

ON THE SO-CALLED LEGIONARY POTTERY AND “MYSTERIOUS” LOWER DANUBE KAOLIN WARES (LDKW)¹

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Abstract: One of the most discussed problems among specialists in Roman pottery, is to determine the characteristics of so-called “legionary pottery” and “Kaolin wares” known from the Lower Danube area. Excavations conducted in *Novae*, which was founded by the *legio VIII Augusta* and, as it seems, functioned until Late Antiquity, help solve this problem. Two characteristic types of pottery can be considered: one made on a potter's wheel simple shapes, sometimes closely similar to the pottery shapes of local tribes, the other features simple Roman shapes, made of local clay. In the third century AD appears a new group of vessels made from kaolin clay in the form of wide caccabus and cups. In our opinion, these are examples of “legionary pottery” first produced in local workshops probably by local potters and some legionists. Later, in the third century AD, arise workshops lying by the deposits of kaolin clay in Dobruja. They produce distinctive ceramics used mainly by legionnaires along the Lower Danube.

Keywords: legionary pottery, Kaolin wares, ceramic production, chronology.

Two characteristic types of pottery were discovered during explorations by the Center of Research on the Antiquity of Southeastern Europe (University of Warsaw) carried out in the legionary baths situated inside the fortress of the First Italic legion in *Novae*, and so-called sector XII-site of the legionary barrack, probably of the *cohors I* of *legio VIII Augusta* and *I Italica*. The clay was indicative of a local manufacturing workshop, but no specific parallels for the shapes could be recognized. Even so, the vessels resembled the so-called legionary ceramics known from other sites.

One group featured clay of red or brick-red color, heavily tempered with fine sand that gave the surface a coarse touch, with apparent spot burning in places. Characteristic forms included bowls, dishes, cups, jars, pots and lids (**fig. 1**). The other group was of black color; it was thick-walled and was also tempered with sand. Typical shapes comprised beakers, cups and pots. The vessels were frequently decorated with a stylized rope ornament. The fabric, shapes and ornament refer directly to the so-called Thracian urns known from this region, which were mostly handmade and decorated on the surface with an plastic rope pattern. Interestingly, the same motif was used later also in the decoration of some of the incense burners. The vessels from the baths were made proficiently on the wheel, and the decoration introduced by cutting a series of oblique incisions into a relief band modeled on the body. Vessels of similar shape as the urns were also found, for example, at *Vindonissa*² and Nijmegen³, in the latter case studied by M.P.M. Daniëls⁴.

At *Novae* the vessels were discovered in well dated archaeological context, the construction of the legionary baths having commenced immediately upon the arrival of the *legio I Italica* in AD 69 and its dismantling occurring in the very end of the first century AD, just before the Dacian wars. Therefore, the deposit as a whole can be dated to the Flavian period. A small number of Gallic terra

¹ Program financed by National Science Center, Poland, no. NN109 182 140.

² Ettlinger, Simonett 1952, 51-65.

³ Haalebos, Thijssen 1977, 102.

⁴ Daniëls 1955, 322.

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sigillata vessels recorded in the same context cannot be viewed as surprising, considering the Legion's history: right after it was formed by Nero it was sent to Gaul from where it was transferred to the region of the Danube. Thin-walled barbotine pottery was also in evidence sporadically and there can be no doubt in these cases that the vessels must have been imported.

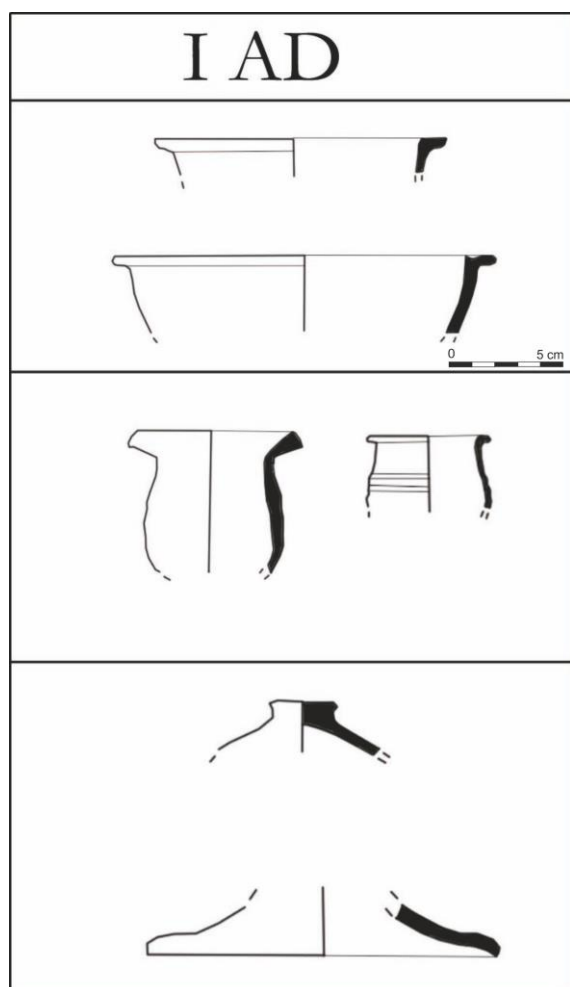


Fig. 1: Examples of legionary pottery from *Novae* (by P. Dyczek)

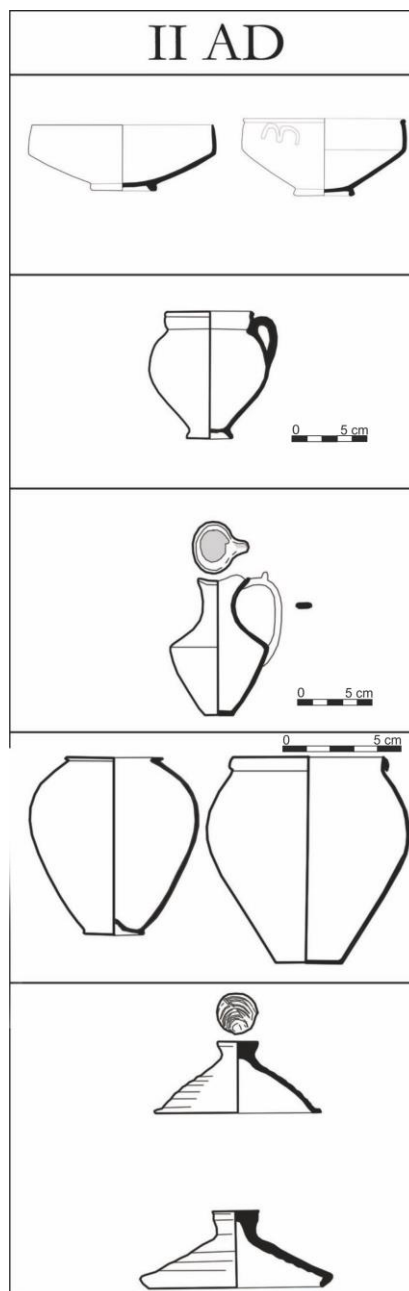


Fig. 2: Pottery types from pottery centers Pavlikeni and Butovo (elaborated P. Dyczek).

