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BLACK-GLOSS (»CAMPANIAN«) POTTERY IN THE LATE LA TÈNE CENTRAL EUROPE – PRELIMINARY ARCHAEOLOGICAL AND ARCHAEOMETRIC STUDIES

BLACK-GLOSS POTTERY

The black-gloss pottery [1] (henceforth abbreviated BG) [2] or more precisely the different BG wares constitute the most characteristic and the most widespread class of Mediterranean fine pottery during the whole second half of the 1st millennium BC [3]. The shapes produced are mostly those of table ware (for both eating and drinking) though oil containers are made as well.

In Italy, the intense production begins in the 4th century BC with principal centres in Sicily and Magna Graecia, Latium and Etruria (see fig. 1 for all the places cited in this paper). This early production is characterised by a high quality as well as a relative complexity of forms. With rare exceptions this ware does not leave Italy and only some examples are more widely distributed beyond the region of their origin (notably the products of Volterran workshops or of the Latial *atelier des petites estampilles*). This situation changes radically after the Second Punic War and the ascent of Rome to the economic predominance of the Mediterranean. The scale of forms of the BG pottery produced at that time in Italy gets reduced to few

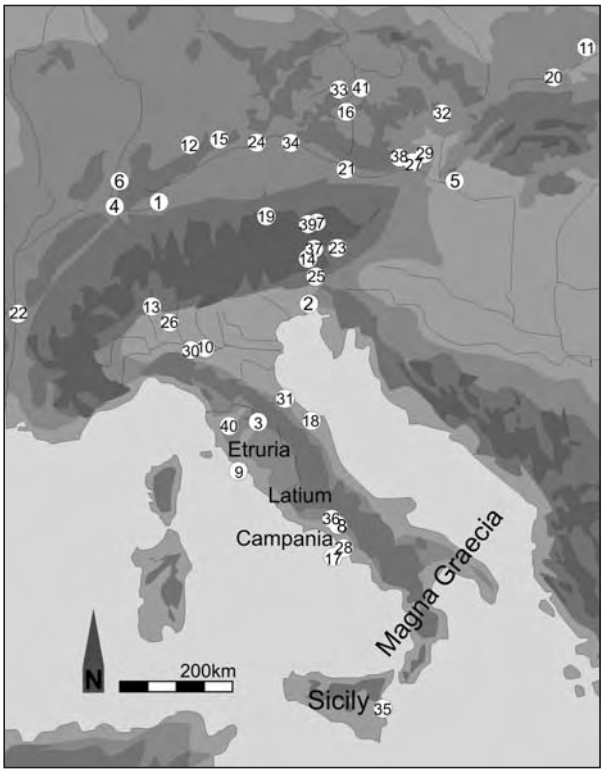

Fig. 1 Places mentioned in the text (in alphabetical order): **1** Altenburg-Rheinau. – **2** Aquileia. – **3** Arezzo. – **4** Basel. – **5** Bratislava. – **6** Breisach. – **7** Bürgkogel. – **8** Cales. – **9** Cosa. – **10** Cremona. – **11** Dalewice. – **12** Elsachstadt. – **13** Giubiasco. – **14** Gurina. – **15** Heroldingen. – **16** Hrazany. – **17** Ischia. – **18** Jessi. – **19** Kirchbichl. – **20** Krakow. – **21** Linz. – **22** Lyon. – **23** Magdalensberg. – **24** Manching. – **25** Mandrga. – **26** Milano. – **27** Michelstetten. – **28** Naples. – **29** Oberleiserberg. – **30** Piacenza. – **31** Rimini. – **32** Staré Hradisko. – **33** Stradonice. – **34** Straubing. – **35** Syracuse. – **36** Teano. – **37** Teurnia. – **38** Thunau am Kamp. – **39** Uttendorf. – **40** Volterra. – **41** Závist. – (Map J. Kysela).

standardised and relatively simple forms and the technical quality becomes sometimes »sufficient« rather than »excellent«. This mass produced pottery then invades the markets of the (mostly western) Mediterranean. This is the ware traditionally called »Campanian«, while the 4th and the 3rd centuries' productions are sometimes labelled »pre-Campanian« (Lamboglia 1952; Morel 1981; Brecciaroli Taborelli 2005). The former, i. e. that of the 2nd and the 1st centuries BC, will be discussed in this article. The *terminus technicus* »Campana« will be used rather than »Campanian« in order to avoid confusions of the ware-label with geographical terms.

In the 2nd and the 1st centuries BC the production of the BG pottery continues in the same regions and centres active already before, i. e. initially in Campania, Latium, northern Etruria and western Sicily. In keeping the pace with the Roman conquerors, workshops emerge already in the 3rd century BC on the Adriatic coast (Jesi, prov. Ancona: Brecciaroli Taborelli 2000), spreading in the 2nd century BC to the Po Valley and northern Italy: they are attested or supposed in the territory of Modena, Cremona, Piacenza, Milano (?), and Aquileia (Morel 1985; Frontini 1985; Brecciaroli Taborelli 1988; Brecciaroli Taborelli 2000; Sfredda 1998; Mandruzzato / Maselli Scotti 2003, 379). In the 1st century BC then, new workshops pop out along the southern coast of France and sometime during the 40s BC in Lyon (Desbat / Genin 1996, 226). By then the first red-slipped wares had appeared in the western Mediterranean and the *terra sigillata* fabrication is about to be launched. This marks the beginning of a rather abrupt decline of the BG wares though in some regions (e. g. the Po Valley) the production continues down to the Tiberian period. It is necessary to mention that the production was in no way centralised and a number of workshops probably supplied the pottery on a local, regional and supra-regional level. In some regions, notably the whole of northern Italy, numerous workshops may be supposed, whose precise geographical location remains, however, so far elusive[4].

In his first classification of the ware, Nino Lamboglia (1952, 140) defined three principal (»universal«) classes. This basic distinction remained in use until today[5]: Campana A with a clear red-orange body, sharp break and dense, deep black and metallescent slip; Campana B with a buff to pinkish body, matt to semi-shiny black slip and irregular break; and Campana C with a grey body and lustrous black to olive grey slip. As observed by N. Lamboglia, each of the three groups comprised a constant and rather limited set of shapes and each was produced in a well defined region. The origin of Campana A is the least problematic of all: this high quality ware was made mainly in the region of the Gulf of Naples. The actual Campana C is a Sicilian product (Syracuse). Various other grey-core wares are, however, produced from the 2nd century BC also in the Adriatic region and in the Po Valley (Brecciaroli Taborelli 2000) and from the 1st century in southern Gaul (Py 1993b). Moreover, other wares may be mistaken for Campana C since misfiring may lead to a greyish tint of the core (Maggetti / Galetti 1986).

The term Campana B is the most problematic and the most disputed one. The buff-beige-pinkish core is in fact common to a wide range of wares which often share also the same repertoire of forms, are produced in both Italy and beyond and their mutual genetic relation is not always clear. These wares include the products of northern Etruria (Volterra, prov. Pisa; Arezzo); Lazio; northern Campania (Teano and Cales, prov. Caserta: Pedroni 2001); the Po Valley; northern Adriatic; southern Gaul and Lyon. According to Jean-Paul Morel, their origin is to be searched for in what he calls »genuine Etruscan Campana B« (produced in northern Etruria) which is consequently imitated by »B-oïd« workshops located primarily in southern Latium and northern Campania. Franca Cibecchini and Jordi Principal (2004) on the other hand propose a more »liberal« model of the »circle of Campana B« (the term itself – once again – minted by J.-P. Morel) consisting of single (Etruscan; Campanian; Latial; Adriatic etc.) groups, which are, however, to be considered as distinct entities without necessarily implying derivations between them as the most fundamental characteristics of their classification. More significantly, F. Cibecchini (2000, 363 f.; Cibecchini / Principal 2004, 160 f.), drawing on the entire tradition of previous studies questions the very criteria of defining the

»genuine Etruscan Campana B« not only as a »universal class« but even as a class in itself. She hints in fact at a possible confusion of several Etruscan workshops under this title and asserts that it is principally the north Campanian »B-oïd« production that is so widely distributed throughout the western Mediterranean. Unfortunately, in the recent and long-awaited new publication of the BG pottery from Cosa (Ansedonia, prov. Grosseto), Ann Reynolds Scott (2008, 8) does not reflect sufficiently this opinion in either a positive or a negative way and does not feel urged to clarify it. She limits herself on asserting the north-Etruscan origin of the local Campana B (localisation based on archaeometric analyses) and otherwise maintains the original Morelian distinction.

The argument concerning the precise localisation of production centres is in no way merely academic since it has been for long acknowledged that each production centre is closely linked to a distinctive distribution circuit. In other words each area exported their products to well defined consumption zones. Whereas the Gaul is supplied mainly from Campania first with Campana A and subsequently (from about the last quarter of the 2nd/first quarter of the 1st century BC onwards) with prevalently Calenian »B-oïd« products (e. g. Morel 1998, 15; Colin 1998; Olmer et al. 2013), Arretine and generally north-Etruscan products are on their part exported mainly overland to the Po Valley (Morel 1985; Brecciaroli Taborelli 1988; Sfredda 1998, 22). From there they continue further northwards both to the west, where they have been identified in the territory of present-day Switzerland (Maggetti 2005) as well as to the east with finds attested in Aquileia (Mandruzzato / Maselli Scotti 2003, 379; Donat 2009, 114), Slovenian Alps (Mandrga, Razdrto Pass: Horvat / Bavdek 2009, 67) and Magdalensberg (Bz. Klagenfurt-Land). In the latter site they share the market with wares from the Po Valley (corresponding respectively with the »hartes« and »poröses Fabrikat« of the Maria Schindler's classification: Schindler 1967; Schindler 1986; Maggetti / Galetti 1986).

