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БАЛКАНСКА АРХЕОЛОГИЯ



ПОД РЕДАКЦИЯТА НА
ПЕТЯ ГЕОРГИЕВА
(главен редактор и съставител)

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SUPPLEMENTUM 8

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FILOV SYMPOSIUM

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Това е поредният суплемент представящ статии, написани на базата на доклади от Филови четения – докторантска конференция по археология. Радвам се, че все пак вижда бял свят. Участниците в тази конференция бяха малко и само една трета от тях предадоха статии, които получиха положителни рецензии и бяха приети за печат. На авторите желая успех.

За съжаление от 2017 г. до сега Филови четения не се провеждаха. Тази година за първи път се появи ентузиазъм за възобновяването им. Дано да доведе до успешен край.

Петя Георгиева

* * *

This is the next supplement containing articles written on the basis of papers presented at the *Filov Symposium*, a doctoral student conference in archaeology. I am glad it is seeing the light of day after all. The participants in this conference were few and only a third of them submitted papers that received positive reviews and were accepted for publication. I wish the authors every success.

Unfortunately, the *Filov Symposium* has not been held since 2017. This year, for the first time, there has been some enthusiasm for its resumption. Let us hope it will have a successful conclusion.

Petya Georgieva



The Neolithic (c. 6200–4900 BC) in the Struma River Valley: Characterizing Change to the Human Ecological Niche from Species Distribution Models

Brent Whitford ^a

^a Anthropology Graduate Program, Trent University, 1600 West Bank Drive, Peterborough ON, Canada, K9L 0G2: brentwhitford@trentu.ca

ABSTRACT

During the Neolithic Period (c. 6200–4900 BC) of the Struma River Valley, early agricultural populations progressively settled in the region until reaching a maximum occupation in the Late Neolithic. The ecological characteristics of the Struma River Valley are particularly heterogeneous along its north-south gradient and also vertically along the valley slopes, suggesting that early agricultural populations may have needed to adapt to this distinctive and localized ecological setting. In this paper, I apply an approach based on maximum entropy species distribution modeling (Maxent) in order to characterize diachronic change in the ecological distribution of Neolithic archaeological settlements in the Struma Valley. The Maxent procedure essentially determines the characteristics and extent of what may be interpreted as the human ecological niche. A diachronic interpretation of the results demonstrates that there is a significant degree of niche conservatism in the Struma Valley all throughout the Neolithic Period—with the majority of settlements generally located on favourable agricultural terrains. However, notable instances of settlement proliferation led to an expansion of the human ecological niche to also include less favourable agricultural terrain over time. The potential implications of such an expansion—among which demographic increase and improvements in agricultural practices likely played a critical role—are subsequently discussed.

KEYWORDS

Neolithic; agriculture; Maxent; ecological niche modeling; Bulgaria; Greece.

Introduction

Understanding the dynamic relationship that exists between humans and their environments has long played an important role in addressing archaeological problems (Butzer 1982; Steward 1955; Winterhalder, Smith 2000). Recently, species distribution modeling techniques have also been adapted towards addressing such problems. More specifically, species distribution models have proven useful for the evaluation of human settlement patterns and in characterizing the ecological niche (for relevant examples see Banks et al. 2008; Conolly et al. 2012; Galletti et al. 2013). Maximum entropy species distribution modeling (Maxent), in particular, lends itself quite well to such tasks. Developed by Phillips, Anderson, Dudik, and Schapire (2006; 2008), Maxent's intuitive interface and readily understandable outputs have proven an invaluable tool in a number of varied applications (Anderson, Raza 2010; Elith et al. 2010; Warren et al. 2008). In this paper, I apply the Maxent species distribution modeling method towards characterizing diachronic change in the ecological niche of

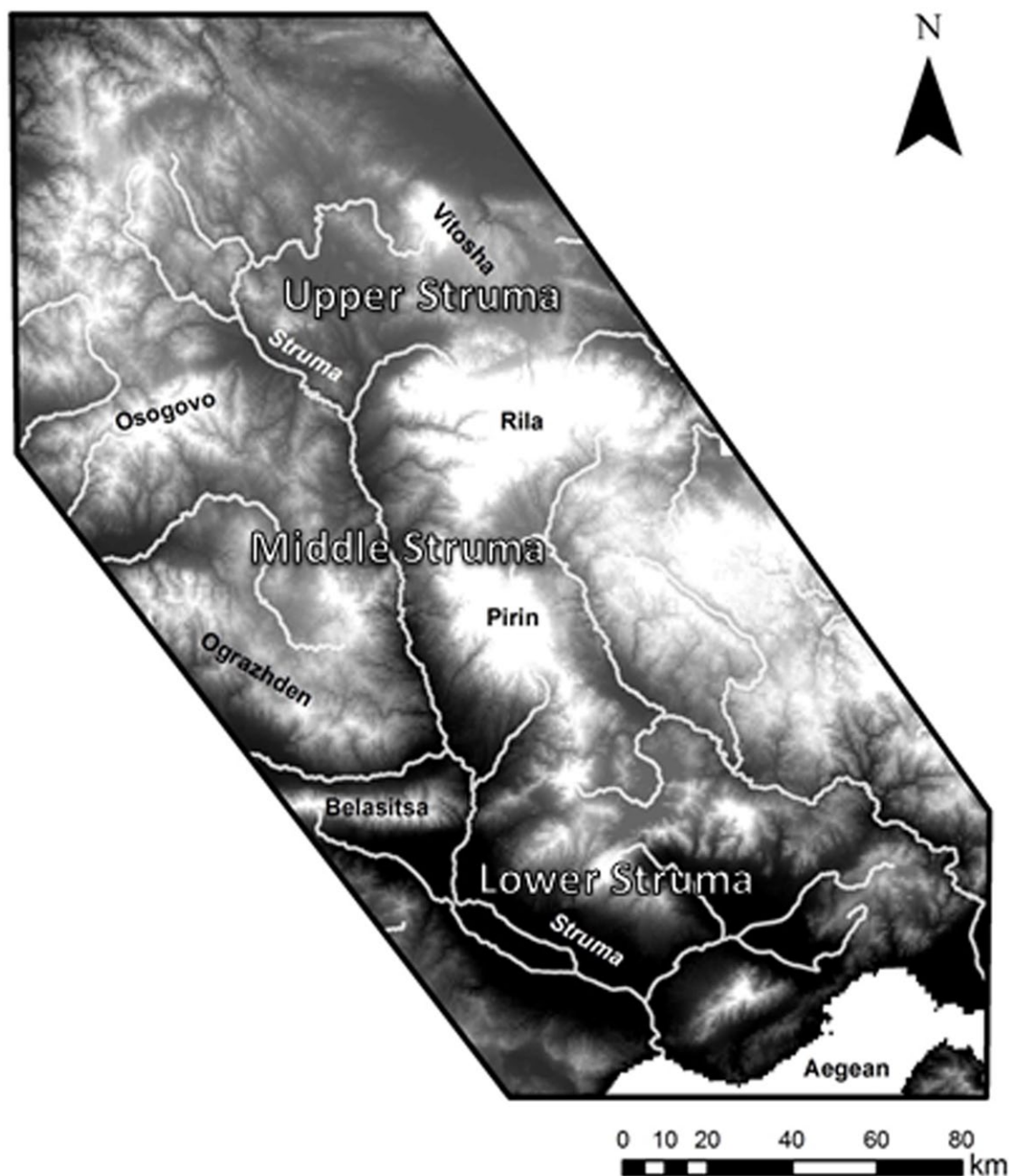


Fig. 1. Map of the Struma River Valley
Обр. 1. Карта на долината на река Струма

Neolithic settlements in the Struma River Valley (Bulgaria and mainland Greece)¹.

Archaeological context: The Neolithic in the Struma River Valley

The Struma River runs 415 km long from its source on the slopes of Vitosha Mountain – near the Bulgarian capital of Sofia – to its outflow in the Aegean Sea at Orphanos Bay (Zagorchev 2007). It extends from North to South, encompassing a total catchment area of approximately 10 800 km²

¹ This paper stems from a presentation delivered at the Doctoral Student Conference on Balkan Archaeology, Sofia, Bulgaria November 19-21 2017. It communicates the preliminary results of research undertaken by the author under the purview of a Master's program in anthropology at Trent University (2017), Peterborough ON, Canada, which has since been published more fully (see Whitford 2019).

The Neolithic (c. 6200–4900 BC) in the Struma River Valley: Characterizing Change ...

Site Name	Early Neolithic	Middle Neolithic	Late Neolithic	Longitude (DD)	Latitude (DD)
Divotino	✓		✓	23.05608	42.66116
Gabrov Dol	✓			22.78234	42.63514
Pernik	✓		✓	23.09958	42.60527
Divlya	✓			22.67778	42.59958
Krakra			✓	23.01791	42.59432
Batanovtsi			✓	22.93516	42.58157
Radomir			✓	22.95085	42.53305
Priboi	✓		✓	22.92093	42.49519
Negovantsi	✓			22.96482	42.46111
Galabnik	✓	✓	✓	23.06337	42.42037
Shipochano			✓	22.72060	42.36661
Shishkovtsi Mogila	✓			22.72435	42.34399
Dozdevitsa			✓	22.56697	42.32699
Krainitsi	✓			23.21023	42.32658
Saparevo	✓	✓	✓	23.29145	42.32383
Kutugerts	✓			22.49945	42.32227
Tavalichevo-Gigan		✓	✓	22.86232	42.31121
Shatrovo-Golemi Vrum			✓	22.96745	42.30672
Dolistovo-Ochilishteto	✓			23.00970	42.30316
Dolno Selo			✓	22.48693	42.29367
Sapareva Bania-Krevnik	✓	✓	✓	23.22564	42.28844
Kjustendil-Kameni Bradvi	✓			22.69321	42.28708
Piperkov Chiflik	✓			22.73413	42.28084
Dupnitsa	✓	✓		23.09366	42.26104
Nevestino-Moshteni	✓	✓		22.85653	42.25741
Chetirts - Peshterata	✓			22.88490	42.24718
Bersin	✓	✓		22.77752	42.24579
Dzherman-Bela Voda	✓			23.08402	42.23466
Vaxevo-Studena Voda	✓	✓		22.85873	42.17065
Slatino-Karo			✓	23.04976	42.16548
Slatino-Tchardako			✓	23.04812	42.16510
Slatino-Guerena			✓	23.03676	42.11369
Mursalevo	✓	✓	✓	23.03620	42.11212
Dragodan			✓	23.03126	42.11171
Kocherinovo-Quartal Levski	✓	✓	✓	23.03898	42.06500
Kocherinovo-Lilacheto	✓	✓	✓	23.02948	42.06440
Golio Rid			✓	23.02555	42.06261
Lisieska Chuka			✓	22.97661	42.05978
Nivite			✓	22.99722	42.05130
Suhate Cheshma			✓	23.00014	42.04691
Balgarchevo	✓	✓	✓	23.03908	42.02609
Drenkovo-Ploshteko	✓		✓	22.97206	42.00055
Drenkovo-Gurleshki Nivi		✓		22.96738	42.00001
Berovakitka			✓	22.96897	41.99489
Strumsko			✓	23.09297	41.97702
Pepelnikov Chukar	✓			23.05715	41.97668
Grobishtartsie			✓	23.03085	41.97254
Popovska Mahala			✓	23.06372	41.95824
Brezhani	✓			23.19515	41.86106
Ilindentsi	✓	✓		23.21940	41.64456

Site Name	Early Neolithic	Middle Neolithic	Late Neolithic	Longitude (DD)	Latitude (DD)
Ploski	✓	✓		23.26430	41.63497
Sandanski			✓	23.24867	41.53402
Damyantsa			✓	23.27179	41.51560
Vinogradi	✓	✓		23.38079	41.50452
Chereshnitsa II		✓	✓	23.45475	41.50078
Kovachevo	✓	✓		23.47573	41.48519
Baskaltsi		✓	✓	23.01011	41.48448
Churichene		✓	✓	23.13621	41.46340
Petrovo I		✓	✓	23.51077	41.46097
Katuntsi III		✓		23.44003	41.45810
Kalimantsi	✓	✓		23.47099	41.45755
Dolna Ribnitsa		✓		23.11244	41.45160
Goleshovo		✓	✓	23.56803	41.44912
Vishlene		✓		23.06417	41.44010
Mitino			✓	23.26564	41.44009
Katuntsi I		✓		23.41955	41.43961
Katuntsi II		✓		23.42366	41.43741
Gega		✓		23.00411	41.43588
Petrovo II			✓	23.52048	41.43474
Harsovo		✓	✓	23.36921	41.43367
Yanovo		✓	✓	23.48561	41.43324
Parvomai		✓	✓	23.14068	41.41743
Drenovitsa I			✓	23.07764	41.41397
Drenovitsa II			✓	23.06864	41.41244
Piperitsa			✓	23.44960	41.40952
Topolnitsa			✓	23.32761	41.39080
Kamena			✓	23.06401	41.38128
Xeropotamos			✓	24.10834	41.19334
Kallyphitos			✓	24.20683	41.17432
Bunar Bashi			✓	24.05699	41.16088
Mikri Toumba			✓	24.01965	41.15805
Kali Vryssi			✓	23.93728	41.15592
Petroussa			✓	24.03907	41.15083
Mylopotamos			✓	24.06645	41.14728
Arkadikos		✓	✓	24.13492	41.14210
Chorla		✓	✓	24.08359	41.13634
Adriani-Agora			✓	24.28418	41.13502
Megalokampos			✓	23.97241	41.13116
Agio Pnevma			✓	23.67579	41.10497
Agrianitsa			✓	23.61777	41.10071
Sitagroi		✓	✓	24.02998	41.08105
Kephalari			✓	24.26318	41.07916
Doxaton		✓	✓	24.20110	41.07185
Monovrisis			✓	23.57599	41.05733
Fakistra			✓	23.61752	41.05281
Toumba Seron			✓	23.66462	41.03910
Kourovo			✓	24.07835	41.03783
Sidirodromikos Strathmos			✓	23.62327	41.03505
Symvoli			✓	24.02535	41.03494
Dikili Tash		✓	✓	24.32005	41.02034

Site Name	Early Neolithic	Middle Neolithic	Late Neolithic	Longitude (DD)	Latitude (DD)
Tholos			✓	23.72160	41.01263
Paliokostra			✓	23.95706	41.01124
Nea Baphra		✓	✓	24.02352	40.99496
Polystylon		✓	✓	24.33439	40.99276
Aïri Bâiri			✓	23.81914	40.98155
Kéramidès			✓	23.97508	40.98097
Dimitra		✓	✓	23.88567	40.96418
Myrkinos			✓	23.82132	40.92955
Paliambela-Eleftheroupolis			✓	24.27564	40.92510
Fidokorifi			✓	23.78216	40.91920
Mikro Souli		✓	✓	23.93730	40.90902
Kryoneri		✓	✓	23.76203	40.84450
Mousthenei			✓	24.13767	40.84358
Hill 133			✓	23.84070	40.83996
Gialimia-Podochori			✓	24.05983	40.82709
Galepsos			✓	23.97696	40.81365
Akropotamos			✓	24.04002	40.79341

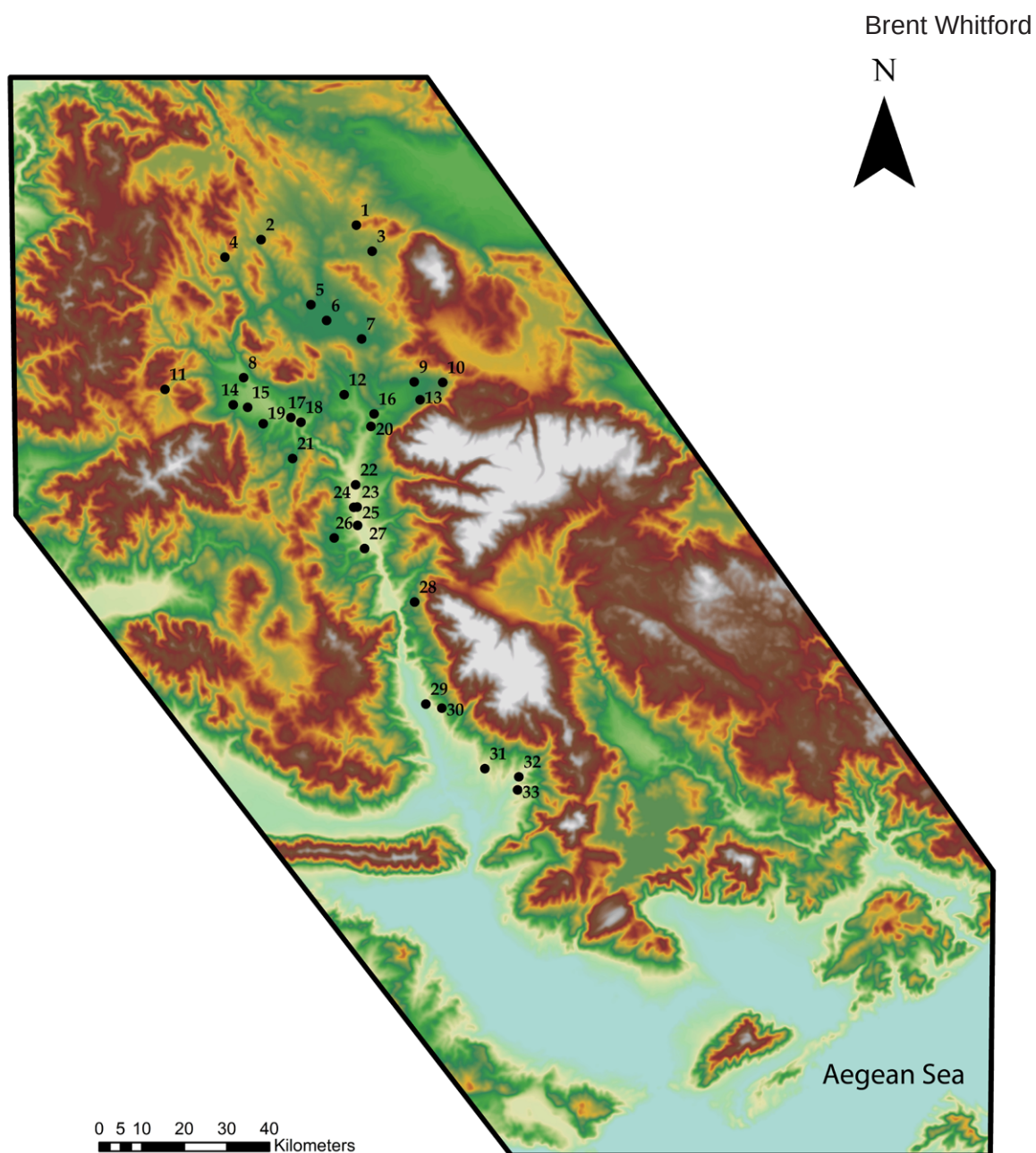
Table 1. Neolithic site coordinates and their relative chronological affiliation (DD = decimal degrees; datum WGS84); Chohadzhiev 2007; Genadieva 2007; Grebska-Kulova 2009; Koukouli-Chryssanthaki et al. 2008; Pernicheva 1995; Pernicheva-Perets et al. 2011; Renfrew et al. 1986

Таблица 1. Координати и относителна хронология на неолитните обекти (DD = децимални градуси; datum WGS84); Chohadzhiev 2007; Genadieva 2007; Grebska-Kulova 2009; Koukouli-Chryssanthaki et al. 2008; Pernicheva 1995; Pernicheva-Perets et al. 2011; Renfrew et al. 1986

(fig. 1). The north-south gradient of the Struma River Valley provides a myriad of different possible ecological niches within which the first agriculturalists of the region could have settled. To the East rise the Rila and Pirin massifs (the former recorded as the highest peak in the Balkan Peninsula) while to the West lay the more gradual Osogovo, Ograzhden, Maleshevska, and Belasitsa ranges (Zagorchev 2007). Furthermore, extensive tectonic and fluvial processes have shaped the valley into several distinct basins delimited by a series of natural gorges (Zagorchev 2007; Pernicheva-Perets et al. 2011). Based on these characteristics, the Struma River Valley can then be further divided into three defined sub-regions: The Upper, Middle, and Lower Struma Valleys.

