

Rita Chinelli

## POST-FIRING PERFORATION ON ROMAN POTTERY FROM THE CIVILIAN SETTLEMENT OF VINDOBONA

Secondary perforations<sup>1</sup> were found while studying the common ware fired in an oxidizing atmosphere from an excavation (Rennweg 44) in the civilian settlement of *Vindobona* (Pannonia). It was a rescue excavation, made in the years 1989–1990, not thoroughly following the stratigraphic criteria, and the documentation is rather incomplete<sup>2</sup>.

The area lies along the road of the *limes* and includes at least three strip houses: on the back side there were kilns for metal and perhaps for pottery and glass production too. We could notice that the structures were just partially conserved.

The on-going study showed a chronological frame mainly from the end of the 1<sup>st</sup> century to the 3<sup>rd</sup> century AD<sup>3</sup>.

Among the common ware (fired in an oxidizing and in a reducing atmosphere) occurs a large variety of forms with perforations: pots, *dolia*, jugs, bowls, dishes, incense-burners and lids (336 items)<sup>4</sup>.

### Description

Every hole (**fig. 1,2**) is surrounded by an area where the clay is partially scratched away; therefore both the dimensions of the diameter of the hole and this area were recorded. The diameter of the holes ranges from 0.2 cm to 2.5 cm; the diameter of the scratched areas ranges from 0.6 cm to a maximum of 7.8 cm. Such areas can be found on the inner wall (34 % of the items) or on the outer wall (40 % of the items; not recognizable execution: 26 %).

The perforation on the vessel wall can be found together with another hole placed at a short distance (**fig. 2**).

In the closed forms of the common ware (which usually have more holes: 49 %) the perforation lies normally at a third of the height from the bottom of the vessel and/or on the bottom (**fig. 3,1; 4,2; 5**). Such claim cannot be statistically verified due to the fragmentary condition of the pottery.

The holes of some jugs were made at the highest liquid content tracing point in the vessel (**fig. 3,1**)<sup>5</sup>: the liquid level

reaches the hole without leaving traces on it. On the opposite wall, evidence shows that the liquid flowed out without interruption. These observations are not always possible because the pottery was overwashed.

Post-firing holes in common ware are present on 90 % of all the pottery classes showing holes. In particular 54 % of them are on items fired in an oxidizing atmosphere and 36 % in a reducing atmosphere (**fig. 6**)<sup>6</sup>.

Such kind of perforation is also present in the tableware (Pannonische Glanztonware, thin wall pottery and even terra sigillata<sup>7</sup>) but in a smaller percentage (7 % of the total, with the exception of terra sigillata items, at the moment not accessible<sup>8</sup>) and on transport vessels (amphorae: 3 % of all the fragments with holes).

The total amount of the recovered common ware found in the excavation and specifically examined consists of 50 boxes of fragments fired in an oxidizing atmosphere and as many boxes of fragments fired in a reducing atmosphere<sup>9</sup>. There are also 550 exemplars of thin wall pottery and 505 exemplars of Pannonische Glanztonware<sup>10</sup>. Finally, there are 64 amphorae, just a few, as we can expect to find in the provinces north of the Alps.

There are holes in 2.3 % of the thin wall pottery, in 1.9 % of the Pannonische Glanztonware and in 17 % of the amphorae.

When looking at these percentages we have to consider that it is possible to find several perforations on a single vessel: usually one on the bottom and one or two on the wall. But they can be up to seven, as in the large *dolium* fragment shown below (**fig. 5**).

in use because, when present, they are only inside.

<sup>6</sup> I thank U. Stipanits und U. Eisenmenger who helped me to check the pottery.

<sup>7</sup> On the bottom of a bowl Drag. 37 (MV38.613/1).

<sup>8</sup> I thank M. Müller who was allowed to see only some of the around 3000 finds in *terra sigillata*. The Wien Museum has almost finished the moving of its storage area.

<sup>9</sup> Because of the abundance and the fragmentary status of the found items I have not applied the statistical examination according to the EVE (Estimated Vessel Equivalent) ratio, see E. CIRELLI, *Classificazione e quantificazione del materiale ceramico nelle ricerche di superficie*. In: N. Mancassola/F. Saggioro, *Medioevo, paesaggi e metodi* (Mantova 2006) 173. All the found items were checked for this study, but only 839 fragments of common ware, fired in an oxidizing atmosphere, were carefully selected for the final evaluation of the excavation.

<sup>10</sup> I thank E. Eleftheriadou and I. Pavić for the reference.

<sup>1</sup> Thanks to the permission of the colleagues E. Eleftheriadou, I. Pavić and U. Eisenmenger, it was later possible to find the same kind of perforation on other pottery classes.

<sup>2</sup> I thank M. Müller for the discussion and the data about the structures. The stratigraphic data comes from her on-going elaboration. (Article submitted on Dec. 2014.)

<sup>3</sup> MÜLLER 2008, 105.

<sup>4</sup> 370 items in all the pottery classes.

<sup>5</sup> Presumably these evidences were produced while these jugs were still

It is interesting to note that perforated jugs are 54 % of the total of common ware fired in an oxidizing atmosphere: such percentage of closed forms seems similar to other contemporary sites as at Silchester<sup>11</sup>.

## Identification

During the systematic examination of the items, I avoided the holes produced because of possible accidental excavation damages (breaks too recent or with irregular perimeter), the ones made by the explosion of some limestone inclusion<sup>12</sup>, and the holes made on the lids to help water evaporation while cooking. Anyway the fragmented status of the finds doesn't always allow the precise identification of the kind of holes.

These holes cannot be mistaken for perforations made to fix the pottery, discovered among the excavated materials too<sup>13</sup>: they are morphologically different, with regular edges produced with a mechanical movement<sup>14</sup>.

Experimental tests<sup>15</sup> and the following considerations ensure that these perforations date back to the Roman age.

- 1) In the majority of cases the position of the hole is restricted to a particular area: in the closed forms of the common ware (which usually have more holes: 51 %) the perforation lies mostly at a third of the height from the bottom of the vessel and/or on the bottom.
- 2) Moreover, the pottery restoration showed that fragments, spread in the examined site, matched to form full holes even if collected from far away (fig. 2).<sup>16</sup>
- 3) The examination of the cheese-presses of the same excavation shows that the scratched areas around the intentional holes (fig. 1,1), made before firing, are similar to the ones around the post-firing holes shown above (fig. 1,2).
- 4) In a few cases there are traces around or in the direction of the holes. Such traces are concentric to the hole or look as made with a pointed tool<sup>17</sup>. They are not recent and therefore they could not have been made during the excavation nor they look having been made before firing. In some case they are unfinished missed holes<sup>18</sup>.
- 5) The detailed record of a large overturned *dolium* fragment (fig. 5) in a pit (fig. 7) allowed the verification of such holes on a vessel found *in situ*. On the bottom of the fragment it was possible to find three holes, three more were found on the wall and one near the rim<sup>19</sup>. Also other pottery (at least another *dolium* and a pot) from the pit has holes, made after firing as well.

- 6) During the Roman age, holes were made on the pottery before and after firing: such practice is recorded in the partial selection of the literature shown below<sup>20</sup>.
- 7) The scratched areas of several holes have the same kind of post-depositional incrustation found on the pottery walls.
- 8) The examination of materials from Roman layers of other recent excavations in Vienna records other examples of perforations.

Post-firing perforation can indicate a form of reuse: in the site of Rennweg 44 there is no evidence suggesting a burial use (*enchytrismos*)<sup>21</sup>, large necessity of wells cleaning, pitch production, essences and aroma diffusion<sup>22</sup>, snail or small animal hunting, kiln firing supportings, or land drainage reuse<sup>23</sup>.

The following hypotheses, all attested to the Roman age, could be taken into consideration regarding the holes:

- 1) planting vessel,
- 2) liquid decanting,
- 3) ritual use.

## Horticultural or storage function

The only example of a perforated vessel with precise documentation of the *in situ* position is a large overturned (fig. 5) *dolium* bottom in a pit (fig. 7)<sup>24</sup>. It was fired in a reducing atmosphere and its inner surface is very scratched. The restoration showed that the bottom due to its diameter,<sup>25</sup> was probably connected with a rim found somewhere else in the same pit. The rim has an outer diameter of 38.5 cm, the bottom of 22 cm, while the height of the whole vessel is 66 cm. As mentioned previously, several holes have been recorded on the *dolium*: three on the wall joined with the bottom (fig. 5), three on the bottom, and one near the rim.