There are, however, exceptions to these schemas and mainly the important trade centres often produce minor quantities of »non endemic« BG pottery (e. g. the fragments of Campana A and C in Aquileia: Mandruzzato / Maselli Scotti 2003; Maggi / Merlatti 2007, 548-550; Donat 2009, 114).

The BG pottery is little useful for answering fine chronological questions (see e. g. Morel 1990) since the principal forms remain throughout the production without significant or quantifiable modifications. It is only in the most recent production horizon, that the appearance of some new forms, common to the BG pottery and the earliest *terra sigillata*, may make us consider the date around or rather after the mid-1st century BC. Such is the case of some south-Gallic products (Desbat / Genin 1996) or of both »Fabrikate« identified on the Magdalensberg. Significantly enough, M. Schindler (1967; 1986) labels them »black sigillata« rather than »Campana«. It is also thanks to this introduction of new shapes that Jana Horvat (1995, 30-36; Horvat / Bavdek 2009) may distinguish two horizons of BG pottery imported to the Eastern Alps.

In transalpine Europe (see also Karwowski 2007), the imports of BG pottery are most common in Gaul where they individually penetrate already in the 3rd century BC (Adam 2007, 260), the main vogue comes, however, in the 2nd and largely in the 1st century BC. Despite the fact that this ware is represented in each site in only low percentages, the distribution covers rather densely and evenly the whole of the southern half of France (Morel 1985; Colin 1998, 72 fig. 28; Morel 1998; Olmer et al. 2013) while towards the north the frequency decreases in terms of number of both sites and finds (for north-eastern Gaul see e. g. Fichtl 2002, 175-177 fig. 5). East of Gaul, the finds of BG pottery are still relatively common in Rhineland: e. g. Basel (Furger-Gunti 1979, 99; Furger-Gunti / Berger 1980, pl. 19, 425-429; Jud 2008, 112), Altenburg-Rheinau (Lkr. Waldshut/Kt. Zürich; Fischer 1975, 319-321; Fischer 2004, 126 f.), Breisach-Hochstetten (Lkr. Breisgau-Hochschwarzwald; Stork 2007, 203-205), and Breisach-Münsterberg (Wendling 2007, 127). In Württemberg, Günther Wieland (1996, 166) mentions mere two possible finds: Elsachstadt (oppidum Heidengraben; Lkr. Reutlingen), and Heroldingen (Harburg, Lkr. Donau-Ries); in neither case does he however exclude their possible later date.

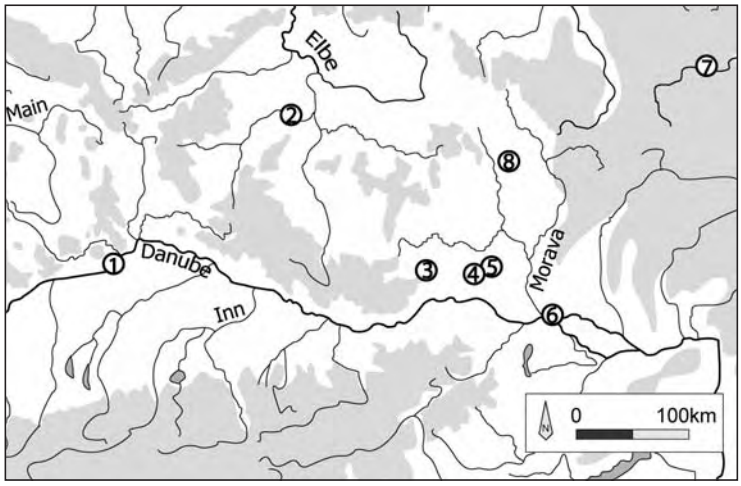

Fig. 2 Campana finds in Central Europe: **1** Manching. – **2** Stradonice. – **3** Thunau am Kamp. – **4** Oberleiserberg. – **5** Michelstetten. – **6** Bratislava. – **7** Krakow. – **8** Staré Hradisko. – (Map J. Kysela).

South of Central Europe, the map charted by Stefan Demetz (1992, 638 fig. 5, 37; see also Gugl 2000; Jablonka 2001) shows the penetration of BG pottery principally through the valleys of Adige and Ticino (for the BG pottery from the necropolis of Giubiasco [Kt. Ticino] see Pernet et al. 2006; the finds were analysed by Maggetti / Serneels 2006). Only in Uttendorf and Bürgkogel (Kaprun, Bz. Zell am See; Moosleitner 1996, 249 fig. 1, 6; Höglinger 2004, 190 fig. 2, 2; 193 fig. 3, 5) we find, however, BG pottery north of the Alpine crest. The other most northerly instances include Kirchbichl (Kufstein) in North Tyrol or Gurina (Dellach, Bz. Hermagor) and Teurnia (Lendorf, Bz. Spittal an der Drau) in Carinthia (Gurina: Jablonka 2001; for the other sites see: Gugl 2000, 126 f. [6]) as well as the already cited Magdalensberg further east. Along the south-eastern route leading from Aquileia through Friuli to the Slovenian Alps the finds are confined in the 2nd century BC to sites with Roman presence, from the 1st century BC the BG pottery is distributed more widely (Horvat 1995, 29 list 3; Donat 2009).

In the »narrower« Central Europe (Bavaria, Bohemia, Moravia, Silesia and southern Poland, northern Austria, and western Slovakia), i. e. in the territory which we fix as the region of our investigation, the finds become extremely scarce (fig. 2). In Bavaria, the only site which produced the finds of BG pottery is Manching (Lkr. Pfaffenhofen an der Ilm) (cat. nos 1-6, 6a; Stöckli 1979; Sievers et al. 1998). The only fragment known so far from Bohemia comes from Stradonice (okr. Beroun) (cat. no. 7; Kysela 2012) while one more piece which came to light in the early 20th century in Staré Hradisko in Moravia is now lost (cat. no. 16; Lipka / Snětina 1912, 350). Thanks to recent discoveries, a remarkable concentration of finds can be detected in the north of Lower Austria: two fragments have been found at Oberleiserberg (Ernstbrunn, Bz. Korneuburg) (cat. nos 9-10; Karwowski 2007), two more in Michelstetten (Asparn an der Zaya, Bz. Mistelbach) (cat. nos 11-12; Trebsche 2010), another handful in Thunau am Kamp (Bz. Horn) (cat. no. 8; Szameit / Obenaus 2009, 606). Two other sherds come from the urban excavations in different parts of Bratislava (cat. nos 13-14; Zachar / Rexa 1988; Pieta 1996; Vrtel 2009). The most distant possible find known to us so far has been discovered in Krakow in Little Poland (cat. no. 15; Poleska 2006, 61).

This list should be supplemented with the presumed imitations of BG vessels, reported from Straubing (Tappert 2006, 217-219), Bratislava (Čambal 2004, 20 pls 13, 5; 56, 9-12), Linz (Kastler 2004, 216 fig. 4), Hrazany and Závist in Bohemia (Drda / Rybová 1997, 111) as well as from Dalewice in Poland (Gromnicki 1962, 122 fig. 2d). While in the first two cases the opinion seems quite plausible, the finds from Linz may belong only to the Imperial period. The case of the closed vessels from Bohemian oppida is somewhat more complex and in our opinion (cf. Kysela 2010) they cannot be considered as a direct formal imitation (and thus proofs of local presence) of the supposed BG models.

The value of these finds consists mainly in their potential to cast more light to the problem of contact between the Mediterranean and the transalpine world. As we have shown above, the identification of the production zone may indicate the direction whence the artefact arrived to its destination. In case of Central Europe the »choice« is between the western and the southern route i. e. between the mediation of Gaul on the one hand and of the Alpine area on the other. Any considerations in this sense must be, of course, made with due precautions: we have seen that the trade schemas do not have absolute values. Moreover, the arrival of the vessels to this distant region was obviously not a result of their single-minded linear transmission from the producer to the consumer but rather of a complex series of operations which probably did not follow standard trade mechanisms (the rarity of this kind of vessels in Central Europe implies a quite intentional selectivity which may have influenced the standard trade mechanism also in other senses).
Already Werner E. Stöckli (1979, 195) asked questions concerning trade routes in his study of the Manching finds. Considering some of them as Arretine, others as Campanian (Campana A) and yet others as Ligurian he concluded that Manching was supplied from both west and south. Few years later Gilbert Kaenel and Marino Maggetti studied the BG pottery from the present-day Switzerland and basing on composition analyses of the ceramic core were able to establish two directions whence the territory was supplied – with Campanian and Gaulish products from the west and with North-Etruscan and Padan ones from the south (Kaenel / Maggetti 1986; Maggetti et al. 1998; Maggetti 2005; Maggetti / Sernels 2006). Since the times of W. E. Stöckli's investigation, new finds have enriched our knowledge of the situation in Central Europe and we believe that it is worthwhile to revisit the enquiry, this time with the help of scientific analyses, including also the sherds studied already by W. E. Stöckli.

