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**INSIGHTS INTO THE CHRONOLOGY AND ECONOMY
OF THE AVAR KHAGANATE AND THE POST-AVAR PERIOD:
POTTERY PRODUCTION AND USE IN THE CARPATHIAN BASIN
FROM THE LATE 6TH TO THE 10TH CENTURY AD**

ABSTRACT

H. Herold 2014. *Insights into the chronology and economy of the Avar Khaganate and the post-Avar Period: pottery production and use in the Carpathian Basin from the late 6th to the 10th century AD*, AAC 49: 207–229.

This article discusses how the analysis of late 6th to 10th-century ceramic finds can contribute to a better understanding and reconstruction of the chronology and economy of the Avar Khaganate and the post-Avar Period in the Carpathian Basin (today's Hungary and adjacent areas). It comprises a critical review of available research results on Avar-Period and 9th to 10th-century pottery, including results from the author's own investigations, thus offering a critical assessment of many decades of research on pottery from c. 400 years in this region.

Key words: Early Middle Ages; Carpathian Basin; Avars; ceramics

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INTRODUCTION

The analysis of Avar-Period ceramics can make several important contributions to our knowledge of early medieval central Europe: it helps to establish a chronological framework for sites and settlement features, it enables connecting the settlements with the cemeteries that these communities used, and, through considering the framework of ceramic production, it also provides an opportunity to gain insight into the otherwise largely unknown economy of the Avar Khaganate¹. For these reasons, it is of prime importance to carry out in-depth analysis of ceramics from Avar-Period sites, both from settlements and cemeteries. The study of Avar-Period (c. late 6th to early 9th centuries AD) ceramics has from the beginning been thoroughly interwoven with research on pottery from the 9th and 10th centuries, with different researchers dating certain pottery groups to

¹ Elements of this paper are based on the chapter 'Die Erforschung awarenzeitlicher Keramik' in Herold 2010, 167–176. I would like to thank Dr. K. Patrick Fazioli, Buffalo, NY, USA, for improving the English of this article.

different periods within these four centuries. Thus, while primarily concentrating on the Avar-Period, this article considers the entire timeframe of the late 6th to 10th centuries AD.

The conventional chronological scheme for Avar-Period ceramics is essentially based on vessels from graves (Vida 1986; 1999; Daim 1994; Macháček 1997), which are usually preserved as whole vessels, or can be fully reconstructed, and on the two wheel-thrown ceramic types, the ‘grey’ and the ‘yellow pottery’. The ‘grey pottery’ is generally dated to the Early and Middle Avar Period (Bialekova 1968; Vida 1999, 33–82), while the ‘yellow pottery’ is connected to the Late Avar Period (Bialekova 1967; Garam 1969). As the occurrence of these two wheel-thrown pottery types is very rare, especially in settlements, many settlement analyses cannot make use of these chronological markers. This often means that settlements cannot be dated more precisely within the Avar Period without the use of scientific dating.

A detailed chronological scheme and evidence for the organisation of Avar-Period ceramic production has been established for the settlement and cemetery of Zillingtal in eastern Austria (Herold 2010; 2013; see also Figs. 1–6 in this article). Taking the results from Zillingtal as a starting point, this article suggests revisions to the dating of selected Avar-Period ceramic groups, and seeks to establish possible interpretation models for this pottery, with a special focus on the organisation of the economy in this period.

EXISTING CHRONOLOGICAL AND INTERPRETATIVE MODELS FOR AVAR-PERIOD AND 9TH TO 10TH-CENTURY CERAMICS

The article of B. M. Szőke published in 1980 represents an important contribution to the analysis of ceramics from early medieval settlements in the Carpathian Basin (Szőke 1980). Szőke suggested a scheme for the dating of early medieval settlement ceramics from south-eastern Hungary based on finds from fieldwalking for the ‘Archaeological Topography of Hungary’ in County Békés. The main aim of early medieval settlement research in this region at the time was to identify the (settlement) ceramics of the Hungarian Conquest period (10th century AD). Szőke divided the early and high medieval ceramic finds into two groups (Szőke 1980, 188):

Group A

- slow-wheel-turned pottery (c. 20%);
- hand-made pottery (c. 75–80%);
- hand-made clay cauldrons (c. 0.5%);
- pottery with stamped decoration (c. 0.5%);
- baking bells (c. 1–2%).

Group B

- slow-wheel-turned clay cauldrons (80–85%);
- slow-wheel-turned pots (15–20%).