The finds from *Novae* have contributed to the ongoing debate on legionary pottery, its origins, typology and chronology. Assemblages of legionary ceramics from different sites have demonstrated

considerable uniformity. The predominant shapes were bowls and dishes, cups and beakers, jugs and *mortaria*⁵. The shapes often imitated vessels made of metal, glass and some terra sigillata forms. Decoration included barbotine, roulette, and stamped ornaments. Legionary ceramics of similar shapes and decoration were also discovered at Haltern⁶, *Novaesium*⁷ and Xanten⁸. Variants have been found in practically all the legionary camps functioning in the first century AD. Indeed, the absence of this ware from other Roman camps should probably be put down to gaps in the state of research.

A good example of different vessel shapes and decoration is the ceramic assemblage from the Roman camp at Draşna-de-Sus, also featuring a stylized rope pattern⁹. It seems therefore to be typical of the area occupied by the Dacian and Thracian tribes who used it on their own ceramic products. The shape repertory included imitations in clay of metal army mess tins, copies of oil lamps known from *Brigetio*, for example¹⁰, Draşna-de-Sus¹¹, Xanten, and also the excavations in *Novae*. Also recorded were vessels intended for ritual purposes¹² as well as vessels, which like those from *Novae*, reflected local ceramic production traditions. In *Vindonissa*, for example, these ceramics followed the La Tène tradition.

The definition of legionary ceramics is a fundamental issue. Two suggestions have been floated to date regarding who made these vessels: either legionary craftsmen, as suggested by one group of researchers¹³, including E. Ettlinger, Chr. Simonet, K. Green and J. R. Perrin, or civilian manufacturers. Ettlinger¹⁴ argued in favor of the first idea on the grounds of stamps containing the name of a legion occurring on some of the vessels, e.g. *legio I Adiutrix PF* from *Brigetio*¹⁵, *Legio XI Claudia* from Holdeurn and *Vindonissa*¹⁶, *Ala I Augusta* from *Vetus Salina*¹⁷, *LEG II ADI* and *LEG II AD PF PAN FEC* from *Aquincum*¹⁸. The *Vindonissa* excavations have also yielded a lamp with the fabricant's name, L. Pupius Masius, a soldier of the *XI Claudia* legion¹⁹, stamped on it. An altar discovered in Nijmegen²⁰ was dedicated to Vesta by a *magister figlinorum*, bringing to mind an inscription from *Drobeta* mentioning one Aurelius Mercurius, a soldier of the *cohors I Sagittariorum*, who also served as *magister figlinae*²¹. Stamps of private owners have also been found at a number of sites, e.g. Nijmegen²², indicating that legions were also supplied by private producers.

The discussion and the state of research on these issues have been summarized very well by V. Gassner and S. Jilek²³. Inspirations for vessel shapes have enjoined a separate discussion. E. Ettlinger interpreted the similarities between ceramic forms on different sites as the result of the dislocation of legions which 'carried' to their new seats the repertory known from their original,

⁵ Haalebos 1996, 145-156.

⁶ von Schnurbein 1974, 77-88.

⁷ Bruckner 1975, 77 ff.

⁸ Hagen 1928, 343-362; Buchen 1941, 18.

⁹ Ştefan 1945-1947 (1948), 126-130.

¹⁰ Bónis 1979, 118-120.

¹¹ Ştefan 1945-1947 (1948), 132-134.

¹² Ettlinger 1951, 110.

¹³ Ettlinger, Simonet 1952; Green 1977, 126; Perrin 1977, 107.

¹⁴ Ettlinger 1951, 108, fig. 11, 18; 109-110.

¹⁵ Bónis 1977, 120.

¹⁶ Drack 1945, 45, pl. 17; Ettlinger 1998, 37-46.

¹⁷ Bónis 1977, 122.

¹⁸ Póczy 1956, 88.

¹⁹ Bónis 1977, 120; Hartmann 1986, fig. 70-71.

²⁰ Haalebos 1996, 145; CIL XIII 8729.

²¹ AE 1939, no. 19.

²² Haalebos, Thijssen 1977, 102.

²³ Gassner, Jilek 1997, 303.

mainly Pannonian posts²⁴. In turn, K. Green²⁵ pointed to *Asia minor* inspirations and formal correspondence with the so-called Eastern terra sigillata. He also concluded that at Holt, for example, there were no local civilian ceramic producers supplying army units. He drew his conclusions from a comparison of the legionary ceramics repertoire on British sites with that found in the eastern regions of the Empire, but more importantly, he noted that legionary ceramic assemblages from different parts of the Empire are notably different, making it difficult to speak of legionary ceramics as such²⁶. In my opinion, the differentiation is proof that particular army units were responsible for supply themselves with ceramics. The repertoire of shapes was hardly extensive, because the main objective was to provide the simplest and most utilitarian forms of pottery for universal use, breaking with the traditional division into tableware and cooking ware. It all depended on the local political situation and the rate at which the newly arrived legionaries settled the area put under their control.

The third issue is that of dating legionary ceramics. At *Vindonissa* and Nijmegen²⁷, but also, for instance, *Aquincum* and *Novae*, these ceramics occurred in the Flavian period²⁸. Pottery from *Argentorate* and Wetterau could be dated to the rule of Domitian²⁹. At *Brigetio* and *Drajna-de-Sus*, it appeared in the beginning of the second century AD³⁰ and in Britain in the first half of the same century³¹. The pottery manufacturing centers at Pavlikeni and Butovo, situated about 60 km south of *Novae*, are thought to have produced legionary ceramics starting from the beginning of the second century AD³². It is generally agreed, however, that legionary ceramics were produced throughout the first century and in the first half of the second century AD. I do not share this view, because the said stamps of Roman soldiers and legion stamps on ceramic products have been dated to a later period, the second century AD, which proves that the “phenomenon of legionary ceramics” continued to function, even though in different form.

The results of the excavations at *Novae* have provided new data for a reconsideration of the issues presented above. First, legionary ceramics should be made to include all local products made both by the legionaries and by private potters to supply Roman army units, but excluding imports. In their new seats legions probably had to take the initiative to organize at least part of their basic ceramic supply. These culturally differentiated regions could not have supported big and efficient pottery centers capable of supplying large army units. The situation must have been more diverse. Some shapes would have been transferred from the original posts and these would have been produced probably by the legionaries and/or their slaves. Other forms could have been made in civilian workshops where local craftsmen produced local ceramics, gradually improving the quality. The material from *Novae* illustrates this situation very well. Local forms, but of definitely superior quality, appeared beside shapes referring to both eastern and western terra sigillata. In the case of *Moesia*, inspiration from *Asia minor* must have found reflection in the vessel repertoire in view of the Greek towns existing on the Black Sea coast and the strong ties with Greek culture. They were wheel-made instead of being cast in moulds for purely practical reasons. Production was easier and cheaper, and the market shallow despite everything. The most utilitarian and universal forms were selected. Legionary ceramics probably served as both cooking and table-ware, this attested to by frequent marks of burning on the outside surfaces. It was adapted to everyday use, easy to replace and probably not expensive. Moreover, firing seems to have been applied in the cheapest form, hence the

²⁴ Ettlinger 1951, 110-111.

²⁵ Green 1977, 126.

²⁶ Green 1977, 126.

²⁷ Haalebos, Thijssen 1977, 101.

²⁸ Ettlinger 1951, 107-108; Ettlinger 1998, 39; Holwerda 1944, 4; Póczy, Zsidi 1992, 10.