The pit location (fig. 7; 2.1 × 1.3 m large and 1.1 m deep) was interpreted as a possible area of horticultural activity<sup>26</sup>. Indeed, layer (522), at the bottom of the pit, showed traces of wood and coal remains, as well as biological and chemical activities. In this layer there was no ash; it was formed from the decomposition of the nearby layers or is related to a previous phase of the pit. Layer (520), where the overturned *dolium*-bottom was found, consisted of earth mixed with ash, burned loam, wood and coal remains. Ash was found also in layer (658), over the *dolium*. An empty space was present

<sup>11</sup> FULFORD/TIMBY 2001, 294–295.

<sup>12</sup> N. CUOMO DI CAPRIO, *Ceramica in archeologia* 2 (Roma 2007) 94.

<sup>13</sup> For ex. the rim of Drag. 37 in terra sigillata: MV38.596/3.

<sup>14</sup> Repair could be done in several ways: usually one hole was pierced on both the detached parts so that a metal insertion (clamp repair) could pass through and keep them together. See: e. g. PEÑA 2007, 232–249.

<sup>15</sup> The perforations are very regular. In case of accidental holes made by excavation tools the cracks would look fresh and the fragments would be very damaged.

<sup>16</sup> This observation was possible because of the restoration work performed during the study of the findings. I thank B. Crouse.

<sup>17</sup> For ex. MV38.484/1106, rim or MV38.392/1000 incense-burner.

<sup>18</sup> MV38.582/12, bottom in Pannonische Glanztonware.

<sup>19</sup> I thank A. Cosentini and B. Crouse for the restoration.

<sup>20</sup> The amount of such findings (published and unpublished) is too large for a full quotation and we rather prefer to mention here some important examples, such as BARRASS 2012, 72.

<sup>21</sup> J. SIMON ET AL., *Mourir autour de la naissance: la pratique de l'enchytrismos ou l'inhumation dans des réceptacles funéraires à Chartres (Eure-et-Loir) au Haut-Empire*. SFEAG Actes Congrès Arles 2011 (Marseille 2011) 547–558.

<sup>22</sup> In the area considered there is already a large amount of incense burners suitable for this function.

<sup>23</sup> PEÑA 2007, 170; 189; G. DISANTAROSA, *Le anfore: indicatori archeologici di produzione, delle rotte commerciali e del rimpiego nel mondo antico*. *Classica e Christiana* 4/1, 2009, 152 with bibliography.

<sup>24</sup> According to U. Eisenmenger's identification it is dated between the beginning of the 2<sup>nd</sup> c. and the first half of the 3<sup>rd</sup> c. AD, see B. PETZNEK, *Römerzeitliche Gebrauchskeramik aus Carnuntum*. *Carnuntum Jahrb.* 1997, Taf. 1 Typ 3.2.

<sup>25</sup> It is not possible to give a precise graphic reconstruction because of the light wall warp due to the weight of the restored fragments.

<sup>26</sup> MÜLLER 2008, 119.

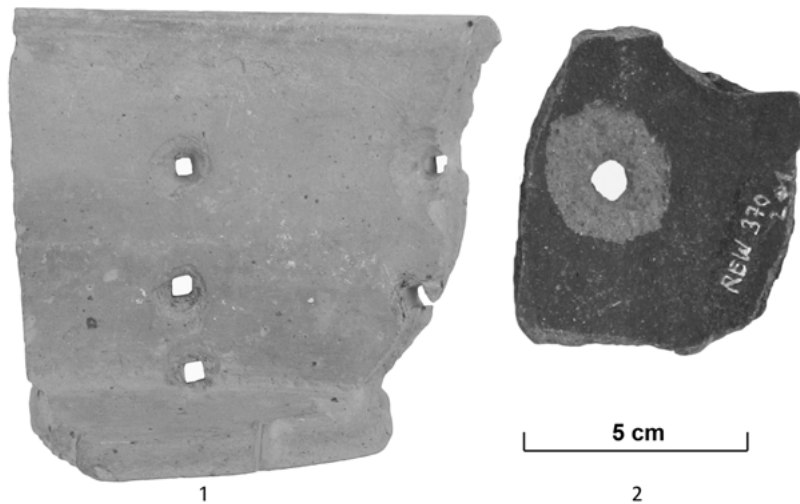


Fig. 1. Holes before firing and hole after firing (Rennweg 44).

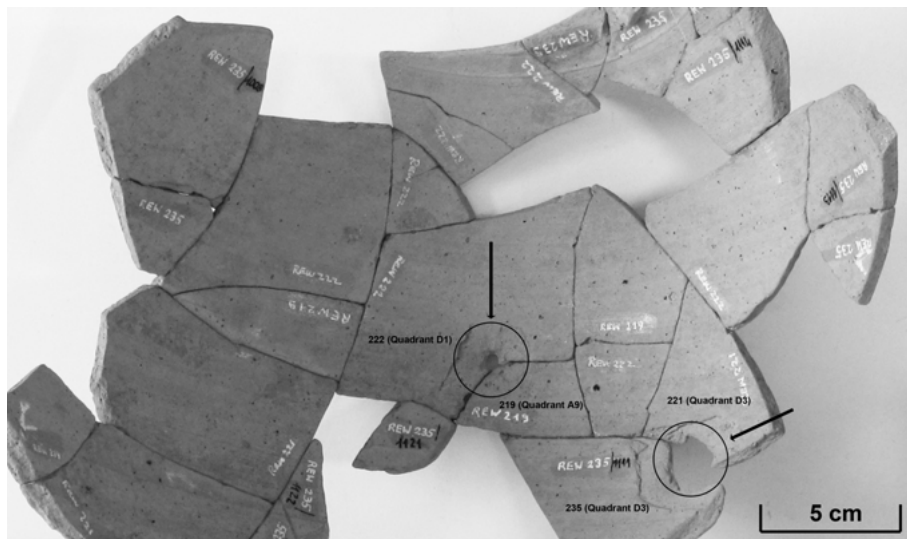


Fig. 2. Joining pottery fragments forming holes (Rennweg 44).

under the *dolium* fragment. There was a thin layer consisting of charcoal (521), between layers (520) and (522). Perhaps it merged with the ground layer (519) to form the pit lining containing the filling (520+658). The description shows that the *dolium* bottom belongs to this filling.

Such information does not help much to identify the use of the perforated vessels but it does not exclude the possibility of horticultural activity. In the Roman age, ash was used also as fertilizer<sup>27</sup> and there is ash in the layers of the phase related to the *dolium*. Anyway, since these layers were located before the fireplaces on the external surface and after the layer (522) at the bottom of the pit, they could be related to the activity of destruction and cleaning (when the material was thrown inside the pit) of the external structures related to the poles<sup>28</sup>.

Therefore, because of such kind of structures, it is possible to conjecture the reuse of the *dolia* in domestic or production activities, given that the inner walls show iron traces evidence. Literary sources report the practice of keeping foodstuffs in vessels (in *dolia* too), used as storage jar, preferably with sand in order to preserve them for a long time<sup>29</sup>. Such practice is still in use nowadays in Europe.<sup>30</sup> The small hole (0.5 cm)

