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FROM CLAY TO CONTAINER
Roman pottery production at the Beukenbergweg, Tongeren (Belgium)

Introduction[1]

Although it is well established that pottery was produced at Tongeren in the Roman period[2], remains thereof could never be investigated in detail. In the foregone decades several wasters and kiln structures have briefly been seen during construction works. In 2013 an area of 2 600 m^2 was to be developed because of the enlargement of the VIIO Humaniora. On the northern part of the school location, at the Beukenbergweg, remains dating to the Roman period have been excavated amongst which was a potter's workshop.[3]

The Roman pottery production at the *civitas Tungrorum* is well known and consists of tableware, pottery reflecting the Mediterranean culinary traditions for instance jugs or *mortaria*, cooking ware and a small group of vessels with different functions like cultic ware and *balsamaria*. The resemblance to the pottery produced at Köln is striking. In this article a description of the Flavian production at the Beukenbergweg will be given and will be integrated with the previous research.

The potter's workshop

The Beukenbergweg, and thus the potter's workshop, is situated on the northernmost border of the city (**fig. 1,1**). A steep slope characterizes this side of the plateau, on which the Roman city was founded. Clearly the micro relief of the location was taken into account whilst constructing the various features of the kiln activity. Four kilns have been excavated on the elevated areas on the natural loamy soil (**fig. 2**). Four wells are situated in the depression in the northwestern part of the site in between them are two clay rotting and preparation pits and one pit used for the extraction of clay.

The period in which the potter's quarter was generating its output is easy to establish. The entire scope of products fits neatly in X. Deru's horizon VI, which can be dated to AD 65/70–85/90.[4] This date is furthermore confirmed by the period of use of well 1 in connection with the workshop. Dendrochronological research has established that the oak used in the construction was felled in AD 71. The potsherds dumped in the well, amongst which five *sigillata* stamps, date the end of its use to AD 85–90. These dates suggest that the workshop was built after the Batavian revolt and the great fire in AD 69–70.[5] The production ends around AD 85–90, after which potter's quarter shifts to other places around Tongeren (**fig. 1,2–4**).

The four kilns were not in use simultaneously; the pottery assemblage in each kiln differs and two kilns were constructed on top of another one. All the kilns were build following the same practice (**fig. 3**). They are round to slightly oval in shape and the foundations are dug into the subsoil. The oven-floor, consisting of a perforated clay plate supported by a central tongue, divides the internal space in two. The superstructure, a clay dome, was not preserved at any of the kilns. Their vertical draught, characterized the so-called updraft kilns.[6] Pots are fired by the hot air which flows through the kiln: from the fire through the flue, the oven-floor, the kiln-chamber and then finally out through the vent-gap. Commonly the oven-floor is supported by the top of the tongue, which was attached to the back of the oven-wall. Within three of the four kilns the tongue was preserved. The kilns round structure measures about 1,75 m in diameter, and have a flue of 0,60 to 0,70 m attached to the front. In front of the flue was situated the stoke-pit which varied from 1 to 2 m in length.

Near three of the kilns two pits filled with wasters and rejects have been found (**fig. 4**). Those pits measure 2,5 × 2,2 m and 6,0 × 3,8 m and both are about 1 m in depth. All pots that did not meet the (high) production standards were discarded therein. The rejects vary from darkly coloured pots to deformed wasters. The base or walls of many rejects, with minor defects, have been punctured with a sharp object. The entire contents of both pits with wasters have been completely dug up and sieved. In total 25 000 potsherds have been recovered from each pit, adding up to a grand total of 60 000 potsherds from the potters workshop, including those from the kilns. All of these potsherds give a good insight into the pottery produced at this potter's quarter.

The two clay rotting and preparation pits present a rectangular plan from 3,6 × 1,5 m about 0,70 m depth. The backfill of both pits are constituted by layers of compact clay, alternating in layers of more or less sandy clay, even in clayey sands. The clay quarry, of which the upper level is perturbed

[1] The work fort this article has been partly financed by the IAP Program (IAP VII/9-CORES) initiated by the Belgian Science Policy.
[2] Vilvorder et al 2010.
[3] Veldman et al 2014; Geerts/Hartoch/Vilvorder 2014.
[4] Deru 1996, 171–172.
[5] Vanderhoeven 2013.
[6] Dufaÿ 1996, 297–312 type II-O-1.