²⁹ Gassner, Jilek 1997, 303.

³⁰ Bónis 1979, 151; Ștefan 1945-1947 (1948), 141.

³¹ Green 1977, 114.

³² Sultov 1985, 9-11; Sarnowski 1987, 121-122.

uniform colors and characteristic of the clay. Sand was the commonly used temper, in the rare case also lime. Archaeometric analyses have shown significant differences between vessels from the local repertoire of shapes and the remaining vessels despite the same clay being used for manufacturing. Local vessels were fired in lower temperatures of approximately 600-700°C, but they contained more lime. Generally speaking, five different kinds of white fire clays (kaolinitic clays) were used to make the vessels from *Novae*: three kinds of iron-rich noncalcareous clays and to a lesser extent two kinds of calcareous clays. One of these should have come from the neighborhood of *Novae*. Some of the vessels were produced of clay originating from deposits found at Dobruja³³. The biggest number of vessels was made of the kind of clay later used by the potters from Pavlikeni and Butovo (fig. 2). These vessels were fired at higher temperatures of 900-1000°C. The high content of iron compounds gave them all in effect a red to brick red to red brown color. It seems therefore that a similar technology used by potters in different parts of the Empire caused a considerable part of the legionary ceramics from different sites to have a similar color and surface characteristic. The following are partial results of archaeometric analyses; the full study will be published in the next issue of the annual *Novensia* 21, 2010.

Forms of local tradition									
SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	MnO	MgO	CaO	Na ₂ O	K ₂ O	P ₂ O ₅
75.81	0.54	11.97	4.66	0.057	1.47	2.80	0.39	1.89	0.42
59.64	0.65	13.16	5.98	0.110	2.52	12.80	0.95	2.71	1.49
50.66	0.88	21.80	9.15	0.047	1.62	10.73	0.63	3.47	1.02
66.91	0.95	14.78	5.50	0.102	2.15	5.13	1.17	2.99	0.32
66.64	0.87	16.25	6.06	0.067	2.04	3.86	1.17	2.81	0.24
45.42	0.761	17.85	5.48	0.049	1.68	21.05	0.17	3.13	4.397
64.59	1.092	26.81	2.93	0.019	0.70	1.14	0.15	2.19	0.377
Forms of non-local tradition									
75.44	0.52	11.18	4.25	0.056	1.26	4.71	0.42	1.88	0.28
76.65	0.52	11.74	3.41	0.050	1.18	4.23	0.56	1.44	0.22
74.04	0.51	14.46	6.54	0.015	1.06	0.32	0.17	1.77	0.12
69.49	0.69	13.62	5.39	0.068	2.04	4.64	0.88	2.30	0.90
77.11	0.50	12.72	5.08	0.019	0.99	1.48	0.22	1.76	0.12
75.84	0.52	12.09	3.29	0.053	1.23	4.62	0.60	1.50	0.25
70.40	0.68	13.00	5.06	0.044	1.58	5.89	0.55	2.32	0.48
62.45	0.73	22.68	5.77	0.085	0.97	2.13	2.61	2.45	0.13
72.92	0.49	14.62	5.79	0.018	1.05	3.01	0.27	1.68	0.16
76.35	0.49	13.17	5.60	0.017	1.06	1.24	0.24	1.73	0.10
Kaolinitic clays									
70.31	1.097	22.80	2.73	0.013	0.55	0.84	0.10	1.53	0.034
Iron rich non calcareous clays									
75.09	0.499	14.61	5.79	0.018	0.93	0.87	0.15	1.78	0.263
76.45	0.489	13.45	5.59	0.016	0.99	0.95	0.09	1.85	0.128
71.57	0.553	17.06	6.68	0.018	1.05	0.83	0.11	1.98	0.143
77.75	0.516	13.10	4.59	0.021	0.89	1.01	0.21	1.80	0.110
74.01	0.502	15.59	6.30	0.021	1.03	0.56	0.11	1.78	0.112
73.26	1.124	18.00	3.66	0.032	0.82	0.67	0.40	1.96	0.075
63.13	0.663	21.80	5.78	0.073	0.94	2.36	2.71	2.43	0.110
Calcareous clay									
60.68	0.745	14.86	5.24	0.061	2.08	12.48	0.67	2.89	0.280

³³ Daszkiewicz *et alii* 2010, 37-49.

The differences in technology demonstrated by the results indicate that only the local repertoire of shapes was produced by local potters. Other vessels were produced by legionary craftsmen or potters employed by the legion. Their skills were much superior to those of local potters. In the case of *Moesia* and vessels made in Dobruja, these could have been Greek craftsmen from the Black Sea towns, equally well as craftsmen from the *XI Claudia* legion stationed in the Dobruja area. It could mean that legions could have exchanged some of their ceramic products among themselves. Excavations in Drajna-de-Sus, including stamps of the *I Italica*, *V Macedonian* and *XI Claudia* legions, as well as the said inscription from Nijmegen have shown that ceramic production took place near brickyards. At *Novae* there is at least one *figlina* attested by ceramic stamps. The situation of the *legio I Italica* was also unusual. Since the legionaries were charged with putting up a stone fortress in place of the earth-and-timber camp occupied by the *VIII Augusta* previously stationed on the site, they must have produced a multitude of building ceramics: roof tiles, bricks and tiles. The situation observed at *Novae* and Drajna-de-Sus leaves no doubt that legionaries on the Lower Danube were perfectly well aware of the resources available in their region right from the beginning of their posting there.

The issue of legionary ceramics is not limited, in my opinion, to analyzing ceramic shapes discovered in camps from the first century AD. In my opinion, the pottery continued to be produced, but the repertoire of shapes and the organization of production changed. The process can be traced in detail in *Novae*, where a significant change occurs after the Dacian wars of Trajan. The baths were dismantled before the military campaign and in the same place a large army hospital was constructed. Layers connected with this structure held little legionary ceramics from the first century AD, which was pushed out by vessels produced in the pottery centers of Pavlikeni and Butovo. The chronology of these centers is wanting and without new investigations it can only be assumed that they were operating between 2nd and 4th century AD. Assemblages of pottery originating from these production centers were fairly uniform, just like legionary ceramics, although the repertoire of shapes had been developed significantly. Vessels – plates and bowls – were wheel-made, and made to look like their terra sigillata models, the surfaces occasionally coated with a metallic slip. Some forms were developed locally. The relation between these centers and the army units stationed in *Moesia* is not clear, but it seems that these fabricants were civilians, most probably Roman settlers who could have employed either the local potters or craftsmen of Greek origin. I am inclined to share K. Green's view that the pottery from these centers should be included in the legionary ceramics category. The juxtaposition of basic shapes reveals clearly the similarities and uniformity of shape, but most importantly the function. They were used by the legionaries as tableware for daily use. Cooking wares at this time used to be produced near *Novae*, although certain forms were produced also in another complex of pottery kilns located close-by, at Hotnitsa and Biala Crkva, where building ceramics were also made.

Situation have changed in second AD. A specific kind of pottery found on practically all the known sites in the Lower Danube region³⁴ (**fig. 3**) a pottery which has come to be known in the literature as kaolin wares³⁵, beige clay wares³⁶ or buff coarse wares³⁷. In early studies, this category of vessels was frequently split among different typologies³⁸, but in my considered opinion, the characteristic clay, main area of occurrence and distinctive tectonics leave no doubt that these vessels should be regarded as a separate type. It can be referred to as Lower Danube Kaolin Wares (LDKW).