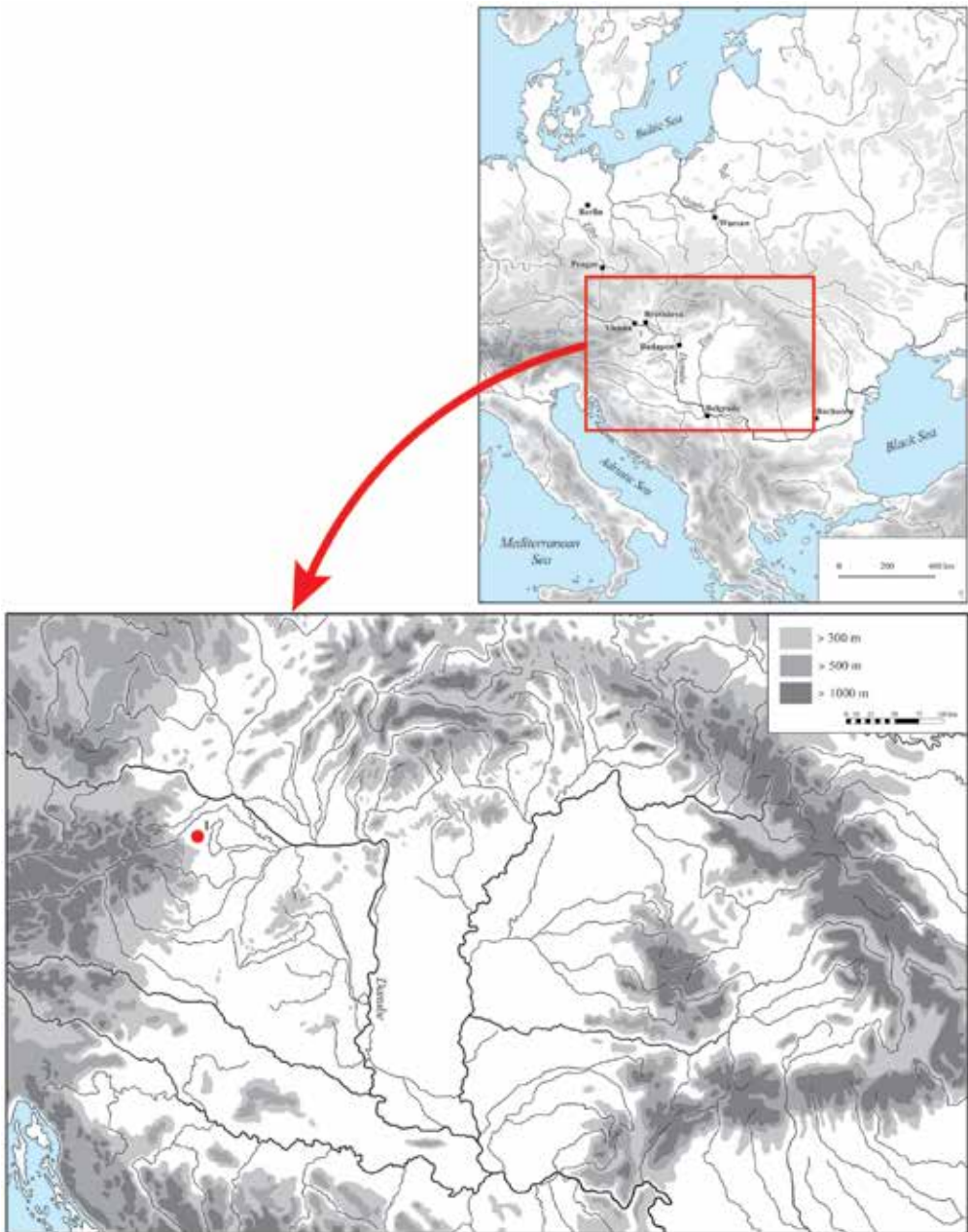


Fig. 1. Zillingtal, Bezirk Eisenstadt-Umgebung, Burgenland, Austria.
The location of the site, drawn by I. Jordan.

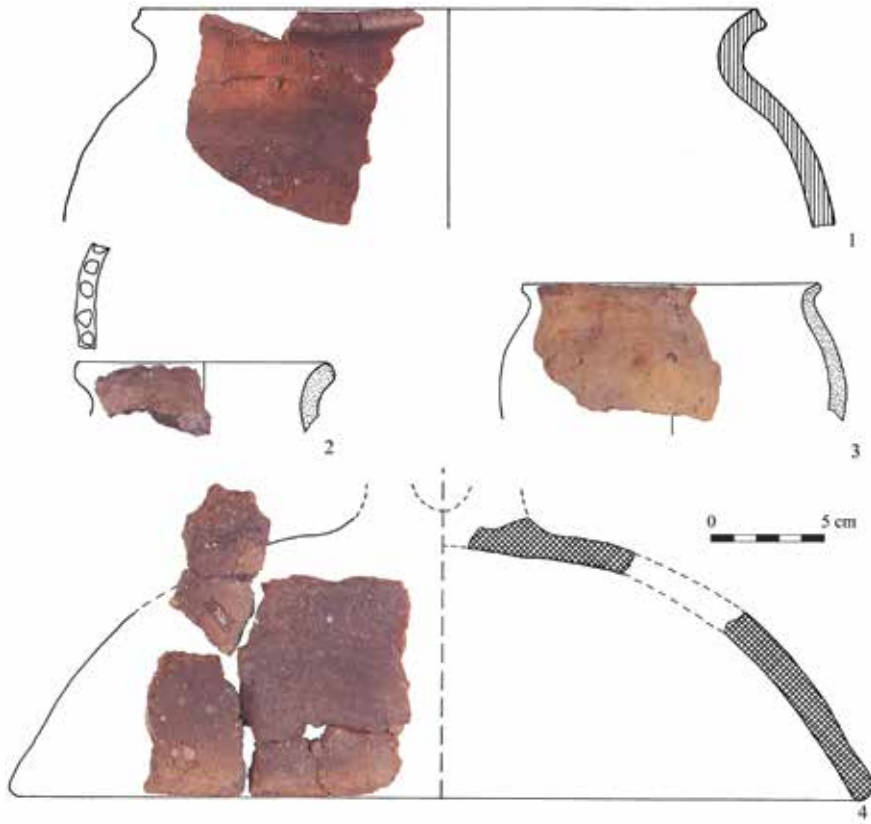


Fig. 2. Zillingtal, Bezirk Eisenstadt-Umgebung, Burgenland, Austria. Pottery fragments from the Avar period settlement; after H. Herold (2011a, Fig. 5).

1 — slow-wheel-turned pot; 2-3 — hand-made pots; 4 — baking bell.

Szóke dated Group B to the 10th century AD and Group A to the 9th century AD. The intense discussion following the publication of his article mainly concentrated on clarifying if these two groups should really be separated, and if they can be reliably dated to the 10th or the 9th century (MRT 8, 29–31). The date of the beginning of the Saltovo-Majak culture (in the 9th century) in the area of today's Ukraine was an important argument in this discussion (Szóke 1980, 189). It must be noted that so far neither the dating of finds and features within the Saltovo-Majak culture itself has been worked out, nor the early medieval relations between the area of present-day eastern Hungary and the area of the Saltovo-Majak culture have sufficiently been characterised. Therefore, it is not possible to include the Saltovo-Majak culture in this discussion as a secure point of (chronological) reference. The dating of Group A, especially the hand-made clay cauldrons, was subsequently set earlier by other authors than it had originally been by Szóke, but these datings were never earlier than the beginning of the 8th century (Vida 1991).

Data from numerous archaeological excavations over the past thirty years give us a chance to re-examine the questions raised in Szóke's article, particularly since his interpretations were based mainly on surface collections, which do not alone provide reliable chronological information on pottery groups.

My working hypothesis is that the so-called Group A includes (settlement) ceramics from a much larger timeframe than previously thought, at least from the beginning of the Middle Avar Period (mid 7th century) to the Hungarian Conquest Period in the 10th century. In addition, it is very well possible that Group A also extends to the Early Avar Period (late 6th century–mid 7th century; for details see below). Thus Group A does not actually represent one group, but is a mixture of (settlement) ceramics across approximately four centuries.

A proposal is presented below for the chronological division of Group A. This is intended to serve as a hypothesis, to be verified or disproved by the analysis of further excavated settlements. Thereby, three specific pottery types receive special attention: baking bells, pottery with stamped decoration, and hand-made clay cauldrons. These very often occur at excavated settlements (i.e. ones that are not only known from fieldwalking) separately from each other. The geographical areas of their distribution are also different (see F i e d l e r 1994 for lists of sites and distribution maps: 334, Fig. 12 [hand-made clay cauldrons]; 335, Fig. 13 [baking bells]; 337 [pottery with stamped decoration]; for additions to these lists see H e r o l d 2004, 74).

BAKING BELLS

There appears to be widespread confusion about the following ceramic vessels in publications: baking bells, clay troughs and baking plates. Baking bells and clay troughs are documented in the area of the Avar Khaganate for example in Zillingtal (baking bells: e.g. H e r o l d 2010, Pl. 3:4; 4:4, 6–7, see also Fig. 5:4 in this article; clay troughs: e.g. H e r o l d 2010, Pl. 14:6, 21:4). Baking plates are not known from settlements of the Avar Khaganate, but occur at early medieval settlements for example in the area of present-day north-eastern Hungary (H e r o l d 2006, Pl. 55:5, 64:7). Baking bells are likely to have been used as a cover when baking, or as a means to retain embers over long periods of time (see e.g. the experiments in F u s e k, Z á b o j n í k 2006). The baking bells of the Avar Period are likely to have originated in the Mediterranean region (V i d a 2011). The function of clay troughs has not been fully explained; they might have been used for roasting grain, which can be related both to preserving grain intended for eating and to brewing, or for drying, for example fruits. Baking plates are possibly connected to baking certain types of flat breads. Interestingly, the contemporary combined use of baking plates and baking bells in south-eastern Europe (e.g. K r a u s s, J e u t e 1998) does not seem to have been practiced in the Avar-Period Carpathian Basin, as these two types of vessels have so far not been found at the same early medieval sites in this region.