The Upper Struma Valley lies in the north and is composed of four sub-basins. It is delimited by the Sofia Plain to the Western Balkan Mountains. The Middle Struma Valley, is composed of three sub-basins and is divided by the Kresna Gorge. Kresna Gorge is an especially worthy landmark for consideration, as it is the longest in the Struma Valley – reaching 16 km in length – and also formally marks the transitional border between the Mediterranean and Temperate climatic and vegetational zones (Pernicheva-Perets et al. 2011). Lastly, the Lower Struma Valley begins at Rupelski Gorge in the south where the river enters East Greek Macedonia, forms the wide Serres Lowlands, and joins with the Angitis River as the latter descends from the Drama Basin.

The compartmentalized nature of the terrain in question also appears to have acted on Neolithic settlement distribution and mitigated cultural contacts throughout the Valley (Pernicheva 1995). One hundred and seventeen distinct settlements from the Neolithic Period have been identified in the Struma Valley (see Chohadzhiev 2007; Grebska-Kulova 2009, Koukouli-Chryssanthaki et al. 2008; Pernicheva 1995; Pernicheva-Perets et al. 2011; Renfrew et al. 1986; figs. 2–4; Table 1). However, a notable complication exists regarding the chrono-cultural periodization system. Issues regarding the chronological placement of settlements along a comparable absolute time-scale arise mainly because



- | | | | |
|----------------|------------------------------|---------------------------------|----------------|
| 1. Divotino | 11. Kutugerts | 21. Vaxevo-Studena Voda | 31. Vinogradi |
| 2. Gabrov Dol | 12. Dolistvovo-Ochilishteto | 22. Mursalevo | 32. Kovachevo |
| 3. Pernik | 13. Sapareva Banya-Kremenik | 23. Kocherinovo-Quartal Levski | 33. Kalimantsi |
| 4. Divlya | 14. Kjustendil-Kameni Bradvi | 24. Kocherinovo-Lilacheto | |
| 5. Priboi | 15. Piperkov Chiflik | 25. Balgarchevo | |
| 6. Negovantsi | 16. Dupnitsa | 26. Drenkovo-Ploshteko | |
| 7. Galabnik | 17. Nevestino-Moshteni | 27. Pokrovnik-Pepelnikov Chukar | |
| 8. Shishkovtsi | 18. Chetirts-Peshterata | 28. Brezhani | |
| 9. Krainitsi | 19. Bersin | 29. Ilindentsi | |
| 10. Saparevo | 20. Dzherman-Bela Voda | 30. Ploski | |

Fig. 2. Early Neolithic settlements in the Struma River Valley (after Whitford 2019)
 Обр. 2. Ранно неолитни селища по долината на река Струма (по Whitford 2019)

		The Struma River Valley						
Period	Thrace (East Bulgaria)	Upper Struma	Middle Struma		Lower Struma (Greek Macedonia)	Serbia	Republic of Macedonia	Thessaly
			North	South				
Late Neolithic	IV B (Kalovanovets)	Sapareva Banya III (Kurilo)	Strumsko I B Balgarchevo III A	Petrovo III Promachon - Topolnitsa II Damyaniitsa I	Sitagroi II	Vinca B	Angeltsi II Zelenikovo II Anza (Late)	Arapi
Middle Neolithic	IV A III	Sapareva Banya II Vaxevo IV	Balgarchevo II B	Kovachevo II Dolna Ribnitsa Marchin	Dikili Tash I Sitagroi I	Vinca A IV	Anza IV Zelenikovo I	Tsangli Larissa
Early Neolithic	II I	Sapareva Banya I Vaxevo III Vaxevo II Vaxevo I	Balgarchevo I A	Id Ic Kovachevo Ib Ia		Starcevo III II I	Anza III Anza II Anza I	Sesklo ProtoSesklo Maenlitsa

Table 2. Chrono-cultural periodization system (adapted from Perničeva 2007, republished from Whitford 2019)

Таблица 2. Хронологическо-културна периодизационна система (адаптирана по Perničeva 2007, повторно публикувана в Whitford 2019)

Period	Phase	Date Ranges (cal. B.C.)
Neolithic	Early Pottery	6300/6200 - 6000/5900
	Early	6000/5900 - 5550/5450
	Middle	5500/5450 - 5200/5100
	Late	5200/5100 - 4900/4850

Table 3. Absolute date ranges (after Boyadziev 1995, republished from Whitford 2019)

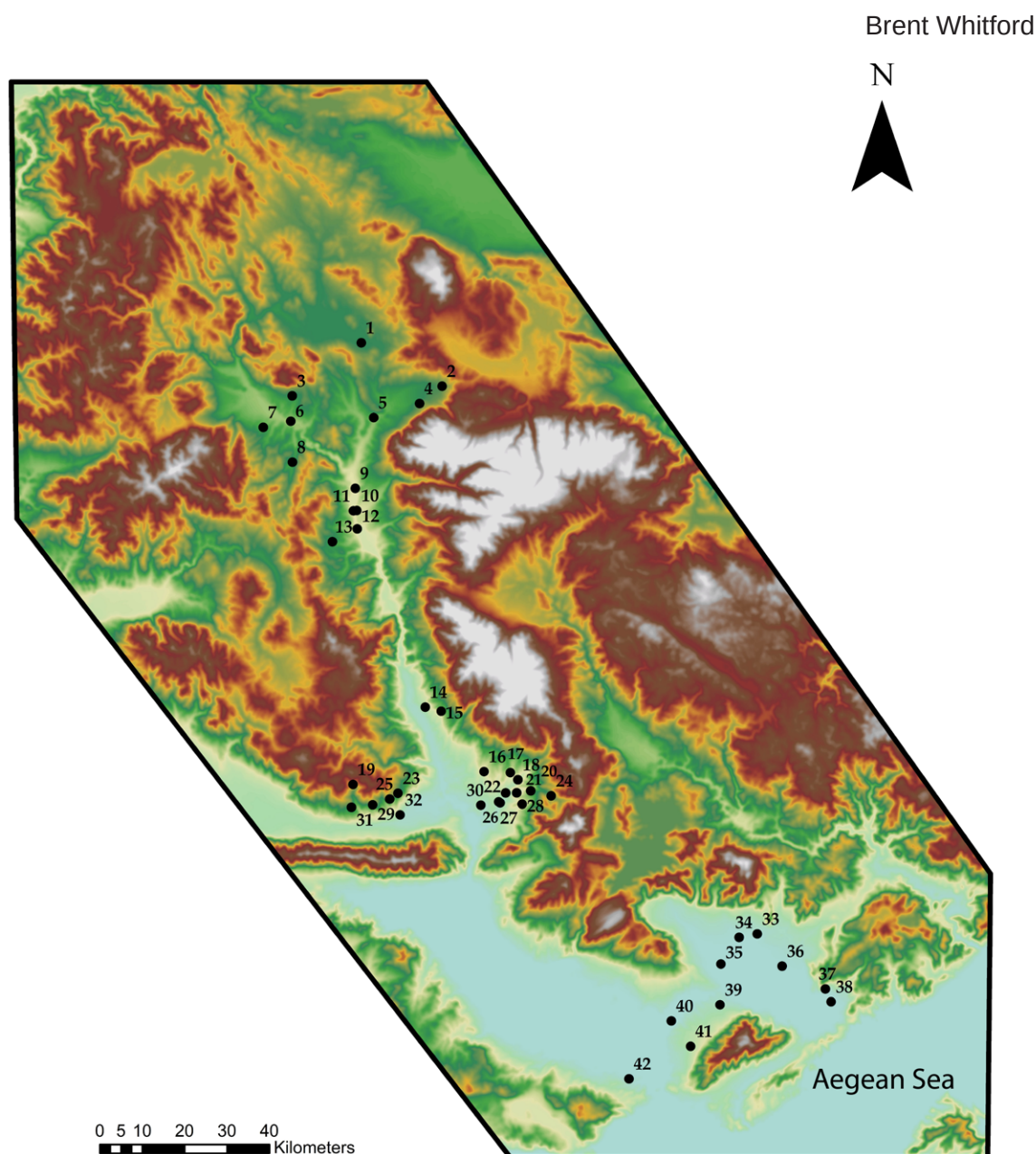
Таблица 3. Абсолютни дати (по Boyadziev 1995, повторно публикувана в Whitford 2019)

the characteristic finds of the region are not wholly isolated to Southwest Bulgaria alone. In most cases, these have also been found geographically and chronologically distributed in parts of Eastern Bulgaria, North Macedonia, Serbia, Mainland Greece, and beyond (Demoule 2009; Pernicheva-Perets et al. 2011; Tsirtsoni 2016), emphasizing connections with the neighbouring regions. Very different chronological periodization systems are in use for each of the regions in question complicating any attempt at a supra-regional synthesis (Pernicheva-Perets et al. 2011; Tsirtsoni 2016). For the purposes of this study, I utilize a variant of the periodization system first suggested by Georgiev (1961) – with regards to the stratigraphy at Tell Karanovo in Eastern Bulgaria – and later by Pernicheva (1995) in relation to the Struma River Valley. Due to the very limited amount of radiocarbon dates for the Neolithic of the region in general, the periodization system is primarily defined by the detailed sequencing of pottery types and in their association across key settlements (Perničeva 2007; Table 2). All absolute dates reported here are from Boyadzhiev (1995; Table 3).

Early Neolithic (6200–5450 cal BC)

In total, 33 settlements represent the Early Neolithic Period in the Struma River Valley. Notably, not a single Early Neolithic settlement has been discovered in the Lower Struma Valley (Demoule, Perlès 1993; Pernicheva 1995; Pernicheva-Perets et al. 2011). All throughout the Early Neolithic Period, the placement of settlements generally remains the same as they are situated along the first and/or second terraces of the Struma River and its principal tributaries (Pernicheva-Perets et al. 2011). In terms of settlement locations, no significant differences are immediately noted between the first and second halves of the Early Neolithic.

From a typological point of view, the settlement of Krainitsi in the Upper Struma Valley represents the oldest known phase of the Early Neolithic, comprising a monochrome ceramic stage



- | | | | |
|--------------------------------|-----------------------------|--------------------|-----------------|
| 1. Galabnik | 11. Kocherinovo-Lilacheto | 21. Kalimantsi | 31. Gega |
| 2. Saparevo | 12. Balgarchevo | 22. Katuntsi III | 32. Parvomai |
| 3. Tavalichevo-Gigan | 13. Drenkovo-Gurleshki Nivi | 23. Churichene | 33. Arkadikos |
| 4. Sapareva Banya-Kremenik | 14. Ilindentsi | 24. Goleshovo | 34. Chorla |
| 5. Dupnitsa | 15. Ploski | 25. Dolna Ribnitsa | 35. Sitagroi |
| 6. Nevestino-Moshteni | 16. Vinogradi | 26. Katuntsi I | 36. Doxaton |
| 7. Bersin | 17. Chereshnitsa II | 27. Katuntsi II | 37. Dikili Tash |
| 8. Vaxevo-Studena Voda | 18. Kovachevo | 28. Yanovo | 38. Polystylon |
| 9. Mursalevo | 19. Baskaltsi | 29. Vishlene | 39. Nea Baphra |
| 10. Kocherinovo-Quartal Levski | 20. Petrovo I | 30. Harsovo | 40. Dimitra |
| | | | 41. Mikro Souli |
| | | | 42. Kryoneri |

Fig. 3. Middle Neolithic settlements in the Struma River Valley (after Whitford 2019)

Обр. 3. Средно неолитни селища по долината на река Струма (по Whitford 2019)

that parallels that of the earliest Neolithic in Thessaly (Čohadžiev 1998). To this point in time, it is the only known settlement that provides evidence for such an early stage of development in the region. During the first half of the Early Neolithic (c. 6200–5850 cal BC), following the monochrome stage – as evidenced also by the stratigraphy at Krainitsi – a white on red painted ceramic tradition emerges near homogeneously across the Middle and Upper Struma Valleys (Pernicheva 1995). During the second half of the Early Neolithic (c. 5850–5450 cal BC), north of Kresna Gorge a dark on red painted ceramic tradition (i.e. classic Starčevo), having close affiliates in the Vardar Valley (see Anza; Gimbutas 1974), progressively supplants the white on red painted tradition (Pernicheva 1995). However, the white on red painted tradition continued to persist to the south of Kresna Gorge. Material culture diversification was thus possibly mitigated in local geographic-ecological terms beginning by at least the second half of the Early Neolithic.

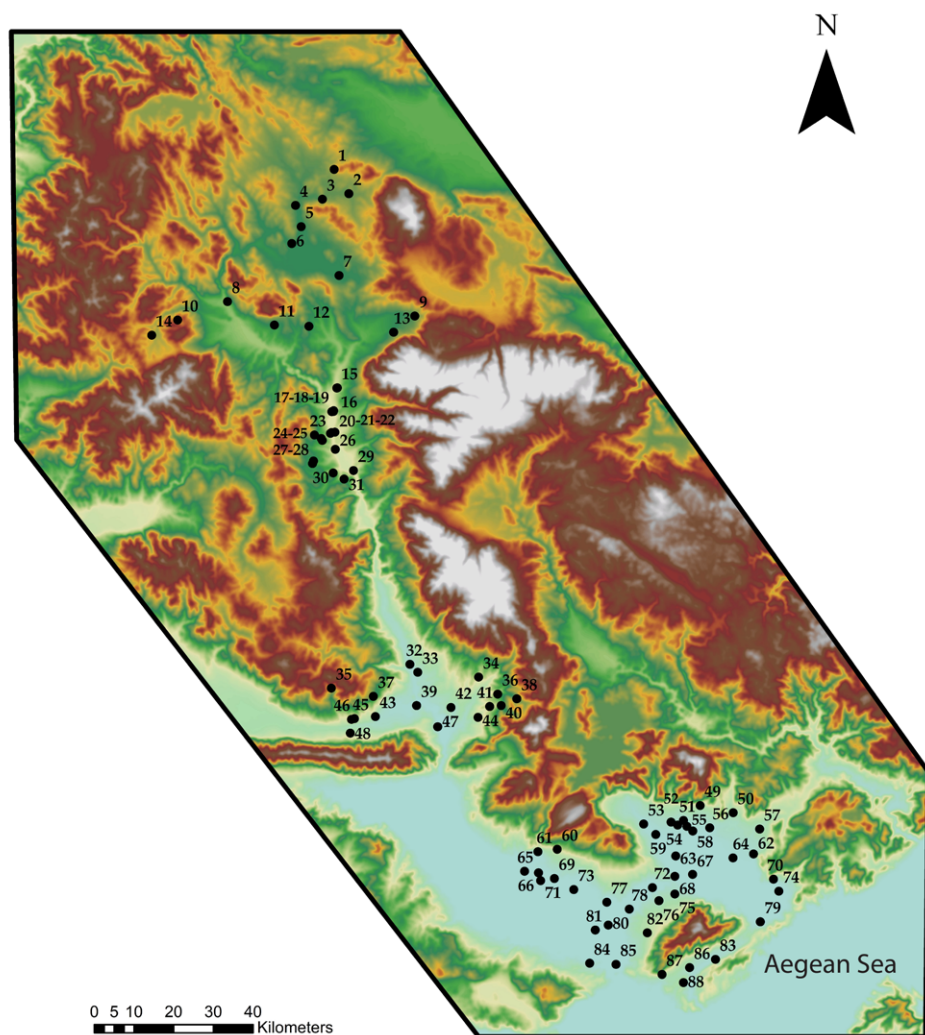
Middle Neolithic (5450–5200 cal BC)

Considering the entire Struma Valley 42 settlements have been recorded for the Middle Neolithic Period. The Middle Neolithic is uniformly characterised by black polished pottery and emphasized bi-conical shapes and in some instances by the Dolna Ribnitsa decorative technique consisting of double or more rarely single rowed punctations located above the carination (Pernicheva 1995). Overall, there is a reduction of known sites in the Upper Struma Valley alongside a proliferation of settlements in the Middle and Lower Struma Valleys. In all cases, Middle Neolithic settlements in the Upper Struma Valley were also occupied in the Early Neolithic Period, suggesting a strong degree of local continuity in the selection of settlement location. In the Middle and Lower Struma Valleys, however, many new settlements emerge in areas that were not previously occupied (Perničeva 1983). In the Lower Struma Valley in particular, all Middle Neolithic settlements are located over previously uninhabited terrain as no Early Neolithic settlements to date have been found in the area. The sub-regional continuity in the Upper Struma Valley, paired with the proliferation of settlements in the Middle Struma Valley and Lower Struma Valley thus suggests that a more southward oriented settlement pattern progressively developed at this time.

Late Neolithic (5200–4900 cal BC)

During the Late Neolithic Period, the Struma River Valley witnesses a drastic increase in the number of settlements in all three of its sub-regions (Grębska-Kulowa, Kulow 2007). The total number of settlements more than doubles from just 42 in the previous period, now reaching 88 in total. Furthermore, with the exception of just a few sites, most of the Late Neolithic settlements are situated over previously uninhabited terrain (Pernicheva-Perets et al. 2011). With regards to settlement distribution, there is now a noticeable distinction between the types and locations of settlements. Some settlements begin occupying vast areas near the terraces of the Struma River and its principal tributaries – reaching upwards of 200 000 m² – while others occupy more hilly terrains farther away from the main river systems (Pernicheva-Perets et al. 2011; Genadieva 2007).

The Late Neolithic is characterized primarily by the appearance and broad distribution of black-topped ceramics of the Karanovo III type, alongside the appearance of the more geographically restricted Vinča B type ceramics, the Akropotamos brown on cream painted style, and the Topolnitsa black on red painted style (Grębska-Kulowa 2003; Boyadziev 1995; Pernicheva-Perets et al. 2011; Vajsov 2007). Vinča B type ceramics, for example, are largely confined to the Upper Struma Valley, but also appear in the Middle Struma Valley. The Akropotamos style, on the other hand, is by far most prevalent in the Lower Struma Valley, with specimens from the North represented only in minor quantities and interpreted as imports (Pernicheva-Perets et al. 2011). Lastly, the Topolnitsa variant originates in the Middle Struma Valley and appears as a local imitation of the southern Akro-



- | | | | |
|--------------------------------|---------------------------------|--------------------------|--------------------------------|
| 1. Divotino | 23. Buchino-Lisieska Chuka | 45. Drenovitsa I | 67. Kourovo |
| 2. Pernik | 24. Buchino-Nivite | 46. Drenovitsa II | 68. Symvoli |
| 3. Krakra | 25. Buchino-Suhata Cheshma | 47. Promachon-Topolnitsa | 69. Toumba Seron |
| 4. Batanovtsi | 26. Balgarchevo | 48. Kamena | 70. Dikili Tash |
| 5. Radomir | 27. Drenkovo-Ploshteko | 49. Xeropotamos | 71. Sidirodromikos Strathmos |
| 6. Priboi | 28. Logodazh-Berova Kitka | 50. Kallyphitos | 72. Paliokastras |
| 7. Galabnik | 29. Strumsko | 51. Bunar Bashi | 73. Tholos |
| 8. Shipochano | 30. Pokrovnik-Grobishtartsi | 52. Mikri Toumba | 74. Polystylon |
| 9. Saparevo | 31. Moshtanets -Popovska Mahala | 53. Kali Vryssi | 75. Nea Baphra |
| 10. Dozdevitsa | 32. Sandanski | 54. Petroussa | 76. K ramid s |
| 11. Tavalichevo-Gigan | 33. Damyanitsa | 55. Mylopotamos | 77. A ri Ba ri |
| 12. Shatrovo-Golemi Vrum | 34. Chereshnitsa II | 56. Arkadikos | 78. Dimitra |
| 13. Sapareva Banya-Kremenik | 35. Baskaltsi | 57. Adriani-Agora | 79. Paliambela Eleftheroupolis |
| 14. Dolno Selo | 36. Petrovo I | 58. Chorla | 80. Myrkinos |
| 15. Slatino-Karo | 37. Churichene | 59. Megalokampos | 81. Fidokorifi |
| 16. Slatino-Tchardako | 38. Goleshovo | 60. Agio Pnevma | 82. Mikro Souli |
| 17. Slatino-Guerena | 39. Mitino | 61. Agrianitsa | 83. Moustheni |
| 18. Mursalevo | 40. Petrovo II | 62. Kephalaria | 84. Kryoneri |
| 19. Dragodan | 41. Yanovo | 63. Sitagroi | 85. Hill 133 |
| 20. Kocherinovo-Quartal Levski | 42. Harsovo | 64. Doxaton | 86. Gialimia-Podochori |
| 21. Kocherinovo-Lilacheto | 43. Parvomai | 65. Monovrisis | 87. Galepsos |
| 22. Buchino-Golio Rid | 44. Piperitsa | 66. Fakistra | 88. Akropotamos |

Fig. 4. Late Neolithic settlements in the Struma River Valley (after Whitford 2019)
 Обр. 4. К сно неолитни селища по долината на река Струма (по Whitford 2019)

potamos type (Grębska-Kulova 2003; Boyadziev 1995; Vajsov 2007). The Late Neolithic Period can then most readily be described as a certain time of dynamic cultural differentiation and of settlement proliferation.