CATALOGUE OF THE BLACK-GLOSS POTTERY FINDS IN CENTRAL EUROPE

Manching (Lkr. Pfaffenhofen an der Ilm, Bavaria, D)

1. Two matching fragments of a plate with an in-turned rim in BG pottery (Sample KP 109 – the sampled sherd was the inv. no. 1967/241; **figs 3, 1; 4, 1**)
A shallow bowl or plate (»patera«) with a pointed in-turned rim decorated with a roulette wreath around the internal centre. The ceramic body is compact, highly refined though comprising numerous tiny black dots. Its colour is dull yellow orange (Munsell code 10YR 7/3). The slip is thick and cohesive opaque black. The breaks are sharp and neat.
Dimensions: reconstructed diameter 245 mm; preserved dimensions of the analysed fragment 80 × 42 mm. – Find context: Manching Südumgehung, excavation campaign 1965, section 220, pit b and section 224, pit d. – Presently kept in: Prähistorische Staatssammlung München inv. nos 1967/226 and 1967/241. – Bibliography: fragment no. 1967/226: Stöckli 1979, 192-194. 255 Nr. 1054 pl. 78; fragment no. 1967/241: unpublished.
Comment: The two fragments were found in two pits making probably part of a single structure (see Lorenz 2004, suppl. 6). They match each other and there is no doubt that they come from a single vessel. The form can be readily determined as Lamboglia 5/7 or Morel's espèce 2250 (Morel 1981, 152-155) attested in both Campana A and B. See also comments below on fragment cat. no. 2.

2. A ring foot of an open vessel in BG pottery (Sample KP 108; **figs 3, 2; 4, 2**)
A massive ring foot trapezoid in section with a fine sharp off-set rim around the lower edge. The bottom of the vessel was decorated with a groove and a five-fold concentric rouletted wreath around the centre. The ceramic body is compact, highly refined without visible inclusions, hard burnt. Its colour is dull orange (Munsell code 7,5YR 7/3). The slip is cohesive opaque black with occasional brownish shades (principally along the slip margins). The breaks are sharp and rather neat.
Dimensions: the original diameter of the foot 90 mm; preserved dimensions 86 × 39 mm. – Find context: Manching Südumgehung, excavation campaign 1962, section 175 (excavation of a sewer trench); stray find in the trench section 0-30 m, i. e. adjacent to the trenches 668, 669, 671, 673 excavated in 1973 (cf. Lorenz 2004, suppl. 1. 6). – Presently kept in: Prähistorische Staatssammlung München inv. no. 1963/1027. – Bibliography: Stöckli 1979, 192-194. 255 no. 1055 pl. 78.
Comment on fragments 1 and 2: W. E. Stöckli (1979, 192-194) classified both pieces as Arretine despite the fact that precise formal analogies were lacking for them

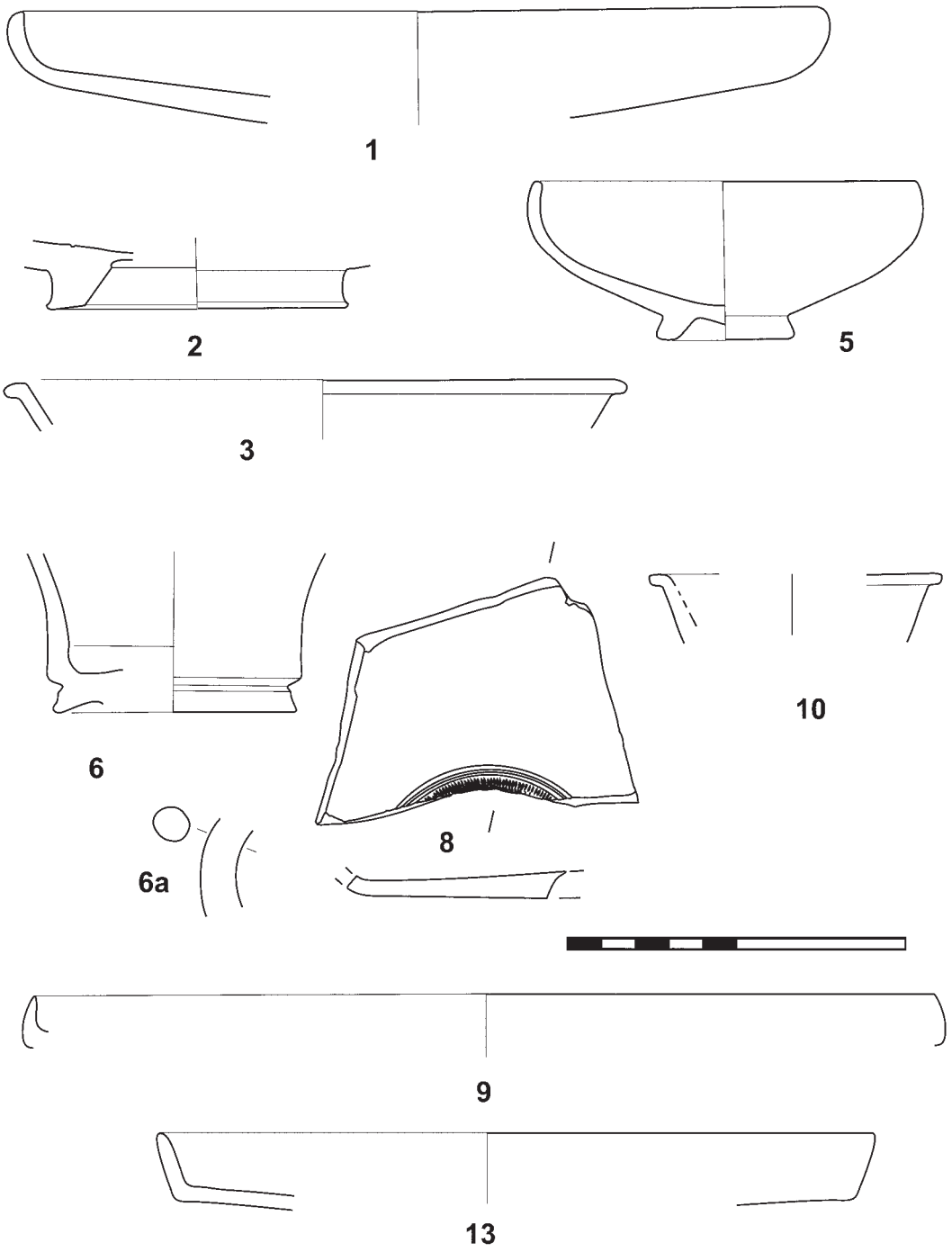

Fig. 3 Campana finds in Central Europe (the numbers correspond to those of the catalogue): **1-3. 5. 6-6a** Manching. – **8** Thunau am Kamp. – **9-10** Oberleiserberg. – **13** Bratislava. – (1-3. 5. 6a after Stöckli 1979; 6 after Sievers et al. 1998; 8 drawing J. Kysela; 9-10 after Karwowski 2007; 13 after Zachar / Rexa 1988).

in the Magdalensberg ensembles (he blamed this implicitly on the chronological difference between both sites). According to Morel (1981, 449-461, in particular 449-451) feet with off-set rims are characteristic of the circle of Campana B, though none of the types listed (F111-152) is perfectly analogous to the Manching ring foot with its sloping lower face.

3. A rim of a bowl in BG pottery (Sample KP 110; **figs 3, 3; 4, 3**)

A fragment of a bowl with straight diagonal walls and a protruding horizontal to slightly oblique rim in the form of a simple bulge. The ceramic body is compact, relatively soft with very numerous inclusions of black dots and stains. Its colour is light ochre (Munsell code 10YR 8/3

Fig. 4 Campana finds in Central Europe (the numbers correspond to those of the catalogue): **1-4. 6a** Manching. – **7** Stradonice. – **8** Thunau am Kamp. – **9-10** Oberleiserberg. – **11-12** Michelstetten. – (Photos: 1-4. 6a A. Mailler, Centre archéologique européen, Bibracte; 7-10 P. Kazakova; 11-12 N. Weigl, Urgeschichtemuseum Niederösterreich, Asparn an der Zaya).

light yellow orange). The deep black mat slip is worn on the edges and sporadically flaked off on the surfaces.
Dimensions: the original diameter 180 mm; preserved dimensions 47 × 22 mm. – Find context: Manching Zentralfläche, excavation campaign 1956, section 43w, pit »e«. – Presently kept in: Prähistorische Staatssammlung München inv. no. 1956/692. – Bibliography: Krämer / Schubert 1970, 96; Stöckli 1979, 194. 255 no. 1056 pl. 78.
Comment: Stöckli's classification as cup Lamboglia 28 in Campana B is upheld here (specifying that the »circle of Campana B« in its widest sense is a safer expression in this case). The form (Morel's F2654) and its varieties (listed by Sfredda 1998) is very characteristic of northern Italy and is one of those repeatedly attested in Alpine region (Morel 1981, 202 f.; Morel 1987, 125; Frontini 1987; Brecciaroli Taborelli 1988, 46 f. 71 f. pl. 7; Sfredda 1998, 26. 33 f. and *passim*; Carlevaro 2006, 188 all with further references; in Inner Alps see e. g. Gurina: Jablonka 2001, 74 f. pls 34, 3. 10-14; 35, 3-5; Uttendorf: Höglinger 2004, 190 fig. 2, 2; Magdalensberg: Schindler 1967, 28-31 pl. 3, 16-22 [»Hartes Fabrikat«]; 61-63 pl. 6, 16-22 [»Graues Fabrikat«]; Mandrga: Horvat / Bavdek 2009, 62 f.; Fornače: Horvat 1995, fig. 6, 3). The variety with straight walls is according to Brecciaroli Taborelli (1988, 47) and Sfredda (1998, 26; see also Carlevaro 2006; Horvat / Bavdek 2009, 62 f.) characteristic of Lt D2[7]. It is on the other hand little common in the southern Italian production: the only, highly approximate comparisons from for instance the Cales workshops is the form F2614 manufactured here in the early production period c. 200-130/120 BC (Aquilué Abadías / García Roselló / Guitart Duran 2000, 405 f.) or the form F2686 belonging to the »archaic« phase of the local production (i. e. c. 275-200 BC: Pedroni 2001, 155 no. 242).