Baking bells have the largest area of distribution from among the three special pottery types of Szőke's Group A (baking bells, pottery with stamped decoration, and hand-made clay cauldrons). Baking bells occur in eastern Hungary (with the exception of north-eastern Hungary, where settlements of the Avar Khaganate have so far not become known), in parts of western Hungary (within this region, the lowest numbers of baking bells are known from south-western Hungary; the publication of the excavations of the M7 motorway can bring new results in this respect, see e.g. Belényesy, Mersdorf 2004, 47 and 62, Fig. 19), as well as in parts of present-day Austria and Slovakia (Fiedler 1994, 335, Fig. 13; Zábajník 2006).

With the exception of Dunaújváros–Öreghegy (Bóna 1973), baking bells occur at all Avar-Period settlements known from the distribution area of this vessel type. It is possible that in Dunaújváros–Öreghegy baking bells were really absent for chronological reasons. If this is the case, it is likely that baking bells only appear after the Early Avar Period. However, it cannot be fully ruled out that baking bells were present among the finds from this settlement, but were not included in the publication. The publication of Dunaújváros–Öreghegy appeared in 1973, i.e. before the discussion on the baking bells began approximately in the mid 1970s, taking a starting point in the analysis of the fieldwalking results for the 'Archaeological Topography of Hungary'. Baking bells were found at the site of Dunaújváros–Alsófoki-patak, near to Dunaújváros–Öreghegy. Based on the occurrence of 'grey pottery', Dunaújváros–Alsófoki-patak is likely to have been occupied in the Early Avar Period, in addition to other settlement phases. However, it cannot be concluded from the preliminary report with absolute certainty if baking bells already occurred in this early settlement phase (Fülöp 1984, 12).

Baking bells are documented at Zillingtal from the Middle Avar Period II until the Late Avar Period III (c. AD 650/680–800/820; Herold 2010). Fragments of baking bells have also been found in well No. 823 at the settlement of Brunn am Gebirge in Lower Austria. This well was built in the second half of the 7th century AD, as shown by ¹⁴C and dendrochronological data from its wooden construction elements, and is likely to have been filled in the first half of the 8th century, based on ¹⁴C dates from its fill (Stadler, Herold 2003, 180, 182, Tab. 1–2; 184, Fig. 3:2; 186, Fig. 5:2; Herold 2002, 172, Pl. 1:1; 177, Pl. 6:4). Future excavations and their analysis will show if baking bells were also used in the Early Avar Period.

POTTERY WITH STAMPED DECORATION

The stamped decoration discussed here occurs on hand-made pottery and mostly displays rectangular patterns; it is not to be confused with the 'Germanic' stamped decoration on wheel-thrown pottery, which is also known from some Avar-Period sites. A roll suitable for producing similar rectangular decoration, as well as archaeological and experimental ceramics with such decoration was depicted by

A. A. Bobrinskij (1978, 235, Fig. 98). Avar-Period pottery with rectangular stamped decoration can be found in eastern Hungary, and in limited numbers also in the eastern part of western Hungary. These vessels are likely to imitate vessels made from organic materials, and the finds depicted by Bobrinskij could suggest an origin of this practice east of the Carpathian Basin; however, so far no clear interpretation could be found for its appearance and disappearance in Avar-period contexts. The area of distribution of the pottery with rectangular stamped decoration is similar to that of the hand-made clay cauldrons, with the exception of southern Slovakia, from where pottery with rectangular stamped decoration has not been published so far (Fiedler 1994, 337).

Some assemblages include few small potsherds with stamped decoration in addition to hand-made clay cauldrons (e.g. Gyoma, site No. 133; see Vida 1991; Örménykút, site No. 54; see Herold 2004, 18; since the stamped sherds at Örménykút were recovered as 'stray finds', i.e. without connection to settlement features, they are only mentioned but not depicted in the publication). These small potsherds are likely to originate from earlier settlement phases. As far as I am aware, there are no larger assemblages containing pottery with stamped decoration, but no hand-made clay cauldrons. Thus, in addition to these two ceramic groups having a similar area of distribution, it is likely that pottery with stamped decoration was in use for a shorter period of time than hand-made clay cauldrons. Since pottery with stamped decoration occurs as likely remains of earlier settlement phases in assemblages with hand-made clay cauldrons, it is probable that the production and use of pottery with stamped decoration ended earlier than that of hand-made clay cauldrons. For defining the beginning of the production of pottery with stamped decoration, it remains to be established if there was a chronological phase in which hand-made clay cauldrons were already produced, but the production of stamped pottery had not started yet. In any case, sites that yield small fragments of stamped pottery, likely originating from earlier settlement phases, have to be dated later than sites with large amounts of stamped pottery. Stamped pottery was not found in Zillingtal, most likely because the site lies outside of the distribution area of this pottery group.

HAND-MADE CLAY CAULDRONS

Hand-made clay cauldrons can be found in eastern Hungary, in limited numbers also in the eastern part of western Hungary, and in southern Slovakia (Fiedler 1994, 334, Fig. 12). They are similar in shape, and possibly also in function, to the slow-wheel-turned clay cauldrons of later centuries, although their material and production techniques obviously differ. Both hand-made and slow-wheel-turned clay cauldrons are considered to be cooking vessels, connected to foodways originating from the eastern European steppe. They are usually not seen to be related to the late antique/early medieval clay cauldrons of slightly different

shape from the eastern Alpine region, which are thought to have mainly been used for producing cheese (Pleterški 2008).

There are numerous sites in the Avar-Period Carpathian Basin that yielded baking bells, but neither hand-made clay cauldrons, nor pottery with stamped decoration (e.g. Zillingtal; see Herold 2010). In many cases this is likely to result from the different areas of distribution for these ceramic groups. When more Avar-Period settlements are published, it will be interesting to examine if in the area where all the three mentioned groups of pottery in principle occur there are sites which only yield baking bells but not the other two pottery groups. This could potentially indicate a longer period of use for the baking bells than for hand-made clay cauldrons and pottery with stamped decoration, or show a selective use of these ceramic types by different communities. Such a settlement phase with baking bells, but without hand-made clay cauldrons and stamped pottery was described from Hunya–Csárda-völgy by B. M. Szóke (MRT 8, 288); a full publication of these excavations can reveal further details.