³⁴ Dyczek 2009, 152-171.

³⁵ Tudor 1968, 83; Popilian 1976, 90.

³⁶ cf. Klenina 2006, 37.

³⁷ Poulter 1999, 72.

³⁸ cf. Popilian 1976, 90-91. 105-108.

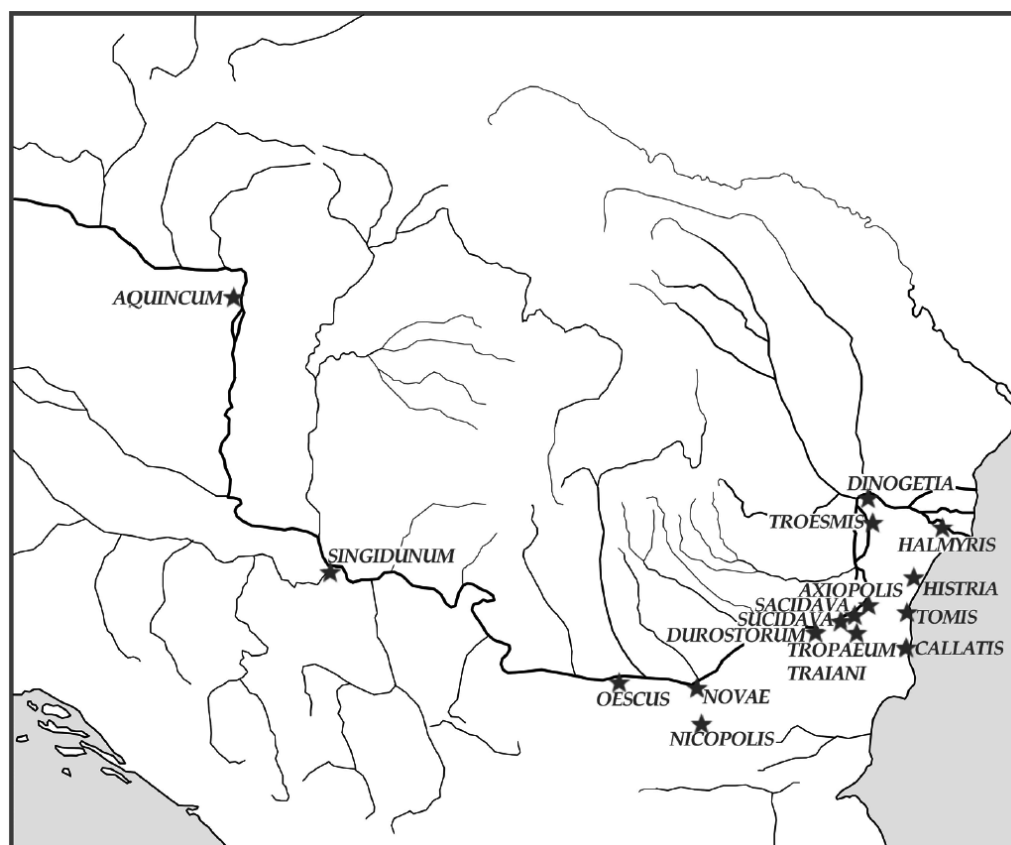


Fig. 3: The distribution of the LDKW along the Danube (by P. Dyczek).



Fig. 4: Fragment of LDKW (photo J. Reclaw).

All the vessels are produced of kaolin clay with considerable amounts of fine sifted sand, grits of magma rock, mica and some limestone, apparently also chamotte. The end effect is a beige, pale

brown and pale-brown-pink color of the surface after firing (corresponding to Munsell soil color codes from 10YR7/3 through 7,5YR7/4, 7,5YR6/3, 7,5YR6/4 to 10YR 7/3 (**fig. 4**). The temper, mostly sand, makes the vessel surface porous. The large amount of sand as temper is due presumably to two reasons: first of all, more silica was needed in the clay to permit effective firing, and secondly, the sand temper facilitated quicker heating of the pots and helped in retaining high temperatures for a longer period of time. The other components of the temper acted as fluxing agents and improved impregnation of the porous walls. Weakly glazed alkali compounds gave the pots a certain shine, not seen today on any but the best preserved pieces. Since firing had to be performed in high temperatures because of the properties of the clay, limited glazing is proof of the low alkali content in the ceramic mass. Vessels with a gray break are rare, the color not necessarily a firing effect, but possibly the result of daily use. Just as rare are vessels with a pinkish color to parts of the surface and some of the breaks. This characteristic feature is proof that the vessels were fired in oxygenated atmosphere in relatively high temperatures. The external surface of most vessels is strongly burned, even overfired, especially in the case of cooking pots and casseroles. A thin clay coating of the same color on the outside surface left it somewhat smoothened. The vessels were all ribbed, although the profiling differed: most of the ribbing was sharp, but there were also examples of sinusoid shape and overlapping like scales³⁹. The other typical feature is a profiled rim composed of sharp edges and deep but gentle grooves in between. While the principle is the same, the details differ, including the angle of inclination of the edge and groove regardless of the type and diameter of the pot. This suggests that they were all furnished with lids adapted to a specific profile and diameter.

While vessel shape appears to have been largely unified, there are some differences in the proportions of temper in the ceramic mass and sometimes also quality of the firing, indicating that production was not limited to a single center. Considerable quantities of these sherds is further proof that there must have been more than one or two production centers. The differences deepened over time.

Taking into consideration the features described above, the pots should be classified as a cooking ware, but the case is hardly as obvious as that. Pots and pans indeed make up most of the category, but there are also bowls, jugs and even small beakers. It seems that the ware was used at the same time for cooking and as tableware, in fact interchangeably for preparing and serving food. The color and texture of the surface imparts on them a certain refinement that distinguishes them from ordinary cooking pots.

These vessels have been found everywhere on the Lower Danube, reaching upriver to *Singidunum*⁴⁰ and apparently also *Aquincum*⁴¹. The range thus covers southern Lower Pannonia, northern Lower and Upper *Moesia*, and southern *Dacia*⁴². Taking into consideration the present state of research, the biggest concentration occurs in Dobruja: *Callatis*, *Sacidava*, *Troesmis*, *Durostorum*, *Dinogetia*⁴³, at *Histria*⁴⁴ in the settlement as well as in the funerary inventories in *Tomis*⁴⁵ and in

³⁹ Dyczek 1991, pl. VIII.

⁴⁰ Bruckner 1981, 100; Nikolić-Đorđević 2000, 46-47, 114-115, 155-156.

⁴¹ Poczy 1856, pl. VIII. 11.

⁴² Paraschiv, 1997, 322; Macrea, Protase 1959, 441, fig. 7/2.

⁴³ Rădulescu 1971, 336; Rădulescu 1973, 129-135; Opaiț 1980a, 355, pl. 8/4; Opaiț 1980b, 330, pl. II/1.

⁴⁴ Alexandrescu 1966, 222-224, pl. 30; Culică 1981, 216, fig. 2/1-3; Suceveanu 1982, 94-96, 107-110, pls. 1/11, 2/4, 5/43, 9/30, 9/51, 11/32.