Fig. 1. Roman city of Tongeren, with the five (supposed) locations of potters' quarters. In black the Beukenbergwag. (DAO: CRAN/UCL).

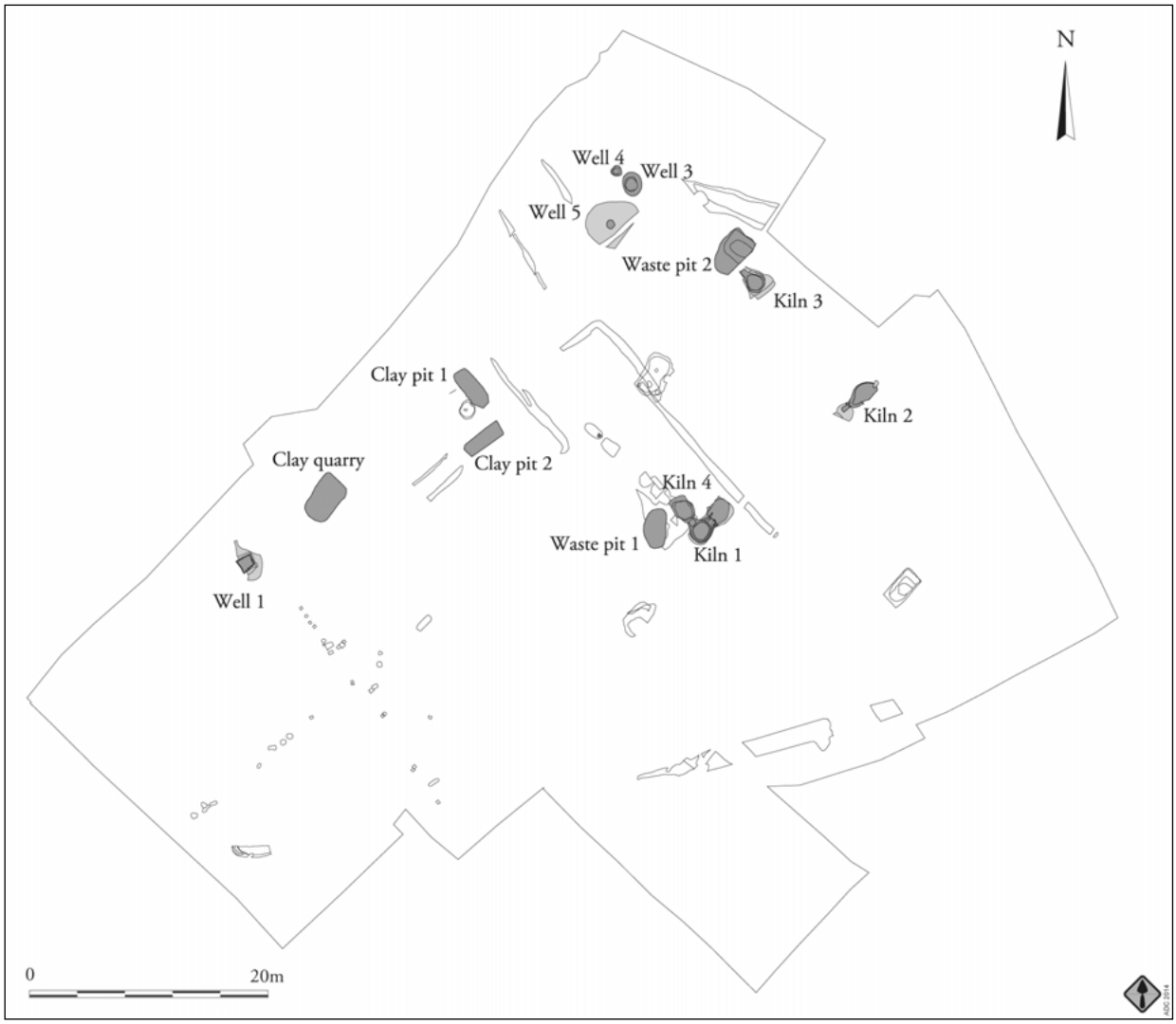

Fig. 2. Location of the kilns, waste pits and clay pits on the edge of the plateau.

Fig. 3. Picture of the kilns with the waste pit to the left.

Fig. 4. Section of one of the waste pits, in the top left the kiln is just visible.

is dug into the natural subsoil of clay. This latter could be related to the Henis Member (Borgloon Formation)[7] but this hypothesis needs to be verified by further chemical analyses.