The chronology of hand-made clay cauldrons has been intensively discussed. So far the hand-made clay cauldron fragment from Štúrovo–Obid appears to be the earliest find, likely dating to the 7th century, since it was found in a settlement feature that also yielded a fragment of the ‘grey pottery’ (Zábajník 1988, 419, 424). T. Vida suggested that the production and use of hand-made clay cauldrons is likely to have started in the 8th century (Vida 1991). A dating of these vessels starting in the 8th century was also supported by Cs. Bálint in the publication of the Eperjes settlement (Bálint 1991, 73). However, it remains to be asked what speaks against a general dating of hand-made clay cauldrons from the mid 7th century. If one considers an even earlier dating, assuming that hand-made clay cauldrons were already produced and used in the Early Avar Period, the same questions arise about the absence of hand-made clay cauldrons from the site of Dunaújváros–Óreghegy, as the ones detailed above about the (missing) baking bells at this site.

There are several different types of hand-made clay cauldrons:

- with a cylindrical handle on top (e.g. Szóreg — from the area of cemetery B, depicted in Bálint 1991, 56 and in Trogmayer 1962, 7, Fig. 2; Csongrád-Bokros see Trogmayer 1962, 5),
- with handles on the interior (numerous examples, e.g. from south-eastern Hungary; a collection of different types of the internal handles is depicted in Vida 1996, 364, Fig. 24:1–10);
- with shell-shaped handles on the exterior (see Vida 1996, 364, Fig. 24:12).

It will be interesting to examine in the future if the different shape variants of hand-made clay cauldrons form regional or chronological groups.

Concerning the chronology of the three investigated pottery types (baking bells, stamped pottery and hand-made clay cauldrons), it was mentioned above that the production and use of stamped pottery ends earlier than that of the hand-made clay cauldrons. Baking bells and hand-made clay cauldrons are likely to have been used in the same period, since within their common area

of distribution these two pottery types usually occur together. Baking bells are documented in Zillingtal until the Late Avar Period III; hand-made clay cauldrons were not found at this site.

In recent years, pottery assemblages were published from more sites that include large amounts of the orange-coloured, slow-wheel-turned vessels described for Szóke's Group A, but contain neither baking bells nor hand-made clay cauldrons (e.g. Edelény; see Wolf 2003; Örménykút, site No. 54, Phase III, see Herold 2004; slow-wheel-turned clay cauldrons do not occur together with this pottery group either). It is not currently possible to date this phase exactly, it is likely to have existed in the 10th century, with a possible beginning in the 9th and end in the 11th century. In any case, this phase provides a *terminus ante quem* for the baking bells and the hand-made clay cauldrons (as mentioned above, the production and use of the stamped pottery appears to have ended earlier), and is thus an important point of reference for the investigation of Avar-Period ceramics.

Based on the above, I suggest that baking bells and hand-made clay cauldrons were produced and used at least from the beginning of the Middle Avar Period, but possibly already from the Early Avar Period, until the end of the Late Avar Period. Especially for the Early Avar Period, we must assume the existence of population groups within the Avar Khaganate, such as, for example, groups of late antique, Germanic or Slavic origin, which did not use (some of) these special ceramic types. It seems logical to assume that the production and use of these ceramics ended at the end of the Avar Period, keeping in mind that the end of the Avar Period might, of course, have occurred at different times in different geographical regions.

RELATIVE PROPORTIONS OF HAND-MADE AND SLOW-WHEEL TURNED CERAMICS

B. M. Szóke described c. 80% hand-made and 15–20% slow-wheel-turned pottery for his Group A. It has, however, been noted (also by Szóke in MRT 8, 288) that the relative proportions of these two groups of pottery vary from site to site, and also within sites. It was observed in Zillingtal that the relative proportion of hand-made pottery decreases in the course of the Avar Period in favour of slow-wheel-turned pottery (see also Figs. 3–6). This tendency was already pointed out by Bóna (1971, 321–324). Multiple researchers cited his findings (e.g. Tomka 1988, 47; Takács, Vaday 2004, 41), or came to the same conclusion based on their own investigations (Macháček 1997, 379). However, Zillingtal is the first site where exact numbers were published on the changing relative proportions of hand-made and slow-wheel-turned pottery in the course of the Avar Period (Herold 2010). Drawing on these results, the question arises if it was possible to establish a chronological sequence at other sites too, based on the relative proportions of hand-made and slow-wheel-turned pottery. The absence of slow-wheel-turned pottery could thereby indicate sites of

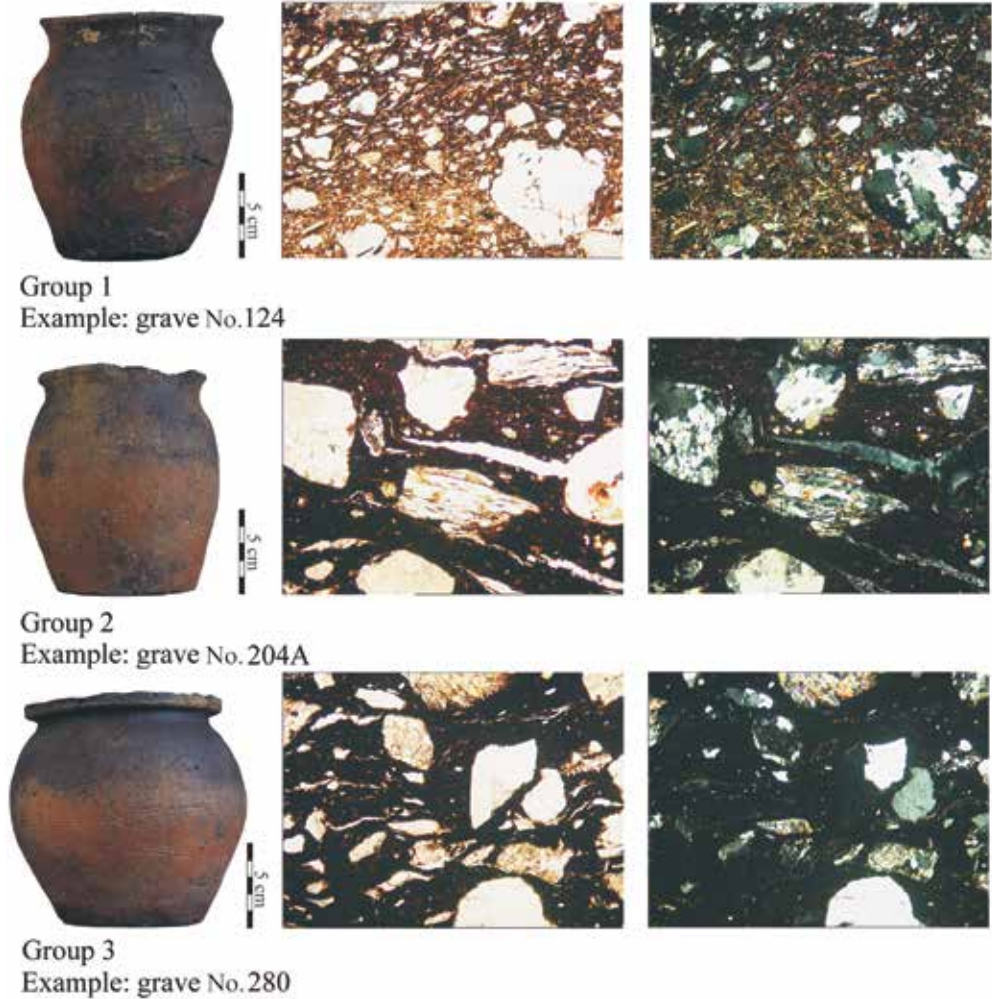
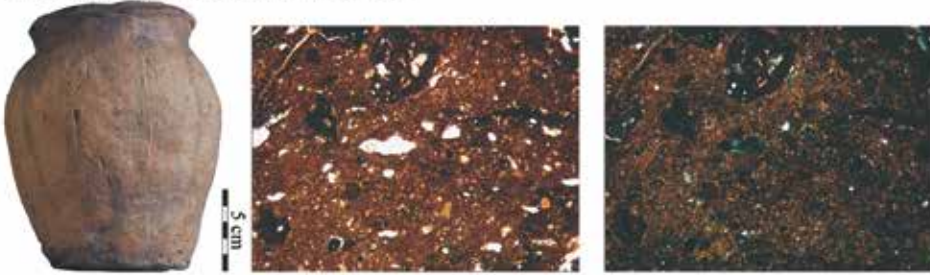