⁴⁵ Bucovală 1970, 195-200; Bucovală, Pașca 1991, pls. III, V, VII-IX; Bucovală, Pașca 1992, 252.

Cernavodă/ *Axiopolis*⁴⁶. Outside Dobruja, these pots are known from *Novae*⁴⁷, *Nicopolis ad Istrum*⁴⁸, *Oescus*, *Hotnitsa*⁴⁹. They are also regularly recorded on practically all the sites in southern *Dacia*⁵⁰.

Vessels of this kind appear on the Lower Danube in deposits of the second half of the second century AD⁵¹. Some forms, e.g. jugs with one handle, were present already in the first half of the century, found together with coins of Hadrian and Antoninus Pius⁵². In *Histria* and *Tropaeum Traiani*, they are dated to the 170s⁵³. In the third century, they were in common use⁵⁴. It cannot be excluded that the form was actually much earlier; for instance, at *Camulodunum* vessels of similar shape (Cam326/331) are attributed to the Claudian-Neronian times⁵⁵.

Excavations at *Novae* have demonstrated a peak in the popularity of this ware on the site in the end of the second and beginning of the third century AD. After the middle of the third century the popularity starts to drop off and the ware is no longer present in the army hospital area after its abandonment in AD 238. Lesser quantities have been recorded in layers of the 3rd and 6th century in the so-called episcopal residence, but the majority comes from layers preceding the erection of this complex and connected with the legionary baths⁵⁶. On other sites they are but sporadic after the third century AD. In *Histria* and *Dinogetia* they are known from the reign of Anastasius⁵⁷. In *Nicopolis ad Istrum* they have been registered in layers from the second half of the 2nd through the first half of the 5th century⁵⁸. At *Halmyris* the latest forms are dated to the 4th-7th century AD⁵⁹. The chronological range for this ware is thus between the second half of the 2nd century and the early second half of the 3rd century AD.

A surprising renaissance of this type of pottery made of identical clay and repeating similar, although simplified forms occurred in the Middle Ages, in the 9th and 10th century AD, but on a much smaller territory within the boundaries of the former provinces of *Scythia minor* and *Moesia inferior*. Vessels of this kind have been found on many sites in modern southeastern Romania lying north of the Danube (Wallachia Plain).

The repertoire of shapes is not very differentiated, although the sizes within particular types can be quite varied, also differing as far as the rim edge profiling. It is not warranted, however, to start distinguishing variants as the differences are not significant and may have been the result of manufacturing in different centers. Since the vessels were strictly utilitarian, maintaining strict standards of volume was of no importance. As for differences in rim edge profiling, they could have appeared as a result of having to adapt it to the shape of the lid edge.

The first type of vessel is not easily classified. It seems to have had a double function — a dish doubling as a bowl. This form is sometimes, probably wrongly, classified as a casserole/pans⁶⁰. It has a flat narrow bottom, flares widely to reach the widest part of the body and then is turns back in at a

⁴⁶ Rădulescu 1971, 336.

⁴⁷ Rutkowski 1961, 135-150; Dyczek 1987, 265-268, pl. XI, XIII, XV; Dyczek 1991, 104-107, Pls III, IV, V; Dyczek 1992, 72-73; Klenina 2006, 109-119.

⁴⁸ Poulter 1999, 72-73, 154-156.

⁴⁹ Sultov 1985, 84-85.

⁵⁰ cf. Comşa 1985, 96, fig.1.

⁵¹ Barnea 1974, 110; Culică 1981, 315-316.

⁵² Popilian 1976, 90.

⁵³ Bogdan Cătănicu, Barnea 1979, 182, fig. 146, 5 (2); Suceveanu 1982, 113.

⁵⁴ Paraschiv 1997, 322.

⁵⁵ Symonds, Wade 1999, 483, fig. 6,7 nos 182-185.

⁵⁶ Klenina 2006, 35-88.

⁵⁷ Rădulescu 1973, 130.

⁵⁸ Poulter 1999, 72-73.

⁵⁹ Topoleanu 2000, 106-117.

⁶⁰ Klenina 2006, 116.

sharp angle. This upper part is sometimes sinusoidal in section. The rim edge is straight or at a slight angle, extending both outward and, to a lesser degree, inward. The surface is sometimes flat and sometimes ribbed. Vessel height oscillates between 8 and 10 cm, the diameter between 15 and 26 cm.

The most popular type of Lower Danubian Kaolin Ware resembles a wide bowl with S-shaped profile. The base is narrow, the body ribbed elaborately and topped by a broad rim with profiled edge. The diameter ranges from 20 to 23 cm, the height is 9-11 cm. These vessels are sometimes called casseroles/pans as mentioned above, but a better term that comes to mind is the Latin *caccabus*. The shape, the ribbing and traces of burning and soot on the surface indicate that they were placed on tripods, that is, they were used to prepare food in field conditions. At home, their instability required them to be placed in openings in the top surface of cooking ovens.

The second most popular form was a jug with one handle. The base was narrow and flat, the body wide and ribbed, the rim profiled and everted. The tape handle, mostly with a double lengthwise groove, is attached just above the rim at one end and in the widest point of the body at the other. The inner rim diameter oscillates between 6.5 to 10 cm, body diameter between 8 and 11 cm, height between 8 and 15 cm. They are sometimes referred to as the 'Constanța-Cernavodă jugs'⁶¹. They were common primarily in Dobruja⁶² but are also encountered in *Novae*, *Nicopolis ad Istrum*, *Oescus* and the Roman villas⁶³ as well as in southern *Dacia*⁶⁴.

Slightly bigger jugs were characterized by all the features described above, as well as by two small tape handles attached under the rim at one end and just above the maximum diameter of the body on the other.

A variant of these jugs is constituted to some extent by cooking pots of identical shape but without the handles. The inner rim diameter oscillates between 7 and 11 cm, body diameter between 9 and 12 cm, height between 8 and 12 cm.

The characteristic rim edge of the above described vessels suggests that most of them were fitted with lids (fig. 4), which all have a similar low conical profile with a ribbed outer surface and a projecting solid cylinder-like handle. A rounded ridge by the top edge of this knob facilitates handling of the lid. It is sometimes replaced with a blob of excess clay. What makes these lids different, permitting two variants to be distinguished, is the shaping of the rim edge. In one case, it is bent inward, in the other it extends outside. The diameter corresponds to that of the pots, while the height ranges from 4 to 9 cm.

Some of the larger lidded bowls could have served a different purpose. Their profile suggests that they were used to bake bread. From the second century BC, written sources evidence two terms for baking bread: *testum* and *clibanus*⁶⁵. Bread could have been baked in the embers or under a lid. These two kinds of vessels acted as a lid of sorts, the first square or rectangular, the second round. The diameter of these ceramic products oscillated between 20 and 50 cm. The kaolin-ware examples would have represented the *clibanus* type.

The next type, *oinochai*, have a clearly formed rim, often merged to form a beak. Again, the bottoms are narrow and flat. The body is ribbed. A tape handle with one or two lengthwise grooves is attached to the body at the widest point, the other end being attached under the rim. The height is 25 cm, maximum width of the body 17.5 cm. Large numbers of these vessels were discovered in the region of *Axiopolis*; a lamp from the VETTI workshop found with these pots provides a *terminus post quem*⁶⁶.

⁶¹ Rădulescu 1975, 336.