The clay

In order to determine if the clays found on the site, in clay pit 2 and in the clayey subsoil of the clay quarry, are those which were used by the potters, samples were taken in the different layers of the backfill of the clay pit 2 and in the soil of the clay quarry.

The methodology used to evaluate the potential of the clays to throw ceramics on a pottery wheel consists mainly of an evaluation of the plasticity and the drying and firing shrinkage of these clays by making small coils or loops (8 cm in length and 1 cm in diameter).[8] Once they dried completely, they are fired under oxidizing atmosphere at temperatures, ranging from about 700°C to 1000°C in steps of 100°C. The loops clay fired at 900°C were compared to nine potsherds from the workshop after they were themselves refired under oxidizing atmosphere for 24 h at 900°C.

The clay sampled in the soil of the clay quarry presents a greenish grey colour (Munsell 10Y 5/1) when wet. When fired at 900°C the clay presents a pale brown orange (Munsell

[7] Thanks to R. Dreesen (geologist). Databank Ondergrond Vlaanderen, https://www.dov.vlaanderen.be.

[8] Rekk 2014; Rekk/ Laduron/Yans 2014.

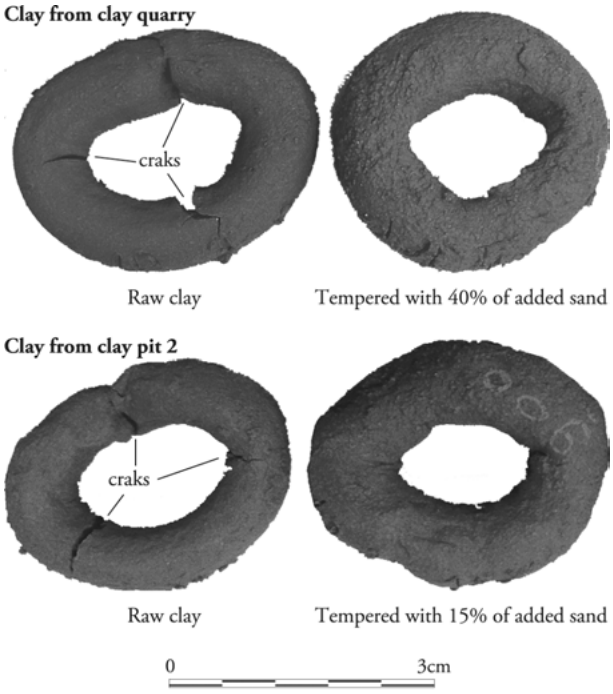

Fig. 5. Loops of clay from clay pit 2 and from clay quarry, fired at 900°C under oxydizing conditions, before and after adding of sand.

2.5YR 6/8). It consists in a very fine heavy clay, pure, naturally free of sand. It's easy to make loops with this clay. The plasticity is good but when drying the shrinkage is important and causes cracking and deformation of the loops. After firing the shrinkage increases resulting to the concomitant increase of the cracks. This shrinkage is important enough to cause the breaking of the fired loops. Given to its too pale firing colours, the hypothesis relating this clay to the Henis Member (Borgloon Formation) should most probably be rejected.

The backfill of clay pit 2 is made of layers of dark green clay (Munsell 5G 4/1) when wet, more or less sandy, which probably belongs to the Henis Member (Borgloon Formation), given to its characteristics (plasticity, texture, firing colours...) even if the latter needs to be verified. When fired at 900°C the clay presents a brown red colour (Munsell 2.5YR 5/8). However, if these clays present sufficient plasticity to throw ceramics, they also present a drying and firing shrinkage that cause excessive deformation or rupture of the loops, exactly like the clays from the clay quarry pit.

Mixing tests with sand have been carried out to evaluate how shrinkage can be reduced. The chosen sand is the white one from the very site which has been related to the Berg Member (Bilzen Formation).[9] The different chosen amounts of sand to be added are 15 %, 25 % and 40 % by weight of dry clay. Those mixings show that the shrinkage of sampled clays, both from clay pit 2 and the clay quarry pit, can largely be reduced to an acceptable level **(fig. 5)**. However, the clay from the clay quarry requires more than 25 % of added sand to make the shrinkage non harmful for the fired loop; it is only at 40 % of added sand that the loops no longer presents cracking problem. For clays from clay pit 2, at just 15 % of added sand, the shrinkage ceases to cause damages to the loop. The firing shrinkage produces no further crack or deformation of the loops which are intact whatever the firing temperature (700°, 800°, 900° or 1000°C). The paste obtained after mixing clays and sand consists of a more or less sandy clay with soft touch, good plasticity and good workability.