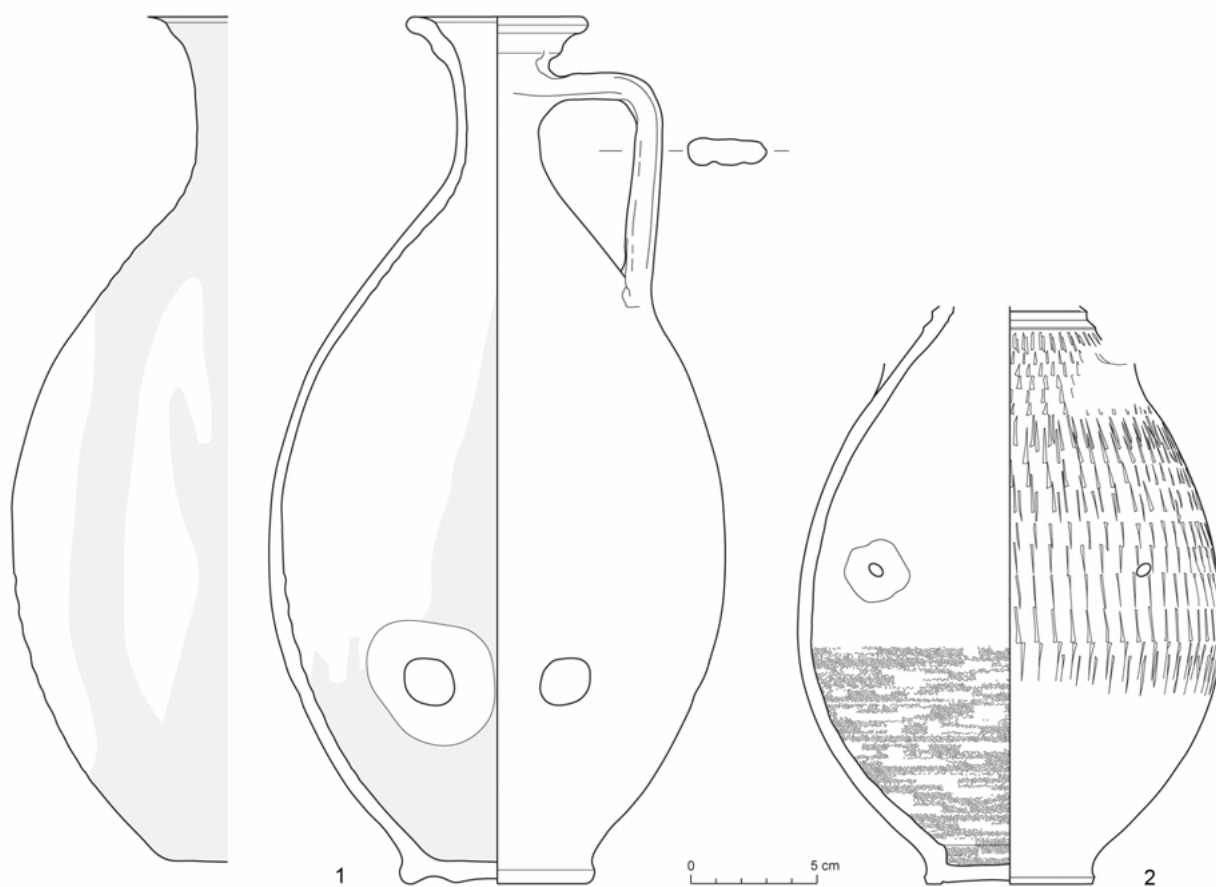
<sup>27</sup> D. B. THOMPSON, The Gardens of hephaistos. *Esperia* 6, 1937, 417; found in France too: BARAT/MORIZE 1999, 223; see also: PEÑA 2007, 308; GARG. MARTIALIS., De hortis 2,2.

<sup>28</sup> The poles could be related to other fireplaces not immediately present over the pit. The presence of ash in this place too is interesting. R. FLEISCHER/V.

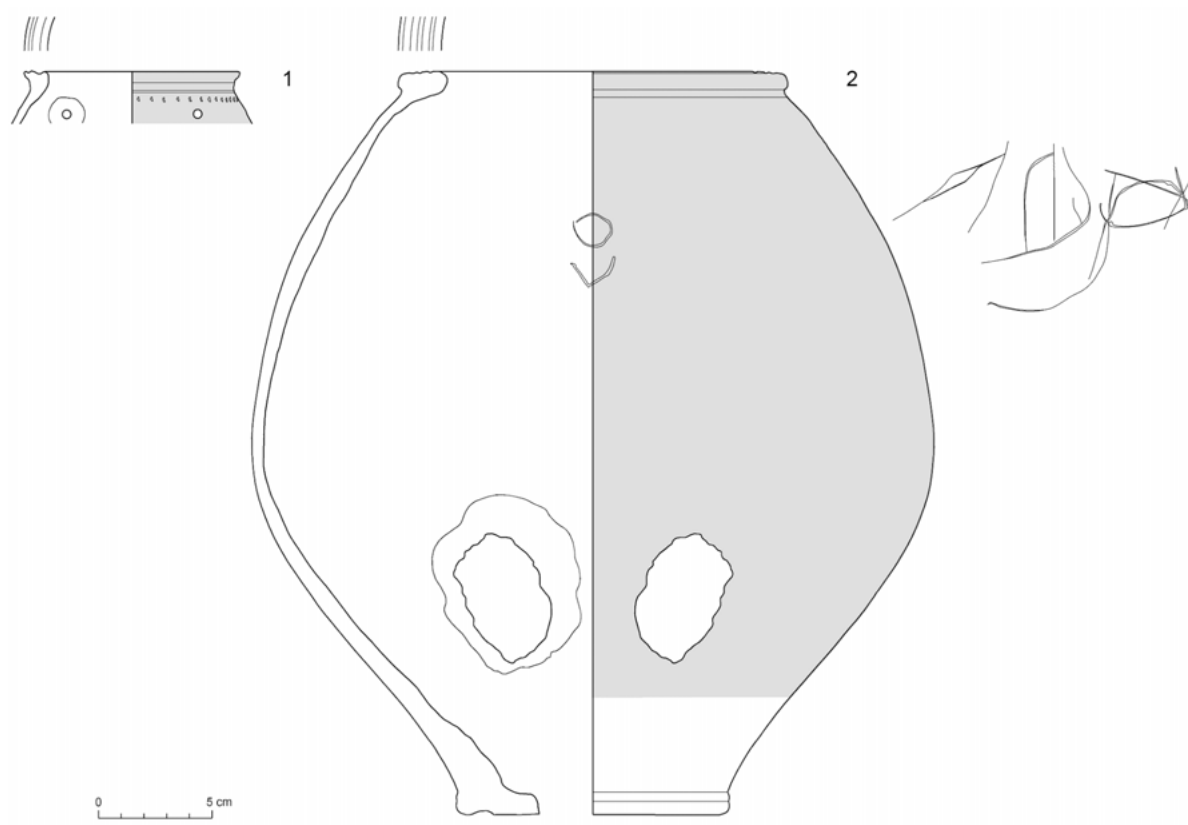
MOUCKA-WEITZEL, Die römische Straßenstation Immurium – Moosham im Salzburger Lungau (Salzburg 1998) 19 Abb. 11. – Perforated vessels (but normally with more holes) are present in glass production, from the 6<sup>th</sup> century: M. CAVALIERI, Quid igitur est ista villa? In: G. Schörner (ed.), *Leben auf dem Lande. "Il Monte" bei San Gimignano: Ein römischer Fundplatz und sein Kontext* (Wien 2013) 316 Fig. 21, moreover they should show evidence of vitrification, see the comparison with more modern times: J. FREY, Die Kühlkeramik der Glashütte Court, Pâturage de l'Envers (1699–1714). Ein Werkstattbericht. *Beitr. Mittelalterarch. Österreich* 27, 2011, 212 Abb. 7.

<sup>29</sup> COLUMELLA, De re rustica 12,46,4; 12,44,3; 12,47,1.

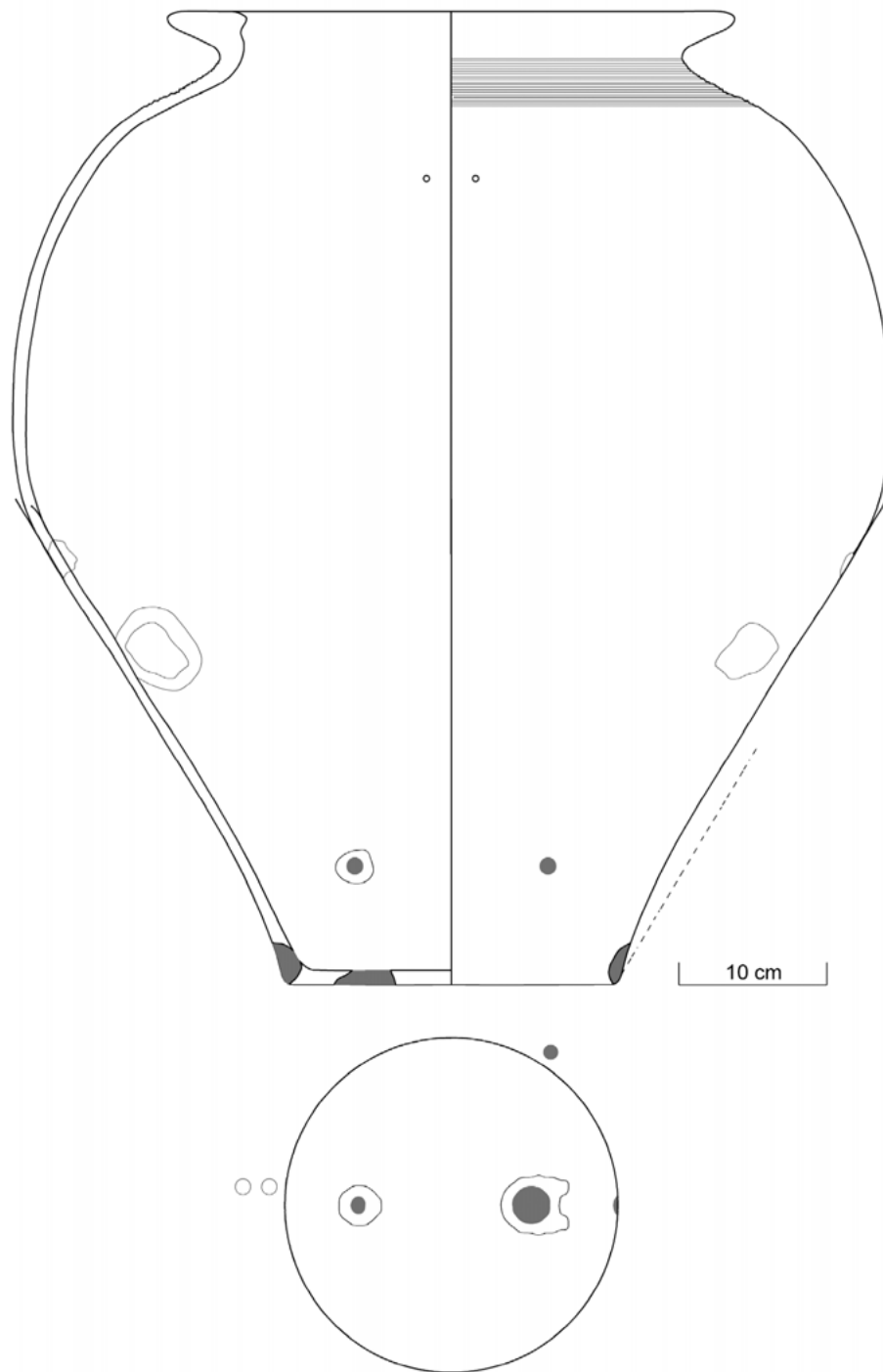
<sup>30</sup> A. A. SCHAFLITZL, Ein Sandkasten zum Einschlagen von Wurzelgemüse: Nahrungsmittelkonservierung im privaten Bereich am Beispiel der villa rustica von Möckenlohe. In: J. Drausche et al. (ed.), *Küche und Keller*