Data and methods

The topic of this paper is to characterize the distribution of early agricultural settlements in the Struma River Valley during the Neolithic Period and to assess how the human ecological niche changed over time. To that regard, Phillips et al. (2006; 2008) developed a maximum entropy species distribution modeling method (Maxent) that I adapted for use in the analyses. Maxent utilizes presence-only data and samples a restricted background to generate a random set of pseudo-absences from which to assess the distribution of presence points against a user defined set of independent ecological variables. I produced one model each for the Early Neolithic (33 presences), Middle Neolithic (42 presences), and Late Neolithic (88 presences), effectively determining the extent and characteristics of what may be interpreted as the human ecological niche for each period. The locations of the archaeological sites were identified via a rigorous review of paper maps and archaeological site registries housed within the relevant regional museums, offered to the author by the regional coordinators M. Grębska-Kulowa (for the Blagoevgrad area), V. Genadieva (for the Kyustendil area), A. Bakamska (for the Pernik area), and D. Malamidou (for the Serres and Drama areas), respectively. The absolute coordinates listed in Table 1 were subsequently obtained from Google Earth.

I selected 10 climate and terrain variables that arguably would have impacted the location selection of early agricultural settlements, particularly in relation to the composition of their respective crop and livestock assemblages and for the purposes of construction (O'Donnell & Ignizio 2012). These are annual mean temperature, temperature annual range, temperature seasonality, annual precipitation, precipitation seasonality, elevation, slope, terrain roughness, topographic wetness index, and soil typological unit (fig. 5). All climate variables were compiled and freely obtained from the WorldClim Present day bioclimatic dataset (Worldclim.org). Terrain variables were computed in ArcGIS 13.1 and derived from the version 2 ASTER Global Digital Elevation Model (Aster GDEM v2; asterweb.jpl.nasa.gov).

The first step in the species distribution modeling procedure involves checking for statistical collinearity between all independent variables (see Peterson 2011). Statistical collinearity is defined as a ridged association between different independent variables, such that the value of one changes relative with the value of another. Once identified, one or more of the collinear variables should be removed from further analysis so as not to unintentionally bias the model in favour of particularly related sets of ecological conditions. By pairing all continuous variables, examining their scatterplots/histograms, and determining their Pearson product-moment correlation coefficient (R^2), I determined significant instances of collinearity ($R^2 > 0.8$; fig. 6) and removed 4 of the independent variables from the analyses—temperature seasonality, annual precipitation, elevation, and terrain roughness. Annual mean temperature, temperature annual range, precipitation seasonality, slope, topographic wetness index, and soil typological unit were each retained. Notably, the soil types dataset was withheld from the test for statistical collinearity as soil types are here represented as categorical data and therefore cannot be collinear in Euclidean space. Collectively, the remaining independent variables adequately represent ecological variability in the Struma River Valley.

The second step in the Maxent procedure regards the selection of suitable modeling parameters. Barbet-Massin et al. (2012) determined that for GLM species distribution models (a methodology similar to that of Maxent) the increase in accuracy of the model reaches an asymptote when the number of presences is equal to 10% or less the number of pseudo-absences. Therefore, I changed

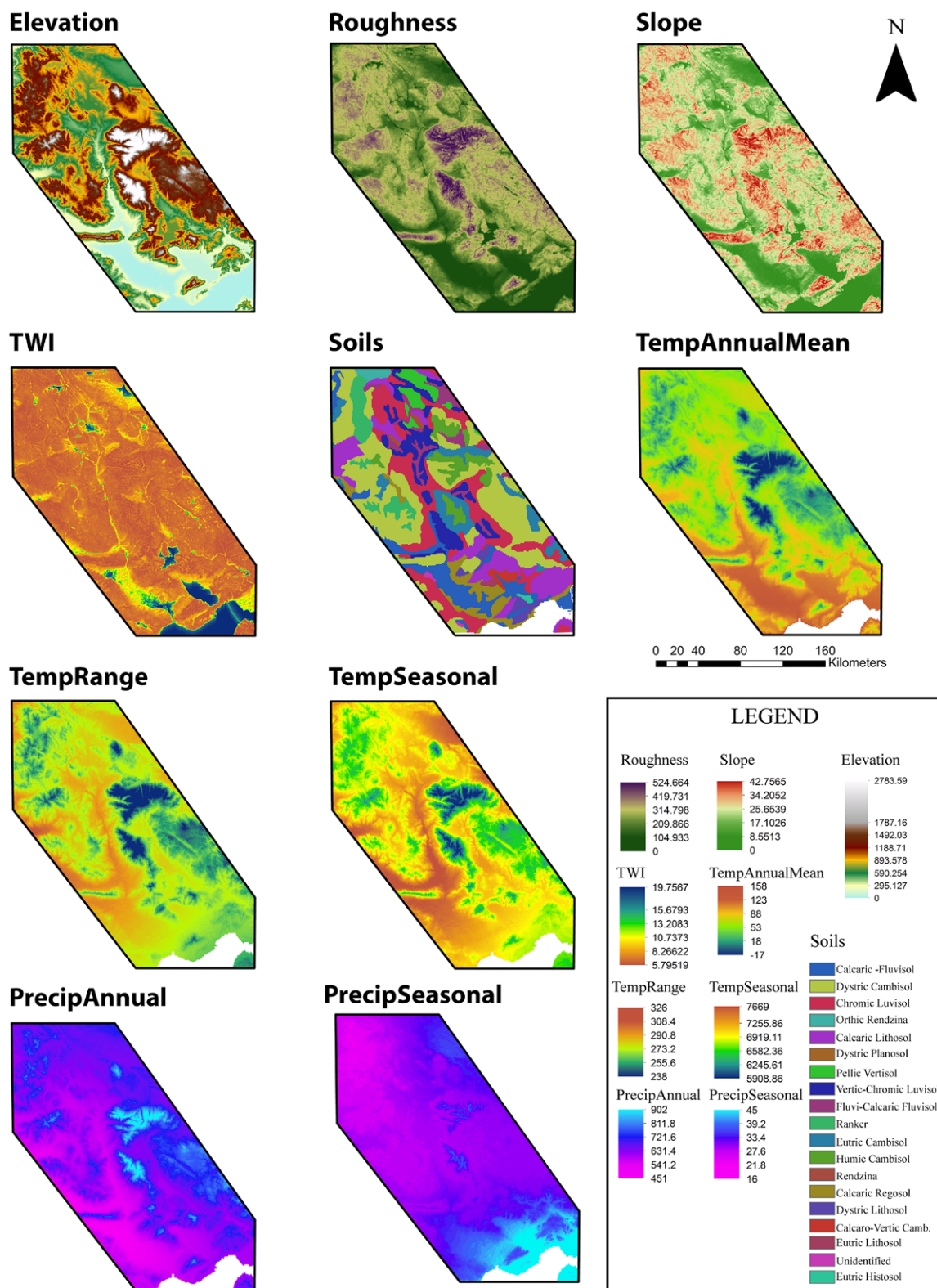


Fig. 5. Ecological variables (after Whitford 2019)

Fig. 5. Екологічні променливи (no Whitford 2019)

the functional parameters of Maxent from their default setting (10 000 pseudo-absences) to sample only 1000 pseudo-absences due to the relatively small sample size of archaeological settlements. The geographic extent of the background from which the pseudo-absences are sampled encompasses the entire catchment area of the Struma River Valley (~10 800 km²) and includes a significant portion of the surrounding region, accounting for a total surface area of approximately 38 000 km². I intentionally selected such a broad boundary so as not to restrict the model too severely and risk model overfit. The identified archaeological sites in the region (33 Early Neolithic, 42 Middle Neolithic, and 88 Late Neolithic) were each recorded as a presence point. The Maxent procedure utilizes a defined percentage of the presences (i.e. archaeological sites) in training the model to determine the ecological values at those locations based on the distribution of the background independent ecological variables. The remaining presences are then retained as test points used in verifying the model's predictive accuracy (measured as AUC; Phillips et al. 2006). I selected a cross-validation method at 500 iterations per run for the training and testing procedure of the models. I determined the additional modeling parameters (i.e. types of feature classes and regularization multiplier) in accordance with the enmevaluation function of the ENMeval package for R (see Muscarella et al. 2014; Whitford 2019).

Results

The Maxent cross-validation procedure produces a cumulative mean model compiled from every single presence point having in turn been retained as a test in verifying the model's predictive accuracy. The logistic output of the procedure projects habitat suitability values (ranging from 0% to 100%) onto the study region, effectively identifying the extent and characteristics of what may be interpreted as the human ecological niche of the archaeological period in question. One model each was produced for the Early, Middle, and Late Neolithic Periods (fig. 7).

Discussion

The results of the Maxent species distribution models for the Early, Middle, and Late Neolithic Periods of the Struma River Valley provide some valuable insight towards interpreting diachronic shifts in the location selection of early agricultural settlements, especially with regards to changes in the ecological niche.

Regarding the Early Neolithic, the probability for settlement is largely confined to particular portions of the Middle and Upper Struma Valleys. These regions can be characterized by temperate to sub-Mediterranean type climates having extended periods of frost and by a lesser precipitation seasonality consisting of slightly wetter winters over summers. Settlements are preferentially located on very gently sloped or flat terrains with a moderate to high topographic wetness index and on easy to work agricultural soils (i.e. fluvisols and luvisols). Interestingly, the Lower Struma Valley was not identified by the model as having any probability for settlement during the Early Neolithic, which is consistent with the current state of research and the absence of any known Early Neolithic settlements in the region. The general characteristics of the Early Neolithic ecological niche then coincide with more temperate areas of excellent agricultural potential generally located near the valley bottoms and in proximity to major river systems.

The distribution of Middle Neolithic settlements, on the other hand, although generally conservative and aligned with the characteristics of the Early Neolithic niche, is more varied in several important manners. Most of the similarities between the Early and Middle Neolithic ecological niche can be accounted for by the fact that all the Middle Neolithic sites located to the north of Kresna

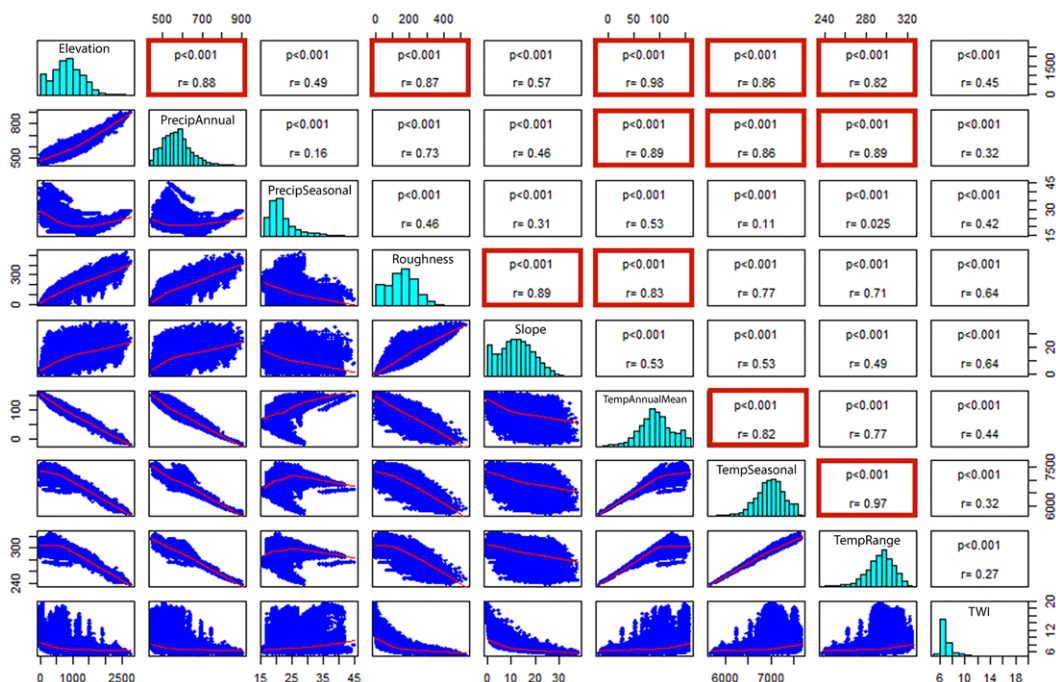


Fig. 6. Test for collinearity; instances of collinearity ($R^2 > 0.8$) outlined in red (after Whitford 2019)
 Обр. 6. Тест за колинеарност; случаи на колинеарност ($R^2 > 0,8$), очертани в червено (по Whitford 2019)

Gorge are situated over the previous Early Neolithic settlements, suggesting a strong degree of niche conservatism in the sub-region. To the south of Kresna Gorge, however, the majority of Middle Neolithic settlements are located over previously uninhabited terrain. This expansion to new terrains during the Middle Neolithic is associated with an increase in the occupation of warmer climates, in regions having a marked precipitation seasonality, located on sloped terrains, and situated farther away from easily worked agricultural soils (represented by the strong probability for settlement on regosols and cambisols, which are less suitable for agriculture without the use of the plough or irrigation).

Lastly, during the Late Neolithic, the vast majority of settlements are situated over previously uninhabited terrain and collectively cover a significant portion of the Struma River Valley's geographic breadth and ecological variability, excluding only the alpine and sub-alpine regions. Although habitat suitability is greatest in areas having a high mean annual temperature, the latter is contrasted by the probability for settlement also in areas having a high annual temperature range. Settlement in locations covering a wide range of different precipitation seasonality values is also attested. With regards to soil types, the Late Neolithic settlement distribution has expanded to include nearly all the available soils in the Struma Valley except for only two (calcaric lithosols and dystric cambisols, which are largely isolated to the alpine and sub-alpine regions). Areas with flat terrains and moderate to high topographic wetness indexes are preferred, though settlement in areas with sloped terrains are also found to a significant degree. Essentially, by the Late Neolithic Period settlements are located on all the inhabitable terrain available in the Struma Valley.

Diachronic considerations of change to the ecological niche

Considerations of change to the human ecological niche during the Neolithic Period of the Struma River Valley demonstrate that a strong degree of niche conservatism is observed. The tendency for change is rather inclined towards niche expansion rather than towards total niche replace-

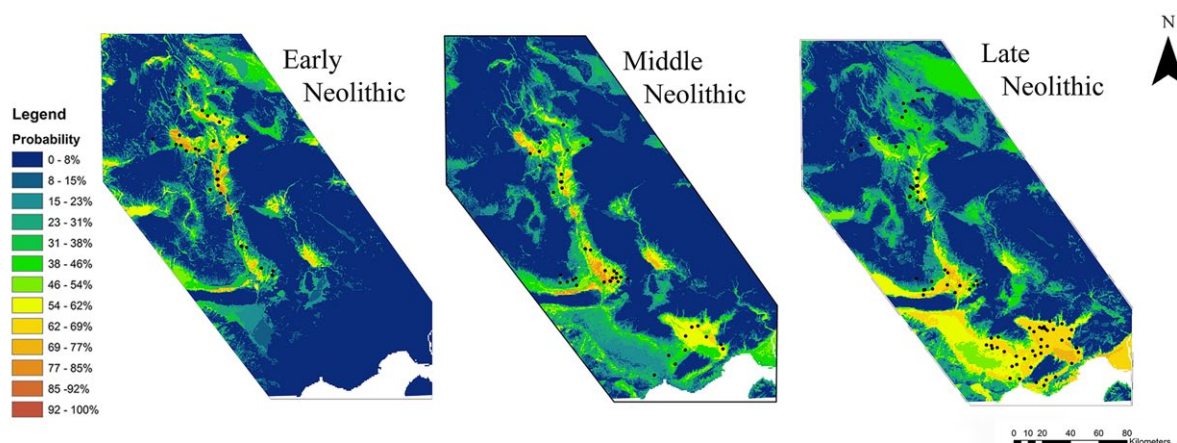


Fig. 7. Maxent species distribution models; Neolithic ecological niches

Обр. 7. Модели с максимална ентропия на разпространение на видове; Неолитни екологични ниши

ment. The progressive occupation of more agriculturally marginal soils and in locations providing more varied types of climate and terrain bears evidence of a need to expand and settle in locations that are less agriculturally suitable over time. The latter niche expansion can then possibly be correlated with population growth, large-scale social reorganizations, improvements in agricultural practices, and/or an increase in the importance of animal husbandry. Additionally, each period is characterized by more frequent episodes of cultural diversification, beginning with a relatively undiversified cultural base during the Early Neolithic and ending with the emergence of three distinct cultural traditions located near exclusively in each of the Struma Valley's sub-regions by the Late Neolithic. It therefore appears that episodes of cultural diversification during the Neolithic Period of the Struma River Valley are strongly correlated with an expansion in the ecological setting of human settlement over time. However, whether cultural diversification was the cause or the result of expansion to the ecological niche during the Neolithic Period remains to be determined.

Conclusion

As demonstrated by the analyses, there is in fact considerable benefit to further adapting species distribution modeling techniques towards addressing archaeological problems. More specifically, such an approach can shed some light on the assessment of human settlement distributions and, when paired with the archaeological record, can help in evaluating diachronic considerations of cultural change. When applied to the spread of early agriculture in the Struma River Valley, the techniques presented here determined to what degree different ecological variables acted as significant factors in the location selection for Neolithic settlement and how these changed (or did not change) over time. Furthermore, considering the relative expansion of the human ecological niche in the Struma River Valley, the results may be tentatively interpreted as evidence for demographic expansion, improvements in agricultural practice, an increased reliance on animal husbandry, and/or of large-scale social reorganizations in association with episodes of cultural diversification. Arguments regarding diachronic change in subsistence strategies, material culture diversification, and/or of land-use practices may then be further addressed considering this new and complimentary evidence.

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Неолитът (с. 6200–4900 ВС) по долината на река Струма: Характеризиране на промяна в човешката екологична ниша според модели на разпространението на видовете

Брент Уинфорд

(резюме)

През неолита (около 6200–4900 г. ВС) ранните популациите на ранните земеделци се установяват постепенно в района по долината на река Струма, докато достигнат максимална заетост в късния неолит. Екологичните характеристики на долината на река Струма са разнородни, особено по нейния градиент север-юг, а също и вертикално по склоновете на долината. Това предполага, че ранните селскостопански популации са се приспособили към тази екологична обстановка. В настоящата статия е приложен подход, основан на моделиране на разпределението на видовете максимална ентропия (Maxent), за да се направи характеристика на диахронната промяна в екологичното разпределение на неолитните селища. Процедурата Maxent по същество определя характеристиките и степента на това, което може да се тълкува като човешка екологична ниша. Диахронната интерпретация на резултатите показва, че има значителна степен на консерватизъм в нишата през целия неолитен период. Повечето селища обикновено са разположени на благоприятни за земеделие терени. Въпреки това, се забелязват и други варианти на разполагане на селища, които водят до разширяване на човешката екологична ниша, в която, с течение на времето, се включват и по-неблагоприятни за земеделие площи. Обсъдени са потенциалните последици от подобна експанзия, сред които решаваща роля вероятно са играли демографското увеличение и подобренията в селскостопанските практики.