Colour comparison between the loops fired at 900°C and the potsherds refired at 900°C under oxidizing atmosphere shows that the clay from the subsoil of the clay quarry presents lighter fired colours than the ones of the selected potsherds of the workshop production. On the other hand the fired colours of the clays from clay pit 2 are similar to those of the potsherds. The clay exploited into the clay quarry is probably not the one used by potters. This is not only the fired colours which don't match these of the potsherds but also the shrinkage which is too severe and so it needs to be tempered by a larger amount of added sand (>25 %) than the ones found in clay pit 2 (15 %). The potters of the Beukenbergweg site might have used the clays of the backfills of the clay pit 2 to which they certainly added some sand. The latter could be the Berg Member (Bilzen Formation), outcropping at low depth on the very site. The relationship between the backfills clay of the clay pit 2 and the Henis Member still remains to be proved by further investigations.

Terracotta lamp

In between the wasters from one of the pits an open topped terracotta lamp was unearthed (**fig. 6**). On the top of this lamp, above the fuse spout, a *phallus* has been modelled. Although similar designs are often found on lamps, in its shape it is unique.[10]

The *phallus* is commonly used in Roman imagery, mainly for its apotropaic qualities; it is considered to ward off evil and to be a lucky charm. It's also used as a plea to the gods to ensure a good outcome of an artisanal process involving fire.[11] The same was intended by the *phalli* inscribed on the kiln-spacers found at Pont-des-Rèmes (France).[12] At La Graufesenque (France) this practice was taken one step further and one of the potters was yearly chosen as *flamen* (priest) to obtain the blessing of the gods.[13] Similar finds are also associated with other trades. In 2005 a second century AD bronze smelter was discovered at the Spikdorenstraat in Tienen (Belgium). A ceramic *phallus* was found pressed into the wall of the largest kiln.[14] Above the bread oven in the bakery of the *Casa di Pansa* in Pompeii, the owner placed a terracotta plate with a modelled *phallus* accompanied with the text *HIC HABITAT FELICITAS* ("here dwells happiness").[15]

[9] Thanks to R. Dreesen (geologist). Databank Ondergrond Vlaanderen, https://www.dov.vlaanderen.be.

[10] Another example of a terracotta lamp with a *phallus* is kept in the Borgia collection, Museo Archeologico Nazionale, inv. Nr. 27867. Augustan. Varone 2001, 21 fig. 13.

[11] Clarke 2003, 97–103; J. R. Clarke (personal communication); Varone 2001, 15–26.

[12] Chenet/Gaudron 1955, 89 fig. 41 (f); 92 fig. 44 (f).

[13] Mees 2012, 41–57.

[14] Martens 2013, 24–26 fig. 1,6.

[15] Clarke 2003, 99; 102–103 fig. 68–69; Varone 2001, 16 fig. 4.