**Fig. 3.** Perforated jugs (Rennweg 44).



**Fig. 4.** Perforated pot and *dolium* (Rennweg 44).



**Fig. 5.** Perforated *dolium* (Rennweg 44).

just under the rim of the *dolium* found at Rennweg 44, could be related with this function. Anyway, its nature is not clear because of the absence of the scratched area and the presence of a large inclusion in another point of the wall. The bottom has more holes and was perhaps reused separately from the rim.

The *dolium* itself, because of the difficulties in the construction and the abrasion of the inner walls, was probably of

particular value, therefore had a long life, and could be used more times for several purposes<sup>31</sup>. In nearby *Noricum* there is evidence of small *dolia*, bowl and pots with post firing perforation in pits; some of the pits could be identified as pit dwellings in use between the 1<sup>st</sup> and the 2<sup>nd</sup> century AD.<sup>32</sup>

in Antike und Frühmittelalter. Tagungsbeiträge der Arbeitsgemeinschaft Spätantike und Frühmittelalter. Stud. Spätantike u. Frühmittelalter 7, 2014, 129–130; A. A. SCHAFELITZL, Der römische Gutshof von Möckenlohe, Lkr. Eichstätt. Bericht Bayerischen Bodendenkmalpflege 53, 2012, 101.

<sup>31</sup> A wall fragment, perhaps related to it, has two possible circular cuts, with a diameter of 7.5 and 11.4 cm respectively. See the reuse of half *dolia* or with holes in Pompei: JASHEMSKI 1979, 286 fig. 432.

<sup>32</sup> S. GROH/H. SEDLMAYER, Forschungen im vicus Ost von Mautern-Favianis. RLÖ 44/1 (Wien 2006) Taf. 9, 2099/15; 99, 995/52; 247, 1631/5; 169, 2155/52.

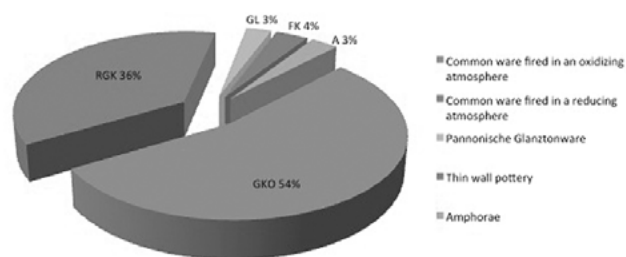


Fig. 6. Material with secondary perforation divided by pottery class.

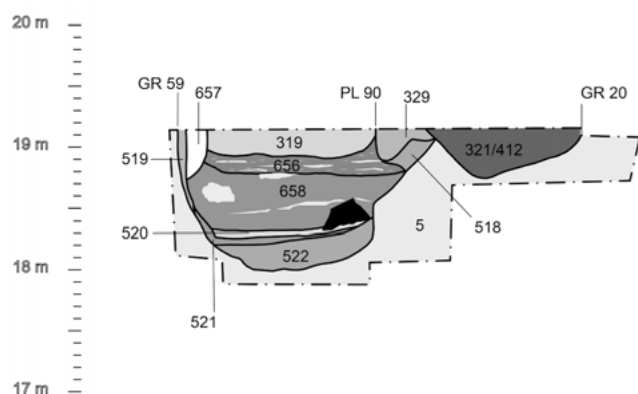


Fig. 7. Museen der Stadt Wien – Stadarchäologie Wien 3, Rennweg 44 (1990\_01) pit GR 59

Part of the domestic activity consisted also in the care of the *hortus*: it helped to fulfil the family needs for food<sup>33</sup> and the surplus could be sold to the *tabernae* on the *limes* road<sup>34</sup>. *Dolia* could be used both as food containers and to transplant trees<sup>35</sup>. In Great Britain<sup>36</sup> soldiers introduced several edible and ornamental plants unthinkable in the Northern Roman Empire; others were found by pollen analysis in northern France<sup>37</sup>.

Actually some bottom of *ollae perforatae* before firing was found in the excavation of Michaelerplatz (*canabae legionis*)<sup>38</sup>, even if in very small number when compared to the vessels with perforation after the firing recorded at Rennweg 44. Trees were probably planted in small pits of the area of Rennweg 44 and could have had both ornamental and food use<sup>39</sup>. Archaeological research has recently identified evidence of gardens in various contexts, sacred, urban and rustic, not only in Great Britain and France, but also in Switzerland and Germany<sup>40</sup> and of *ollae perforatae* (Italy,

Great Britain, France, Greece, Israel, Jordan, Tunisia) from 1<sup>st</sup> century BC to the second half of the 2<sup>nd</sup>, and up to the 3<sup>rd</sup> century AD, for particular forms.<sup>41</sup> In the northeastern France, a testament with the mention of “*topiari*” was found, dated to the second half of the 2<sup>nd</sup> century AD.<sup>42</sup> and it seems that orchards were even cultivated *intra muros*<sup>43</sup>. Only recently botanical research on the Roman age began in Vienna (and generally Austria).<sup>44</sup> At the moment it is not possible to prove on-site cultivation of trees or potted plants, even if it was possible to find remains of fruit (stones) from a pit of *canabae legionis* (Freyung)<sup>45</sup>. Also, in Winden am See, an inscription indicates the existence of a *viridarium* for a grave<sup>46</sup>.

In Pannonia, individual cases of perforated vessels are not rare and are related to jugs<sup>47</sup>, pots<sup>48</sup>, and bowl<sup>49</sup>. Publications do not always explain if holes were made after firing. Perforations on the rim of some small *dolia* might just help their closure<sup>50</sup>.

Although this horticultural function is less plausible for the *dolium* of Rennweg 44, it could be applied to some of the many perforated examples of other sizes found in the excavation. According to the purpose (transport, transplantation, vegetative propagation, decoration<sup>51</sup>) the *olla* or the vessel could have different sizes and shapes<sup>52</sup>, but also according to the plant species, e. g. trees needed different types of transplant techniques<sup>53</sup>.

<sup>41</sup> In layers dated to the Antonine period: A. QUERCIA, Le ceramiche comuni di età romana. In: F. Filippi (ed), Horti et Sordes. Uno scavo alle falde del Gianicolo (Roma 2008) 212 note 123; MACAULAY LEWIS 2006, 207–208. – Perhaps in the mid 2<sup>nd</sup> c. BC: MACAULAY LEWIS 2006a, 159; also later: 163. – 1<sup>st</sup> c. AD: MACAULAY 2006, 191; BARBERAN 1998, 69; id. 2000, 181; DESBAT 1997. – 1<sup>st</sup> c. AD–end of the 2<sup>nd</sup> c. AD/beginning of the 3<sup>rd</sup> c. AD: G. LAVOIX/F. GERBER/D. GUITTON, Des poires, des pots et un dépôt: chronique d’une exploitation agricole antique en territoire picton (La Viaube 1, Jaunay-Clan, Vienne). SFECAG Actes Congrès Potiers 2012 (Marseille 2012) 223–242; BARAT/MORIZE 1999, 229. – About distribution: Ibid. Fig. 14 and MACAULAY LEWIS 2006, 209 Tab. 1.