4. A body fragment in BG pottery (Sample KP 111; **fig. 4, 4**)
A trapezoidal fragment of a vessel body. The ceramic body is compact and refined, relatively soft with sporadic concentrations of tiny black dots. Its colour is light grey

(Munsell code 2,5Y 8/2 light grey). The black mat slip with here and there greenish tinge is rather compact only in few places flaked off.
Dimensions: 38 × 37 mm. – Find context: Manching Zentralfläche, excavation campaign 1956, section 43w, depression (»Mulde«) »l«. – Presently kept in: Prähistorische Staatssammlung München inv. no. 1956/696. – Bibliography: Krämer / Schubert 1970, 96; Stöckli 1979, 192. 255 not illustrated.
Comment: Stöckli (1979, 195) regarded the piece as of possibly south-Gallic or Ligurian origin (within the »circle of Campana B«). As he himself admitted, however, he had no real arguments to support this attribution. As mentioned above, the grey core may occur in various workshops of the Campana B circle.

5. A semi-globular bowl in BG pottery (**fig. 3, 5**)
A small bowl with rounded walls and a ring foot. Due to restorations carried out on it, exact observations could not be made. The ceramic body is ochre; the slip though mostly preserved is worn on relatively large spots. It is rather irregularly black and shiny with bluish tones.
Dimensions: diameter 115 mm; height 48 mm. – Presently kept in: kelten römer museum Manching inv. no. 1958/147, 258. – Bibliography: Stöckli 1979, 194. 255 no. 1057 pl. 78.
Comment: W. E. Stöckli considered the quality of the artefact as too low for a genuine Campana and regarded it rather as »an imitation«. As we outlined above in the discussion on the »world of Campana B«, the concept of »central productions« and their »imitations« does not correspond to the actual complexity of the problem and it should be mentioned that the quality of manufacture need not be a valid criterion for the determination of the workshops' »centrality«. Unfortunately, the state of the artefact defied any detailed observations, let alone the execution of an archaeometric analysis and therefore, its origin can be in no way determined beyond the very general statement that it belongs to the Campana B circle. Its form may be identified with Lamboglia's form 27 and Morel's espèce 2780 particularly the forms F2788 or F2784 (Morel 1981, 224-226). Although, as noted by W. E. Stöckli, in the 2nd-1st centuries BC these are represented principally in Campana A and there seems therefore to be a neat discrepancy between the form and the category, P. Frontini (1985) and N. Sfredda (1998, 26 no. 63; 32-33) list in Lombardy several examples from various contexts of the late 2nd or the early 1st century BC which they ascribe to local(?), north-Etruscan or Adriatic workshops. The existence of this form also in Campana B is thereby confirmed.

6. A small cup of the type Lamboglia 2 (**fig. 3, 6**)
The bottom and the greater part of walls of a small cup with concave walls slightly flaring from the bottom to the top. The find could be neither analysed nor directly autoptically studied.
Dimensions: diameter of the base 70 mm; preserved height c. 50 mm. – Find context: Altenfeld, excavation campaign 1996-1997, the fragments were split between the upper levels of the infill of the well 1213c, the infill of the ditch 1 and the pit »a« in the structure 1214. – Presently kept in: Prähistorische Staatssammlung München. – Bibliography: Sievers et al. 1998, 637 fig. 5.
Comment: The form Lamboglia 2/Morel espèce 1220-1230 is well represented in the circle of Campana B, mainly in the production of Cales where it dates from its central production period on (Pedroni 2001, 189-191. 194. 202; Aquilué Abadías / García Roselló / Guitart Duran 2000, 405 f.).

6a. A fragment of a handle (in BG pottery?) (Sample KP 112; **figs 3, 6a; 4, 6a**)
A fragment of a curved »stub« circular in section. The ceramic body is relatively coarse with very frequent siliceous inclusions up to millimetre dimensions, some of them even protruding through the slip. The break is highly irregular. The colour of the ceramic body is lively brick-orange (Munsell code 7.5YR 7/6 orange). The slip(?) is thick opaque black with dark brown tinges. It is flaked off in several places and the whole of its surface is covered with hair-thin cracks and scratches.
Dimensions: preserved length 32 mm. – Presently kept in: Prähistorische Staatssammlung München inv. no. 1959/252. – Bibliography: Stöckli 1979, 194. 255 no. 1058 pl. 78.
Comment: W. E. Stöckli classified the piece as Campana A and even quoted a number of analogies to such handles in the same ware. It must be, however, born in mind that all these analogies belong to a much earlier horizon (4th-3rd centuries BC) and that only extremely few of them continue down to the middle of the 2nd century BC (particularly some *kylikes* of the Morel's genres 4100 and 4200 which are, however, in this period produced principally in northern Etruria and the Adriatic area i. e. not in Campana A). In the few forms of the 2nd-1st centuries BC where handles are present (e. g. Lamboglia 10/Morel's genre 3400) these are as a rule either flat or fluted. Moreover, they are, once again, not produced in Campana A. All of this, together with the nature of both ceramic core and slip which both show marked differences to the classical BG wares, raise serious suspicions about this artefact as a handle of a BG vessel.

Stradonice (okr. Beroun, central Bohemia, CZ)

7. A body fragment in BG pottery (Sample KP 107; **fig. 4, 7**)
A fragment of a BG vessel. The ceramic body is rather compact and refined, relatively soft; the break is blunt and

worn. The colour of the body is beige-pinkish (Munsell code 7.5YR 6/4 light brown), the only visible inclusions are some sporadic tiny flakes of mica. The deep black slip is not consistently preserved and largely flakes off.
Dimensions: 31 × 34 mm. – Find context: Stradonice, excavations of A. Stocký in 1929. – Presently kept in: Národní Muzeum, Prague inv. no. 125833. – Bibliography: Kysela 2012.
Comment: The preserved portion naturally excludes any identification of the original form.

Thunau am Kamp (Bz. Horn, Lower Austria, A)

8. Two fragments of a plate in BG pottery (Sample KP 113, fragment b; **figs 3, 8; 4, 8**)
A series of fragments all of which seem to belong to the same vessel. Two of them could be studied in detail. They belong to a large plate with straight walls, its bottom is decorated with a double groove and a concentric rouletted wreath (two ranks are preserved) around the centre. The ceramic core is highly refined with very rare inclusions of tiny dark brown dots. The break is straight and only slightly blunt while the touch of the core is slightly powdery. The colour of the core is pinkish (Munsell code 7.5YR 7/4 pink). The slip is thick, compact, semi-lucent with metallescent bluish reflections.
Preserved dimensions of the analysed fragments: a) 111 × 38 mm; b) 90 × 55 mm. – Find context: Thunau am Kamp 2008, parcel 98/1, trench 11, SU 557; find number 281. – Bibliography: Szameit / Obenaus 2009, 606.
Comment: The preserved parts enable us to reconstruct the vessel as a »patera«, probably the most widespread genre of Campanian pottery forms well represented in all production groups great and small. In the absence of a rim we cannot decide if the form is that of Lamboglia 5 (with oblique walls and an in-turned rim) or Lamboglia 7 (with quasi horizontal walls and an abrupt carinated transition to a straight rim). The uncertainty about the distinction between the two types may, however, concern even complete vessels and a label Lamboglia 5/7 is a commonplace.

Oberleiserberg (Bz. Korneuburg, Lower Austria, A)

9. A rim of a plate in BG pottery (**figs 3, 9; 4, 9**)
An in-turned rim of a plate. The ceramic core is compact and refined, hard burnt with a sharp break. It comprises very rare tiny dark inclusions. The colour of the core is pinkish (Munsell 5YR 7/6 »reddish yellow«), the slip is dense compact and semi-lucent greyish black with olive tinges. It is worn on the edges and rather flaked off.
Dimensions: preserved length 46 mm; reconstructed diameter c. 280 mm. – Find context: Oberleiser Berg 2004, trench 72, surface level; find number 23.491. – Bibliography: Karwowski 2007, 28 fig. 4a.
Comment: Lamb 5/7.

10. A rim of a cup in BG pottery (**figs 3, 10; 4, 10**)
A minute rim-chip of a dish with a concave wall and an out-turned lip. The ceramic core is compact and refined, hard burnt with a sharp break, comprising isolated longitudinal white particles. The colour of the body is grey-brown (Munsell code 10YR 5/3 brown). The semi-opaque slip, black with brownish tinges is partially flaked off.
Preserved dimensions: 24 × 27 mm. – Find context: Oberleiser Berg 2004, trench 72, square 19; find number 14.489. – Bibliography: Karwowski 2007, 28 fig. 4b.
Comment: Despite its petty dimensions the fragment may be identified with the dishes type Lamboglia 28 (for closer discussion of the form see the comment to cat. no. 3). This piece is characterised with particularly small dimensions (diameter c. 70 mm).

Michelstetten (Bz. Mistelbach, Lower Austria, A)

11. A wall fragment in BG pottery (**fig. 4, 11**)
A pentagonal pottery wall fragment; a double groove runs along its longest side. The ceramic core is compact, well refined, hard burnt with a sharp break. The colour of the core is beige with orange tinges; the slip is thick, compact deep black and shiny.
Find number V1486/12575. – Bibliography: Trebsche 2010, 92.
Comment: The fine double groove might imply that the fragment comes from a cup Lamboglia 1/8 characterised with such a feature running under the rim. This is one of the commonest forms of the Campana B and related wares. Also the ceramic body indicates a high quality B-circle production.