White Pigments Used for Inlay and Painting on Pottery Dated Back to the Neolithic and Chalcolithic Period (Archaeometric Study)

Angelina Pirovska ^a

^a Department of Archaeology, Faculty of History, Sofia University “St. Kliment Ohridski”, 15 Tsar Osvoboditel Blvd, 1504 Sofia, Bulgaria; pirovska.ar@gmail.com

ABSTRACT

White, yellow, red, brown and black pigments were used for the decoration of pottery in the prehistoric period on the Balkans. The use of white pigment is the only technology of decoration which has undergone development between the 6th and 1st millennium BC. It was the prime colouring agent used for white painted pottery at the beginning of the Neolithic on the Balkan Peninsula. Gradually, in the Late Neolithic, completely different decorative technique was introduced: white paste was applied on the outer or inner surface of the vessels. Further archaeometric studies will answer the question whether the raw material, the composition of the white pigment or only the method of preparation, depending on the type of decoration (paint or inlay), was changed.

This paper is focused on the archaeometric characterization of pigments used for different types of pottery decoration – incrustation or painting. More than 50 pottery sherds from 13 archaeological sites located in Western, Central and Eastern Bulgaria and dated back to the Neolithic and the Chalcolithic were analysed. A multi-analytical approach including different techniques was used for identifying the inorganic ingredients of the pigments. The main analysis is XRD (X-ray diffraction) considering that the white paste is made up of inorganic materials (minerals).

KEYWORDS

white pigment, inlay, pottery, paint, XRD

Introduction

During prehistory on the Balkans, various pigments were used for the decoration of ceramics – white, yellow, red, brown, black. During the long period of its use (6th–1st millenium BC), only the white pigment undergoes development in the technology of decoration. At the beginning of the Neolithic Age on the Balkan Peninsula, it appears as the prime coloring agent for decorative applications on ceramics. A paint (homogenized thick or diluted solution) was used, which was applied with an instrument over a flattened, smoothed or polished surface, probably before the baking of the vessel. Gradually, close to the end of the epoch, a radically different technique of decoration appears, white paste was inlaid on the outer or inner surface of the vessels. The pigment comprises of materials with different consistencies (a paste of components with a variety of gauges), which implies another way of fixing and applying it, most probably after the baking, thus indicating a completely new technology. Incrusted decoration persists up to the beginning of the Early Iron age, whereas the painting with white coloring agent disappears much earlier, at the beginning of the Chalcolithic.

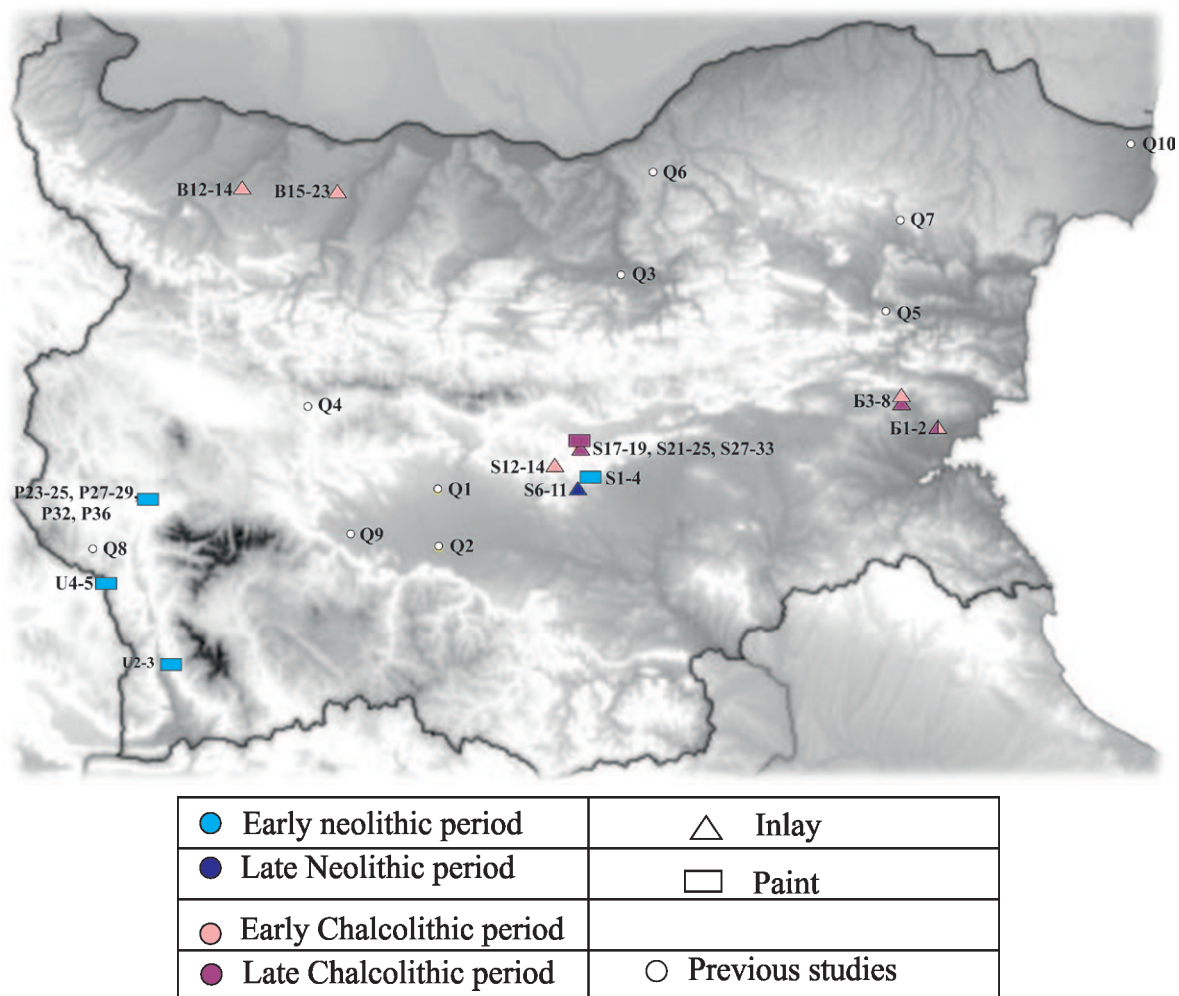


Fig. 1. Map of Bulgaria showing the site from where the samples were taken with their number and the archaeological sites mentioned in previous studies (Q1-10) (figure by A. Pirovska)

Фиг. 1. Карта на България с отбелязани на нея местата на археологическите обекти, от които са взети керамичните фрагменти с номера на пробата и тези, които са изследвани в предходните проучвания (Q1-10) (изработка А. Пировска)

The archaeometric analysis of white pigment, used for decoration of the ceramics from all over Europe, presents great variety in the mineral composition: anatase, talc, kaolin, apatite or hydroxylapatite, calcium oxide, calcium carbonate, dolomite. These raw materials have a different base composition and structure, leading to different properties. Whether the raw material, or the composition of the white pigment, or only the way of preparation (depending on the way of decoration- paint or inlay) has changed, is a question that can be answered through archaeometric investigations.

In this paper, we focus on the archaeometric characterisation of white pigments used for different kinds of decoration on pottery – incrustation or painting. The purpose is to determine their composition and to draw conclusions about the used pigment on the territory of Bulgaria dated to Neolithic and Chalcolithic period.

Studies in Europe

European studies of ceramics decorated with white pigment dated to prehistory provide a basis for comparison. A detailed analysis of the inlaid paste on the Chalcolithic ceramics in Spain was

made. The analyses show the presence of calcium oxide and carbonate, and hydroxylapatite as major components in the white pigment. (Odriozola, Hurtado Pérez 2007, 1794-1796). In the Chalcolithic, two technology groups, which occupy a different territory and belong to two distinct cultural groups (Odriozola, Hurtado Pérez 2007, 1802), can be distinguished by the raw material used for making white pigment for inlay on ceramics in the Iberian peninsula.

A white matter analysis was made on ceramic vessels from the Chalcolithic era from the territory of Hungary. The data show that a mixture of predominantly pre-ground and roasted bones was used, based on Ca/P ratio and crystal lattice. In addition, another material is used - lime, which presents two different raw materials by which the potter masters made the inlay white. According to studies on ceramics from the late Chalcolithic, Early and Middle Bronze Age on the territory to the west of the Carpathians and Danube area, the white paste used for inlaying was made from crushed animal bones, while in the middle Neolithic it was made from clay, and in the late Neolithic - from calcite (Parkinson et al. 2010, 64-70, Roberts et al. 2008, 322-330).

The culture of inlaid ceramics spread throughout Hungary during the Bronze Age is differentiated into different types based on the ornamentation and the structure of the ceramics. The white pigment used for inlay is composed of calcium carbonate or biogenic apatite, which are of different origin and technology of preparation (Roberts et al. 2008, 322-329).

In the neighboring area, occupied by the Tripoli-Cucuteni culture, white pigment analyzes were also carried out, for both inlay and ceramics. The data identifies light kaolinitic clay with a high concentration of calcium carbonates, silicates or titanium minerals (anatase, rutile) as raw materials. The variety of impurities is due to the various used deposits, which implies the use of local clay (Pozdrinina et al. 1999, 33-37, Constantinescu et al. 2007, 280-288, Buzgar et al. 2010a, 6-14, Buzgar et al. 2013b, 41-50).

Previous studies in Bulgaria have the potential to use a larger amount of results and to cover the vast majority of the studied pigments for comparison.

Studies of white pigment, applied as paint on the surface of Early Neolithic ceramics from the settlement near the village of Djulyunitsa (fig. 1, Q3), define clay with a high content of calcium as the main raw material. The studied materials distinguished imported ceramics with a different mineral composition of white talcum with amesite or chrysotile (Dzhanfezova et al. 2014, 150-154, fig.8).

The chemical composition of the white substance used on ceramics from the late Neolithic and Chalcolithic from Koukata mogila, to the village of Duvanliy (map Q1) and the Yasaptepe mound in Plovdiv (map Q2) was determined. Beside fragments of vessels in white embroidered ornamentation, gypsum tiles found in a ceramic tile were subjected to analysis. The spectral analysis shows that white matter and gypsum tiles contain a large amount of calcium, and have almost the same chemical composition (Peykov, Lautlieva 1971, 58-62).

It was found that the white pigment used on early Chalcolithic ceramics from Panagurishte (map Q4) is based on calcium carbonate (Hristov 2003).

X- Ray phase analysis is made on materials from the Early and Middle Chalcolithic from a settlement mound near the village of Sava, Northeastern Bulgaria (fig. 1, Q5). Mineral calcite predominates, which is identified as the basis for the white paste used for inlaying (Kostov 2005, 80-81, Table 1, 2).

An analysis of the white pigment was made on 7 ceramic fragments originating from settlements situated on the territory of the four Chalcolithic ethno-cultural areas in the present Bulgarian lands. These are the settlement mound Sava (fig. 1, Q5) and the altitude settlement in Kaletto near the village of Svalenik, Rousse (fig. 1, Q6) (Early Chalcolithic); from the village of Koriya near Suvorovo, Varna (fig. 1, Q7) (middle Chalcolithic); from the village of Skaletto, near the village of Vaxevo, Kyustendil (fig. 1, Q8), Kapitan Dimitriev (fig. 1, Q9) and the Big island settlement near

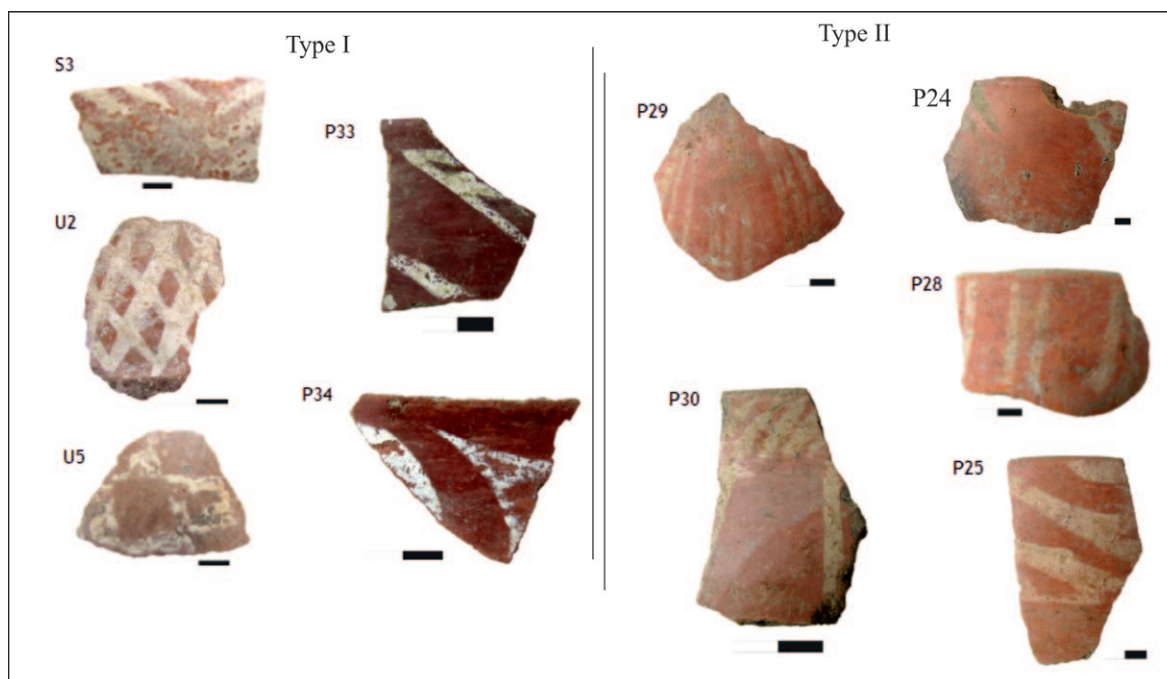


Fig. 2. Samples of pottery fragments with decoration of white pigment applied as paint. Macroscopic analysis (photos by A. Pirovska)

Fig. 2. Керамични фрагменти с украса от бяла боя (снимки А. Пировска)

the village of Durankulak (fig. 1, Q10) (late Chalcolithic). The study was performed using Scanning Electron Microscopy. It was found that in the white matter lime predominates, to which small quantities of quartz, white mica, rarely plagioclase (albit), potassium feldspar, anatase, jarosite and/or pieces of unbleached limestone are added. According to the researchers, the pigment is applied after the ceramic vessel is baked (Ivanov 2014, 28-31, Appendix 3).

According to the available analyses of white pigment on ceramics from Europe, several materials that were used as raw materials for white inlay (quote) can be distinguished. These are crushed and pre-baked bones (biogenic apatite); calcite in different forms - lime, marble, limestone; gypsum; talc, titanium minerals – anatase or rutile, titanate.

The archaeometric analyses of white pigments used for decoration of ceramics in the Neolithic and Chalcolithic on the territory of Bulgaria are mainly consistent with homogeneous material based on calcite. It is formed as calcium carbonate or oxide in different manifestations - lime, marble, limestone.

Data and methods

In this paper, we focus on the archaeometric characterisation of white pigments used for different kinds of decoration on pottery – incrustation or painting. The fragments are from different archaeological sites located in Western, Central and Eastern Bulgaria, dated to Neolithic and Chalcolithic period. We made analyses on more than 50 ceramic pieces from 13 archaeological sites (fig. 1).

In order to identify the inorganic ingredients of the pigments we used a multi-analytical approach, incorporating different techniques. The leading analysis is XRD (X-ray diffraction), considering that the white paste is made up of inorganic materials as various minerals.

The essence of the pigments is decisive for choosing the chemical and physical methods of analysis. Inorganic paints are mainly composed of minerals acting as colorants. The main purpose of the present work is to determine the inorganic pigment composition, which is to be achieved by X-

ray analysis. The X-ray powder diffraction method (XRD) is the most reliable method for identifying crystalline materials (Nakai, Abe 2012, 279-280). The analyses are made through a TUR M62 X-ray diffractometer using a Fe-filtered Co X-ray irradiation in the range of $4-80^{\circ} 2\theta$ in conditions of 30 kV and 10 mA. The Phase Identification is based on the International Powder Diffraction File, ICDD.

An infrared analysis was then used to refine the results obtained on a portion of the samples, regardless of whether they were of a biogenic nature or not. FTIR spectrum was collected with a Bruker, Vertex 70 spectrophotometer in transmission mode in the range of $4000-400\text{ cm}^{-1}$. The powdered sample was dispersed in Nujol and spread on a KBr window. The reference spectrum of pure Nujol was used to compensate its own bands in all spectral regions. The spectrum was obtained by averaging 100 interferograms with a resolution of 2 cm^{-1} .

Description of the samples

The materials collected for the study are selected to represent the group-specific decoration for which a pigment is used. Most fragments are small to medium in size, which is unusual for the shapes of the vessels. They can be classified as fine or rough ceramics according to their thickness, dough and structure.

The macroscopic analysis of the white pigment applied as paint determines a differentiation of two types of paint with different physical properties of thickness and density (fig. 2).

Type I – thick layer, high density, the pigment detaches as a separate layer from the surface of the ceramic. It is easily distinguished as a slight convex relief that stands out from the polished or smoothed surface of the pottery. It is possible that the pigment has been applied after the baking of the pottery, but the attachment itself could be as a result of a secondary baking or another gluing agent.

Type II – even without magnification, it can be noticed that the pigment is applied on a very thin layer with low density. In some areas the paint is transparent and impregnated in the outer layer of the ceramic base. Most probably, a liquid solution was used, applied before the baking of the pottery, while the surface was still porous and had absorbed some of the pigment.

The macroscopic analysis of the white pigment applied as paste determines a differentiation of three types of material with different physical properties – particle size (fig. 3).

Type I – paste with large gauge particles

Type II – paste with small gauge particles

Type III – paste with a homogenous structure

Each of them correlates to a different type of dents and incisions at the base. Type III fills thin and shallow incisions, or very wide and shallow grooves. The other two types have been used for deep and wider incisions.

The macroscopic analysis represents the physical qualities of the material used in its final condition. This is due to the technological properties of the method of decoration.

The archaeometric analysis identifies the essence of the mineral composition of the white pigment used for decoration regardless of their technological groups. A few minerals are determined as a base: Quarts, Illite, Muscovite, Plagioclase, Feldspate. These are the clay carriers, to which a specific material is added to form the pigmentation of the consistence. The differentiation of the different types of paint is determined according to the mineral used for the main pigment (Table 1, 2).