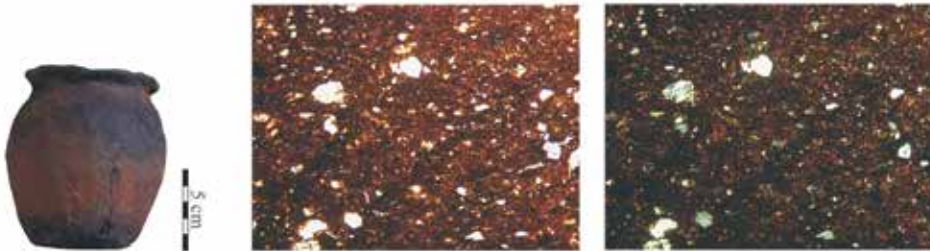
Fig. 3. Zillingtal, Bezirk Eisenstadt-Umgebung, Burgenland, Austria. Chronological groups of the slow-wheel-turned pottery, photographs of vessels and of their petrographic thin sections. Photographs of vessels by the Photography Laboratory of the Department of Prehistoric and Historical Archaeology of the University of Vienna, microscope photographs by the author; after H. Herold (2011b, Fig. 3).

Group 1: Middle Avar Period II — Late Avar Period I; Group 2 — Late Avar Period II; Group 3 — Late Avar Period III. Microscope photographs on the left in plane polarised light, on the right with crossed polarisers; the longer side of the microscope images equals 2.6 mm.

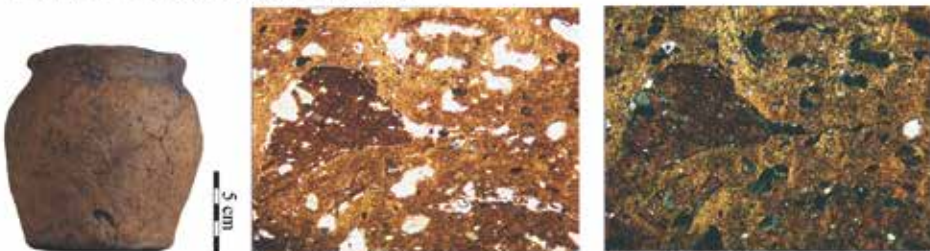
Group 1 Example: grave No. 232



Group 2 Example: grave No. 148



Group 3 Example: grave No. 469



Group 4 Example: grave No. 169

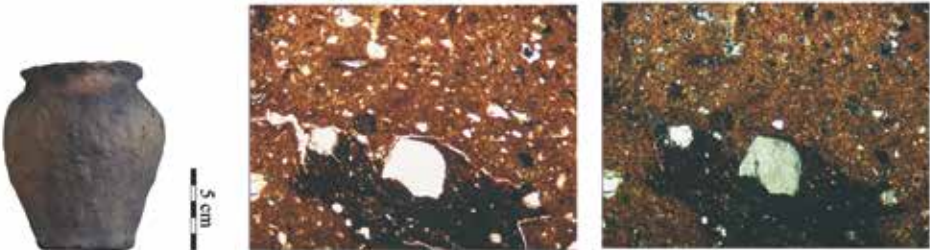


Fig. 5. Zillingtal, Bezirk Eisenstadt-Umgebung, Burgenland, Austria. Chronological groups of the hand-made pottery, photographs of vessels and of their petrographic thin sections. Microscope photographs on the left in plane polarised light, on the right with crossed polarisers; the longer side of the microscope images equals 2.6 mm. Photographs of vessels by the Photography Laboratory of the Department of Prehistoric and Historical Archaeology of the University of Vienna, microscope photographs by the author; after H. Herold (2011b, Fig. 5).

Group 1 — Early Avar Period–Middle Avar Period I; Group 2 — Middle Avar Period II–Late Avar Period I;
Group 3 — Late Avar Period II; Group 4 — Late Avar Period III.