12. A wall fragment in BG pottery (**fig. 4, 12**)
A tiny wall fragment. The ceramic core is compact, refined, hard burnt with a sharp break. The colour of the core is pinkish beige; the slip is thick, compact deep black and shiny.
Find number V1487/12592. – Bibliography: Trebsche 2010, 92.
Comment: As cat. no. 11, also this fragment probably belongs to a good quality ware of the B-circle.

Bratislava (SK)

13. A rim of a plate in BG pottery (**fig. 3, 13**)
Dimensions: reconstructed diameter 200 mm. – Find context: Bratislava, Panská street 19 (by the time of excavation Nálepkova street 19-21), trench 5, layer 15/I, rescue excavation in the early 1980s. – Presently kept in: Múzeum Mesta Bratislavy. – Bibliography: Zachar / Rexa 1988; Pieta 1996, 185 fig. 1, 1; Vrtel 2009, 122.
Comment: According to the published description, the colour of the ceramic core was light beige to orange, the slip covered only the upper part of the rim. Unfortunately,

we could neither study the fragment directly nor undertake the analysis of it. The publication (op. cit.) clearly shows that it belongs to the patera type Lamboglia 7 (Morel espèce 2260-2280). This information does, however, not provide any useful clues to determine the provenance and chronology of the piece (beyond the most general statement of the late 2nd or 1st centuries BC). A. Vrtel (2009, 122) classifies it as Lamboglia 7/16 placing its production to the early second half of the 1st century BC.

14. A wall of a plate in BG pottery
A wall of a plate with transition to the (not preserved) ring foot. Also the rim is missing. According to the description given by A. Vrtel, the ceramic core is hard burnt, its colour is yellowish (»hey yellow«) while the slip is black with bluish metallescent reflections.
Find context: Bratislava, Radničná street 14, shaft pit 14/06. Rescue excavation of municipal monument service in 2006. – Bibliography: Vrtel 2009, 122.
Comment: According to the trustworthy opinion of S. Zabehlicky it is most probably an Arretine product. We are grateful to A. Vrtel (Comenius University in Bratislava) for this information.

Kraków-Cło (woj. małopolskie, PL)

15. A wall fragment of a dish in BG pottery
A fragment of a carinated dish. A greater part of the profile is preserved: the dish had a fine ring foot, the wall is articulated between a conical lower part and a vertical concave upper part. Both parts are separated with an angled transition. The rim is missing. No closer information is given.
Bibliography: Poleska 2006, 61.

Staré Hradisko (Malé Hradisko, okr. Prostějov, Olomoucký kraj, CZ)

16. The find is known only thanks to a verbal description by the site's first excavators: »A recipient, from which only the bottom and a part of the adjacent wall have been preserved, manufactured from fine yellow clay with a reddish tinge and varnished in black on the exterior, is downright classical and an Italian import.« (Lipka / Sněttina 1912, 305). This rather general statement does not allow any certitude as to the form determination. We may only guess that the recipient probably belonged to the Campana B circle. J. K.

CHEMICAL ANALYSES

The aim of the archaeometric analysis was to contribute to the identification of the manufacturing place of the seven studied pottery samples. First, a chemical analysis was performed for each sample (**tab. 1**). In a second step these compositions were compared with known chemical (reference) groups (**tab. 2**).
A sound chemical reference group should comprise a minimum of 20-30 chemical analyses of unequivocally local products of a specific manufacture (Schneider / Hoffmann / Wirz 1979). Homogeneous reference groups based on fewer samples, however, may be helpful for a first hypothesis of provenance. Most of the available reference groups are defined and assigned to a specific origin based on archaeological arguments such as shape, stamps and macroscopic appearance, but not on excavated potter's tools and waste material or geological clay samples from a specific workshop. Such groups are therefore not true chemical reference groups, but only »floating« chemical groups, needing confirmation by analytical data from excavated workshops. Further, care must be taken if results of laboratories using different analytical methods are compared. The laboratories of Berlin (G. Schneider), Fribourg (G. Galetti, M. Maggetti) and Lyon (M. Picon) use the same method (wavelength-dispersive X-ray fluorescence [WD-XRF]), and their cross-checked results are directly comparable (Galetti 1994; Schneider / Daszkiewicz 2006). The comparison with data from the neutron activation analysis (NAA) is limited because some of the important elements are not determinable by both methods (Schneider / Mommsen 2009). **Table 2** therefore lists only reference groups done by XRF or ICP (inductively coupled plasma mass spectrometry) yielding the same series of elements.
There are many archaeometric studies on Italic and French black slip (Campana) and red slip (*terra sigillata*) ware, but only few published individual analyses. At least about 10-15 significant oxides/elements are needed for comparison. As a minimum requirement, published means and standard deviations should be

available. The comparison with own data in a large database in Berlin is the best choice and was used here as a first check.

Methodology

Sampling: M. Maggetti and J. Kysela chose seven objects on March 3, 2011, at the Department of Geosciences, University of Fribourg. A small sample was obtained by cutting with a diamond saw from each ceramic object or fragment (description of the objects/fragments see above).

Sample preparation: The samples were ground at the Department of Geosciences, University of Fribourg, in a tungsten carbide mill after the removal of the possibly contaminated (during burial) surface layer. After milling, the amount of powder obtained was (in grams) 3.28 (KP 107), 5.55 (KP 108), 2.40 (KP 109), 1.19 (KP 110), 1.47 (KP 111), 3.67 (KP 112) and 1.45 (KP 113).

Chemical analysis: The wavelength-dispersive X-ray fluorescence analysis (PANalytical AXIOS) was done to determine the content of the major elements and a series of fourteen trace elements (Cu, Nb, La, Ce, Pb are ascertained less precisely; see **tab. 1**). Total iron was calculated as Fe_2O_3. The powdered samples were ignited at 880 °C (heating rate 200 °C/h, soaking time 1 h), melted with a lithium-borate mixture (Merck Spectromelt A12) and cast into small discs for measurement. The results are, therefore, valid for ignited samples but, with the ignition losses given, may be recalculated to a dry basis. For the easier comparison the major elements were normalised to a constant sum of 100 % (the original sum of the measurement is shown). The precision for the major elements is better than 1 %, for the trace elements this rise up to 20 % depending on the concentrations. The accuracy (5 and 10 % for the major elements and the most important trace elements) was tested analysing international reference samples and per exchange of samples with other laboratories.

Multivariate analysis: The statistical treatment of the chemical analyses was done with the program SPSS13. Hierarchical Cluster Analysis (HCA) was performed with the Ward-method (average-linkage, squared Euclidean distances, between groups, z-scores) and Principal Component Analysis (PCA) using log transformed data of 14 oxides/elements (SiO_2, TiO_2, Al_2O_3, Fe_2O_3, MgO, CaO, Na_2O, K_2O,

sample	lab.-no.	SiO_2	TiO_2	Al_2O_3	Fe_2O_3	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	V	Cr	Ni	Cu	Zn	Rb	Sr	Y	Zr	Nb	Ba	La	Ce	Pb	sum	LOI
KP 107	R865	56.22	0.837	18.21	6.84	0.116	2.71	8.11	0.63	2.98	3.36	115	147	81	36	112	139	384	24	187	17	1791	19	66	18	99.80	3.84
KP 108	R866	57.17	0.746	16.26	6.17	0.100	2.90	11.99	0.69	2.78	1.18	110	137	66	38	130	132	357	22	173	14	506	35	68	15	99.52	3.81
KP 109	R867	56.99	0.748	16.51	6.17	0.094	2.90	12.26	0.66	2.83	0.83	106	135	63	37	119	136	352	20	174	15	502	38	77	19	100.26	4.06
KP 110	R868	57.68	0.756	15.81	6.15	0.138	3.29	11.24	1.08	2.77	1.09	96	137	87	47	130	142	344	23	190	15	673	33	68	13	99.87	4.78
KP 111	R869	57.33	0.755	15.81	6.29	0.148	3.28	10.97	1.19	2.90	1.34	100	134	82	43	118	143	342	23	189	13	720	24	72	13	99.90	4.06
KP 112	R870	78.25	1.003	14.34	2.94	0.024	0.81	0.41	0.23	1.90	0.09	65	85	38	18	50	119	56	34	391	19	375	32	82	138	99.40	1.06
KP 113	R871	56.26	0.847	17.96	6.81	0.147	3.37	11.07	0.68	2.48	0.37	128	172	85	56	118	133	321	26	155	17	509	36	67	30	100.27	1.64

sample	SiO_2	TiO_2	Al_2O_3	Fe_2O_3	MnO	MgO	CaO	Na_2O	K_2O
KP 107	58.18	0.866	18.84	7.08	0.116	2.800	8.39	0.66	3.08
KP 108	57.86	0.755	16.45	6.25	0.100	2.940	12.14	0.69	2.82
KP 109	57.47	0.754	16.65	6.22	0.094	2.928	12.37	0.67	2.86
KP 110	58.31	0.764	15.99	6.22	0.138	3.323	11.36	1.09	2.80
KP 111	58.10	0.765	16.02	6.38	0.148	3.320	11.12	1.20	2.94
KP 112	78.32	1.004	14.35	2.94	0.024	0.809	0.41	0.23	1.90
KP 113	56.47	0.850	18.03	6.83	0.147	3.386	11.11	0.68	2.49