Results and discussion – Mineralogical (XRD) Analysis

The archaeological sites from which the samples were selected cover the territory of several cultural groups. In Southwest Bulgaria, during the Neolithic period, the culture of the West-Bulgar-

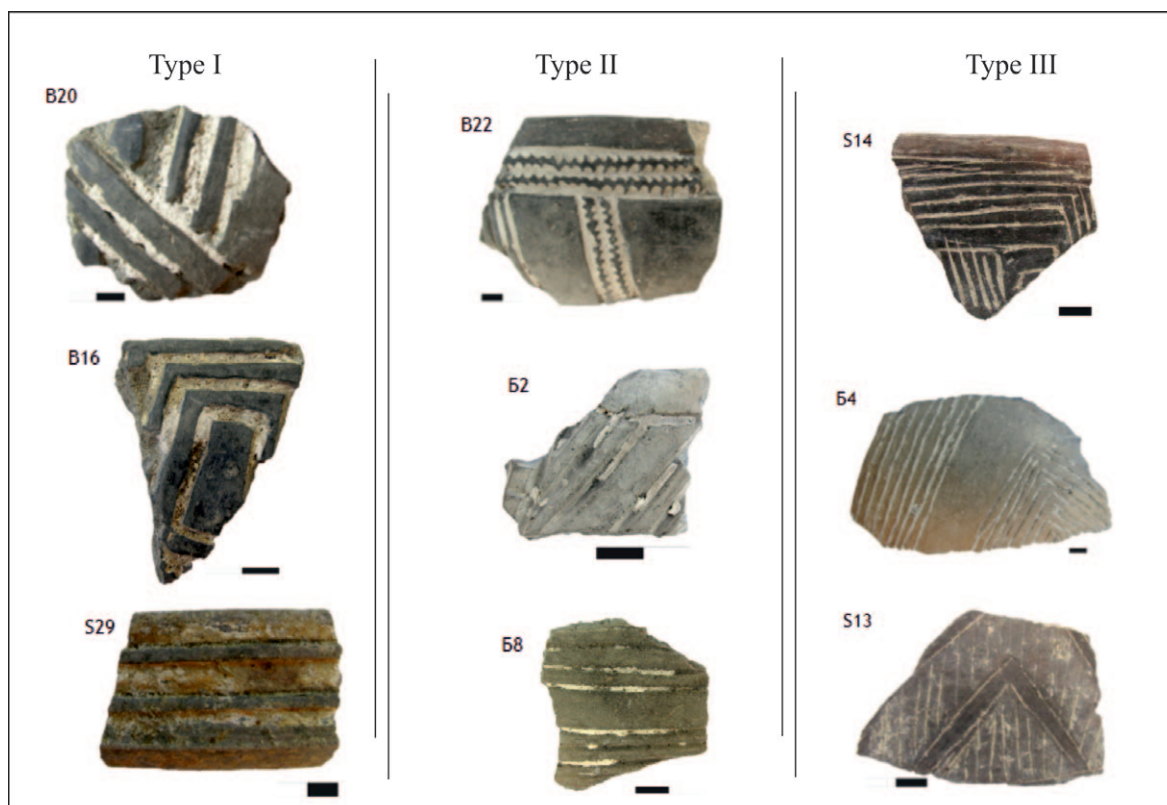


Fig. 3. Samples of pottery fragments with decoration of white pigment applied as paste. Macroscopic analysis (photos by A. Pirovska)

Фиг. 3. Керамични фрагменти с украса от инкрустирана бяла паста (снимки А. Пировска)

ian painted ceramics, which belongs to the Balkan-Anatolian Early Neolithic Complex, was spread. Typical ceramic decorations from this cultural group are painted with a white painting. It is represented by 12 ceramic fragments from 3 archaeological sites (fig. 1, P, U). According to X-ray analysis of white pigment, calcite is mainly used (Table 1). Only one sample shows gypsum.

In Central Bulgaria, the geographical area of the Thracian Lowland during the Neolithic period, another cultural group developed. It is represented by 6 ceramic fragments of 2 archaeological sites (fig. 1, S). Analyses identify calcite as a major mineral in white paint (Table 1). Talc was added in two of the samples (fig. 4, S1). In the same settlement from the early Neolithic there are two types of ceramic decoration paint, which can not be distinguished by visual inspection (fig. 4, S1 and S4). This raises the question of whether the materials are imported from another area (which is less likely, and can be determined by other physical and chemical methods of analysis) or, at the same time in this village, they used two different techniques to prepare the white paint.

According to the XRD analysis, we could clearly distinguish two types of colorants used for the manufacturing of white pigment as paint – with or without calcite. Specific mineral impurities could be determined as local features (gypsum in the region of Pernik, North West Bulgaria; and talc around Stara Zagora, Central Bulgaria).

At the beginning of the Chalcolithic on the territory of Bulgaria white paste inlay decoration appears. In this period, in Northwestern Bulgaria, the cultural group Gradeshnitsa is developing. It is represented by 12 ceramic fragments from 2 archaeological sites (fig. 1, B). According to the X-ray analysis, the white paste used to inlay the ceramic fragments from both archaeological sites is made mainly of calcite (Table 2). In one of the villages – Brenitsa, Vratsa, in three of the samples another type of mineral lacking calcite is defined. Two of them are made of gypsum and barite or bassanite

№ по ред	проба	Q	illite	Fs	calcite	talc	gypsum
1	S1	~	~	-	+	+	-
2	S2	+	-	-	+	-	-
3	S3	+	-	~	+	+	-
4	S4	+	-	~	+	-	-
5	S25	~	-	~	+	-	-
6	S28	+	-	-	+	-	-
7	P23	+	+ Ms	+ Pl	-	-	-
8	P24	+	+ Ms	+	-	-	-
9	P25	+	+ Ms	+ Pl	~	-	-
10	P27	+	+	+	+	-	-
11	P28	+	+	+ Pl	-	-	-
12	P29	+	+ Ms sericite	+ Pl	-	-	-
13	P32	-	+ Ms	-	+	-	-
14	P36	+	+ Ms sericite	+ Pl	+	-	+
15	U2	+	+	+	+	-	-
16	U3	+	+	+	+	-	-
17	U4	+	+	-	~	-	-
18	U5	+	+	+	-	-	-

Table 1. Mineralogical composition of investigated samples of inlayed paste by XRD analysis: Q = quartz, ill = Illite, Fs = feldspar, Pl = plagioclase, cal = calcite, Px = Pyroxene, Ms = Muscovite; + (present), ~ (little present), – (not observed)

Таблица 1. Минерален състав на пробите взети от инкрустирана бяла паста според Рентгенофазов анализ: Q = кварц, ill = илит, Fs = фелтшпат, Pl = плагиоклаз, cal = калцит, Px = пироксен, Ms = мусковит; + (наличен), ~ (малко количество), – (не е засечен)

(fig. 5, B19, B22). Barite deposits are found in the geographic area around the archaeological site (Tokmakchieva, 233-234), which suggests the use of local raw material to make the pigment.

Only one of the samples for white pigment used for Mineralogical (XRD) analysis was created from apatite (fig. 5, B23). For the determination of its characteristics, we did analysis with Fourier transform infrared spectroscopy (FTIR). The data revealed that the used apatite is of biological origin. The most probable explanation is that this is because of an import of ceramic material, but this can be confirmed only after a new archaeometric study.

The cultural groups in Central Bulgaria through the Chalcolithic are represented by 22 ceramic fragments from 3 archaeological sites (fig. 1, S; Table 2). According to the X-ray analysis, the base mineral used to make the white paste for inlay is calcite. Thirteen of the ceramic samples are collected from all of the residential horizons of a settlement mound. They represent a kind of ornamentation - inlay with white paste, for a long time in one settlement. All specimens have a uniform composition, the major mineral being calcite. Only one of them contains dolomite. It is most likely that one deposit was used to extract the raw material needed to produce the white paste during the entire period of occupation of the settlement. The presence of a fragment with a different composition can be explained by extruded material.

In the same micro region from another archaeological site, the white paste used for inlaying on three ceramic fragments was examined. X-ray analysis, again, determines calcite as the major mineral (Table 2, fig. 1, S). In two, however, there is also clinocllore (fig. 5, S14), which determines a different composition of the raw material used. Most likely, the pottery decoration paste is locally made and the raw material is extracted from another deposit. These results raise the question of the centralization of ceramic production. The use of different fields for the extraction of raw materials to

№ по ред	проба	Q	illite	Fs	calcite	clinochlore	kaolinite	dolomite	gypsum	bassanite	barite/ hyalophane	apatite
1	S6	+	-	~	+	-	-	-	-	-	-	-
2	S7	+	-	+ Pl	+	-	-	-	-	-	-	-
3	S8	+	-	+	+	-	-	-	-	-	-	-
4	S9	+	+	~	+	-	-	-	-	-	-	-
5	S10	+	+	-	+	-	-	-	-	-	-	-
6	S11	+	-	-	+	-	-	-	-	-	-	-
7	S12	+	-	-	+	-	-	-	-	-	-	-
8	S13	+	-	-	+	+	-	-	-	-	-	-
9	S14	+	+	-	-	+	-	-	-	-	-	-
10	S17	+	-	+ Pl	+	-	-	-	-	-	-	-
11	S18	+	-	~ Px	+	-	-	-	-	-	-	-
12	S19	+	+	+	-	-	-	-	-	-	-	-
13	S21	+	-	-	+	-	-	-	-	-	-	-
14	S22	+	+	+ Pl	+	-	~	-	-	-	-	-
15	S23	+	-	~	+	-	-	-	-	-	-	-
16	S24	+	-	~	+	-	-	-	-	-	-	-
17	S27	+	-	~	+	-	-	-	-	-	-	-
18	S29	+	~	~	+	-	-	-	-	-	-	-
19	S30	+	+	~	+	-	-	-	-	-	-	-
20	S31	+	+	-	+	-	-	+	-	-	-	-
21	S32	+	-	~	+	-	-	-	-	-	-	-
22	S33	+	-	~	+	-	-	-	-	-	-	-
23	B12	+	-	~	+	-	-	-	-	-	-	-
24	B13	-	-	-	+	-	-	-	-	-	-	-
25	B14	~	-	-	+	-	-	-	-	-	-	-
26	B15	~	-	-	+	-	-	-	-	-	-	-
27	B16	+	+ Ms	+ Px	+	-	~	-	-	-	-	-
28	B17	~	-	-	+	-	-	-	-	-	-	-
29	B18	~	-	~	+	-	-	-	-	-	-	-
30	B19	-	-	-	-	-	-	-	+	+	-	-
31	B20	-	-	-	+	-	-	-	-	-	-	-
32	B21	-	-	-	+	-	-	-	-	-	-	-
33	B22	-	-	-	-	-	-	-	+	-	+	-
34	B23	+	-	-	-	-	-	-	-	-	-	+
35	Bu1	+	+ Ms	-	-	-	-	-	+	-	-	-
36	Bu2	+	-	-	+	-	-	-	-	-	-	-
37	Bu3	+	-	-	+	-	-	-	+	-	-	-
38	Bu4	+	+	+	+	-	-	-	-	-	-	-
39	Bu5	+	-	+	+	-	-	+	-	-	-	-
40	Bu6	+	+	+	+	-	-	-	-	-	-	-
41	Bu7	+	-	-	+	-	-	-	+	-	-	-
42	Bu8	+	-	-	+	-	-	+	-	-	-	-

Table 2. Mineralogical composition of investigated samples of paint by XRD analysis: Q = quartz, Fs = feldspar, Pl = plagioclase, Ms = Muscovite; + (present), ~ (little present), – (not observed)

Таблица 2. Минерален състав на пробите взети от бяла боя според Рентгенофазов анализ: Q = кварц, Fs = фелтипат, Pl = плагиоклаз, Ms = мусковит; + (наличен), ~ (малко количество), – (не е засечен)

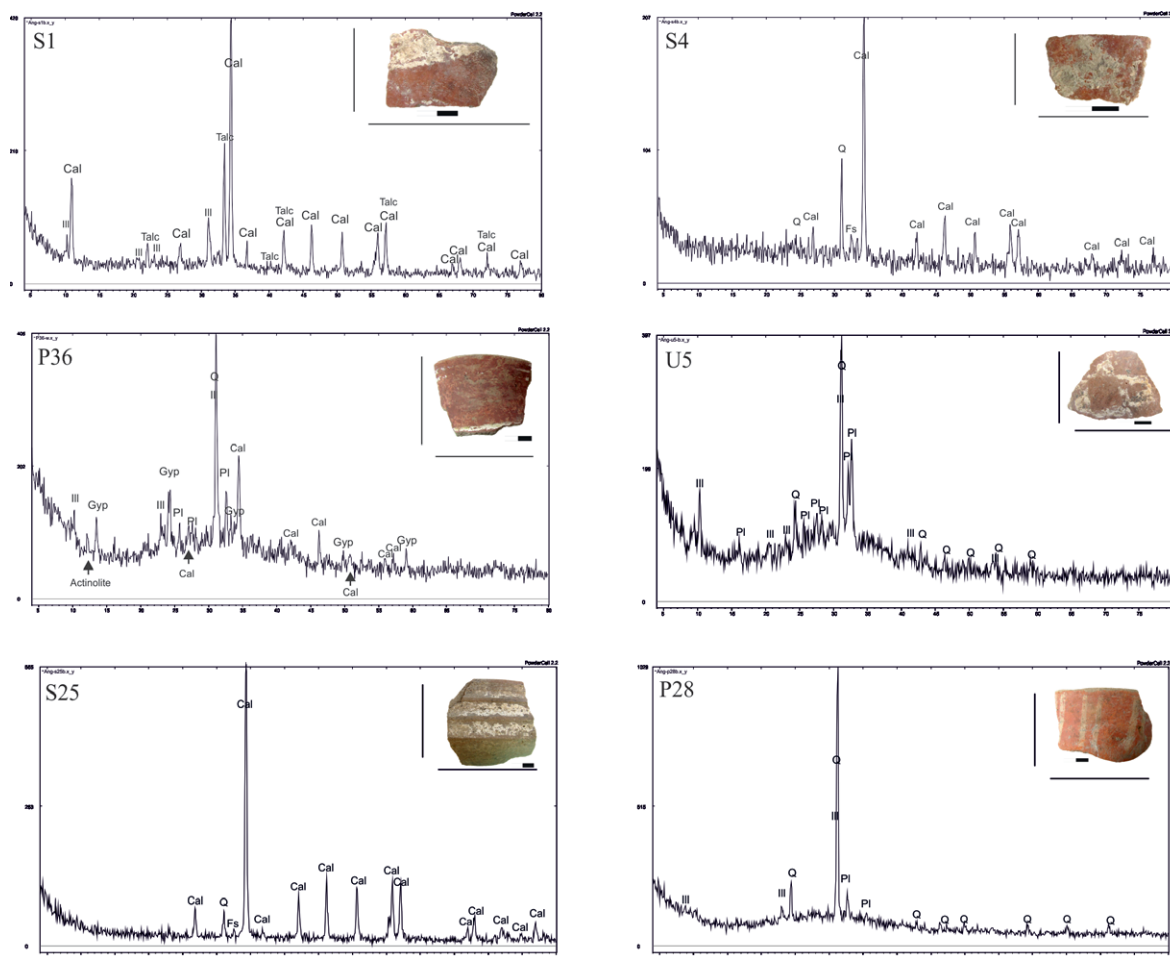


Fig 4. XRD spectrum of white pigment used as paint: Q = quartz, ill = Illite, Fs = feldspar, Pl = plagioclase, cal = calcite, Ms = Muscovite, Gyp = gypsum (figure by A. Pirovska)

Фиг. 4. Рентгенограми на бял пигмент използван като боя: Q = кварц, ill = илит, Fs = фелтшпат, Pl = плагиоклаз, cal = калцит, Ms = мусковит, Gyp = гипс (изработка А. Пировска)

prepare the white paste involves local manufacture of pottery, even in a small micro-region.

In the eastern part of the Thracian Plain, at the same time, another cultural group was developed during the Chalcolithic, which is represented by 8 samples, two archaeological sites (fig. 1, Bu). Again, in all samples, calcite is present as the main component, with the exception of one (Table 2, fig. 5, Bu2, Bu7). In addition, the X-ray analysis determines the presence of gypsum in three pieces, or dolomite, in two. The variety of raw material used to produce the white paste can be explained by the use of two different deposits, which in turn implies the distinction between two ceramic production centers.

According to the XRD analysis, we could clearly distinguish two types of materials used for the manufacturing of white pigment paste for inlay: with and without calcite (Table 2).

Specific mineral impurities can be determined as local features (dolomite or clinocllore in the region of Stara Zagora, Central Bulgaria and Burgas, Central East Bulgaria, and the other is kaolinite in Stara Zagora, Central Bulgaria and Vratsa, North West Bulgaria). This could be due to the usage of different sites to acquire the necessary material.

The second type of material can be clearly distinguished as the base for the production of white pigment as paste for inlay. This is gypsum. It is used in combination with calcite, or by itself. Specific mineral impurities could be determined as local features (bassanite, or barite or hyalophane). This

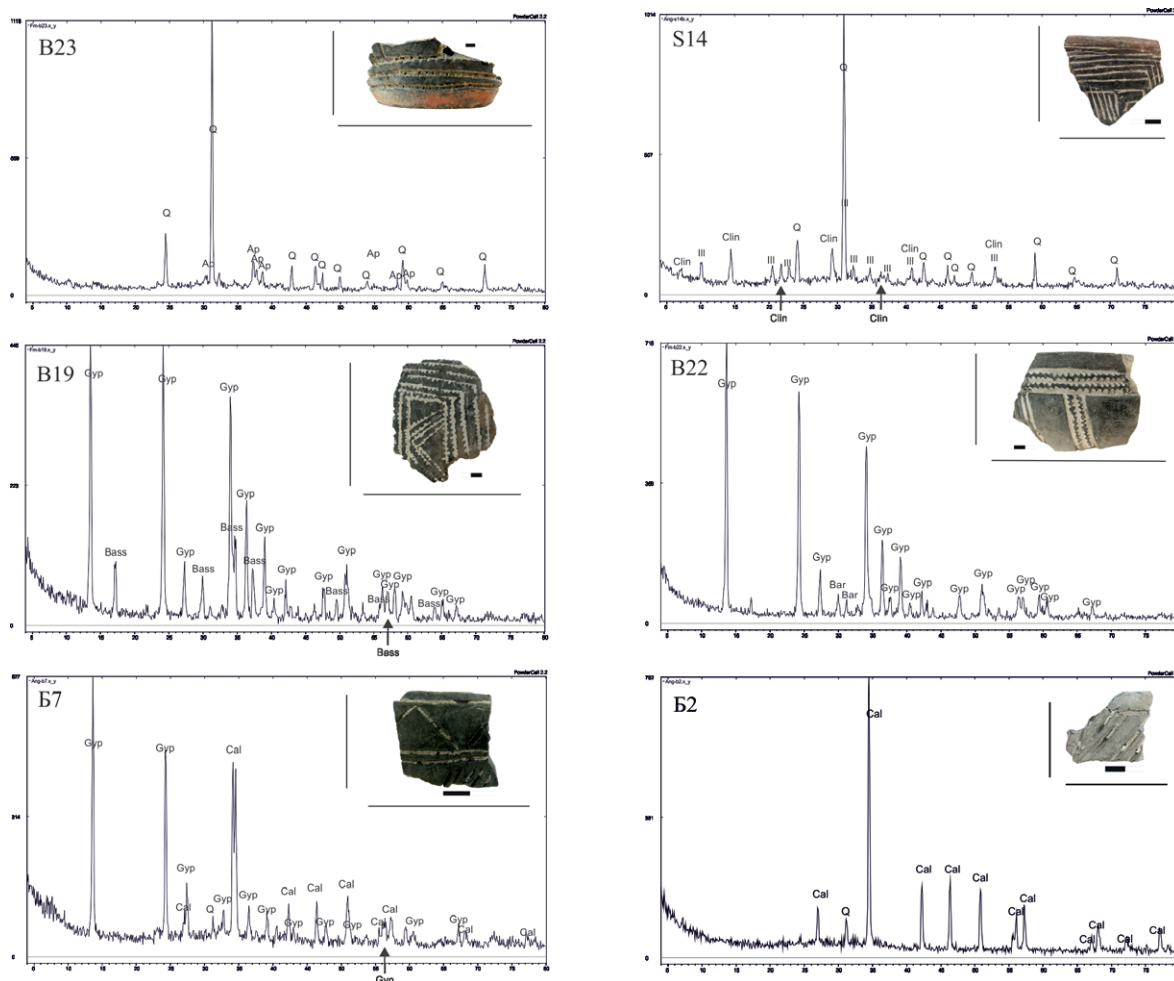


Fig 5. XRD spectrum of white pigment used as paste: Q = quartz, ill = Illite, Fs = feldspar, Pl = plagioclase, cal = calcite, Ms = Muscovite, Gyp = gypsum, Ap = apatite; Clin = clinocllore, Bass = bassamite, Bar = barite (figure by A. Pirovska)

Фиг. 5. Рентгенограми на бял пигмент използван като паста: Q = кварц, ill = илит, Fs = фелтшпат, Pl = плагиоклаз, cal = калцит, Ms = мусковит, Gyp = гипс, Ap = апатит; Clin = клинохлор, Bass = басамит, Bar = барит (изработка А. Пировска)

could be due to the usage of different sites to acquire the necessary material. The mixture of the two basic materials used for the creation of white pigmentation could be a result of the specific features in the technology for the preparation of the material.

The great variety of white pigment composition in a small micro-region may be a reflection of an increased movement of people and goods. This conclusion would need to be confirmed by a more thorough study.

Conclusions

The main material used for the manufacturing of white pigment on the territory of Bulgaria is calcite (fig. 6).