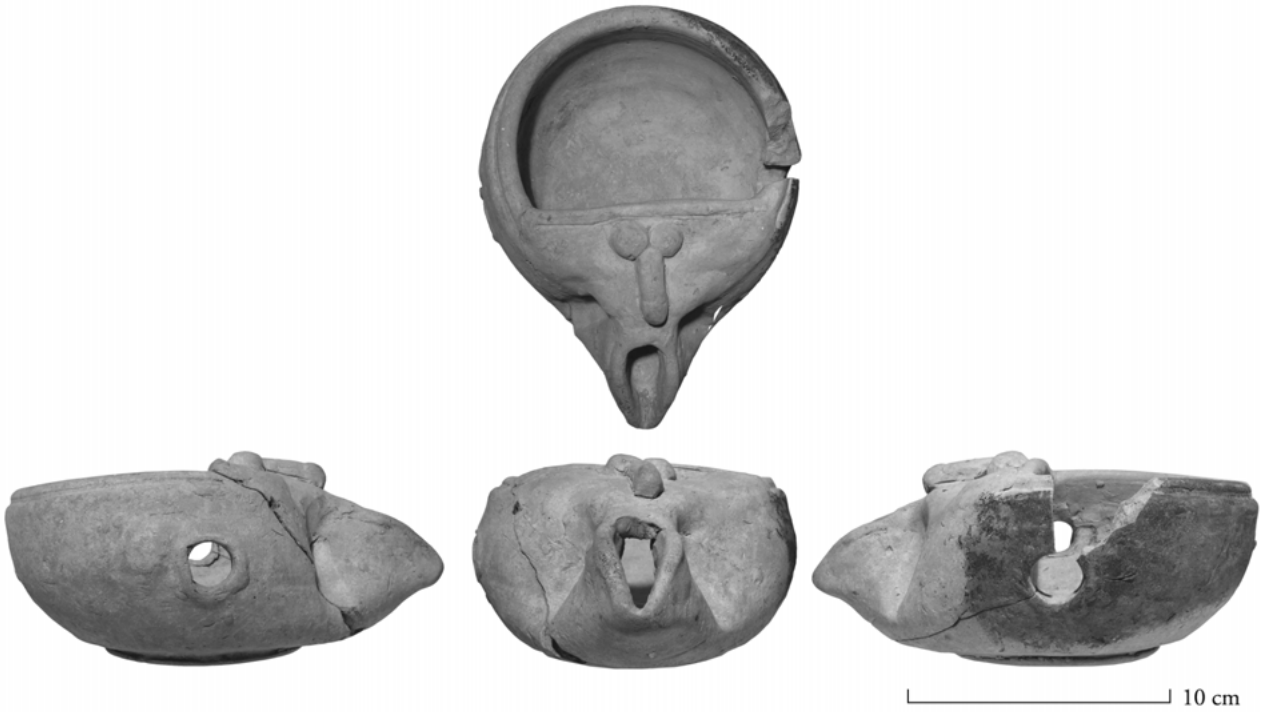

Fig. 6. Terracotta lamp with a phallic motive.

A masonry basin at the entrance of a textile dyer along the *via dell'Abbondanza* is decorated with two *phalli*; a winged *phallus* within an *aedicula* and a horizontally orientated *phallus* in relief.[16] *Phalli* are depicted on a large variety of objects for a similar functionality. For instance a *phallus* was made in sunken relief on the top of a grindstone (*catillus*) from Ingolstadt-Etting (Germany).[17] Attached to the wall of a *taberna lusoria* in Pompeii, dating to the 1st century AD, was a terracotta plate with a bottle flanked by two *phalli.*[18]

Considering the evidence it is not out of the ordinary to find such a lamp in the potter's workshop in Tongeren.

Pottery production

The numerous ceramics, mainly from the waste pits, provide an insight into the pottery that was produced at this workshop. Through analysis of these finds various products and characteristics of the pottery could be identified.

The potters used a sandy clay with enough iron in the clay matrix to produce a red colour after firing the pots in mode A (a *stricto sensu* reduced firing with oxidized cooling)[19]. Although most Tongeren products consist of smoked pottery characterized by a brown coating on the surface of the pots, this technique was not yet used at this workshop. The cooking vessels, belonging to the set Tongeren BII, are still fired in mode B (a *stricto sensu* reduced firing and reduced cooling). This production appears by the middle of 1st century AD.[20]

Later cooking wares, from set Tongeren BIII onwards, are not fired in mode B any longer. The pottery which reflects the Mediterranean culinary traditions, amongst which jugs, storage vessels, *mortaria* and *dolia*, have been covered with a whitishh slip to cover up the red colour of the vessels. Probably a kaolinitic clay has been used in this process. In certain instances this clay is found as a 'wiry substance' in the fabric of the *terra rubra* beakers. Furthermore the quality of the wall finish of certain *terra nigra* vessels is of high standard.

All together the products from this workshop, being the first that was excavated in Tongeren and could therefore be properly studied, are representative of the pottery in circulation in the second half of the first century AD.

The Gallo-Belgic wares are dominated by the large quantities of beakers Deru P10/Ton 1 and Deru P11 (**fig. 7,5–6**), both in *terra rubra* or *terra nigra*. Those are complemented by *terra nigra* plates Deru A42 en A43 (**fig. 7,1–2**), pots Deru P49 and P54 (**fig. 7,7–8**) and bottles Deru BT2 (**fig. 7,9**). Some forms are less commonly produced, like the bowl Deru B21, of which exemplars with a perforated base might have served as sieves (**fig. 7,3–4**).