<sup>42</sup> In Langres/Andemantunnum (Belgica/Germania Superior) [CIL 13, 05708].

<sup>43</sup> BARBERAN 2000, 181.

<sup>44</sup> THURY 2008, 180.

<sup>45</sup> KRONBERGER 2009, 75.

<sup>46</sup> THURY 2008, 179. Inv. Nr. 2275, www.ubi-erat-lupa.org (picture database about stone monuments; as at December 24, 2014)

<sup>47</sup> U. TRINKS, Fundbericht Palastruine 1957. Carnuntum Jahrb. 1957 Abb. 1, 18.

<sup>48</sup> K. PÓCZY, Keramik. In: M. R. Alföldi et al., Intercisa II (Dunapentele) (Budapest 1957) Taf. 15, 13 Kat. 302.

<sup>49</sup> V. DAUTOVA RUŠEVLIJAN/O. BRUKNER, Gomolava. The Roman Period (Novi Sad 1992) Taf. 10, 68.

<sup>50</sup> M. KRONBERGER/P. SCHERRER, Archäologische Untersuchung am Europaplatz: ein Ausschnitt aus der Gräberstrasse im Südwesten von Aelium Cetium. In: P. Scherrer (ed.), Landeshauptstadt St. Pölten, Archäologische Bausteine II. ÖAI Sonderschriften 23 (Wien 1994) Taf. 3, 29 (Noricum).

<sup>51</sup> For the development of a climbing plant: BARBERAN 1998; LILJENSTOLPE/KLYNNE 1997–1998, 130; JASHEMSKI 1979, 295 fig. 446. – Cicero mentions ivy among the column of his brother’s porticus: M. T. CICERO, Ad Quintum 3, 1, 5; RYLEY 2006, 9; M. MARIOTTI LIPPI, Il verde urbano nell’antica Pompei. In: A. Ciarallo/E. De Carolis (eds.), Homo Faber. Natura, scienza e tecnica nell’antica Pompei. Cat. mostra (Milano 1999) 88; COWAN/HINTON 2008, 79 Fig. 2–4; MESSINEO 1984, 72.

<sup>52</sup> The *ollae perforatae* could have different sizes: MACAULAY LEWIS 2006, 208; 210; 216. See also: DI GIOVANNI 1996, 90 Abb. 18, 2311a. Up to 32,4 cm in height; CARROLL 2008, 40 Fig. 7. From 9–10 cm in Rome with the maximum diameter up to 20 cm at Pompei.

<sup>53</sup> PLINIUS D. Ä., Naturalis historia 12, 16.

<sup>33</sup> At Fishbourne a domestic fireplace was located in the *hortus*: B. W. CUNLIFFE, Fishbourne: Rom in Britannien. Neue Entdeckungen der Archäologie 2, 1971, 173.

<sup>34</sup> A stove was found near the *limes* road.

<sup>35</sup> See the big *olla*: DI GIOVANNI 1996, 90 Fig. 18, 2311a.

<sup>36</sup> C. RYLEY, Roman Gardens and their Plants (Lewes 2006) 18–19.

<sup>37</sup> BARAT/MORIZE 1999, 226: larches, cedar trees, lilac and even olive trees. MV45.1558/36.

<sup>38</sup> F. JASHEMSKI, Roman Gardens in Tunisia: Preliminary Excavations in the House of Bacchus and Ariadne and in the East Temple at Thuburbo Maius. Am. Journal Arch. 99, 1995, *passim* and in particular 569.

<sup>40</sup> M. E. FUCHS, Jardins romains au Nord des Alpes: entre ville et campagne. In: F. Bertholet/K. Reber, Jardins antiques, Grèce – Gaule – Rome (Gollion 2010) 115–146; COWAN/HINTON 2008, 78; RYLEY 2006, 15–17.

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Fig. 9. Jug with intentional detached bottom (Rennweg 44).

At Rennweg 44 there were found several sorts of forms of perforated pottery, even amphorae. However, the latter could be reused for gardens: cut in half and overturned with the rim facing down, representing an orifice for roots, and the shape limiting the growth of the plant on the surface<sup>54</sup>.

Fractures of restored jugs of Rennweg 44 were analyzed: they are not always a clean cut in half of the form.

The difficulty in making a hole after firing a vessel could easily lead to its rupture, but it appears that in some cases of vegetative propagation this was not a problem. Cato and Theophrastus describe a kind of air-layering of trees made by the insertion of the shoot inside a broken vessel in the ground, later the growing roots would push away the vessel walls. Such practice implied binding the broken vessel to a tree<sup>55</sup>, something difficult to imagine in the case of heavy containers with a small hole on the base<sup>56</sup>. In fact, *ollae perforatae* with only one small hole on the bottom are much more useful for transporting, transplanting and plant keeping<sup>57</sup>, although they could also be related to other practices of vegetation propagation<sup>58</sup>. The breaking of the vessel *in situ* could therefore be related to the elimination of such containers without moving them<sup>59</sup>.

<sup>54</sup> MACAULAY/LEWIS 2006, 216; BARAT/MORIZE 1999, 221; F. VILLEDIEAU, "La coenatio rotunda" neroniana e le altre vestigia nel sito della Vigna Barberini al Palatino. Boll. Arte 12, 2011, 23.

<sup>55</sup> M. P. CATO, De agricultura 60,51; THEOPHRASTOS, Historia plantarum 2,5,3. – A proposal was made by MESSINEO 1984, 82 fig. 23 on the base of a 19<sup>th</sup> c. reconstruction fig. 22.

<sup>56</sup> CARROLL 2008, 39.

<sup>57</sup> LILJENSTOLPE/KLYNNE 1997–1998, 127–147 part. 130; CARRARA 2013, 211; PLINIUS D. Ä., Naturalis historia 17,64.

<sup>58</sup> PLINIUS D. Ä., Naturalis historia 17,64; M. P. CATO, De agricultura 60,51; CASSIANUS BASSUS, Geoponica 10,3; PALLADIUS, De agricultura 4,10,5.

<sup>59</sup> CARRARA 2013, 190; MACAULAY LEWIS 2006, 216.

Roots and vegetable remains on vessels perforated on the bottom and on the wall – found in context – confirmed that they were used as plant containers, regardless of the use for water drainage or vegetative propagation.<sup>60</sup> At Rennweg 44 small holes were normally found on the bottom of the vessels, sometimes also detached bottoms (fig. 9) in common were fired in both oxidizing and reducing atmosphere. In the latter case, the separate manufacture of the walls and the bottoms could be the reason for the presence of detached bottoms: the detachment was not intentional (e. g. for plant vessels), but due to the use. Side holes could be different in sizes and numbers (between one and five) and a hole was normally on the bottom (the *dolium* with seven holes is an exception)<sup>61</sup>; most of the holes could be found at a third of the height from the bottom, as in *ollae perforatae*.

Perforation on pottery items of Rennweg 44 occurred after firing, while holes on the *ollae perforatae* (normally produced *ad hoc*<sup>62</sup>) were usually made before firing. Recently, however, *ollae* or other *vasa fictilia*<sup>63</sup> (even *mortaria*<sup>64</sup>) with post-firing perforations<sup>65</sup> – as noted in the sources<sup>66</sup> – were found in the provinces. Actually more perforated items in other classes too, such as *terra sigillata*<sup>67</sup>, were attributed to this function.

## Decanting function

In the excavation, the presence of secondary perforation on 11 amphora items (among them Aquincum 78/Grado I, Galouise 4, Africana III, Cretoise)<sup>68</sup> could be related to the difficulty in emptying them because of the tight sealing. The amphorae were full of liquid, like wine, or semi-liquid material, like liquamen; evidence of liquid content could also be found in perforated jugs. (fig. 3,1).

The presence of holes on the shoulder, on the body or on the bottom of the jugs suggested the practice to decant wine, fish sauce or oil, according to a system more common in Mediterranean areas<sup>69</sup>.

On the shoulder of an *amphora* there are three holes placed at the same level and at a certain distance one from the other<sup>70</sup>. According to some experiment, one hole would help to empty

<sup>60</sup> K. L. GLEASON, Garden Excavations at the Herodian Winter Palace in Jericho, 1985–1987. Bull. Anglo-Israel Arch. Soc. 7, 1987–1988, 29 Fig. 6; PLINIUS D. Ä., Naturalis historia 17,98. JASHEMSKI 1979, 240.