The variations of the technological groups determined by the physical properties of the pigment are not influenced by its composition. The different types of paint and paste with different gauges are prepared from the same materials. Most probably the main differences are in the process of preparation of the pigment and the technic of application and attachment (with gluing agent or

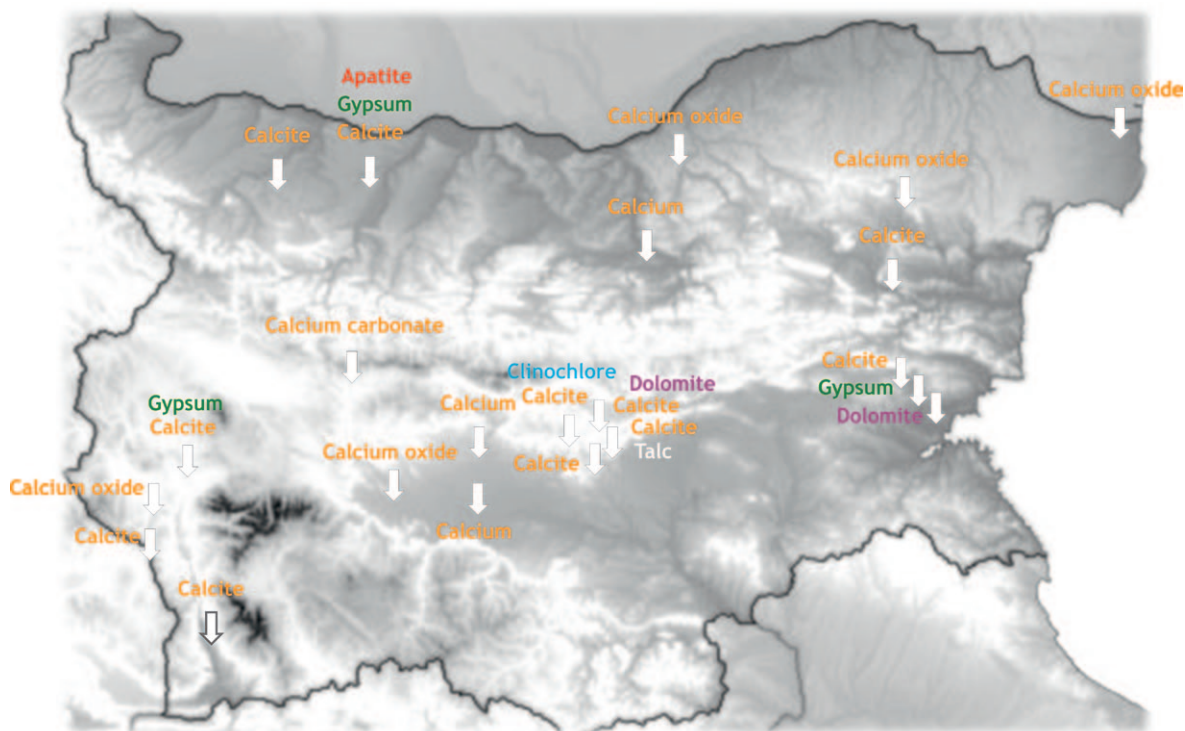


Fig. 6. Map of Bulgaria showing the XRD results of the main mineral used as white pigment
(figure by A. Pirovska)

Фиг. 6. Карта с основните минерали, които са използвани за изработка на бял пигмент за украса на керамични съдове през неолита и началото на халколита на територията на днешна България (изработка А. Пировска)

baking), but not the composition.

The presence of a variety in the mineral components of the pigment could be a result of local specifications – the availability of the resources and knowledge about local and imported materials.

The presence of a similar composition of the white pigment used for inlay on ceramics in distant regions could be a result of an import of ceramics or transmission of knowledge.

On the territory of the same micro region, different sites for acquiring of resources have been used. This suggests decentralization of the ceramic production connected to the manufacturing of white pigment.

During the time from the beginning of the Neolithic to the end of the Chalcolithic period, a change of the recipe for the preparation of the white pigment could not be determined, nevertheless the change in the technology for decoration.

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Характеристика на белия пигмент използван за украса чрез инкрустация и рисунка върху керамика от неолита и халколита (археометрично изследване)

Ангелина Пировска

(резюме)

В праисторията на Балканите за декорация на керамика са използвани различни пигменти – бял, жълт, червен, кафяв, черен. През дългия период на своето използване (VI–I хил. пр. Хр.) единствено белият пигмент претърпява развитие в технологията на украсяване. В началото на неолита на Балканския полуостров, той се появява като първия използван оцветител за нанасяне на украса върху керамика. Използвана е боя (хомогенизиран гъст или рядък разтвор), която е поставяна с инструмент върху загладена, излъскана или полирана повърхност, най-вероятно преди изпичането на съда. Постепенно в края на епохата се появява коренно различна техника на декорация. Инкрустацията изисква друга консистенция на материала за украса (паста с различни по едрина компоненти), друг начин на закрепване и на нанасяне, най-вероятно след изпичането на съда, т. е. напълно нова технология. Този метод на украса се запазва до началото на ранно желязната епоха, докато рисуването с боя изчезва доста по-рано, към началото на халколита.

Дали суровината и състава на белия пигмент се променя или само начина на подготовка в зависимост от начина на украсяване – боя или инкрустация, е въпрос, на който може да се отговори чрез археометрични изследвания.

В тази статия сме направили анализ на повече от 50 керамични фрагмента от 13 археологически обекта от територията на България, датирани в периода от началото на неолита до края на халколита. За определянето на състава на бялата боя и паста са използвани няколко физични метода, като водещият е Рентгенофазов анализ, имайки предвид, минералния състав на пигментите.

Резултатите показват, че няма значителна разлика в състава на белия пигмент независимо от начина му на използване през целия период на употреба. Най-вероятно основните различия са в подготовката и начина на закрепване към повърхността, но не и на използваната рецепта.

Основният минерал е калцит, в различни негови проявления, по-рядко се разпознават гипс, талк, доломит, апатит. Наличието на специфични минерални фази в един микрорайон, е в следствие на използването на различни източници на суровина, което от своя страна говори за наличието на повече от един производствен център.

В същото време използването на един и същ минерал за изработката на белия пигмент на такава голяма територия пресичайки границите на отделните култури и векове представя наличието на връзка и обмен на познание между праисторическите керамични майстори.



Decoration Analysis of the Pottery Assemblage from Devnya Settlement

Stanimir Parvanov ^a

^a Department of Archaeology, Faculty of History, Sofia University “St. Kliment Ohridski”, 15 Tsar Osvoboditel Blvd, 1504 Sofia, Bulgaria; stynyto@gmail.com

ABSTRACT

The aim of this paper is to analyse in more detail the ornamentation of the pottery found in the Devnya settlement. It was excavated as part of the rescue excavations of the known Early Medieval cemetery Devnya-3. According to the leader of the excavations Ivan Ivanov, the settlement contains one layer, which is 20 cm thick, and according to the materials found, belongs to the Late Eneolithic period. It is very important to analyse the pottery because it comes from one of the few excavated settlements from the region of the Varna lakes. The region falls within the area of the Varna culture, known mostly for its cemeteries, but we know much less about the settlements in general.

All of the 1,282 samples known from the settlement were analyzed and decoration was found on 685 of them. For the purpose of a detailed examination, the pottery is classified on the basis of the technique of decoration. The following information on each of the techniques is then presented: technological implementation; on which types of vessels and on which parts of the vessels is each technique found; which other techniques it is combined with; in which variants/motifs it is found or which compositions it forms. The results from the analysis show that all of the techniques are used with a clear purpose. They give us more valuable data about the characteristics of the pottery of the population that inhabited this region and also of the Varna culture. At the current state of research, it appears that the main features of the ornamentation of the pottery from Devnya are identical to those from the other settlements from the lakes' region. Given the parallels at this moment, we believe that the pottery from Devnya could be dated to phase II of the Varna Culture, with a possibility of existing in phase I, at least in its final stage.

KEYWORDS

Devnya settlement, Varna lakes region, Late Eneolithic pottery, Decoration analysis, Varna culture

Introduction

The Devnya settlement was excavated during the summers of 1969 and 1970. It is located on the first overflow terrace of the west shore of Beloslav lake (fig. 1). The region falls within the territory of the Varna culture, which is dated back to the Late Eneolithic period – the middle and second half of the fifth millennium BC. Its areal is a strip of 30-40 km on the Black sea shore. It differs from the other neighbouring cultures with the burial rites, pottery style, some of the metal items used and the exceptional social stratification, visible in the cemeteries (Todorova, Tončeva 1975, 42-46; Тодорова 1985; Todorova 1990, 235-237; Slavchev 2017, 252). The culture is famous mainly with the discoveries of its cemeteries – Varna I, Devnya and Durankulak. The first two are located in the region of the Varna Lakes. Because of the huge amount of gold and copper items found, there is a large number of descriptions of the area of the lakes as the center of the culture as it differs from other

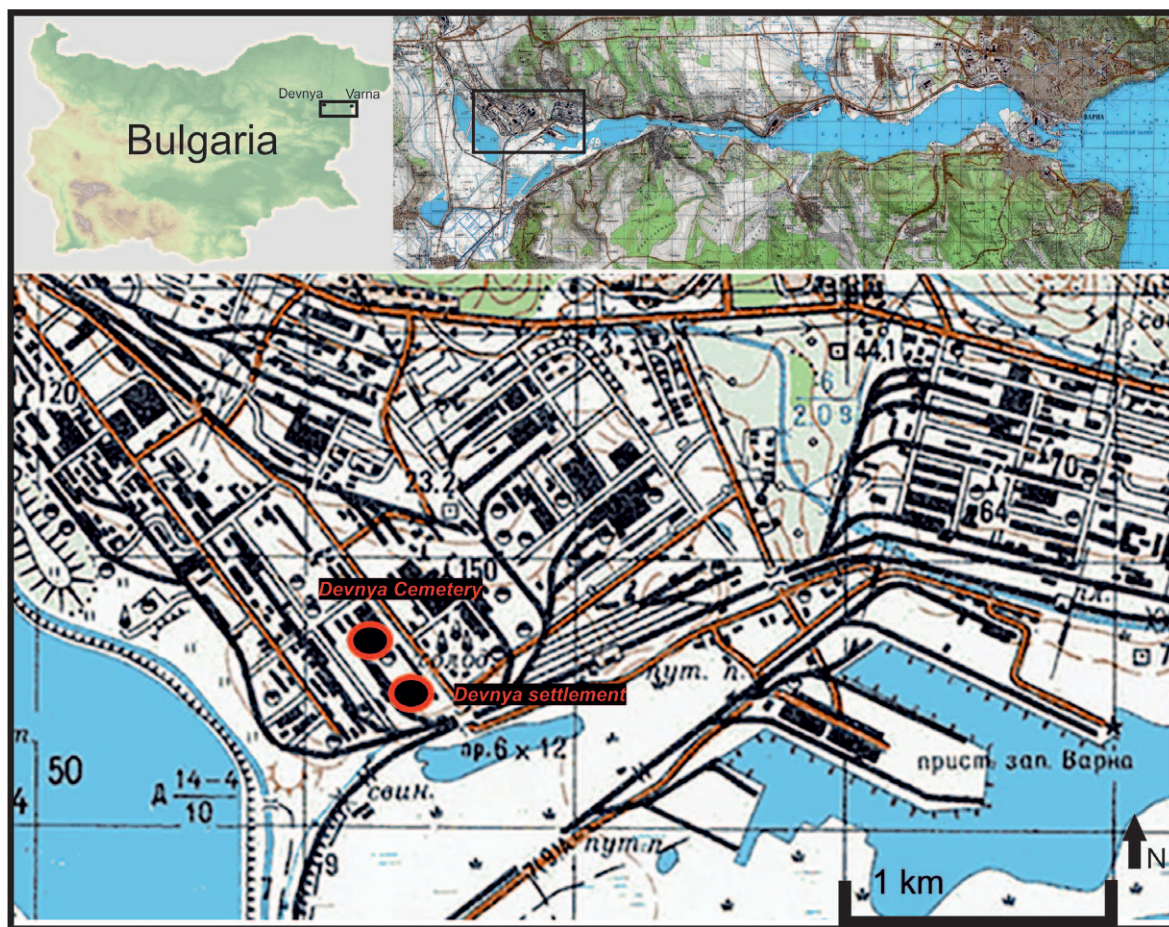


Fig. 1. Map of the settlement and the cemetery at Devnya (figure by S. Parvanov)

Обр. 1. Карта на селището и некропола при Девня (изработка С. Първанов)

regions in the late Eneolithic in an economic aspect, with highly developed trade and metallurgy, and clearly outlined social differentiation (Todorova 1986, 284, 286; Todorova 2003, 284-285; Ivanov 2000, 11-12; Slavchev 2010, 201-207). Most opinions about the character of the area are based on the cemeteries, but as to the settlements in general, we know much less.

We know at this point about ten settlements in the region of the Varna Lakes that are connected with the Late Eneolithic Varna culture. Except for Devnya and the newly excavated site at Avren-Bobata (Leshtakov, Ivanova 2016), the other settlements are currently submerged – they are below the current level of the lake waters, and were probably coastal settlements (Ivanov 1993; Slavchev 2017, 254). At this point, the materials known from them are not too many, but in general they display the main characteristics of the pottery of the region: Ezerovo (Todorova, Tončeva 1975), Strashimirovo (Margos 1973) and Povelyanovo (Parvanov 2019). The main features of the pottery of the culture are known from these sites and also from the tell and cemetery at Durankulak, the latter of which is, for now, the only site where all 3 phases are known (Todorova 2002; Georgieva 2014). On the basis of certain analogues from the Durankulak sites and tell Golyamo Delchevo, the lake settlements are dated to the IInd phase of the culture, with some portion of the material relating to phase III (Todorova, Tončeva 1975, 44-45; Slavchev 2017, 254). For now, there are no features which could be dated back to the Ist phase, except for one uncertain group of examples from Povelyanovo (Parvanov 2019, 78-79).

The reasons for the necessity to process the material from the settlement are numerous. For about 50 years after its discovery, too little attention has been paid to them. A short article on the

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settlement was published by Ivan Ivanov in 1972, where the author discusses the main features of the pottery and illustrates a part of the material found (Ivanov 1972). It is largely stored in the collection of the Varna Museum and, although it is highly fragmented and only a small quantity of intact vessels are known, it is important to handle it more precisely. Some of the material is washed out, covered with sticks or has been in a secondary firing. However, it is very important to analyse it because it comes from one of the few settlements from the region of the lakes that have been excavated archaeologically. The examples that could be typologically determined or those in very good condition are in sufficient amount to allow the technological, typological and ornamentation analyses of the pottery. They give us more valuable data about the characteristics of the pottery of the population inhabiting this region and also of the Varna culture. In a technological aspect, the material from this settlement is better preserved because the lake waters have washed out the pottery from the other settlements. Analyzing the pottery from one layered settlement could also be very helpful in the future for answering other important questions concerning the chronological position of the sites in the lakes region and the relative chronology between them. Another important reason is that there is no later prehistoric occupation of Devnya. Along with the Eneolithic materials, three EBA graves were explored. Out of these, 1 EBA intact vessel and parts of 2 other EBA vessels were found (Ivanov 1972, 252). Nevertheless, there is no data of any EBA mass material discovered within the context of the Eneolithic settlement. In this sense, the Devnya material would have great importance, because in all of the coastal settlements above the Eneolithic layer, the EBA one is available and they are mixed due to several reasons, which sometimes makes the distinction of a part of the material difficult.

The aim of this paper is to analyse in more details the ornamentation of the pottery found in the settlement. Despite the aforementioned studies of pottery from the region, there are none that present the specifics of the decoration in more detail. It is important to understand how the assemblage fits into the overall picture of the ornamentation characteristics of the culture. Also, it is necessary to seek out the chronological connection of the settlement to the other known sites from the lakes region.

Data about the settlement

During construction activities in the winter of 1968, on the first non-overflow terrace of the west shore of Beloslav Lake, in proximity of the Povelyanovo neighborhood of the town of Devnya, several graves from the Eneolithic were found (fig. 1; Todorova-Simeonova 1971, Tab. XIV). Rescue archaeological excavations, led by H. Todorova, could be implemented in the spring of 1969, and 26 graves in total were explored (Todorova-Simeonova 1971). The Devnya cemetery actually became the first archaeologically explored site of the Varna culture and the results thereof are commented to present date. During a field survey of the same terrace in 1968, at its southeastern end, A. Margos found pottery and flint tools at a depth of 0.40 m below the terrain (Ivanov 1972, 246; Margos 1972, 234). Materials from this location were also reported by H. Todorova in the spring of 1969. They were located some 500 m southeast of the cemetery excavated by her, spreading at 300 m along the end strip of the terrace and at a 0.30-0.40 m depth from the current level. Apart from pottery fragments, flint tools and a few wall plasters that were found, in Todorova's opinion a cultural layer was missing (Todorova-Simeonova 1971, 17). Rescue archaeological excavations of the early medieval cemetery of Devnya-3 were carried out for 2 months in the summer of 1969 and one month in 1970, led by D. Dimitrov (Dimitrov 1972; Ivanov 1972, 246). The aforementioned section of Eneolithic materials was found in its southern part, and Ivan Ivanov was responsible for the excavations in this sector. The explored area is located about 500 m away from the central building of Devnya TPP and about 150 m away of the Eneolithic cemetery (Dimitrov 1972, 45; Ivanov 1972, 250; Tab. V). Three structures were found – 2 sections of burned houses and 1 pit, and the cultural layer is only 0.20 cm

thick, at a depth of 0.40-0.60 cm from today's surface. It seems that the settlement was destroyed by subsequent digging and contemporary agricultural activities (Ivanov 1972, 246-250).

In his short publication about the settlement, I. Ivanov briefly presents the general characteristics of the vessels (Ivanov 1972, 248-249). They are made of purified clay, coloured in yellow-red to gray-black, mainly conical or biconical, very rarely with small knobs near the shoulders and band-shaped handles. Incised decoration is the most common, forming various geometric shapes, sometimes with roughened spaces between the lines. Channels or graphite decoration are rarely found, and polished lines are found on the smaller vessels. Large vessels have plastic bands with embossed impressions around the mouth (Ivanov 1972, 248-249). According to the author, the pottery has parallels in the settlements of Strashimirovo and Poveljanovo and the tells at Kodzhadermen, Salmanovo, Ruse and Levski, dated back to the late Eneolithic. At that moment, the Varna Culture was still not defined as an autonomous phenomenon, so I. Ivanov counted the site as part of the Kodzhadermen-Gumelnita Culture that is synchronous with Karanovo VI in Thrace (Ivanov 1972, 249, note 6). The site was identified as a single layer settlement that existed in the late Eneolithic (Ivanov 1972, 249-250).

As to the settlement's nature, the researchers of the two sites of Devnya take different positions. In H. Todorova's opinion, the settlement of the explored cemetery was not located on the same terrace because there were no indications of a cultural layer even in the multiple excavation profiles (Todorova-Simeonova 1971, 16). She thinks that the cemetery should belong to a pile settlement located in the lake (subsequently accepted to be coastal settlements), stating that the findings of the south-eastern corner of the terrace are scattered and dislocated Eneolithic materials without a cultural layer. In her opinion, they probably belong to a "coastal outpost" (picket) of said pile settlement since it is located on a convenient road to the valley. She even assumes that the pile settlement's inhabitants used a waterway to reach the bay in which the cemetery was located (Todorova-Simeonova 1971, 17). Respectively, I. Ivanov thinks that the cemetery belongs to the settlement explored by him. He indicates as evidence: the close proximity, their dating back to the late Eneolithic and the same yellowish colour of the flint from both sites, which is clearly different from the flint tools from the pile settlements. Also, the similarity of the pottery, expressed in the vessel facture, shape and colours, is significant (Ivanov 1972, 250). This opinion is shared by A. Margos who, due to the huge resemblance of the materials from both sites, excludes the possibility for the cemetery to belong to "some pile settlement" (Margos 1972, 234, note 4; Margos 1978, 148). Surprisingly, the discussion has stopped. Since then, the matter has neither been commented by the authors mentioned above nor by any other experts. Even more surprising is the fact that, to this day, the settlement in Devnya is very rarely discussed and examined in the scientific literature.