The pottery, designated for domestic use, is a heterogenous group which ultimately originates in the Mediterranean culinary traditions. Most common are the jugs Ton 21/Hofheim 50 (**fig. 8,11**) but jugs Gose 374 (**fig. 8,12**) and Gose 372 (**fig. 8,13**) are found as well. Small enigmatic amphorae of the type Gauloise 15 (**fig. 8,10**) are also produced here. These distribution of these amphorae is limited to an area of 40 km around the *civitas* capital.[21] Storage jars, type Ton 28/Vanvinckenroye 357 (**fig. 8,15**) and *mortaria*, type Stuart 149B (**fig. 8,16**) are produced in some larger quantities.

16 Clarke 2003, 99–101 fig. 66–67. Varone 2001, 17 fig. 8.
17 Thüry 2009, 12–13 fig. 14
18 Varone 2001, 16 fig. 3.
19 See the fabric descriptions in Vilvorder et al. 2010, 243.
20 Lepot/Espel 2010.
21 Baudoux et al. 1998.

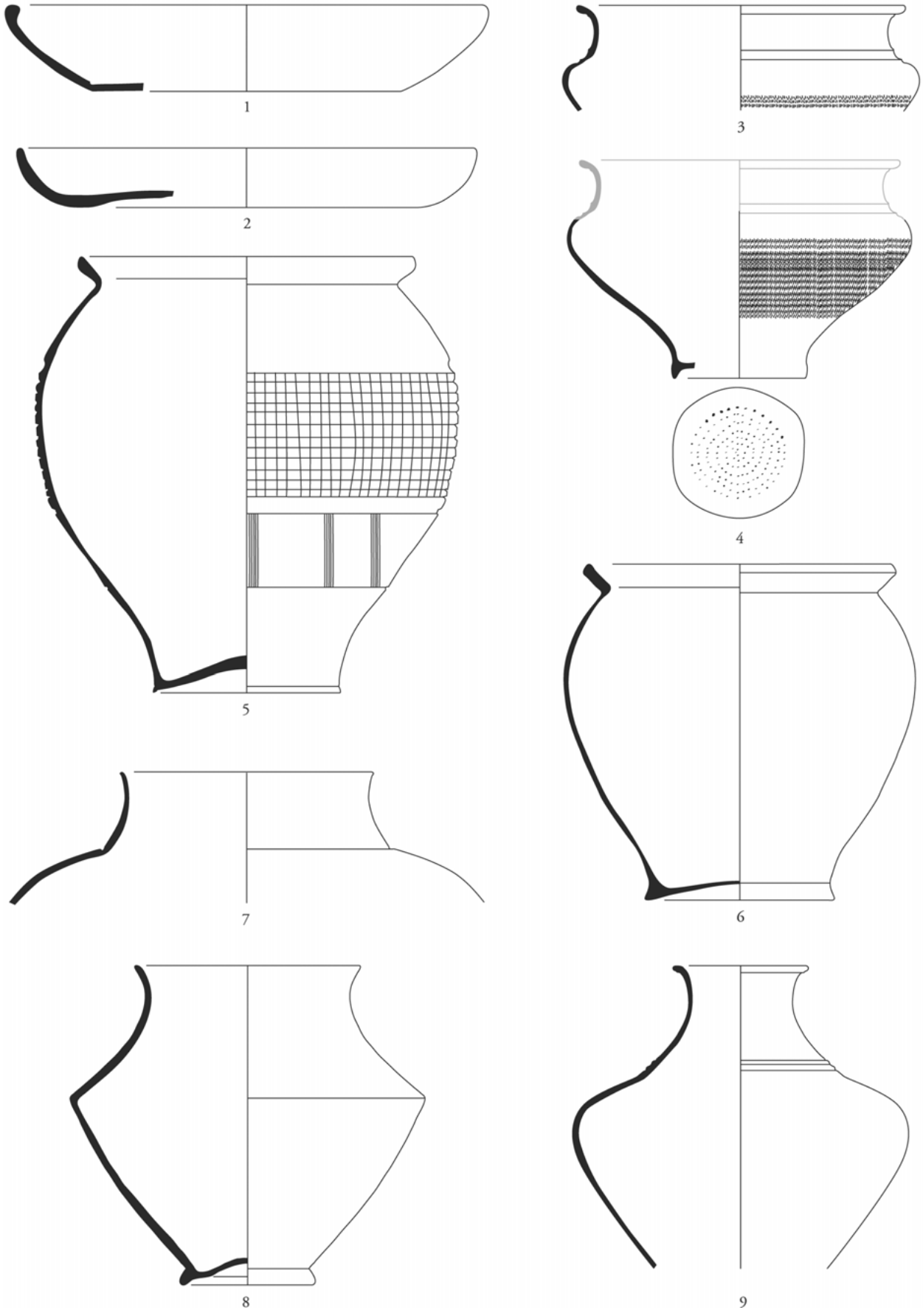

Fig. 7. Gallo-Belgic ware produced at the workshop. – Scale 1:3.