<sup>61</sup> MACAULAY LEWIS 2006, 207; 213; MACAULAY 2006, 192 note 2; F. VILLEDIEU (ed.), Il giardino dei Cesari. Dai palazzi antichi alla Vigna Barberini sul Monte Palatino (Roma 2001) 76; BARBERAN 2000, 178–179; BARAT/MORIZE 1999, 213; DESBAT 1997, 311; DI GIOVANNI 1996, 90.

<sup>62</sup> An exception in Rome: MESSINEO 1984, 67 fig. 3,9.

<sup>63</sup> PLINIUS D. Ä., Naturalis historia 12,16; 17,97–98.

<sup>64</sup> BARAT/MORIZE 1999, 220 Fig. 7,52.

<sup>65</sup> MACAULAY LEWIS 2006a, 161; BARAT/MORIZE 1999, 219 fig. 6,36. 39.

<sup>66</sup> M. P. CATO, De agricultura 61,52.

<sup>67</sup> BARAT/MORIZE 1999, 221–220 fig. 7,49–51. Usually the *ollae perforatae* are made in common ware fired in an oxidizing atmosphere, anyway there are some exemplar fired in a reducing atmosphere.

<sup>68</sup> I thank P. Hárshgyi for the help in the identification: MV38. 220/11<221; 55/39; 55/40; 235/11; 236/9>220>55>250; 621/23; 305/1001.

<sup>69</sup> LOUGHTON/ALBERGHI 2012, 815; PEÑA 2007, 67–69; or in ship-wrecks where amphorae were used to fulfil the water needs aboard: PEÑA 2007, 138. See also: WARNER SLANE 2011, 98.

<sup>70</sup> MV38.644/50>484>386.

the amphora: a second hole would be necessary to keep the air inside the vessel in order to balance the inner pressure. When the hole was located on the neck of the amphora it could allow for a second fermentation of the content too<sup>71</sup>.

These evidences suggest pouring and decanting from amphorae to common ware jugs or to *dolia*: they retain white (perhaps calcium from milk or water<sup>72</sup>), yellow or shiny black<sup>73</sup> traces on the inner walls only. In the latter case, when shiny<sup>74</sup> and therefore fat traces are present, several diagnostic methods (Raman spectroscopy, infrared adsorption spectroscopy<sup>75</sup> and gas chromatography<sup>76</sup>) were applied.

The diagnostics findings confirmed each other: in two fragments of the most common jugs of the 2<sup>nd</sup> century AD it was found a predominant mixture of pine resin, with addition of birch tar, beeswax, Baltic amber, preheated oil, ?carbohydrates.<sup>77</sup>

### Ceremonial/ritual function

A ceremonial/ritual hypothesis could give a general explanation for all the perforated pottery of Rennweg 44 and explain particularly the different positions of the perforations<sup>78</sup>.

During the Bronze Age in Crete<sup>79</sup> and, later, in Magna Graecia, cups and *hydriae* with an upside down perforated bottom were used as funnels, to let offers flow to Demeter<sup>80</sup>, goddess of the Earth. *Ollae perforatae*, with vegetable remains and deer bones, were found in pits in *Latium* where propitiatory rites were performed in honour of Demeter from the 1<sup>st</sup> century BC.<sup>81</sup> In the Roman age, ritual perforation had also the purpose to make unusable the pottery dedicated to the divinity<sup>82</sup> and it was a purification system to convert a profane vessel for the reuse in religious practice too<sup>83</sup>. Dipping the vessel in water was another practice to offer a vessel to the gods<sup>84</sup>.

The liquid traces inside the most common perforated form of Rennweg 44, the jugs, could also be connected to rituals of *libatio* or *ablutio*<sup>85</sup>.

During the middle Roman Empire, the northern and central areas recorded the presence of perforated vessels in pits related to the cult of *Liber* (*Apulum*, *Dacia* – where the 13<sup>th</sup> legion was deployed from *Vindobona*) – or Sabazios (Straubing, *Raetia*), gods of the fertility of land, of women, of crops, and of regeneration of the nature<sup>86</sup>.

Other relationships refer to Mercury, god of the commerce<sup>87</sup>. Water, seen as *fons perennis*<sup>88</sup>, seemed to be the essential element in the rites related to the temples of Jupiter Dolichenus and Mitra.

The practice of perforation *post cocturam* can also be found on the northwest side of the empire, in France and in England<sup>89</sup>, in cult contexts, often in pits or wells, where it dates back from the Iron Age. In Silchester it was possible to find items similar to the ones found in *Latium*: flower pots and more than 81 perforated standard forms of common ware were found in pits and wells or isolated findings in the *insulae*<sup>90</sup>.

The domestic and craftsmen area of Rennweg 44 allows one to hypothesize propitiatory ceremonies for the successful production of the artifacts<sup>91</sup>. Actually apotropaic evidences occur, such as fragments related to a mask (not found in pits or in a documented layer), perhaps produced *in situ* to bring luck to the potters or to be sold (In this latter case there is not apotropaic value for the site). Ritual vessels with applied twined snake figures<sup>92</sup>, face-pots with phallic applications or uncommon face-pot with funnel<sup>93</sup> suggest the same kind of evidence.

The connections in the pits/wells allow for some of these finds their association to perforated vessels, to incense burners, to lamps, to terra sigillata, to beaker, to tools for

<sup>71</sup> LOUGHTON/ALBERGHI 2012, 815. In order to have a good *garum*, made even in *Londinium*, it had to ferment at least two months in a jug with a hole: see CASSIANUS BASSUS, *Geoponica* 20,14; FULFORD/TIMBY 2001, 295. See also: WARNER SLANE 2011, 98.

<sup>72</sup> See for example jug MV38.411/1010.

<sup>73</sup> See for example jug MV38.370/1004 or fragments MV38.265/1007, 248/1004, 248/1012.

<sup>74</sup> Unfortunately there are no holes on these items.

<sup>75</sup> I thank E. Libowitzky (Institut für Mineralogie und Kristallographie, Universität Wien).

<sup>76</sup> I thank H. van Keulen and M. de Keijzer (Rijksdienst voor het Cultureel erfgoed, Amsterdam). The results and the analysis (also mentioned above) will be published in the monograph dedicated to the interpretation of the excavation.

<sup>77</sup> MV38.489/1062<1067; MV38.381/1001.

<sup>78</sup> The same practice was found in France in the sanctuary of Sains-du-Nord: WILLEMS/NEAUD 2012, 542.

<sup>79</sup> B. OTTO, *Olympische und chthonische Gottheiten*. In: B. Brandt (ed.), *Synergia II. Festschrift für Friedrich Krintzinger 2* (Wien 2005) 334.

<sup>80</sup> I thank B. OTTO, *Herakleia in Lukanien und das Quelleiligtum der Demeter*. Veröff. Univ. Innsbruck 220 (Innsbruck 1996) 112; 219 Taf. 15; id., *Il santuario di Demetra a Policoro*. In: M. Osanna/L. Prandi/A. Siciliano, *Culti Greci in Occidente II. Eraclea* (Taranto 2008) 88.

<sup>81</sup> With several bones of pigs consecrated to Demeter: <http://www.castellodeicontidiceccano.it/ceccano-nella-storia/ceccano-archeologica/archeologia-tav.aspx>. For the meaning of the deer bones in pits see also: ALBRECHT 2014, 191; 193; 195; 201 and the related chapter.

<sup>82</sup> MORTREAU 2008, 395; TRESCARTE 2007, 373; NIELOUD MULLER 2011, 376.

<sup>83</sup> TRESCARTE 2007, 374

<sup>84</sup> NIELOUD MULLER 2011, 377.

<sup>85</sup> TRESCARTE 2007, 382, also in burial practice.

<sup>86</sup> HÖPKEN 2014, 206–207. In Gaul and Germany the local and oriental gods had a particular role in the deposition in pits, even more important than the ones related to the Graeco-roman tradition: ALBRECHT 2014, 193.

<sup>87</sup> TRESCARTE 2007. We do not know to whom the sanctuary of Sains-du-Nord was attributed, anyway a jar with an appliqué of Mercury in a temple was found 200 m away, see WILLEMS/NEAUD 2012, 550.

<sup>88</sup> ALBRECHT 2014, 190.