⁶² Pârvan 1923, 145, fig. 73.

⁶³ Sultov 1964, 53-54, fig. 7/a.i.b.

⁶⁴ Tudor 1968, 73.

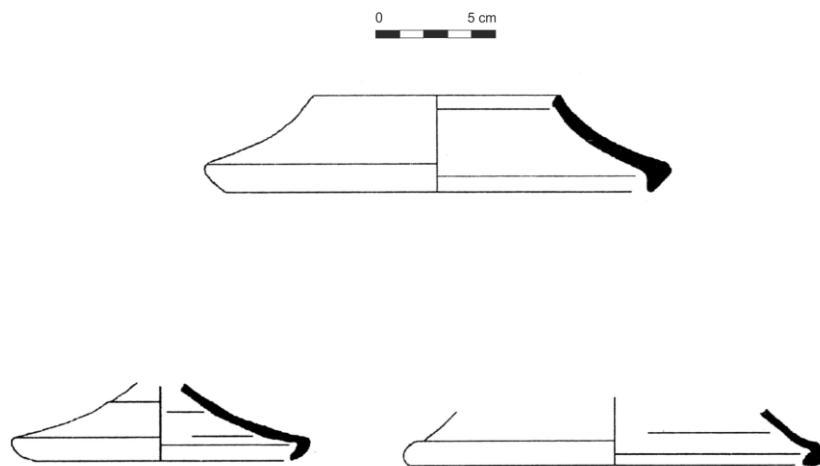
⁶⁵ Cubberly 1995, 55-68 fig. 5,2.

⁶⁶ Rădulescu 1975, 343 note 20.

Later, even in the 4th century AD according to some researchers⁶⁷, a new form of jug appears, characterized by a flat narrow base, ribbed body and conical neck ending in straight rim. A wide horizontal groove runs below the rim on the outside. There is one handle of ellipsoid section, attached to the middle part of the neck at one end and the widest part of the body at the other.

An analysis of vessel tectonics reveals a number of characteristic points in common. One such feature is a very narrow flat bottom, which makes the lower part look conical. When empty, these vessels are unstable. The second feature in common is the fluting, which is found characteristically on the lower part and the maximum diameter of the body. Finally, all of the vessels except for *oinochai* and jugs have distinctly profiled rim edges. Based on these features, we can hazard a guess as to how the vessels were used. They appear to have been adapted for use out in the open, in field conditions. The conical shape permitted them to be mounted on tripods in order for the food in them to be heated over a fire as indicated by the burning and soot. The small handles on some pots were certainly not for handling, but rather for suspending the vessel over an open fire. The lowered center of gravity of the conical pot when filled with food or a liquid ensured stability despite just two handles. Three-handled pots are recorded sporadically. Conical vessels were also easily sunk into the soil, which also increased their stability overall. In favor of these pots being used in the open is the fact that they all have closely fitting lids, which permitted cooking also during poor weather due to wind or rain. The properties of the clay made it possible to retain high temperatures for a longer time. Naturally, they could have been used inside as well, stability being the only problem.

Since the different types of vessels are always found together, it is to be assumed that they were part of a group consisting of a limited number of vessels serving different functions. Bowls were used for cooking or heating food, but also to eat from. Pots were for cooking, but also for drinking etc. This appears as a highly practical set, cheap and functional, indeed perfect for army detachments. They are in fact found mostly on sites in the Lower Danubian *limes*, putting in an appearance in the 2nd century AD and lasting through the 3rd century, which only verifies the assumption that these kaolin wares were used mainly by the Roman army stationed on the Lower Danube. Their appearance in the second century is hardly surprising, considering the political stabilization and extensive economic development which stimulated the exploitation of new clay sources and an efficient organization of mass production. The Danube being the cheapest trade route, it favored a quick spread of new ceramic forms. Other producing centers, like those near *Novae* in Butovo, Pavlikeni and Hotnitsa, although they had no kaolin clay sources, repeated certain forms of kaolin wares, imparting upon them a more noble tableware character⁶⁸.



⁶⁷ Rădulescu 1975, 348.

⁶⁸ cf. Sultov 1985, 62-67, 76, pls. XXVIII 1,5; XXXII 6, 7; XXXIII 5; XXXVI 4; XLII 2, 4, 6; XLIII 5; XLIV 1, 4.

Fig. 5: The lids of LDKW pots (by P. Dyczek).

The genesis of these vessels is another issue. The profile of the S-shaped bowls in particular brings to mind metal vessels, not surprisingly when one thinks of all the different types of metal pots and bowls which were used out in the open. The much higher price of metal vessels detracted from their popularity. Consequently, the tested utilitarian form was widely imitated in clay. Celtic influence cannot be excluded⁶⁹. On the other hand, Greek influence should not be overlooked, as the ware was widespread primarily in Dobruja with its many Greek towns on the coast. A detailed analysis of the form suggests prototypes of at least some types among the Greek vessels⁷⁰.

Another conclusion concerning the use of these vessels is based on the presence of similar forms in the quarters of Roman army units in other provinces⁷¹. Perhaps vessels of this kind should be considered as legionary ceramics. The universal shapes of these vessels made them a perfect choice for the highly mobile army units.

A provisional typology can also be attempted (fig. 5). A key issue to be considered is the place of production. Kaolin clay is characteristic and it is not very frequent in Lower Danubian territory. Sources of this clay have been recorded in Muntenei and Olteni⁷² in the vicinity of *Sucidava* and *Romula*⁷³. Ceramic production is known from the latter site, but none of the products were made of kaolin clay. Distribution patterns demonstrate a considerable concentration of products in the area of Dobruja. Analyzing the occurrence of just the ribbed kaolin jugs in 1975, A. Rădulescu suggested a production place from them either in *Callatis* or *Axiopolis*; with regard to *oinochai*, he said outright that they were produced in *Axiopolis*⁷⁴ but he failed to follow his line of reasoning, treating the kaolin ware as no more than a representative of pottery manufacture in Roman Dobruja. It is not to be excluded that legionaries from either the *legio V Macedonica* or the *XI Claudia* manufactured them⁷⁵. If so, it would confirm the theory about the wares representing legionary ceramics.

Paradoxically, an analysis of the distribution of medieval kaolin wares suggested the idea that Roman kaolin wares were also produced in Dobruja, possibly in the same centers. Bigger deposits of kaolin clay in Dobruja are few: near Tulcea north of the Pricopan massif, the Carasu valley near Mircea Vodă⁷⁶, in southwestern Dobruja and the biggest sources in the section between Cernavodă and Ovidiu, where their thickness ranges from 8 to 15 m⁷⁷. Dobruja also has sources of appropriate limestone and magma rocks, fragments of which can be identified macroscopically⁷⁸.

Analyses of some of the kaolin clay sources from Dobruja in the 1950s gave results that, while approximate and somewhat flawed, were sufficient for comparative purposes. The chemical composition determined then was: kaolin 21.27–16.19%, quartz 36.79–40.06%, feldspar 29.50–36.12%, mica 3.80–7.17%, Fe₂O₃ • H₂O 0.40–0.52%. Sources from near Cernavodă were characterized by the following composition: SiO₂ 57–63%, Al₂O₃ 20–25%, Fe₂O₃ 2.0–4.9%, TiO₂ 0.8–1.5%, MgO 0.08–0.80%, K₂O + Na₂O 1.0–3.5%. The general characteristics of Dobruja kaolin, especially from the region between Cernavodă and Ovidiu, is a low iron and alkali content, more feldspar, and a big content of aluminum oxides and silica. Comparison with the results of physico-chemical analyses obtained by M.