Technological features of the pottery

The pottery analyzed in this publication originates from the three researched complexes and the areas between them, and due to the specifics of the study, they are considered together. At this stage the technological features can be presented very briefly. The dishes and bowls are mostly with a very well burnished surface, sometimes polished to a shine, less often smoothed and in rare occasions rough (fig. 18.1-2, 4-6). The paste is mixed very well and the admixtures are in low to medium concentrations and usually in different combinations, but the most common are sheer sand and grog (fig. 18.1, 2, 6). The most common colour is black, but different shades of brown are also common, which happens to be a difference from the other settlements, in which they are rarely seen (fig. 18.1, 2, 5, 6). The vase-like and pot-shaped vessels are with a mostly smoothed, roughed or roughly smoothed, less often with a rough surface, and there are some exceptions with a burnished surface (fig. 18.3). The vase-like vessels with smoothed surfaces are often divided in two parts as the lower one is roughed.

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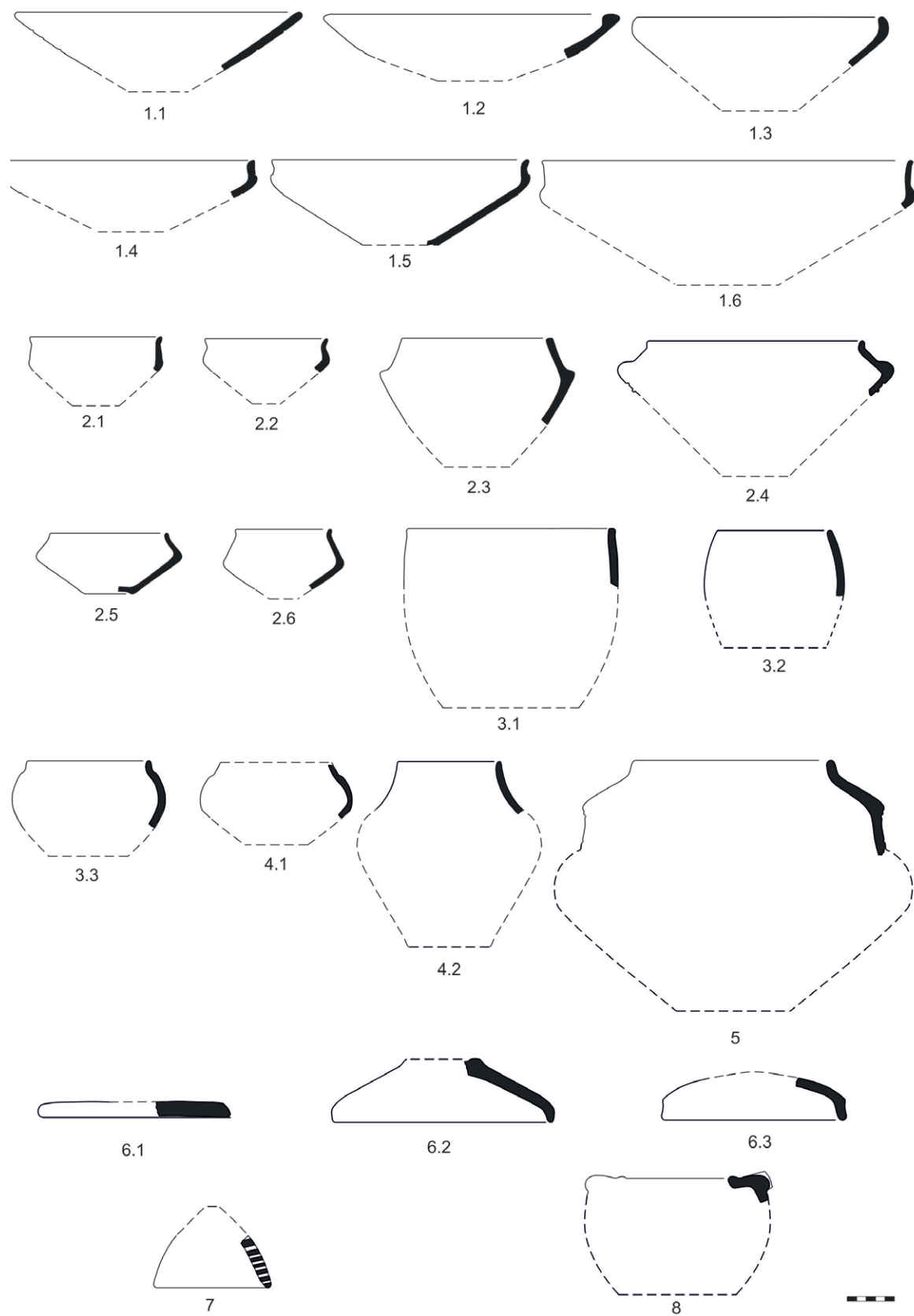


Fig. 2. The main types of vessels from the settlement (figure by S. Parvanov)
Обр. 2. Основните типове съдове от селището (изработка С. Парванов)

The paste is roughly stirred, the admixtures are in medium to high concentration and, most often, are limestone inclusions, some of them up to 4 mm large, refined or river sand, less often grog and organic temper with an unknown character could be available also. The most common colours are the different shades of beige and grey, and less often light orange. Storeyed vessels are usually of a roughly stirred paste with a high concentration of admixtures, but the external surface on their upper parts is always carefully smoothed or burnished, and their lower parts are usually roughened. Their colour is black or grey.

Typology of the pottery

In order to give an idea of the basic types of shapes found in the material, a most general typology was elaborated, based on the morphological and technological characteristics of the vessels (fig. 2). The typology of the Povelyanovo vessels was used as a basis, although very small changes are implemented here, consistent with the specifics of the material (Parvanov 2019, 63-73).

1. Dishes – open, shallow, one- and two-component vessels (fig. 2.1.1-6):
 - 1.1. Conical dishes without a ledge
 - 1.2. Dishes with an internally thickened mouth rim
 - 1.3. Dishes with an inward bent ledge
 - 1.4. Dishes with a cylindrical ledge
 - 1.5. Dishes with a S-shaped ledge
 - 1.6. Dishes with a high vertical and outward bent ledge
2. Bowls – closed, two-component vessels (fig. 2.2.1-6):
 - 2.1 S-shaped bowls with a slightly inward bent ledge
 - 2.2 S-shaped bowls with a sharply inward bent ledge
 - 2.3. Deep bowls with a slightly inward bent ledge
 - 2.4. Deep bowls with a sharply inward bent ledge
 - 2.5. Biconical bowls with a low upper part
 - 2.6. Biconical bowls with a high upper part
3. Pot-shaped vessels – deep, open or closed, two-component vessels (fig. 2.3.1-3):
 - 3.1. Pot-shaped cylindrical vessels
 - 3.2. Pot-shaped cylindrical-spherical vessels
 - 3.3. Pot-shaped vessels with a spherical body and a slightly hinted neck
4. Vase-like vessels – deep, three-component vessels (fig. 2.4.1-2):
 - 4.1. Vase-like vessels with bulged out shoulders and a sharply inclined inward neck
 - 4.2. Vase-like deep vessels with a spherical belly and a high neck
5. Storeyed (lidded or floor-like) vessels – deep, closed, multi-component vessels (fig. 2.5).
6. Lids – for covering the vessels' opening (fig. 2.6.1-3):
 - 6.1. Flat lids
 - 6.2. Conical lids with a low cylindrical ledge
 - 6.3. Conical lids with a low S-shaped ledge
7. Fumigators/Censers – vessels with a specific shape, assumed to have been used for fumigate (fig. 2.7).
8. Stands – specific ceramic items that served for placing vessels on them (fig. 2.8).

Decoration analysis of the pottery

In view of a detailed examination, the pottery is classified on the basis of the technique of decoration. The following information on each of these techniques is then presented: technological implementation; on which types of vessels and on which parts of them is each technique found;

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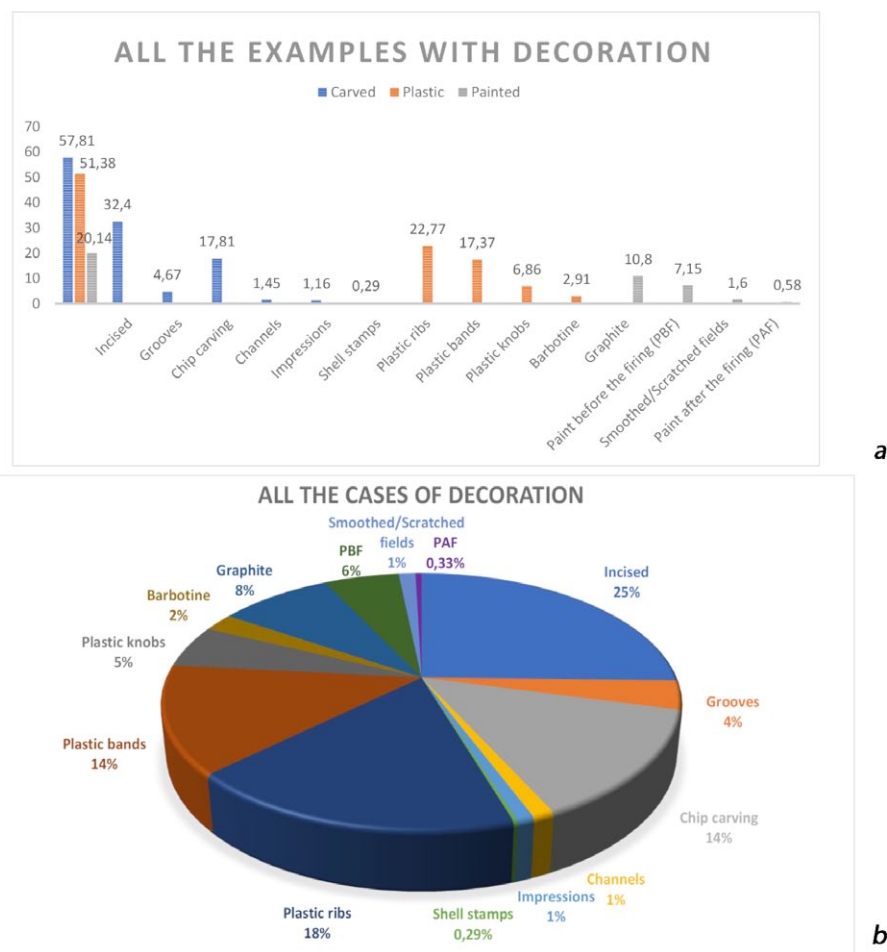


Fig. 3. Diagrams showing the distribution of the decoration in the vessels: a – in all the examples with decoration; b – in all of the cases of decoration (figure by S. Parvanov)

Обр. 3. Диаграми показващи разпределението на украсата при съдовете: а – при всички образци с украса; б – при всички случаи на украса (изработка С. Първанов)

which other techniques it is combined with; in which variants/motifs it is found or which compositions it forms. Due to the aforementioned fragmentation of the material, the motifs and compositions are only partly preserved and difficult to analyse. All of the 1,282 samples known from the settlement were examined and decoration was found on 685 (53.35 %) of them (fig. 3). Of these, 500 (72.99 %) exhibit a single technique, 170 (24.81 %) are combinations of two techniques, 14 (2.04 %) are combinations of three techniques, and only one case (0.14 %) with 4 techniques. This makes 886 cases of decoration in total. Due to the small sizes of the samples, the actual combinations between the various decoration techniques cannot be objectively determined.

1. Decoration by carving into the vessel surface (396 cases – 57.81 % of the decorated samples and 44.69 % of all cases of decoration).

1.1. Incised decoration (222 cases - 32.40 % of the samples with decorations and 25.05 % of all cases of decoration).

Technological features

Applied on the still wet surface of the vessel, usually with a tool with a wide blade and oval section, made of wood or bone. Used to make 1 to 5 mm wide lines. Most often, the tool tip is blunt and the incision has a 2-3 mm wide U-shaped internal cross-section, an incision depth of 1 mm and

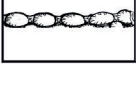
	- Broken place		
	- Incised ornamentation		- Plastic knob
	- Grooves		- Barbotine
	- Chip carving		- Graphite painting
	- Channels		- Paint before the firing
	- Impressions		- Scratched field/surface
	- Plastic rib		- Smoothed field/surface
	- Plastic band		- Roughened surface

Fig. 4. Legend (figure by S. Parvanov)

Обр. 4. Легенда (изработка С. Първанов)

less often 2 mm (fig. 12.12-17). Incised lines made with a sharp tool and thinner lines, reaching up to 1 mm, are found less often (fig. 11.11; 12.8; 14.12). The incised lines are smoothed well, without any traces from the tool, but there are some with remaining thin strips that obviously have not been further smoothed. In some places, mostly on the rougher vessels, there are excesses of removed clay, remaining in the form of small ridges over the incised surface. Preserved white paste incrustations are relatively rare in the Devnya samples, but judging by the known parallels, the incisions were likely inlaid in most cases. Incised decoration was used to make motifs both in positive and negative when combined with chip carving.

Concentration and placement on the types of vessels (which types of vessels is this decoration typical to and on which part of the vessels is available)

Incised decoration is almost only found on the external surface of the vessels and only three cases of application on the internal surface of shallow dishes were reported (fig. 5.12; 16.20). This decoration is frequently used for decorating dishes with a cylindrical (fig. 5.9, 10) and an S-shaped ledge (fig. 5.12-19), very rarely on conical dishes (fig. 5.1, 2) and ones with a high ledge (fig. 6.10), and is completely absent on dishes with an internally thickened mouth rim and an inward bent ledge. This decoration is also typical of S-shaped bowls (fig. 6.15-18) and deep bowls (fig. 7.2, 5, 7), but is absent on biconical bowls. The decoration is a permanent part of storeyed vessels (fig. 11.7-12) and is relatively common on lids (fig. 12.1-4, 6, 7). This decoration is completely absent on pot-shaped vessels and found as an exception on vase-like vessels (fig. 11.3, 4, 6; 13.9). It is present on one of the two fragments of stands (fig. 12.9). Although rare, this decoration is found in a group of samples with a still unclear typological affiliation (fig. 7.20). On the vessels, this decoration is almost always located on the transitions or on their most bulging parts as well as on the uppermost parts above the

Decoration Analysis of the Pottery Assemblage from Devnya Settlement

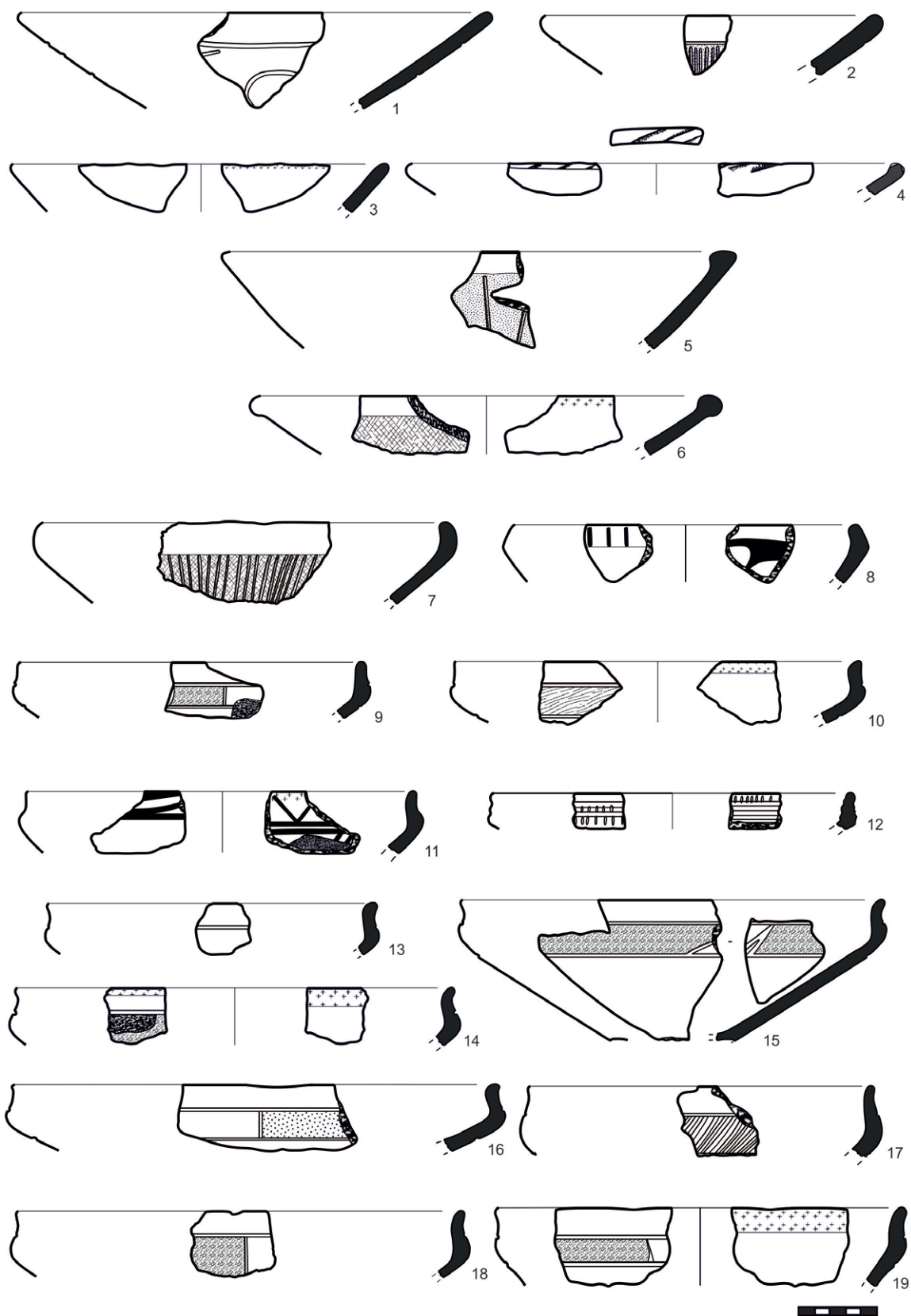


Fig. 5. Pottery from the settlement: dishes of various types (drawings by S. Parvanov)

Обр. 5. Керамика от селището: различни типове паници (рисунки С. Първанов)

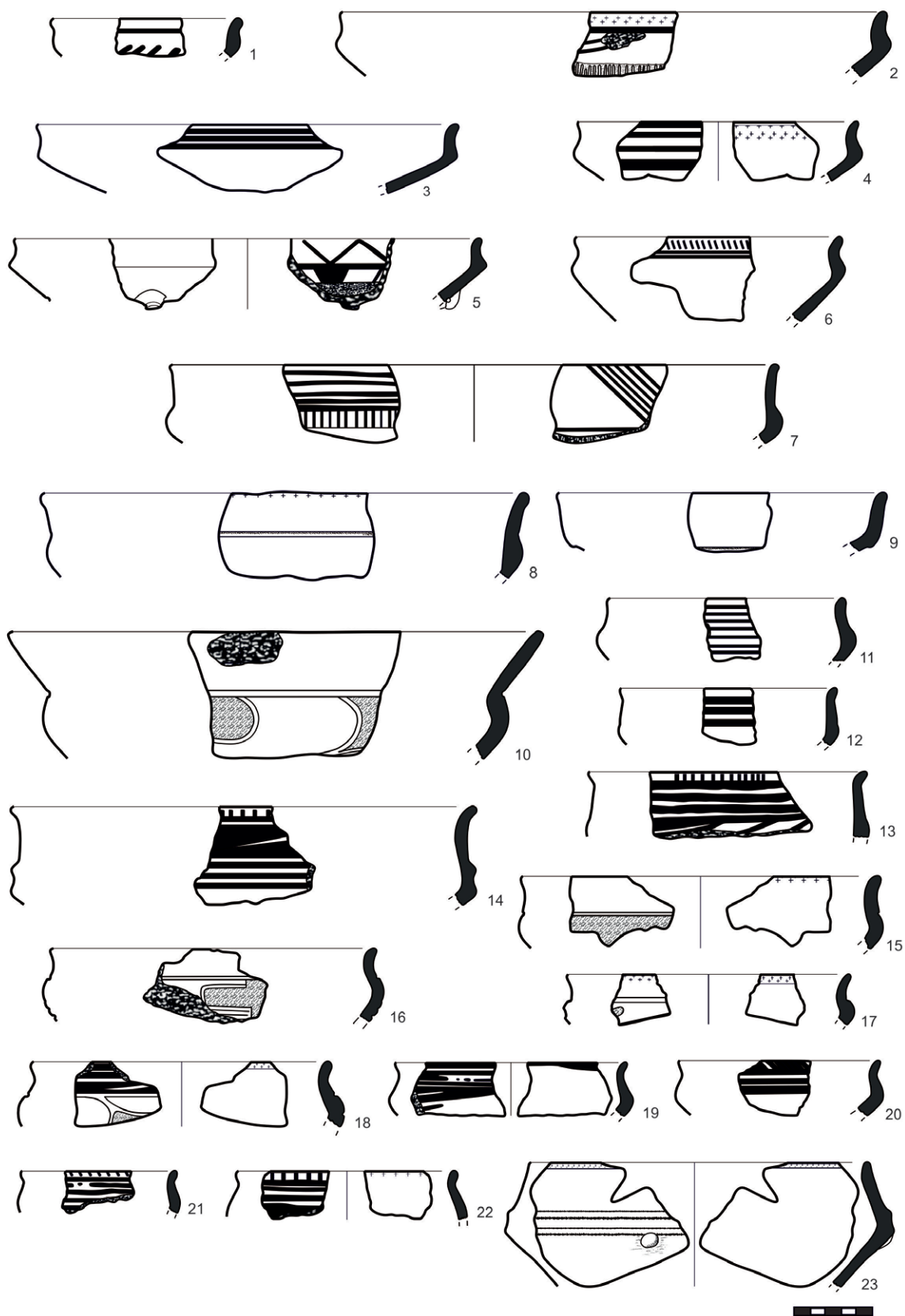


Fig. 6. Pottery from the settlement: dishes and bowls of various types (drawings by S. Parvanov)

Обр. 6. Керамика от селището: различни типове паници и купи (рисунки С. Първанов)

bottoms or the stalks.