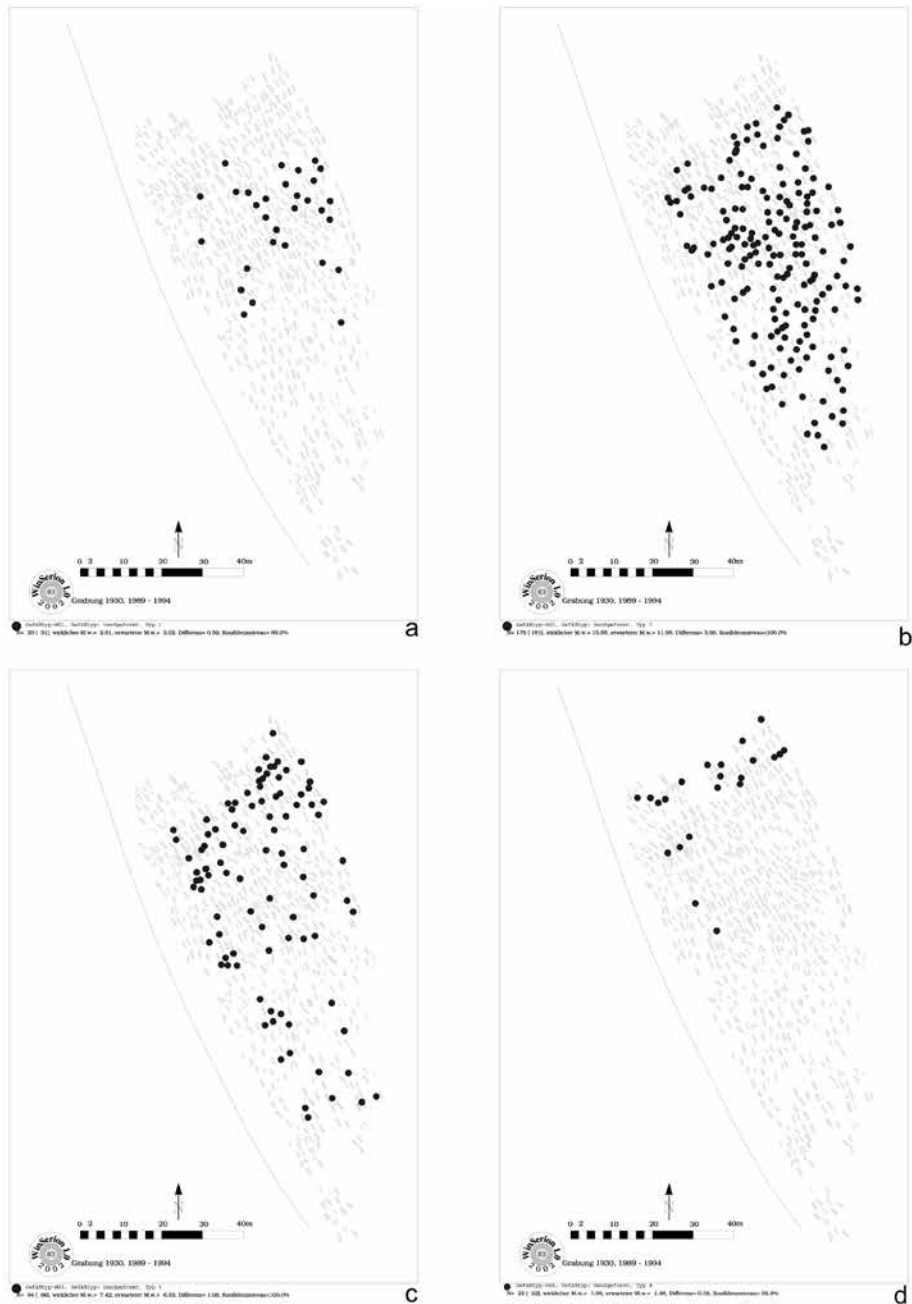


Fig. 6. Zillingtal, Bezirk Eisenstadt-Umgebung, Burgenland, Austria. The distribution of the chronological groups of the hand-made pottery in the cemetery. Maps by P. Stadler, Natural History Museum, Vienna; after H. Herold (2011b, Fig. 6).

Top left: Group 1, top right: Group 2, bottom left: Group 3, and bottom right: Group 4; see Fig. 5 for details on the groups

the Early (and possibly Middle) Avar Period (for details see below), which are otherwise difficult to identify.

Concerning differences between pottery from settlements and cemeteries, Zillingtal yielded the following results: if considering all chronological phases together, half of the pottery is hand-made and the other half is slow-wheel-turned at the settlement, while at the cemetery three quarters of the pottery are hand-made and only one quarter is slow-wheel-turned. This undermines the assumption that the settlement pottery of the Avar Period would have been of worse quality than the pottery deposited in the cemeteries. It cannot be clearly decided if at least a part of the (hand-made) pottery found in the graves was made solely for the use in the burials. In any case, all types of ceramics found in the graves were also found at the settlement at Zillingtal.

The use of the cemetery and the settlement at Zillingtal appears to have each ended at the end of the Late Avar Period. Although the relative proportions of hand-made pottery decreased in the course of the Avar Period in favour of the slow-wheel-turned pottery both at the settlement and cemetery at Zillingtal, hand-made vessels can also be found in the latest chronological phases of these sites. Thus, based on the results from Zillingtal, it seems likely that ceramic assemblages that do not contain hand-made pottery (any more) should be dated to the post-Avar Period.

The production of the hand-made and slow-wheel-turned pottery of the Avar Period is likely to have been carried out by producers working at two different levels of economic complexity (for details see Section *The organisation of production...* below; see also Herold 2010, 97–99). Thus the gradual disappearance of hand-made pottery also reflects changes in the economic organisation of the Avar Khaganate, no matter if we consider the territory of today's eastern Austria, Hungary or southern Slovakia. The simplest way of production, in which production mainly takes place to cover the producers' own needs, was gradually given up. This means that the members of the Avar-Period population could afford to obtain ceramic vessels from another person who, to a certain extent, was specialised in pottery production, and they could also rely on the continuous, or at least regular, supply of these objects.

HAND-MADE POTTERY OF THE AVAR PERIOD

The ceramic assemblages of the Avar period mainly consist of pots, in addition to small amounts of the special pottery groups discussed above, such as baking bells and hand-made clay cauldrons. The typology established by T. Vida for the hand-made and wheel-thrown pottery of the Early and Middle Avar Periods (Vida 1992; 1999) is extremely important for the chronological analysis of cemeteries as well as for the reconstruction of connections between population groups. However, most of the pottery groups included in these works occurs only in small numbers at cemeteries, and virtually never at settlements. For example,

of the pottery groups included in T. Vida's analysis the vessels with knobs on their rim and the vessels with rectangular mouth were found at Zillingtal, but only at the cemetery and not at the settlement.

Settlements are usually only identified as belonging to the Early or the Middle Avar Period if at least some of the pottery found at the site belongs to one of the known pottery groups from these periods, e.g. the vessels with funnel shaped neck, or the wheel-thrown 'grey pottery'. This inhibits the recognition of settlements and settlement phases from the Early and Middle Avar Period, as well as the correct dating of graves if they do not contain other chronologically significant grave goods. In addition to their rarity, the pottery groups definitely originating from the Early and/or the Middle Avar Period also have a geographically limited area of distribution, as shown by the mappings carried out by T. Vida (1999). This means that we can only rely on their occurrence in some areas. At sites in other regions, the Early and Middle Avar Period has to be identified by other methods, most likely by establishing a relative chronology for the entire assemblage (including the pottery) at a site. The hand-made pottery groups of the Late Avar Period have largely remained unstudied. Thus for this period we currently also have to rely on establishing the internal chronology within sites.

SLOW-WHEEL TURNED POTTERY

The slow-wheel-turned pottery of Zillingtal was tempered with sand and fired in an uncontrolled atmosphere. Pottery produced with similar methods can be found in the area of the entire Avar Khaganate. According to T. Vida, the production of the slow-wheel-turned pottery starts in the Middle Avar Period (Vida 1999, 107). The results of the analysis of Zillingtal support this result; slow-wheel-turned pottery can be found at the cemetery of Zillingtal from the Middle Avar Period II until the end of the cemetery in the Late Avar Period III. Slow-wheel-turned pottery was found in the same settlement features as hand-made pottery and baking bells at the settlement of Zillingtal.

The slow-wheel-turned pottery of the cemetery at Mödling (Lower Austria) was analysed by F. Daim (1994). He compared graves from this cemetery which contained both datable metal finds and slow-wheel-turned vessels. As a result, vessels tempered with carbonates and displaying a weakly structured cross section (e.g. no strongly flaring rims) could be assigned to the earlier phases of the cemetery (Middle Avar Period II–Late Avar Period I), while vessels tempered with sand and having a strongly structured cross section and a bevelled rim were identified as originating from the later phases of the cemetery (Late Avar Period II–III). This analysis provided the first chronological sequence for pottery within an Avar-Period cemetery. The morphological traits of the slow-wheel-turned pottery are similar at Zillingtal as at Mödling in the corresponding chronological phases. However, the tempering practices were different; in Zillingtal no carbonate temper was identified.