⁶⁹ cf. Daszkiewicz *et alii* 2003, 137–139.

⁷⁰ Bucovaľă 1969, 303, 312, figs. 10, 21.

⁷¹ Symonds, Wade 1999, 313.

⁷² Barnea 1974, 110.

⁷³ Popilian 1997, 7–14; Dyczek 2006, 189 f.

⁷⁴ Rădulescu 1975, 336, 343.

⁷⁵ Doruțiu-Boilă 1990, 252–265; Dyczek 1999, 43.

⁷⁶ Mușețeanu 2003.

⁷⁷ Comșa 1985, 99.

⁷⁸ Rădulescu 1972, 178, 180–181, pl. VIII.

Daszkiewicz, E. Bobryk and G. Schneider for some cooking and tableware fragments from *Novae*⁷⁹ indicated that samples SN 1 and 2 from Lower Danubian kaolin ware vessels were similar or identical:

SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	MnO	MgO	CaO	Na ₂ O	K ₂ O	P ₂ O ₅
70.01	0.83	22.05	2.41	0.016	0.79	0.87	0.79	2.00	0.24
68.23	0.95	22.66	2.75	0.019	0.66	2.28	0.81	1.50	0.14
68.36	1.03	23.58	3.50	0.025	0.64	0.82	0.61	1.36	0.07

Additional technological analyses have demonstrated that the firing temperature of kaolin wares was rather high, oscillating between 900 and 1100°C. The chemical composition coupled with high firing temperatures gave the vessels a low level of open porosity ranging from 25.7 to 30.9% and low water absorption: 13.1–16.9%. This confirmed the properties of the vessels described above. Thin section examination contributed further data to the macroscopic observations. The clay matrix contained mica pieces of varied size from 0.04 to 0.33 mm. Well visible grains of feldspar and quartz measure 1.25 mm across. Since both grain size and quantities of the two are changeable, it should be assumed that they were added intentionally instead of being present in the original clay source. Isolated clusters of clay particles characterized by high iron content combined with quartz were also observed. It was this temper that was occasionally and incorrectly, as the analyses have shown, recognized as chamotte. These clusters of iron compounds explain the pinkish color on some vessels. Another observation made on the grounds of the analyses is that in some cases, the vessels before firing were given a wash of the same clay as the vessel.

Additional samples were analyzed for the purposes of this study in order to confirm the above described results and to ascertain whether the ware was produced in one or many workshops and whether more than one clay source was used⁸⁰.

SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	MnO	MgO	CaO	Na ₂ O	K ₂ O	P ₂ O ₅
68.58	0.75	23.57	2.50	0.018	0.82	0.89	0.80	1.96	0.12
69.43	0.67	22.75	2.43	0.016	0.90	0.77	0.85	2.04	0.16
65.13	0.83	27.21	2.83	0.011	0.93	0.65	0.54	1.80	0.08
65.11	0.83	27.22	2.83	0.010	0.93	0.64	0.55	1.78	0.09

This series leaves no doubt that kaolin wares originated from the Lower Danube region. It has also confirmed production in different workshops of similar standard. The clay source was one, but there were minimal differences in how the clay matrix was prepared. On the grounds of these analyses and based on the current state of research, it can be said that most of the kaolin wares were produced in the three big pottery-making centers. This corresponds in turn to a concentration of kaolin clay deposits in Dobruja (**fig. 6**), lying near three important ancient military and economic centers in the region: *Sacidava*, *Axiopolis* and *Troesmis*.

Apparently the biggest quantities of vessels were produced in the pottery workshops concentrated around modern Cernavodă, which is the ancient *Axiopolis*. This explains why the vessels were so widespread along the banks of the Danube. *Axiopolis* was founded on the spot of the settlement of *Herakleia* which went back to the times of Alexander the Macedonian⁸¹. It lay on the crossing of important routes leading from the Danube to the Wallachia Plain on one hand and to the port at *Tomis* on

⁷⁹ Daszkiewicz *et alii* 2006, 195-196, 204-205.

⁸⁰ cf. Baranowski *et alii* 2006, 160-162.

⁸¹ Dyczek 1999, 18-19.

the other. A harbor used by the commercial fleet was also probably located there, judging from an inscription which mentions *nautae universi Danuvii*⁸². Important quarries also operated in the vicinity⁸³.

The remains of a Trajanic fort discovered at *Sacidava* housed either the *cohors I Cilicium* or the *cohors II Gallorum* connected with the *legio V Macedonica*. Bricks bearing stamps of the *legio I Italica* and *XI Claudia* legions could suggest the temporary stationing of army units from these legions⁸⁴.

The important military center of *Troesmis* served as the seat of *legio V Macedonica* and then of at least detachments of *I Italica*. A station of the *classis Flavia Moesica* was also presumably stationed here. A dynamic town grew to the north of the fort.

