. Potters tried to create more angular shapes to copy the stone vessel (Fig. 4, 5), but soon a better imitation appeared using different clays, fired in a reducing atmosphere and burnished. Nevertheless, Brittle Ware was still a successful production during the Abbasid period and will remain so in the Mameluk time. In the case of the basalt-tempered wares imitating the steatite vessel, we have clear evidence that the appearance of another cooking ware tradition is not related to a question of efficiency or raw material availability but stands as a deliberate choice to create a new product, fulfilling a specific demand.

Subsequently, during the Ayyubid period at Mayadin, cooking pots are moulded, tempered with calcite or made in a fabric with various inclusions (micas, calcite, sand) (Rousset 1996, 236-238) (Fig. 6, 12). Calcite or organic tempered handmade
cooking vessels are also present in similar Ayyubid contexts at Apamea. Finally, it is also worth noting that, during the Mameluk period, Brittle Ware reappears, with an inner yellow glaze cover. This is the case at Tilbeshar (Rousset 1998, fig. 36), at Mayadin (Rousset 1996, pl. 61, 606-609), at Balis (Leisten 1999-2000, 52), at Qala‘at Ja‘bar (Tonghini 1998, fig. 145), but also at Apamea and Aleppo (Vokaer 2007, 719). On these two last sites, where the fabric was identified, it belongs to Workshop 4 (for Apamea see Fig. 4, 7).

6. CONCLUSIONS

In summary, before the Brittle Ware tradition covers the whole inner Syria, which happens at the latest in the 3rd c. A.D., we can observe the existence of several types of cooking wares some being influenced by the Mediterranean Hellenistic facies. These latest are made in various kinds of clay, but among them some are already produced by Brittle Ware Workshops 1 and 4 (in Tell Sheikh Hassan and Apamea). The first shapes produced by the Brittle Ware workshops (1 and 4) appear thus in the Late Hellenistic period and, at that time, they seem to be part of the Hellenistic koine, as similar types are also produced on several other Eastern Mediterranean sites. Simultaneously in Syria, other traditions of cooking wares survive from the Iron Age. Even though the publications do not clearly describe the type of raw material used, most of the vessels seem to be made with a clay different than the Brittle Ware. Furthermore, as opposed to the Brittle Ware repertoire, only closed globular cooking pots are known; open and shallow forms do not appear in the publications. After ca. five centuries of Brittle Ware monopoly, in the course of the Early Islamic period, other cooking wares make their re-appearance next to the Brittle Ware. These are burnished, mostly “handmade” and tempered with basalt or calcite. Forms consist of cooking pots with an everted neck. Some of the Hellenistic and Islamic productions can be compared in shapes and techniques with the Bronze Age and Iron Age traditions. These not only illustrate the use of a different raw material but also different technological behaviours in terms of raw material selection and preparation, shaping and firing. Some clays are indeed voluntary tempered with calcite or basalt. Unlike Brittle Ware, most of the vessels are not wheel-thrown and burnished on the outside. Firing techniques also seem to differ and in the case of the calcite tempered wares, temperatures must have been lower than the Brittle Ware. Alternative choices in term of material resources and behaviours did exist and were as successful in term of duration as the Brittle Ware production. Brittle Ware does thus replace older successful recipes (and will be replaced afterwards), not because it is efficiently more performing but because it represents a “model” that starts to spread at the Hellenistic time. Whether this change in pottery tradition is associated with a change in cooking habits cannot so far be asserted in Syria.

Subsequently, during the Roman period, Brittle Ware workshops will develop their specific repertoire and start to be distributed on a wide scale but limited to inner Syria. This does not however mean that they will become blind to the surrounding concurrence, as witness by phenomenon of imitation such as the manufacturing of the sliced-rim casserole or the copy of the steatite cooking vessel.

In this paper, I have examined the case of cooking wares and their technical specificities by combining clay analysis, typology and distribution patterns. This synthetic review demonstrates that ceramic studies should not be separated from the geographical and cultural contexts, even when coming to fabric studies. Combining micro and macro-scale analysis and widening the study of cooking wares in time and space reveals the diversity of the manufacturing techniques and highlights the existence of alternative traditions besides Brittle Ware. More than a perfect cooking pot Brittle Ware appears to correspond to a model that takes its root in the Hellenistic Mediterranean koine and later develops its economic network oriented towards inner Syria and the garrison cities of the limes. It also demonstrates that even when studying the relationship between shapes, functions and fabrics we should try to keep the economical and social issues in the heart of the debate.

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BIBLIOGRAPHY


Bronitsky, G. and Hamer, R., 1986, Experiments in Ceramic


Fig. 1. Map of the sites mentioned in the text (DAO: Anja Stoll, CReA, ULB).
Fig. 2. Brittle Ware cooking set from the Roman period (scale 1/4). 1: Dibsi Faraj (DF. 2307. 57 277. 1); 2: Ain Sinu (Oates and Oates 1959, pl. 75, 81); 3: Apamea (AP. 02. I. 50. 8); 4: Dibsi Faraj (DF. 4306. 2 271); 5: Zeugma (courtesy of M. Gschwind); 6: Apamea (AP. 01. I. 6. 19) and 7: Ain Sinu (Oates and Oates 1959, pl. 75, 85).
Fig. 3. Brittle Ware cooking set from the Byzantine period (scale 1/4). 1: Apamea (AP. 03.I. 159.1); 2: Apamea (AP. 79. I. 5. 899); 3: Apamea (AP. 73. III. 44. 18); 4: Apamea (AP. 76. II. 6. 146); 5: Apamea (AP. MRAH) and 6: Apamea (AP. 79. I. 5. 913).
Fig. 4. 1-5. Brittle Ware cooking set from the Umayyad period (scale 1/4). 1: Apamea (AP. pot C2, 1); 2: Apamea (AP. 88. II. 8. 2); 3: Dibsi Faraj (DF. 1113. 34 264); 4: Dibsi Faraj (D.F. 1407. 6 143); 5: Dehes (Orssaud 1980, fig. 307, type 7). 6: steatite vessel from Tetrapyrgium (Konrad 2001, fig. 12, 3) and 7: Brittle Ware cooking pot from the Mameluk period, Apamea (AP. 02. I. 62. 26).
Fig. 5. 1-4: Selection of Hellenistic and Roman cooking wares from Beirut (scale 1/4) (Aubert 2002, fig. 6 and Pellegrino 2007, fig. 7, 6, fig. 8, 1 and fig. 5, 9); 5-7: selection of Roman cooking wares from Kefar Hananya (Adan-Bayewitz 1993, pl. 1C, 3; pl. 3B, 8 and pl. 4C, 2); 8-9: selection of Byzantine cooking wares from Dhiorios (Catling 1972, fig. 35, P136 and fig. 27, P91) and 10: selection of Umayyad cooking ware from Jerash (Schaefer and Falkner 1986, fig. 13, 6).
Fig. 6. 1-9: Cooking wares from Late Hellenistic and Early Roman periods (scale 1/4). 1 and 2: Tell al-Sweyhat (Holland 2006, pl. 316, 7 and 4); 3 and 4: Zeugma (courtesy of M. Gschwind); 5: Apamea (AP. 03. III. 22. 114); 6: Aleppo (AL. 6289 BW-1); 7 and 8: Tell Sheikh Hassan (Bartl 1999/2000, fig. 12, 9-10). 10-12: cooking wares from the Abbasid and Ayyubid periods from Mayadin (Rousset 1996, pl. 57, 572-573 and pl. 59, 594).