Tab. 1 The chemical composition of the ignited samples. Oxides, LOI (loss on ignition) and sum in wt.%, trace elements in ppm. – Fe_2O_3 = total Fe as Fe_2O_3. – The first seven rows show the results of the XRF analysis, the second seven rows the transformed data of the oxides (recalculated without phosphorus to 100 wt. %). – (Analyses G. Schneider).

reference group	method	laboratory	literature	remarks
Italian				
Aquileia	XRF	Berlin	Database Schneider / Daszkiewicz (C)	hypoth. local group of vernice nera
Arezzo	INAA, XRF	Paris	Widemann et al. 1975 (B)	
Arezzo	XRF	Lyon	Picon / Vichy / Meille 1971 (C), Picon 1972 (C), Lasfargues / Picon 1982 (A, B*)	
Arezzo	XRF	Berlin	Schneider / Hoffmann 1990 (corrigenda in 2nd ed.) (B)	
Arezzo	XRF	Berlin	Schneider / Daszkiewicz 2006 (B)	
Arezzo	XRF	Berlin	Database Schneider / Daszkiewicz (C)	incl. 100 samples found in Arezzo
Arezzo (Magdalensberg »hart«)	XRF	Fribourg	Maggetti / Galetti / Schindler 1986 (A)	
Arezzo	ICP-OES, XRF, NAA	Ontario	Gliozzo / Memmi-Turbanti 2004 (A)	
Cales	XRF	Fribourg	Maggetti et al. 1981 (B)	
Cales	XRF	Lyon	Maggetti et al. 1981 (B*), Maggetti / Picon / Galetti 1998 (B*)	
Cales	XRF	Berlin	Database Schneider / Daszkiewicz (C)	incl. 3 workshop wasters
Campana A	XRF	Lyon	M. Picon, pers. comm. 1983 (C)	
Campana A	ICP-OES, FES	Torino	Mirti / Aceto / Preacco Ancona 1998 (A)	finds in Calabria
Campana A	XRF	Berlin	Schneider 2000 (B)	
Campana A	XRF	Berlin	Database Schneider / Daszkiewicz (C)	from workshop, including one local clay
Campana B	ICP-OES, FES	Torino	Mirti / Aceto / Preacco Ancona 1998 (A)	finds in Calabria
Campana b1	XRF	Lyon	M. Picon, pers. comm. 1983 (C)	
Campana C	XRF	Lyon	M. Picon, pers. comm. 1983 (C)	
Campana C	ICP-OES, FES	Torino	Mirti / Aceto / Preacco Ancona 1998 (A)	finds in Calabria
Campana C	XRF	Berlin	Database Schneider/Daszkiewicz (C)	finds from Pantelleria
Chiusi (Marcianella 6)	ICP-OES, XRF, NAA	Ontario	Gliozzo / Memmi-Turbanti 2004 (A)	
Chiusi (Marcianella 8)	ICP-OES, XRF, NAA	Ontario	Gliozzo / Memmi-Turbanti 2004 (A)	
Cincelli	XRF	Lyon	Lasfargues / Picon 1982 (B)	
Cosa	XRF	Lyon	Maggetti / Picon / Galetti 1998 (B)	
Cosa	XRF	Berlin	Database Schneider/Daszkiewicz (C)	local *Firmalampen*
Latium	XRF	Lyon	M. Picon, pers. comm. 1983 (C)	
N-campanien ancient	XRF	Lyon	M. Picon, pers. comm. 1983 (C)	
N-campanien recent	XRF	Lyon	M. Picon, pers. comm. 1983 (C)	
Padan (Magdalensberg »porös«)	XRF	Fribourg	Maggetti / Galetti / Schindler 1986 (A)	
Padana and tardo-padana	XRF	Berlin	Schindler-Kaudelka / Schneider / Zabehlicky-Scheffenegger 1997 (A)	
Padan 1,2	XRF	Lyon	Lasfargues / Picon 1982 (B*), Maggetti / Picon / Galetti 1998 (B)	
Pisa	XRF	Lyon	Lasfargues / Picon 1982 (A, B*)	
Produzione A di Baia di Napoli	XRF	Berlin	Soricelli / Schneider / Hedinger 1994 (B)	
Puteoli	XRF	Berlin	Database Schneider/Daszkiewicz (C)	inlcuding 25 samples from Puteoli
Puteoli	XRF	Lyon	Lasfargues / Picon 1982 (B*)	
Pompei	XRF	Berlin	Schneider / Daszkiewicz / Cottica 2010 (B)	
Rimini	XRF	Lyon	M. Picon, pers. comm. 1983 (C)	
Rimini	XRF	Berlin	Database Schneider / Daszkiewicz (C)	
Rome	XRF	Berlin	Daszkiewicz / Schneider 2002 (A)	local *terra sigillata*

Tab. 2 Synthesis of the chemical (reference) groups used in this study. – Published values: A = individual analyses; B = means and standard deviations (B*, only eight major elements); C = unpublished database.

reference group	method	laboratory	literature	remarks
Rome	XRF	Berlin	Database Schneider/Daszkiewicz (C)	local vernice nera lamps and *terra sigillata*
Volterra	ICP-OES, XRF, NAA	Ontario	Gliozzo / Memmi-Turbanti 2004 (A)	
France				
Banassac	XRF	Lyon	Picon et al. 1975 (B*)	
La Graufesenque	XRF	Lyon	Picon et al. 1975 (B*)	
La Graufesenque	XRF	Berlin	Schneider 1978 (B)	
La Graufesenque	XRF	Berlin	Database Schneider / Daszkiewicz (C)	
Lezoux	XRF	Berlin	Schneider 1978 (B)	
Lezoux (1, 2, 3)	XRF	Lyon	Vertet / Picon / Vichy 1970 (C), Picon / Vichy / Meille 1971 (A), Picon / Vertet 1970 (B)	
Lyon	XRF	Lyon	Lasfargues / Picon 1982 (A, B*), Picon 1972 (C)	
Lyon, Loyasse	XRF	Lyon	Picon 1972 (C)	
Lyon, Loyasse	XRF	Lyon	M. Picon, pers. comm. 1983 (C)	
Lyon, Loyasse	INAA, XRF	Paris	Widemann et al. 1975 (B)	
Lyon, La Muette B	XRF	Lyon	Picon / Vichy / Meille 1971 (C), Picon 1972 (C), Picon / Vichy 1974 (B)	
Lyon, La Muette B	INAA, XRF	Paris	Widemann et al. 1975 (B)	
Lyon, La Muette B	XRF	Lyon	M. Picon, pers. comm. 1983 (C)	
Lyon, La Muette B	XRF	Berlin	Database Schneider / Daszkiewicz (C)	attributed sherds
Montans	XRF	Lyon	Picon et al. 1975 (B*)	

Tab. 2 Continuation.

Ba, Cr, Ni, Rb, Sr, Zr). A general screening was first made with all reference groups of **table 2**, using binary plots and both multivariate statistic programs. For the discussion, only binary plots and the factor analysis were used, relying on reference groups of the same laboratory (Berlin) in which the seven studied samples were analysed. By such an approach, errors due to other laboratories and/or other analytical methodologies are minimised.

Chemical contamination

As M. Maggetti (2001, 924) stated: »A ceramic body reacts sensitively to post-firing environmental influences. Due to the high porosity of the sherd, often more than 30 vol. %, circulating soil solutions can easily access a ceramic fragment and react with its phases. Such an interaction is exemplified by the element phosphorus. The P_2O_5 content of clays and soils on our planet rarely exceed 0.2-0.5 wt. %. As a consequence, one would expect to find similar concentrations in ceramics, despite the fact that these values increase slightly during firing due to loss of volatiles«. Except KP 112 and KP 113, all other samples show P_2O_5 concentrations exceeding 0.5 wt. %. The analyses (**tab. 1**) had therefore to be corrected assuming 0 wt. % P_2O_5 and recalculating to a sum of 100 wt. %.

General impression

All samples are, except KP 112, rich in calcium oxide (CaO). This fits perfectly with the predominantly CaO-rich bodies of red and black coated Roman tableware. **Table 1** and **figure 5** illustrate the marked chem-