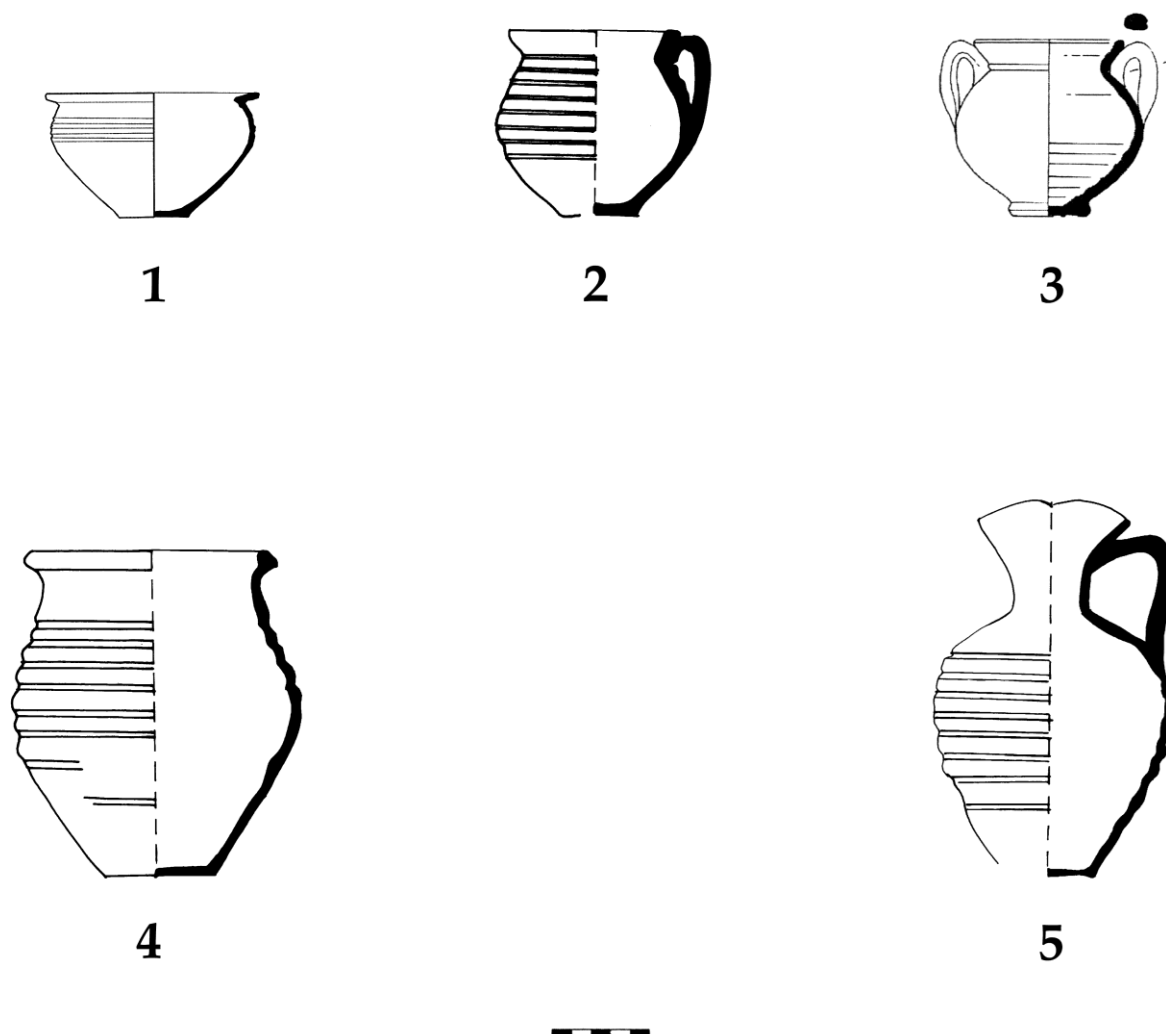


Fig. 6: Preliminary typology of LDKW (by P. Dyczek).

These centers all had easy access to sources of clay, they lay on important trade routes and enjoyed an excellent strategic location on the Danube. Consequently, pottery manufacturers had a large and stable market for their products, which could be transported easily and at low cost throughout the Danubian region and Dobruja.

⁸² CIL III 7485.

⁸³ Florescu 1936, 33; Rădulescu 1972, 187-194.

⁸⁴ Zahariade, Gudea 1997, 78.

Explaining the mystery of pottery made of kaolinitic clays is of considerable importance for the Danubian region and for understanding the phenomenon of legionary ceramics. Excavations at *Novae* have demonstrated the rapid evolution of this type of vessels. Ceramics made for the army seem to have changed depending on the region where the legions were stationed, the actual dislocation of Roman troops and the military operations being carried out, also outside *Moesia*. But the overriding purpose was always maximum versatility of shapes to serve cooking and table needs simultaneously. At first, the legions produced their own ceramics independently and with some use of local potters. In the second stage, as the political and economic situation stabilized around them, the legions passed on these operations to civil and army production centers. Then, in the third phase, once the production of centers in southern *Moesia* had ceased, centers lying in modern Dobruja took over, manufacturing pottery of the LDKW type.

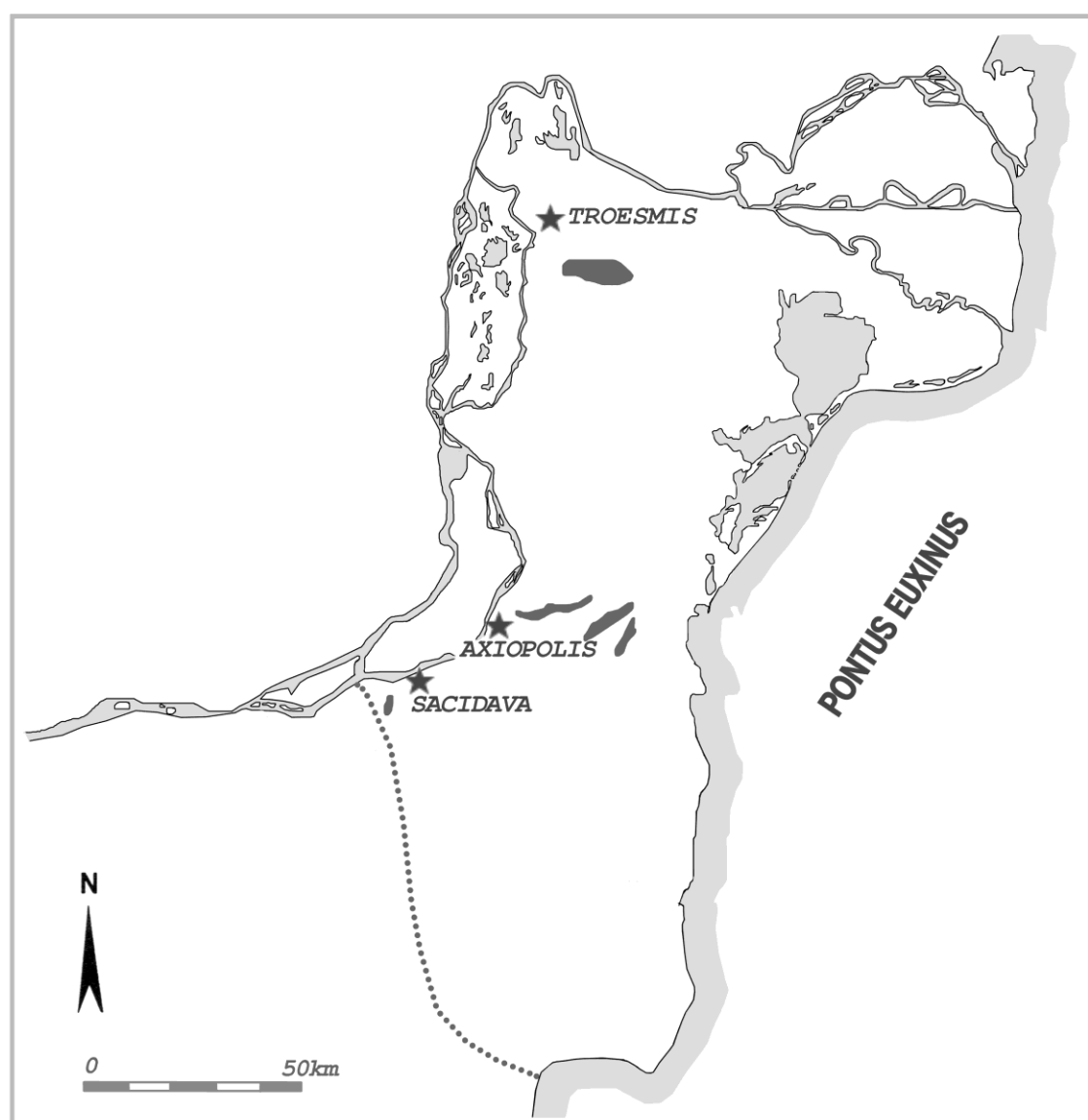


Fig. 7: Gangues of kaolin in Dobruja (elaborated by P. Dyczek).

Legionary ceramics as a phenomenon, assuming the line of reasoning presented here is correct, also covered an extensive period of time, from the 1st century to at least the 4th century AD.

They appear to have accompanied the legions in different forms until the structural and organizational reforms of the late third century. Research carried out at *Novae* undoubtedly throws light on the issue of legionary ceramics, contributing important new archaeological material and data for further investigations of this kind of pottery.

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