<sup>89</sup> In a sanctuary of the 1<sup>st</sup> c. AD: TRESCARTE 2007, 371. It looks common on the French territory: NIELOUD MULLER 2011, 376; MORTREAU 2008, 395–396 Fig. 23–24. It is present without interruption up to the Roman age: FULFORD/TIMBY 2001, 293–294.

<sup>90</sup> FULFORD 2001, 201, 204–206; FULFORD/TIMBY 2001, 294.

<sup>91</sup> See perforated vessels in production contexts: WILLEMS/NEAUD 2012, 544. For the relationship between ritual and production contexts see also: M. BERGAMINI (ed.), *Scoppio I. Il territorio e i materiali* (Borgo S. Lorenzo 2007) 155; C. HÖPKEN, *Die Funde aus Keramik und Glas aus einem Liber Pater-Bezirk in Apulum (Dakien). Ein erster Überblick*. In: M. Martens/G. de Boe (eds.), *Roman Mithraism: the evidence of the small finds*. Papers of the international conference, Tienen, 7–8 Nov. 2001. Arch. Vlaanderen Monogr. 4 (Brussels 2004) 239.

<sup>92</sup> For the frequency of these vessels in the cult of *Liber Pater*: FIEDLER 2014, 193 note 15. – In the sanctuary of *Iuppiter Heliopolitanus*: GASSNER 2013, 267–268, 269 Abb. 9a–b. – For the presence of these vessels and their meaning in the pits: ALBRECHT 2014.

<sup>93</sup> MV38/1000: it can be compared with an item from Usk: J. DORE/K. GREENE (eds.), *Roman Pottery Studies in Britain and Beyond*. Papers presented to John Gillam. BAR Suppl. Ser. 30 (Oxford 1977) fig. 6.4.18 (type Niederbieber 80), the funnel is not perforated, differently from the exemplar found at Rennweg 44.

pottery production, etc. This happens also in settlements of the Alps' north provinces<sup>94</sup>.

Anyway at Rennweg 44, if we exclude the perforated material<sup>95</sup>, the percentage of the pottery related to a religious context is rather small if compared to the pottery related only to a residential use, but higher if compared to the pottery found in the *canabae* of Michaelerplatz, a production/residential/commercial site.

Moreover, at Rennweg 44 it is not possible to correlate the finds in the pits with the animal bones removed at the end of the excavation<sup>96</sup>.

An exception is the material between pit n. 5 and pit n. 57 (**fig. 8,GR5-57**): a dog skull<sup>97</sup>, 12 perforated fragments, eight incense burners (one of them with a post-firing hole)<sup>98</sup>, a face pot with phallic application, a not completely-fired jug with graffito, two lamps, 18 beakers. Unfortunately the attribution of this material to one of the pit only is not stratigraphic possible.

The hypothesis of ritual throws or sacred rubbish in site wells, filled with such material after the use looks difficult to be proven<sup>99</sup>, but the high concentration of possible ritual finds<sup>100</sup> in well n. 1 is interesting (**fig. 8,GR1**), especially the items found more than 11 m deep<sup>101</sup>: seven incense burners, five lamps, one singular perhaps ritual vessel, 35/41 beaker fragments, 25 bowls Drag. 37 made in *terra sigillata*, one washing bowl, (seven fragments of moneybox)<sup>102</sup>, and 21 fragments of perforated vessels. The latter have no connection with other perforated vessels found in other points of the excavation (**fig. 8,GR1**).

<sup>94</sup> HÖPKEN 2014, 206. See also FIEDLER 2014, 193 for *Apulum*: only the incense burners looks perforated after firing. Tools or misfired pottery were lately attributed to a subsequent phase of the pits: SCHÄFER 2014, 41.

<sup>95</sup> The concentration of vessels with twined snake figures is higher, see: HÖPKEN 2014, 207.

<sup>96</sup> Exceptions are a dog skull between pit n. 5 and some dog bones in debris-layer. For the connections of bones in wells see also: FULFORD 2001, *passim* and the case of *Verulamium*. In the area between the temple and the city, several pits, with animal skulls and face pots, were found (dating between the middle of the 2<sup>nd</sup> c. and the 3<sup>rd</sup> c. AD).

<sup>97</sup> According to S. Czeika, a bone specialist, it could be a carcass disposal.

<sup>98</sup> 142 incense burners with a hole in the middle of the bottom were found in the sanctuary dedicated to *Liber Pater* in *Apulum*: FIEDLER 2014, 193. – See also: J. BIRD, Incense in Mithraic ritual: the evidence of the finds. In: M. Martens/G. de Boe (eds.), *Roman Mithraism: the evidence of the small finds*. Papers of the international conference, Tienen, 7–8 Nov. 2001. Arch. Vlaanderen Monogr. 4 (Brussels 2004) 192.

<sup>99</sup> It is not possible to understand the layers related to the use of pit n. 1 since its bottom was not excavated. For the difficulty in the interpretation see: GASSNER 2013, 260.

<sup>100</sup> Perforated incense burners, particular face-pots, very small moneyboxes, not refined vessels, vessels intentionally destroyed by stones found *in situ*, a lot of drinking pottery and some table ware with evidence of use were found in pits of the sanctuary of *Apulum*: FIEDLER 2014, *passim*. Pits were larger and the documented stratigraphy better, about their interpretation with different ritual sequences, see: SCHÄFER 2008, 181. FIEDLER 2014; SCHÄFER 2014.

<sup>101</sup> Material from the finding numbers: 806, 811 e 812. (+ finding numbers, 807, 810, 809: 13 perforated vessels, 4 incense burners, 29 beakers, 4 Drag. 37, 1 washing bowl, 2 misfired pottery sherds).

<sup>102</sup> In *Apulum*, their religious meaning was clear: they are miniature pottery without any possible other use, differently from Rennweg 44. Here the moneyboxes were found without coins. A large amount of coins was found in the ground, a real treasure, attributed to a merchant: G. DEMBSKI/M. ZAVADIL, Der Münzschatz vom Rennweg 44. Wiener Arch. Stud. 6 (Wien 2004) 89. Coin treasures were found also in sanctuaries for public use too, see: C. HÖPKEN/B. LIESSEN, Römische Gräber im Kölner Süden II. Kölner Jahrb. 46, 2013, 382 with bibliography.

The pottery of this well mostly consists of forms that can be reconstructed. So it is perhaps possible to deduce that the presence of the above-mentioned material found in the upper layer of the well (but still 11 m deep) could be due to a different activity throw unrelated to the fillings of the other pits<sup>103</sup>. Actually these pits seems collecting the trash produced from the whole discovered area.

Making a distinction between residential and ritual rubbish, the latter composed of vessels thrown away after a rite<sup>104</sup>, would be difficult even if the stratigraphy of the layers in the pits was clear also because cooking was done in meeting places for religious ceremonies as well<sup>105</sup>. For safety reasons, it was not possible to rely on all the stratigraphy of well n. 1<sup>106</sup>.

In a short time, after the full interpretation of the excavation<sup>107</sup>, further explanations and interpretation changes will be possible.

## Reuse

Another perforated *dolium* having two graffiti executed in different styles (**fig. 4,2**)<sup>108</sup>, and, likely, in different moments, indicates that this could be a reuse of pottery.

The perforated pottery of Rennweg 44 is sometimes defective because of working, finishing or firing problems as happened in ritual sites near production areas<sup>109</sup>: for example there are “colpi da fuoco” made by the sudden oxygen inflow in the firing chamber of the kiln<sup>110</sup>.

Romans probably here selected defective pottery for secondary uses (perforation) or less likely (the majority shows evidence of use) specifically produced part of these vessels for a short use or one-off use, as in *Apulum*<sup>111</sup>.

## Techniques

Apart any possible speculation on the kind of tool to make the perforation on the pottery, there are some crucial points to explain.

All that archaeological evidence suggests is that some pottery fragments, previously mentioned, show traces made by some pointy tool in the direction of the holes, after the firing<sup>112</sup>.

<sup>103</sup> The material is composed of partially documented fillings from different layers, but the sherds joint together.

<sup>104</sup> HÖPKEN 2014, 207; FIEDLER 2014, 189 (here the position of the material is sure); G. ZIPF, Religion und Rituale in der Archäologie. Anz. Germ. Nationalmus. 2003, 20; SCHÄFER, 2008, 175–176 note 43; 184.

<sup>105</sup> E. g. FIEDLER 2014, 192; TRESGARTE 2007, 374; SCHÄFER 2008, 175.

<sup>106</sup> The pit was not documented to the bottom because of its depth. Since it was a rescue excavation the surface is little documented as well.

<sup>107</sup> About the difficulty in the interpretation of these contexts see: FULFORD 2001, 216; FULFORD/TIMBY 2001, 295.