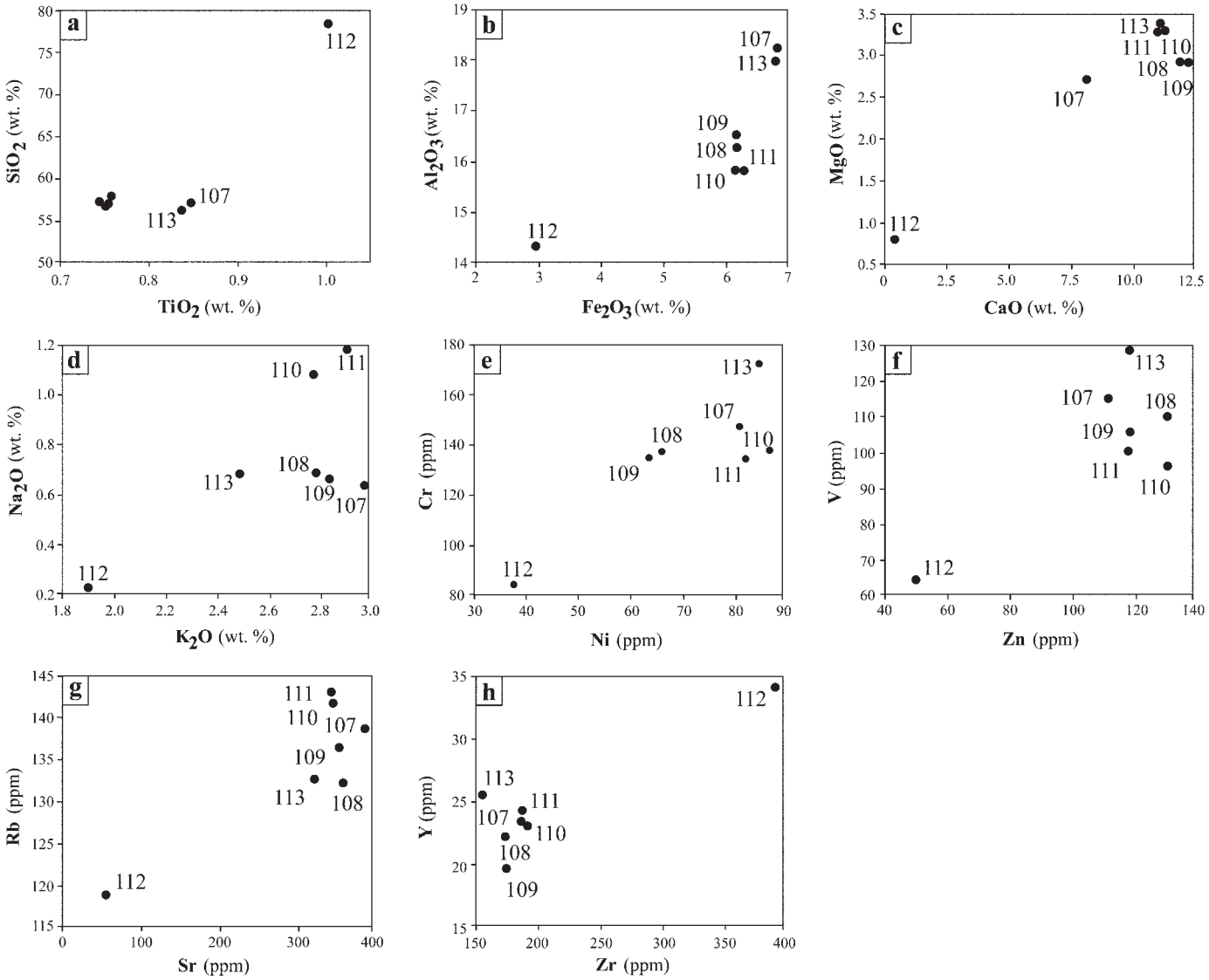

Fig. 5 Binary diagrams showing the chemical variability of the seven samples: **a** SiO_2-TiO_2. – **b** Al_2O_3-Fe_2O_3. – **c** MgO-CaO. – **d** Na_2O-K_2O. – **e** Cr-Ni. – **f** V-Zn. – **g** Rb-Sr. – **h** Y-Zr. – (Diagrams M. Maggetti).

ical difference of KP 112 if compared to the other samples. The former is much richer in silicium oxide (SiO_2), titanium oxide (TiO_2), yttrium (Y) and zirconium (Zr), but lower in aluminium oxide (Al_2O_3), iron oxide (Fe_2O_3), magnesium oxide (MgO), sodium oxide (Na_2O), potassium oxide (K_2O), chromium (Cr), nickel (Ni), vanadium (V), zinc (Zn), rubidium (Rb) and strontium (Sr). KP 108 and KP 109 as well as KP 110 and KP 111 cluster very tightly, which most probably indicates that these four samples only represent two different vessels. The samples KP 107 and KP 113 plot close, but differ in some oxides or elements.

Provenance

France: No French chemical (reference) group matches the composition of the analysed samples. Pottery from Lyon and the Rhone Valley generally has lower Mg, Cr and Ni values. Therefore, the studied vessels were not made in a Gaulish workshop.

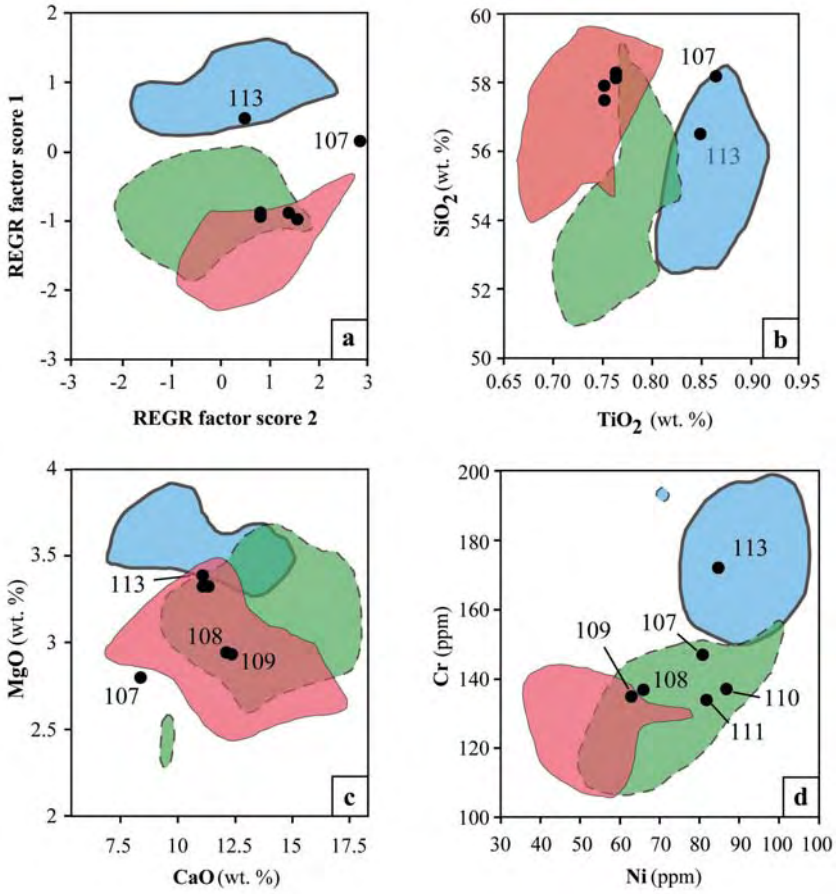

Fig. 6 Selected variation diagrams of the reference groups (unpublished database in Berlin): Arezzo (blue field, heavy line, 104 samples), Cales (red field, normal line, 27 samples), Puteoli (green field, dashed line, 54 samples) and the studied CaO-rich samples. – **a** binary plot of the regression factors (PCA). – **b** SiO_2-TiO_2 binary diagram. – **c** MgO-CaO binary diagram. – **d** Cr-Ni binary diagram. – (Diagrams M. Maggetti).

Italy: The comparison of the six CaO-rich samples with published and unpublished Italic chemical (reference) groups (**tab. 2**) shows a very good matching of KP 113 with the chemical composition of all known Arretine reference groups (**tab. 2**), as evidenced by **figure 6**, where the sample plots in the field of this reference group. An Arretine origin is therefore beyond any doubts.

KP 107 is similar to the Arretine group for some oxides/elements (e. g. **fig. 6b**), but not for all (**fig. 6c-d**). In a multivariate analysis, when all oxides/elements are considered together, its position is therefore outside the Arretine group (**fig. 6a**). These differences exclude an attribution to Arezzo. The very high phosphorus content, as usually connected with a high barium content and a high loss on ignition, could be taken as an indication also of other compositional changes by leaching. These changes, however, will mainly influence potassium, rubidium and calcium whilst the main difference to Arezzo (or Cincelli) is in magnesium and chromium. Quite similar in composition, however still with significant differences, is other pottery in Etruria as e. g. from Cosa, Chiusi and Volterra. Therefore a provenance from Etruria seems most probable.

The remaining samples KP 108, KP 109, KP 110 and KP 111 are chemically very similar to the reference material attributed to Cales and Puteoli (Naples). They plot in the **figures 6a, 6c** and **6d** in the overlapping fields of both reference groups, impeding a clear attribution, despite the fact that **figure 6d** favours an origin of KP 110 and KP 111 from Puteoli (but unlikely for BG pottery).

As for KP 112, its non-calcareous composition seems very unlikely to represent any French or Italian black-gloss ware (i. e. an existing chemical reference group). His origin cannot be solved. Because of its chemical similarity to some analysed Roman pottery from the provinces north of the Alps it could be a find to be attributed to a later period (*terra nigra*?). M. M. / G. S.

CONCLUSIONS

We may draw some conclusions from the above-exposed facts: As far as the distribution is concerned, it is obvious that with one or two sherds for a site, the BG pottery is extremely rare in Central Europe. It could be considered as a proof of its being a luxurious ware available only for few people, but at the same time we should not forget that two fragments come also from the rather inconspicuous site of Michelstetten. Rather than with its value (about which we cannot be really sure) we may explain this rarity with logistic reasons: the transport of this fine ware was much more problematic in case of our region than it was in Gaul connected with Italy via maritime and fluvial routes. The relative rarity of finds of this category in our zone may, however, be also due to the failure of the local archaeologists (not familiar with this ware) to recognise it: much may have been dumped since considered to be modern intrusions.

Among the forms, out of the 16 Campana sherds there are six plates, five dishes, one cup and four undetermined wall-fragments. The precise typological determination is only possible for few forms. Among the plates, the cat. nos 1 and 9, probably 14 and maybe 8 can be very generically considered as forms Lamboglia 5 or 5/7, the cat. no. 13 as Lamboglia 7. The dish cat. no. 5 belongs to the type Lamboglia 27, the cat. no. 6 to cup Lamboglia 2. In none of the cases does this determination say anything more about the date or origin of the vessel. On the other hand, in the case of the cat. nos 3 and 10 the best comparison is with the form Lamboglia 28, whose variety with a straight wall only appears in northern Italy after 70/60 BC (see comment on the cat. no. 3). The north-Italian provenance of the Manching piece is, however, denied by the results of the analyses and among the Calenian forms the closest, though not precise, parallels date either to the 2nd or even the 3rd century BC.