J. Macháček analysed vessels from Avar Period cemeteries in southern Slovakia based on their morphological traits (M a c h á č e k 1997). He concluded that the vessel shape changed from tall vessels towards short and wide vessels in the course of the Avar Period. He also pointed out the connection of the Avar Period slow-wheel-turned pottery to the late antique ceramics of the same regions, which is indeed an important topic. Research on the connections between the late antique and the early medieval periods will undoubtedly be one of the most interesting questions for the early medieval archaeology of central Europe in the upcoming decades. By investigating this question, it will also be possible to analyse the emergence of the slow-wheel-turned pottery of the Avar Period in more detail.

In eastern Hungary, the current state of research on Avar-Period slow-wheel-turned pottery only allows for the definition of less precise chronological groups than in eastern Austria, western Hungary or southern Slovakia. This is partly due to the rare occurrence of pottery as grave goods in Late-Avar-Period cemeteries in eastern Hungary. The slow-wheel-turned pottery of Szőke's Group A consists of at least three different groups, based on the analysis of the Örménykút settlement (for Örménykút see H e r o l d 2004; Szőke suggested a different division of the slow-wheel-turned pottery in his Group A, see S z ő k e 1980, 182):

- vessels tempered with grog and fired under uncontrolled conditions (as opposed to a controlled oxidising or reducing atmosphere during firing);
- vessels tempered with sand and fired under uncontrolled conditions;
- vessels tempered with sand and fired under oxidising conditions (this group is easy to identify through its orange colour both on the external and internal surface of the vessels; such pottery is known e.g. from Edelény, see W o l f 2003; Örménykút, see H e r o l d 2004; but also from the cemetery of Halimba–Cseres from the area of the former Roman province Pannonia, see T ö r ö k 1962).

These three pottery groups are likely to originate from different chronological phases. The slow-wheel-turned vessels tempered with grog can be dated to the Avar Period, probably to the Late Avar Period, and possibly also to the Middle Avar Period (H e r o l d 2004, 61 and 68–74). This pottery type was not found at Zillingtal, where only hand-made pottery was tempered with grog (H e r o l d 2010). This indicates a limited area of distribution for the slow-wheel-turned pottery tempered with grog; the more precise borders of this area remain to be defined by future research. The group of sand-tempered slow-wheel-turned pottery is a very heterogeneous group with a large-scale distribution, the slow-wheel-turned pottery from Zillingtal also belongs to this group. Future research will certainly subdivide this group further; it is likely that some subgroups will belong to the Avar Period, while others will have to be assigned a post-Avar-Period dating.

The sand-tempered slow-wheel-turned pottery fired in an oxidising atmosphere that was found for example at Edelény and Örménykút, but also at Halimba–Cseres, is absent from 'classical' Avar-Period cemeteries such as e.g. Zillingtal.

This pottery group does not occur together with baking bells, clay cauldrons (neither hand-made, nor slow-wheel-turned ones), or hand-made pots (Wolf 2003; Herald 2004) and is thus clearly separate from the other pottery types in Szőke's Group A. Based on the results of the analysis of the Örménykút settlement, this group of sand-tempered, slow-wheel-turned pottery that was fired in an oxidising atmosphere can be identified as the chronologically latest subgroup within Szőke's Group A, and is likely to be dated to the post-Avar Period (Herald 2004, 62).

A detailed comparison of the vessels from Edelény, Örménykút, and Halimba–Cseres with the pottery found at the 'classical' Hungarian-Conquest-Period cemetery of Karos–Eperjesszög showed that the vessels from Karos possess a much more complicated rim structure than the pottery of the other sites (the vessels of Karos–Eperjesszög are published in Révész 1996, Pl. 9:7 [cemetery II, grave No. 3], Pl. 31:6 [cemetery II, grave No. 22], Pl. 68:3 [cemetery II, grave No. 48; this vessel is depicted on a different scale than the other vessels], Pl. 135:2 [cemetery III, grave No. 18]). The comparison of the vessels from these four sites was carried out in the course of the preparation of the book on north-eastern and south-western Hungary in the Early Middle Ages, and is also discussed in the book (Herald 2006, 41–42). However, at that time the ^{14}C date of the Gnadendorf grave, which gives a new dimension to the interpretation of these results and is discussed below, was not available yet.

If we assume that the early medieval pottery at settlements and in graves was not basically different in its quality, and that no strong regional differences existed in the rim structure of vessels from the same chronological phase, we have to assign a later date to the vessels from Karos than to the vessels of the other three sites. If we date the vessels from Karos to the mid 10th century, which would comply with the archaeological dating of the metal finds from the graves (Révész 1996), we have to suppose an earlier date for the other sites (i.e. 9th or possibly early 10th century). However, if we assume that the main phase at Edelény, Örménykút, and Halimba–Cseres took place in the 10th century, we have to suggest a later date for the cemetery of Karos–Eperjesszög (Herald 2006, 41–42).

In these considerations, the ^{14}C date for the equestrian grave of Gnadendorf (Lower Austria; see Daim 2006), which contained 'classical' Hungarian-Conquest-Period grave goods, plays an interesting role. ^{14}C measurements from the skeleton of the young man and the horse buried in the Gnadendorf grave provide a date of AD 980–1018 at 1 sigma (Daim 2006, 22). This ^{14}C result shows the possibility of a later dating for 'classical' Hungarian-Conquest-Period graves than the usually assumed early/mid 10th century, and complies well with the results of the comparison of ceramic vessels described above. Further analysis, especially scientific dating, can show if we have to assume a later dating for 'classical' Hungarian-Conquest-Period graves than previously thought, or if these graves simply occur over a longer period of time than it has been usual to suppose.

THE ORGANISATION OF PRODUCTION FOR HAND-MADE,
SLOW-WHEEL-TURNED AND WHEEL-THROWN POTTERY
IN THE AVAR PERIOD

Based on the analysis of T. Vida, slow-wheel-turned vessels started to be produced in the Middle Avar Period, as mentioned above (Vida 1999, 107). The analysis of the pottery from Zillingtal supports this result (Herold 2010). The Early Avar Period is characterised by hand-made pottery and in some regions, especially in western Hungary, by wheel-thrown ceramics (Bialekova 1968; Vida 1999). In the Late Avar Period, hand-made and slow-wheel-turned ceramic vessels were used; in some areas the wheel-thrown 'yellow pottery' can also be found (Bialekova 1967; Garam 1969). These three types of pottery (hand-made, slow-wheel-turned and wheel-thrown vessels) reflect three different types of organisational structures for ceramic production in the Avar Period.

Hand-made pottery of the Avar Period is likely to have been produced in the simplest organisational structures (see also Herold 2010, 97–99), roughly corresponding to the models household production/household industry outlined by D. Peacock (1982, 8–9). Peacock's models were established for the Roman Period, and might be seen as focusing too strongly on 'logic' and functionality and less on symbolic aspects. They definitely simplify past realities (as all models necessarily do), which must have contained a very rich variety of production structures and associated symbolic meanings. Nevertheless, I think Peacock's models are useful for characterising early medieval pottery production; they provide a terminology which enables researchers working in this area to effectively communicate with each other about their respective research results.