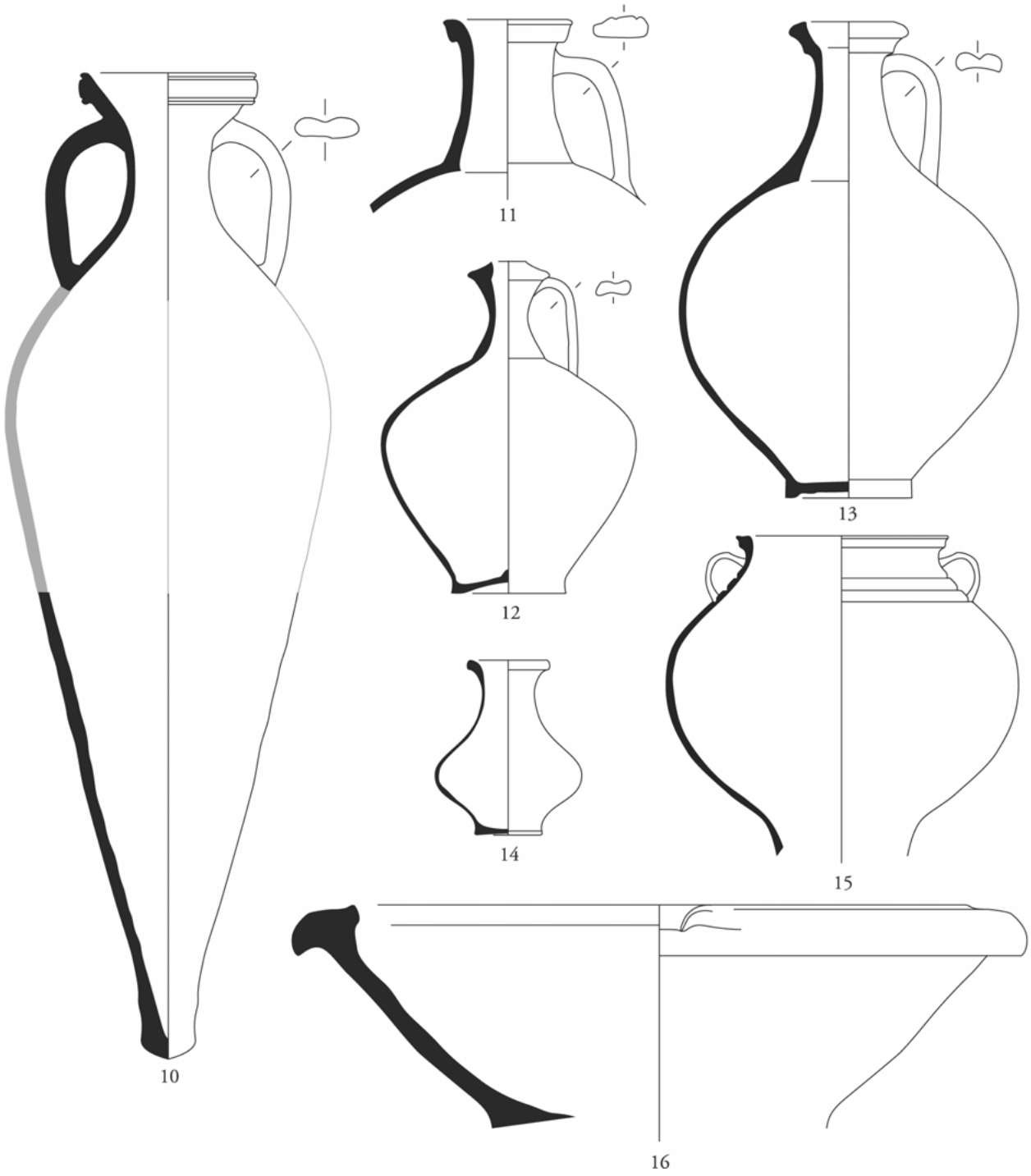

Fig. 8. Amphora, jugs, *balsamaria*, pots and *mortarium* produced at the workshop. – Scale 1:3.