Most interestingly, the archaeometric analysis stated the provenance of the sherds cat. nos 1 (KP 107: Stradonice) and 8 (KP 113: Thunau am Kamp) as Etruscan (Etruscan broadly speaking and Arretine respectively). The composition of the other studied fragments (cat. nos 1-4: Manching) indicates their origin in Campania, namely the region of Cales/Puteoli. Arretine origin has been suggested on the ground of macroscopical analysis also for our cat. no. 14 and may be proposed though only tentatively also for the cat. nos 10-12. Finally, the analyses ruled out the appurtenance of the sherd cat. no. 6a to any of the reference groups, reinforcing thus the doubts (see comments to cat. no. 6a) about its »campanity« (a modern intrusion is suggested as an alternative).

Curiously enough, the analyses stated the composition of the Manching sherds cat. nos 1 and 2 (KP 109 and KP 108) and 3 and 4 (KP 110 and KP 111) respectively as so similar to each other that it is not excluded that they originate only from two instead of four vessels. Neither their form nor the find circumstances contradict this idea: the cat. nos 1 and 2 are both plate fragments very similar in terms of both slip and the ceramic core. Sherds of the cat. no. 1 were discovered in different pits in the trenches 220 and 224 while the cat. no. 2 comes from the humus spit of the sewer trench 175. Both findspots are localised roughly 100 m from each other (Lorenz 2004, suppl. 6). Given that the sherd cat. no. 2 was discovered in humus, its straying from the place of its original deposition is highly probable. According to the studies of H. Lorenz (2004, fig. 9), sherds may stray as far as 400 m in the site of Manching. The ceramic core and slip of the cat. nos 3 and 4 are, as for them, also very similar to each other. The only significant difference between them is the tinge of the core, beige and grey respectively, which may, however, be due to variations in firing or depositional conditions. Moreover, both were unearthed in a very close vicinity: in the pit »e« and the depression »l« in the trench 43w, i. e. merely 15-20 m from each other (Krämer / Schubert 1970, 96 and suppl. 11).

Taking into consideration the usual commercial circuits of Arretine and Calenian BG pottery (see above) we may advance some hypotheses concerning the directions whence the studied fragments reached their

destination. Unfortunately, the analysed sherds do not cover evenly the whole area of distribution of BG pottery in Central Europe: most of them come from Manching while Stradonice and Thunau are represented with one studied fragment each. In Manching all the analysed sherds come from Cales. This indicates clearly their western provenance via Gaule. This western orientation of the site is not illogical since also the absolute majority of the local amphorae were produced on the Tyrrhenian coast and therefore must have been mediated via Gaule. Further eastwards, the concentration of finds in the Middle Danube area provided unfortunately a single analysable vessel, the patera from Thunau, which has been determined as Arretine. The fragments from Oberleiserberg and Michelstetten were regrettably too small to be studied. The provenance of one of the pieces from Bratislava could be stated at least macroscopically as Arretine, too. This provenance is possible also for the sherds from Michelstetten. Among the Oberleiser finds the patera seems to correspond with the characteristics of some Adriatic wares. If we accept all these attributions, we may hypothesise (once again rather logically) their arrival from the south-eastern direction via the Alpine route. In case of the fragment from Stradonice, the determination is unfortunately too vague (»Etruria«) to permit a decisive response to the enquiry of its provenance either from the west or the south-east.

In this way, two circuits delineate themselves in our evidence: western, Calenian, reaching via Gaul as far as Bavaria, and south-eastern, Arretine, crossing the Eastern Alps and supplying the regions of the Middle Danube area. The position of Bohemia in this schema is not clear.

It must be born in mind, however, that the corpus we are dealing with is extremely limited and hopefully far from complete. Only ten years ago, no more than eight BG sherds were known in Central Europe (four of these, moreover, probably belong to only two vessels and one other – our cat. no. 6a – was in fact only a wrong attribution). The research of the last ten, even five years has doubled their number. Future analyses will broaden the picture and complete the conclusions of this paper. J. K.

Notes

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2) The gloss or slip (*Firnis*, *vernis*) of the ware is a partially amorphous, highly sintered engobe with relictic quartz and high temperature colour pigments. The often used term »black glaze« is therefore imprecise, since glaze is a glassy, i. e. fully amorphous, layer and the terms »gloss«, »slip« or »coating« are preferable (cf. Maggetti et al. 1981).

3) The most substantial studies in the production of the western Mediterranean are still those of J.-P. Morel, principally Morel 1981; for the class in general see besides them e. g. Py 1993a; Brecciaroli Taborelli 2005.

4) See Brecciaroli Taborelli 2000, 27 f. for a possible model of production in northern Italy.

5) For more detailed characteristics of the single BG wares based on the shades and nature of both core and slip see principally Morel 1981, 45-52; Mandruzzato / Maselli Scotti 2003; Brecciaroli Taborelli 2005.

6) Interestingly enough, in Gurina and Breisach have been found fragments of relief vessels (respectively a central medallion of a cup and a wall of an omphalos-phiale). The relief ceramic (traditionally and not in all cases appropriately called »Calenian«) belongs to a rather early horizon of the 3rd and the early 2nd century BC: traditionally dated to c. 250-180 BC (e. g. Brecciaroli Taborelli 2005) though L. Pedroni (2001, 117-139) tries (on not absolutely unshakeable historical grounds) to rise the datation to the late 4th century BC – the Second Punic War. The finds of relief ware are exceptional even in northern Italy: for a cup medaillon from a very early context of Aquileia (and thus deposited surely after 181 BC) see Maselli Scotti / Mandruzzato / Tiussi 2009, 266-268 fig. 28c).

7) Sfredda (1998, 26) does not refer to the chronological system she follows, though it seems probable that is that of R. De Marinis (1986) in which the transition between Lt D1 and Lt D2 (De Marinis' horizon Treviglio) is dated to the time span 70/60 BC. This is also the date to which Brecciaroli Taborelli (1988) fixes the appearance of this form.

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Zusammenfassung / Abstract / Résumé

Glanztonware (»Campana«) aus dem latènezeitlichen Mitteleuropa –
vorläufige archäologische und archäometrische Untersuchungen

Der Artikel stellt die späteisenzeitlichen Funde einer besonderen Art mediterraner Feinkeramik (Glanztonkeramik) aus dem nordalpinen, hauptsächlich mitteleuropäischen Bereich vor. Die Stücke aus Bayern, Böhmen und dem mittleren Donauraum werden aus Sicht der archäologischen Keramikbearbeitung und anhand der chemischen Zusammensetzung einiger Proben analysiert. Diese Untersuchungen zeigen zwei Verbreitungswege in Mitteleuropa: einen westlichen mit Erzeugnissen aus Cales in Kampanien, der über Gallien Bayern erreicht, sowie einen südöstlichen aus Arrezzo, der die Ostalpen überquert und die Gebiete im mittleren Donauraum versorgt. Außerdem konnten einige Stücke aus unserem Fundkatalog ausgesondert werden, da es sich bei ihnen um falsche Zuweisungen oder »Verdoppelungen« aus Scherben eines einzigen Gefäßes handelt.

Black-gloss (»Campanian«) pottery in the Late La Tène Central Europe –
preliminary archaeological and archaeometric studies

This article presents the finds of a particular class of Mediterranean fine ware (black-gloss pottery) in the Late Iron Age of transalpine, principally Central Europe. The finds from Bavaria, Bohemia and the Middle Danube area are studied from a ceramological point of view and mainly through the analysis of the chemical composition of samples. These investigations show two distribution circuits of the ware in Central Europe: a western, Calenian, reaching Bavaria via Gaul, as well as a south-eastern, Arretine, crossing the Eastern Alps and supplying the Middle Danube regions area. Moreover, several individuals had to be eliminated from our corpus as either false attributions or »duplications« of sherds of a single vessel.

Campaniennes d'Europe moyenne à La Tène – études archéologiques et achéométriques préliminaires

Cet article présente les découvertes d'une céramique fine méditerranéenne luisante (campanienne) à la fin de l'âge du Fer pour les régions au Nord des Alpes, principalement en Europe centrale. Les pièces en provenance de Bavière, de Bohème et de la moyenne vallée du Danube seront présentées avec un regard de céramologue, avec un éclairage spécifique obtenu au moyen d'analyses chimiques. Ces études démontrent l'existence de deux axes de diffusion européens: un axe occidental avec des productions de Calès en Campanie qui permettent de rejoindre la Bavière via les Gaules, et un axe oriental en provenance d'Arezzo qui traverse les Alpes et approvisionne la moyenne vallée du Danube. Par ailleurs, certaines pièces du catalogue ont pu être retirées, qu'il s'agisse de mauvaises identifications ou de doublons de pièces en provenance d'un seul vase. Traduction: L. Bernard

Schlüsselwörter / Keywords / Mots clés

Spätlatènezeit / Südimport / Glanztonkeramik / Röntgenfluoreszenzanalyse / Archäometrie
Late La Tène period / southern import / black-glazed pottery / X-ray fluorescence analysis / archaeometry
La Tène finale / importation / céramique à vernis noir / spectrométrie de fluorescence X / archéometrie

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