In the models that are relevant for the production of hand-made pottery in the Avar Period (household production/household industry), the producers of pottery create vessels to cover their own needs, or for a minor profit that supplements income from other sources. The production of slow-wheel-turned vessels probably took place in somewhat more organised structures, similar to the models household industry/individual workshop of Peacock. Here, the producers created vessels in larger amounts than it would have been necessary for their own needs, and achieved profit through this activity; in these models pottery making can be a (seasonal) part time activity, but can represent an important source of income. Hand-made pottery and slow-wheel-turned ceramic vessels were used in all regions of the Avar Khaganate in the corresponding chronological phases. Of these two types, only the hand-made pottery was used in the Early Avar Period. Both types were in use simultaneously in the Late Avar Period, even though the relative amounts of hand-made and slow-wheel-turned vessels are likely to have been different in different regions.

The production of Avar-Period wheel-thrown pottery took place in specialised workshops, as already assumed in the early studies of these ceramic groups (Bialekova 1967; 1968; Garam 1969). These production structures can roughly correspond to the models individual workshop/nucleated workshop after

Peacock. In both of these models, the pottery producers work for profit, which is an important or the most important source of income. Unlike the production of hand-made and slow-wheel-turned pottery, for the production of wheel-thrown pottery considerable investment is likely to have been made in the form of a fast (i.e. foot-operated) potter's wheel and pottery kilns. These instalments enabled production on a large scale, and also 'paid off' through the profit achieved by pottery production. Remains of such pottery workshops for wheel-thrown vessels from the Avar Period were uncovered in the region of Szekszárd, in the south-eastern part of today's western Hungary (Rosner 1990). These are the only remains of pottery production currently known from the Avar Period. The less elaborate facilities used in the production of slow-wheel-turned and hand-made pottery (e.g. furnaces/kilns with only one chamber, or pits, used for firing pottery) have so far not been archaeologically documented.

The specialised pottery workshops produced a larger amount of vessels, also of better quality, than part-time pottery producers. These products from specialised workshops were also marketed in larger areas, especially in regions where the Avar-period population was able and willing to 'purchase' these higher quality vessels. Also, most of the wheel-thrown vessels were not suitable for cooking, unlike the coarser slow-wheel-turned and hand-made pottery, but were serving vessels. Thus using wheel-thrown vessels in the Avar Period also implies a form of elite eating and drinking habits, which was apparently not widespread in the entire Avar Khaganate, as shown by the distribution maps of the 'grey' and 'yellow' pottery (Stadler 2004, Pl. 156–157). For example, although large parts of today's eastern Austria belonged to the Avar Khaganate, as indicated by the distribution of cemeteries, only one single vessel of the 'grey pottery' is known from this region (Sommerein, grave No. I; see Daim, Lippert 1984, 57); vessels of the wheel-thrown 'yellow pottery' of the Avar Period have so far not been found in eastern Austria.

In the Early Avar Period, hand made pottery was used throughout the entire Avar Khaganate, while the occurrence of wheel-thrown ceramics was confined to certain regions lying mainly in western Hungary. Obviously, there was no possibility or need for the use and production of these high-quality vessels in other areas. Based on the results of T. Vida, the 'grey pottery' was distributed in a wider area than other wheel-thrown pottery groups of the Early Avar Period, and at least some of the latter groups are likely to have had their origins in late antique local pottery production (Vida 1999, 186–188). Differences in the distribution areas of different wheel-thrown ceramic types of the Early Avar Period were already noticed by D. Bialekova (1968). These different distribution areas can provide a starting point for future research investigating specialised pottery production in the Avar Period, including the study of the diversity of production and distribution mechanisms of pottery workshops.

In the Middle Avar Period, with the start of the production of slow-wheel-turned pottery a new level of ceramic production appears. This reflects a change in the organisation of pottery production, which was most likely connected to

other (economic) changes in the Avar Khaganate that are less readily detectable by archaeological methods. At least some of the specialised pottery workshops producing wheel-thrown vessels seem to have stopped production around the beginning of the Late Avar Period, as far as we can tell from currently available archaeological evidence. In addition to hand-made and slow-wheel-turned pottery, the wheel thrown 'yellow pottery' appears in the course of the Late Avar Period. Workshops producing the 'yellow pottery' are not yet known. It would be especially interesting to investigate in the future if (and if yes, in what way), workshops producing 'yellow pottery' originated from workshops producing 'grey pottery'. Similarly to all other changes in the organisation of production, the appearance, disappearance and change of specialised workshops during the Avar Period reflect changes in the economy of the Avar Khaganate.

Based on pottery production, the Early Avar Period (*c.* AD '568'–630) can be envisaged as having, on the one hand, loosely organised local communities where each household was basically responsible for covering its own needs (hand-made pottery), and on the other hand, a 'well-off' ruling elite, which had elaborate eating/drinking habits and probably also a rather different lifestyle from that of the local communities (wheel-thrown 'grey pottery'). This corresponds well with the image we know from metal finds of this period, including a small set of very rich graves, found at locations separated from the larger amount of 'simple' Early Avar Period burials. These two groups of society are complemented by remains of late antique (and possibly Germanic) traditions, especially in the western part of today's Hungary (other wheel-thrown pottery groups with a rather local distribution).

In the Middle Avar Period (*c.* AD 630–680), this image gradually changes with the appearance of the slow-wheel-turned pottery, which can be interpreted as the emergence of a 'middle class', situated socially between the elites and members of weakly organised local communities. The increase in the relative amounts of slow-wheel-turned pottery in the Late Avar Period (*c.* AD 680–820) can be seen as the increasing number and influence of such 'middle class' groups in Avar-Period society. Population groups of the Late Avar Period using both slow-wheel-turned and hand-made pottery must have been organised and structured more strongly than the Early Avar Period groups using only hand-made pottery, as the production of slow-wheel-turned pottery is likely to have included some form of specialisation of selected members of society.

Instead of every household/small population unit caring for all its own needs, as it seems to have been in the Early Avar Period, the Late Avar Period appears to have witnessed an increased sharing of responsibilities within local communities which included members of society specialising in some form of activity, supplying at least a part of this community with a certain product they needed, and receiving other types of products from other members of society in exchange. Elite pottery production seems to have existed in the Late Avar Period too (wheel-thrown 'yellow pottery'), but was in its distribution less centralised than the wheel-thrown 'grey pottery' of earlier periods, and was, in terms of

quality, more like pottery used by ‘everyday people’ than it had been the case in the Early Avar Period. This image of a better organised and more ‘egalitarian’ society for the Late Avar Period than for the earlier phases is also reflected in the metal finds, which become much more widespread and more unified in the Late Avar Period than they used to be previously.

The considerations presented here provide an overview of Avar-Period pottery production. Through the analysis of the ceramic finds from Zillingtal, it was possible to trace the development of ceramic production in the Avar Period in a region lying beyond the distribution areas of wheel-thrown pottery. It will be necessary to conduct detailed investigations of Avar-Period pottery production in other regions by analysing further sites. If one sees pottery production as part of the overall economy of the Avar Khaganate, and follows its changes, which become accessible through the analysis of ceramic finds, new perspectives can emerge for understanding and reconstructing the otherwise largely unknown economic history of the Avar Khaganate.

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