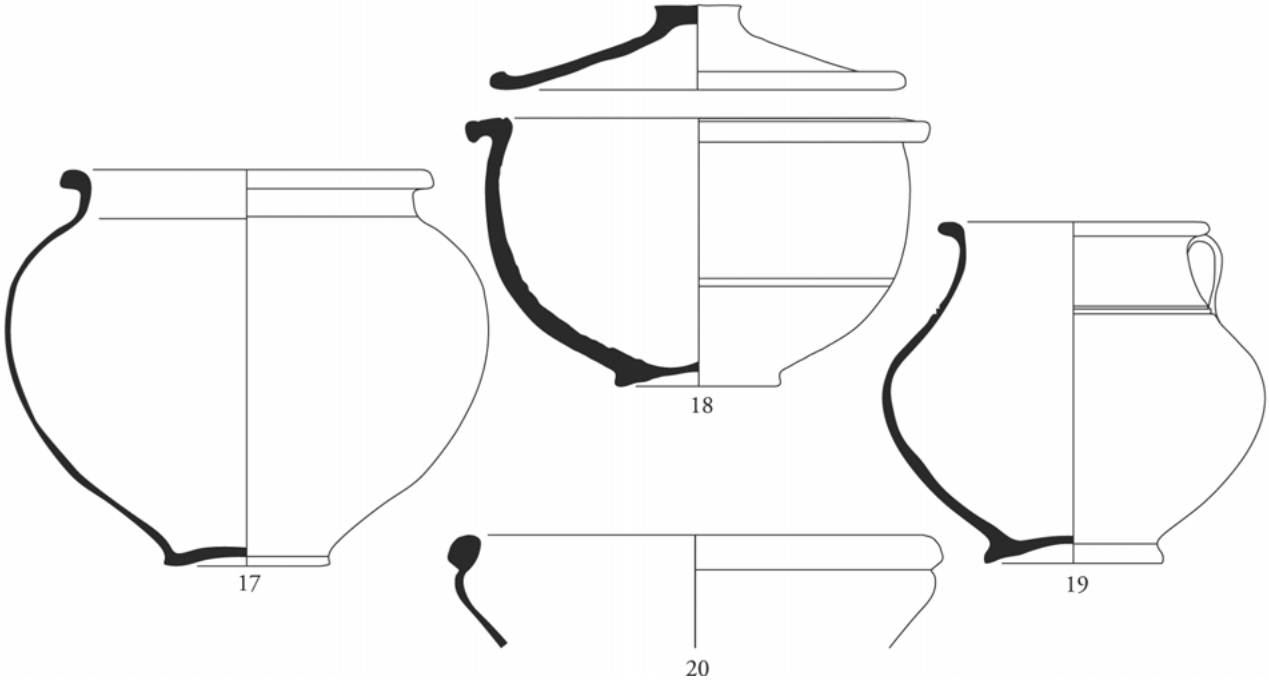

Fig. 9. The set of cokking vessels Tongeren BII produced at the workshop. – Scale 1:3.

The large numbers of *balsamaria* type Ton 73 (**fig. 8,14**) are remarkable.

The cooking ware belongs to the set Tongeren BII and includes cooking pots Ton 39/Vanvinckenroye 466 (**fig. 9,17**), characterized by a large variety of rim shapes, cooking pots of the type *cacabus* Ton 50/Vanvinckenroye 498 (**fig. 9,18**), cooking bowls which reflect the indigenous tradition Ton 46/ Vanvinckenroye 61 (**fig. 9,19**), pot Ton 33/Vanvinckenroye 489 (**fig. 9,20**) and an impressive amount of lids.

Conclusion

The artisans who set up their workshop in the northeastern part of the *civitas* capital, before the city walls and the aquaduct were built there, are the first generation known of Gallo-Roman potters in Tongeren. This family activity begins after the Batavian revolt in AD 69/70 and lasts only for one or two decades. The clays, tested with the technic of loops, show that the raw material were tempered with sand. It is very likely that the raw clay used by the potters is coming from the outcrops of the Henis Member (Borgloon Formation). To avoid evil spells the potters have resorted to a lamp with an apotropaic symbol. The production is varied, with the joint manufacturing of fine dishes, domestic and culinary ceramics.

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Gose	Gose 1950.
Hofheim	Ritterling 1913.
Stuart	Stuart 1977.
Ton	Vilvorder et al 2010.
Vanvinckenroye	Vanvinckenroye 1991.

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