<sup>108</sup> MV38.168/1007>142. I thank R. Wedenig for the discussion.

<sup>109</sup> E. g. the bottom MV38.1122/30. WILLEMS/NEAUD 2012, 543.

<sup>110</sup> N. CUOMO DI CAPRIO, La cottura della ceramica: i combustibili. RCRF Acta 19/20, 1979, 238.

<sup>111</sup> SCHÄFER 2014, 41.

<sup>112</sup> E. g. MV38.484/1106, rim of a bowl, MV38.392/1000, an incense burner with concentric traces not forming a scratched area.

The perforation on the fine pottery (i. e. very thin walled pottery) of Rennweg 44 is not exceptional: in France it occurs also in terra nigra, even with the usual scratched area around the hole<sup>113</sup>.

Understanding how the holes were done is difficult, since the reconstructed vessels show irregular breaks in the walls related to the holes. The area around the hole shows that it was made by means of chipping<sup>114</sup>. The irregularity of the holes, their variety and position are not isolated occurrences. In French religious area of Puy de Dome, dedicated to Mercury, it was proposed that the found pottery was perforated after being broken<sup>115</sup>. The presence of holes, mainly on the bottom of the pottery, could be related with the selection of the strongest parts of the pottery used to produce *ex-voto* by the pilgrims travelling to the sanctuary. Perforated body walls could be considered as a temporary receptacle for food offerings during the rites<sup>116</sup>.

In Rome, pilgrims and merchants were sprinkled with water from the fountain of Mercury<sup>117</sup>. The ceremony took place on the day dedicated to the god: the aim was wishing good luck in the business. Evidence of the cult of Mercury is frequent in Vienna especially because of small finds<sup>118</sup>: a gem with the carved god sitting (a common subject of the merchant cults) was found in a Roman cellar of Rennweg 44. The area, along the limes road, was the most important communication route, having a strong trade character, where this kind of evidences already occurred<sup>119</sup>.

Coming back to the destructive perforation technique, one could speculate that the uneven wall breaks near the holes could be subsequent to the use of the perforated vessel.

## Conclusions

It is not possible to apply the hypothesis of reuse as plant vessels to all the drilled pottery of Rennweg 44: other assumptions have to be considered.

In some cases traces of liquid indicate that the vessels were used for watery or fluid contents (wine, *liquamen*, water but also pitch or similar products): given that the holes are also present on amphorae, this suggests decanting or pouring.

Because of the position of the site, on an “international” route dedicated to commerce and production, a feasible

alternative to justify the presence of most of the perforated pottery could be the presence of a redistribution site of the goods together with a recycling centre for the vessels. All along Rennweg, and the *limes* road, there were a number of workshops for pottery and other local productions. Exotic goods<sup>120</sup> travelled in amphorae on this same route as the local products (the latter came in less transportable vessels as *dolia* and less resistant as big jugs with two handles): therefore it was necessary to spread this large selection of goods to a regional level for a small-scale commerce<sup>121</sup>. Pottery was reused for several transports (sometimes refilled with new products) and for storage *in situ*.

These features bring to mind the largest amphora-assemblage located in “Caserne Niel”, near Toulouse, Haute-Garonne. Several kinds of amphorae modifications, such as perforations for reuse or redistribution are present in a large scale. The site, on an important route, connected the goods arriving from the sea with the inner territory<sup>122</sup>.

This explanation is insufficient for the interpretation of the perforation of the smaller vessels or tableware (beakers and bowls, for example) from Rennweg 44 for which filtering could be a possible option. In this case one wonders about the kind of relationship between forms founded at Rennweg 44, produced *ad hoc*, like cheese-presses, filters, sieves, and strainers and others obtained from vessels originally produced for other purposes<sup>123</sup> – as mentioned in the sources<sup>124</sup>. The same situation occurs for the planting pots: post-fired perforated amphorae were used together with *ollae perforatae*, the latter produced *ad hoc*. In this case a possible explanation could be the different destination of the plants.<sup>125</sup>

The presence of holes in all the classes of pottery could lead to a common interpretation, difficult to prove. The variety of forms excludes a single kind of use or function apart from the ritual hypothesis that is not verifiable because of the absence of sacred structures in the excavation area or nearby.

The massive presence of perforations excludes a strictly private religious context (for example domestic). The presence of a sanctuary on the West of the excavation area is possible but not demonstrated<sup>126</sup>. On the other hand, perforations on the vessels were found in areas where sanctuaries were close to production sites<sup>127</sup>.

Such speculations are complicated by the difficulties of undocumented or irrelevant stratigraphic revelations<sup>128</sup>. The

<sup>113</sup> WILLEMS/NEAUD 2012, 540 Fig. 6.7.

<sup>114</sup> PEÑA 2007, 67.

<sup>115</sup> TRESCARTE 2007, 371.

<sup>116</sup> Ibid. 374.

<sup>117</sup> Ibid. 382.

<sup>118</sup> R. CHINELLI/M. MÜLLER, *Vindobona: due gemme con raffigurazioni di divinità da contesti di scavo*. In: G. S. Chiesa/E. Galletti, *Aquileia e la glittica di età romana. Atti del Convegno “Il fulgore delle gemme. Aquileia e la glittica di età ellenistica e romana”, Aquileia, 19–20 giugno 2008 (Trieste 2009)* 358. – Without exactly findings place: M. KRONBERGER, *Drei Silbergefäße aus der Sammlung des Wien Museum. Fundort Wien 9, 2006*, 106 Kat. 1; 123.

<sup>119</sup> CHINELLI ET AL. 2007, 819 fig. 1,31; 839. – In streets on the side of the road (Rudolfstiftung): F. VON KENNER, *Römische Funde in Wien 1908–1910. Jahrb. Altkde.* 5, 1911, 153 Fig. 47. – Marokkanergasse 25/Rennweg, votive altar to Mercury: ID., *Neue römische Funde in Wien. Mitt. K. K. Central-Comm. Baudenkmale* 5, 1879, 41; *CIL* III 4562. – Bronze statuette: ID., *Römische Funde in Wien 1908–1910. Jahrb. Altkde.* 5, 1911, Beibl. 136a Fig. 131. – Arsenal: a relief showing Mercury acting as Jupiter, reused as a sarcophagus; KRONBERGER 2009, 55.

<sup>120</sup> Here we find the highest concentration of “ceramica a vernice rossa interna” from the Thyrrenian area, see: CHINELLI ET AL. 2007, 827.

<sup>121</sup> D. ADAN BAYEWITZ, *The pottery from the Late Byzantine Building (Stratum 4) and its implications*. In: L. Levine/E. Netzer (eds.), *Excavations at Caesarea Maritima 1975, 1976, 1979 – final report. Qedem* 21 (Jerusalem 1986) 96. The relatively low amount of amphorae should not be surprising because in Pannonia they rather used barrels.

<sup>122</sup> LOUGHTON/ALBERGHI 2012.

<sup>123</sup> For the discussion about lipides see: BARRASS 2012, 72.

<sup>124</sup> COLUMELLA, *De re rustica* 12,8,1.

<sup>125</sup> See e. g. MACAULAY 2006, 192–193.

<sup>126</sup> KRONBERGER 2009, 59 and also in a more remote area East of the Arsenal. Evidence of perforations on pottery in religious areas near trade routes in Savoy: NIELOUD MULLER 2011, 372, 375 fig. 9; 376.

<sup>127</sup> See e. g. WILLEMS/NEAUD 2012, 535–536.

<sup>128</sup> The excavation was made according to methods not longer in use. Besides, the material dating of the most significant and reliable contexts, so far did not show at the moment particular useful chronological differentiations.

available documentation, still to be fully elaborated, suggests that the material is concentrated in several pits not always to be considered as wells.

Unfortunately, apart from well 1, the same material of the pits/wells appears to be spread over the rest of the excavated area as well: therefore it is possible that the pits/wells were used to deposit the useless material<sup>129</sup> or even that the pottery from other areas of the civilian settlement could be here filling material. In this case, all suggested hypotheses could be true, since it is not possible to know the kind of reuse in non-investigated areas nearby, or at a small distance from the excavated site.

These data record for the first time a large scale evidence of post-firing pottery perforation in the North Eastern provinces, particularly in Pannonia.

The purpose of this study, apart from the communication of the scientific data, is to focus the attention on the reuse during the Roman age, a subject still little treated in archaeology, and to stress the importance of the information given by the conservation and restoration treatments, often considered too expensive and time consuming.

*rita.chinelli@stadtarchaeologie.at*

<sup>129</sup> PEÑA 2007, 283. Common pottery, treated as trash, can be found on roofs too: *ibid.* 289.

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