Combinations with other techniques (which other techniques are used with this decoration and what are the possible dependencies)

In about $\frac{1}{3}$ of the cases, the decoration is used alone (fig. 5.1; 12.17) but in most cases, it's on very small fragments, and the indicated incisions were probably combined with other techniques (fig. 5.13; 7.5; 11.7). In the other $\frac{2}{3}$ cases, the decoration is combined with chip carving only – 120 cases, 11 of which combined with other techniques. Two cases exhibit a combination with grooves (fig. 16.15), and two other cases - with impressions (fig. 5.12). The decoration is often used in combination with painted decoration: 9 times combined with smoothed or scratched fields (fig. 14.12, 14), 6 times with graphite painting (fig. 11.3, 4; 14.9), 1 case with paint (before the firing) (fig. 7.20), 5 cases with chip carving and paint along the mouth rim (fig. 5.14; 6.15, 17), 1 case with graphite painting and paint (fig. 6.2), 1 case with manipulated fields and paint (fig. 5.21), 3 cases with graphite painting and chip carving (fig. 7.7, 11.6) and 1 case with paint, graphite painting and chip carving (fig. 6.18). The decoration is most rarely combined with plastic decoration – 2 cases with ribs only and 2 cases with ribs and chip carving - applied only on storeyed vessels (fig. 13.10). The decoration is not found in combinations with channels or plastic bands. It is primarily used with chip carving, less often with painted decoration, even more rarely alone, and in very rare cases, it is combined with plastic decoration.

Motifs and compositions:

Motifs:

- horizontal line. Most common, forms a belt composition on the transition points (fig. 5.9, 10, 13-19; 6.15-17; 11.7-12), or much less commonly, found as a single motif (fig. 5.2; 12.7; 16.1-5). In both cases, primarily in combination with other motifs of incised or chip carving techniques. The line is a typical element of the “ring-shaped stalks”, with a single sample preserved in most cases, but two lines are also found (fig. 6.1, 3-5, 7, 10, 14, 15). They are also found on bottoms without a stalk (the so-called “fake stalks”), intended to create the impression of an actually existing stalk (fig. 16.6, 9, 12, 13). Most rarely exhibited as a group of parallel horizontal lines, only found in the cases of incised decoration on the inner side (fig. 5.12; 16.20).

- vertical line. Rarely and mainly found in the form of multiple vertical parallel lines. They are thin, closely spaced and most often intended to further roughen the surface (fig. 6.2; 14.12; 16.21-23, 25). Found on the lower part of dishes, bowls, vase-like and storeyed vessels. No cases of combinations with other motifs are reported, except that they usually match a roughened surface (fig. 16.23). A single line is found in belt compositions, always in combination with chip carving or manipulated fields, probably representing rectangles (fig. 5.9, 16, 18).

- line, sloped or inclined at various angles. Several variants of expression are reported. They are most often multiple and run in parallel on the lower parts of the vessels, being identical with the vertical lines in idea and method of execution (fig. 12.8). As another type, they are found in couples: along the vertical, combined with chip carving between them (fig. 16.19) or in parallel, forming a negative motif (fig. 5.15; 11.8, 12; 12.12-14, 21). It is not clear whether they are part of another motif or stand alone. In rare cases, they may be found as parallel, wide, sloped, slightly curved lines (fig. 5.17; 13.9). In the last two cases, they are found in belt compositions or along the most protruding parts of the vessels.

- rectangle. There is no fully preserved rectangle, but the aforementioned vertical lines probably form rectangles (fig. 5.9, 16, 18). Made only by incision or in combination with chip carving and manipulated fields (fig. 12.11; 14.14).

- horseshoe. Found rarely and presented by an incision and chip carving in positive (fig. 6.16; 13.11). In a negative perspective, it is similar to a highly stylized spiral-meander.

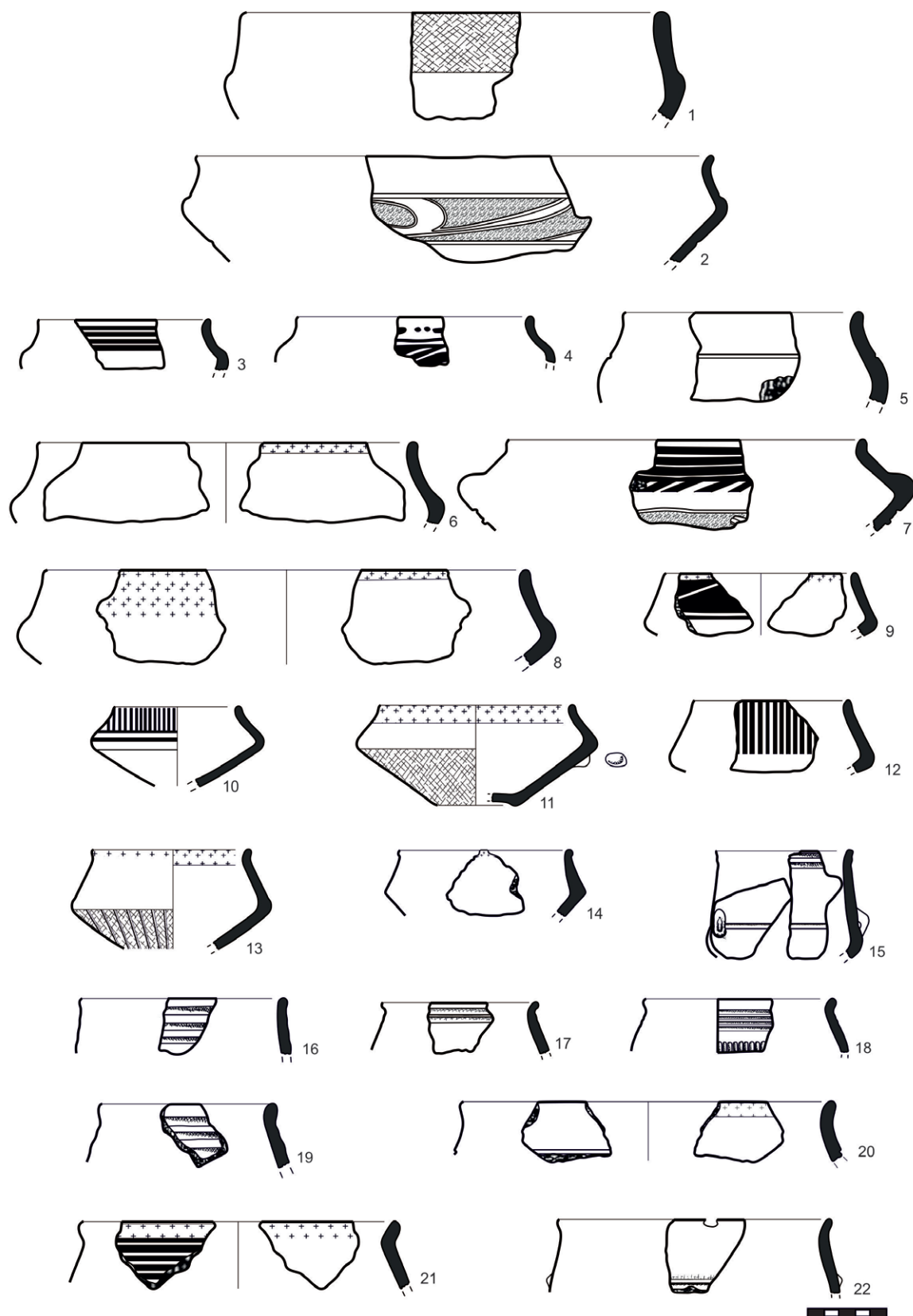


Fig. 7. Pottery from the settlement: deep and biconical bowls (drawings by S. Parvanov)
 Обр. 7. Керамика от селището: дълбоки и биконични купи (рисунки С. Първанов)

Decoration Analysis of the Pottery Assemblage from Devnya Settlement

- spiral/circle (?). There are cases of incompletely preserved lines, which appear to be parts of spirals or a circle (fig. 5.1; 6.10; 12.1, 4, 6, 13, 17; 13.5-7). Made only by incision or in combination with chip carving in a positive. Some of them may be part of the lower motif. Reported in belt compositions and on the protruding parts of bulged bowls or storeyed vessels.

- segmented spiral-meander called “Ezerovo” type (Todorova, Tončeva 1975: 32). Relatively frequent and the most distinctive motif of the culture. Usually made by a combination of incision and chip carving, with only one case of incised decoration only (fig. 13.10). In all cases, however, since the spiral-meander is not preserved entirely, or is very fragmented in some cases, the data from the material are incomplete (fig. 6. 10, 18; 12.16; 13. 1, 2). They can be supplemented, however, by available parallels from the other settlements of the lakes. The motif is usually horizontal (fig. 11.10, 11; 12.6), but is also encountered as slightly sloped (fig. 13.3). There are various ways of presentation. Here, the motif is usually found alone (fig. 7.2), but there are also cases of two intertwined motifs located horizontally above one other (fig 12.15). Presented in a belt composition and alone and not objectively assessable as to having been combined with any other motifs. Found on S-shaped dishes and bowls, deep bowls and storeyed vessels.

Compositions:

Since the samples are preserved as very small fragments, no information may be derived on the repeatability of the motifs or any dependencies in their arrangement. Only one sustainable combination may be indicated:

- belt composition framed by two horizontal lines. Only fragmented parts of the motifs are preserved and a precise reconstruction is not possible. We can only observe the frequent use of rectangles and spiral-meanders (fig. 5.9; 7.2). The motifs are presented by a combination of incised and chip carving techniques, but they are also found in combination with manipulated fields (fig. 5.10, 16). What is impressive is the very rare absence of chip carving in the compositions (fig. 11.7). Found on the transitions of dishes with a cylindrical (fig. 5.9, 10) and an S-shaped ledge (fig. 5.13-19), S-shaped bowls (fig. 6.15-18) and deep bowls (fig. 7.2, 5; 12.16, 16, 20), lids (fig. 12.1-4, 6) and storeyed vessels (fig. 11.7-12). Very rare in the lower parts, primarily on storeyed vessels (fig. 13.11). A significant part of the available fragments surely belongs to the group of dishes or bowls, but their more precise differentiation by types is not possible (fig. 12.11-15, 20; 13.5). The composition width depends on the transition size, therefore it is 2-3 cm on the dishes and the small bowls, and up to 5-6 cm on the storeyed vessels and the deep bowls. The lids show that the composition may cover the entire length of the vessel (fig. 12.6).

1.2. Decoration with grooves (32 cases – 4.67 % of the samples with decoration and 3.61 % of all cases of decoration).

Technological features

The grooves are shallow furrows carved into the surface of the vessel. The tool that was used had a wide blade and a flat section, probably made of wood or bone. Unlike the incised lines, their width is greater than their depth, but no more than twice. Their width varies between 0.1 and 3 cm, most frequently between 0.5 and 0.8 cm. In most cases, they have a well smoothed or burnished surface, homogeneous with the rest (fig. 13.17; 16.2, 15, 26, 27). More rarely, their surface is smoothed better than the surrounding surface, which is especially roughened (fig. 5.7; 16.24; 17.3). In the rarest cases, they are roughly made and intended to roughen the surface (fig. 13.14, 15). Those applied to a burnished and smoothed surface have their edges well smoothed and levelled, while the more roughly shaped grooves have incompletely removed edges that appear as thin strips. There are 2 cases of combinations with plastic ribs where the remaining clay of the grooves is well smoothed and shaped as protruding ribs with an oval section between them (fig. 11.13).

Concentration and placement on the types of vessels

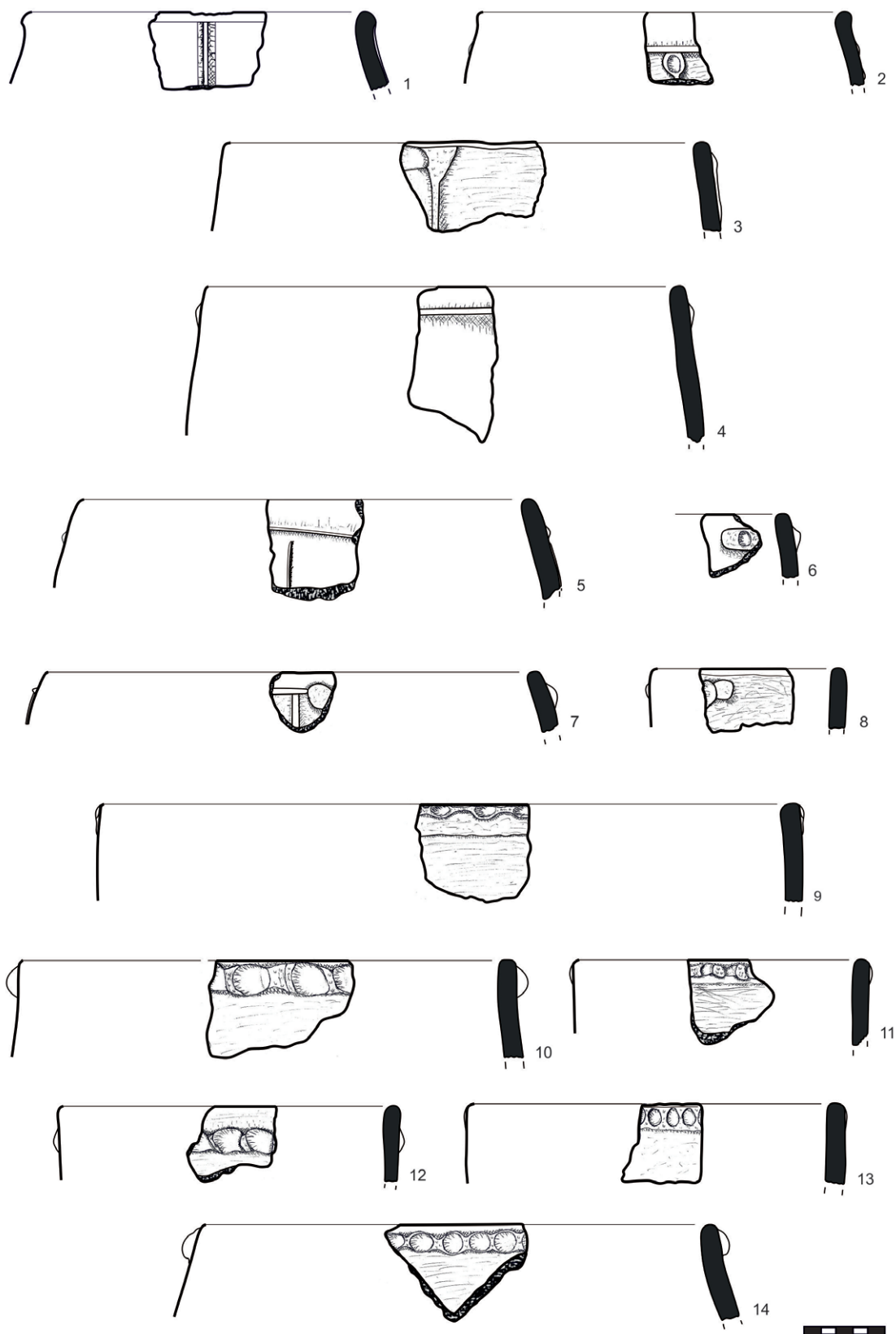


Fig. 8. Pottery from the settlement: pot-shaped vessels with plastic ribs and bands (drawings by S. Parvanov)
 Обр. 8. Керамика от селището: гърневидни съдове с релефни ребра и ленти (рисунки С. Първанов)

Decoration Analysis of the Pottery Assemblage from Devnya Settlement

In most cases, the samples with this decoration cannot be identified typologically, but those that can be clearly identified are usually found on dishes and bowls (fig. 5.2, 5, 7; 6.8, 12; 7.13, 15; 12.18, 19; 13.17; 16.2, 16-18), the lower parts of vase-like vessels and storeyed vessels (fig. 16.15, 24, 26, 27), extremely rarely on pot-shaped vessels, with no cases on lids reported so far. Grooves are only found on the outer surface of the vessels, most frequently applied to their lower parts (fig. 17.1-4) and more rarely near the transitions (fig. 6.8, 12; 7.15) or above the bottoms (fig. 16.2, 15-18).

Combinations with other techniques

In more than 2/3 of the samples, the grooves are reported to be alone. The other cases are very few various combinations with no clear dependencies of combining: 3 cases with channels (fig. 13.14), 2 with incised decoration (fig. 5.2), 3 cases with plastic ribs (fig. 12.19), 1 case with a plastic band, 1 case with graphite painting (fig. 6.12) and 2 cases with paint on the mouth rim (fig. 6.8). The decoration is mainly alone, but even in rare cases the technique is observed in combination with all other techniques, with the exception of impressions.

They are found in the following variants:

Horizontal: They are found more rarely, only alone, always burnished and homogeneous with the rest of the surface, and located above the ring stalks (fig. 16.2, 15-18) or above the transitions of dishes or bowls (fig. 6.8, 12; 7.15, 18; 12.18, 19).

Vertical: found most often, almost only on the lower parts of the vessels and always multiple, applied in parallel, close to each other at distances ranging from 0,2 to 0,5 mm (fig. 5.2; 16.26, 27; 17.1-4). Applied next to the bottom or a little above it.

Inclined: only 2 cases of groups of grooves, thinly carved on a rougher surface, on the lower part of the vessels (fig. 5.5; 16.24).

1.3. Decoration through removal of chips from the surface – the so-called “chip carving” or “Kerbschnitt” (122 cases – 17,81 % of the samples with decoration and 13,76 % of all cases of decoration).

Technological features

The removal was made by a sharp or blunt tool (and maybe by using the thorns of spiny plants) from the still wet surface. The surface remains relatively flat – without any significant depressions and protrusions but roughened by shallow incisions and prickings. A rough surface is thus obtained, which is lower than the surrounding one usually by 2 mm and about 3 mm in rare cases. As such, the surface was suitable for the application of mineral paints that stick better. Sections of various sizes that form ornamental motifs or belts are usually removed (fig. 5.15, 19; 13.10, 11). The motifs are most often negative, i.e., the non-roughened background is the actual motif of the decoration. Motifs produced by chip carving in a positive are more rarely found. In almost all cases, the removed sections are marked by incised lines. Most often, they are very well smoothed, with part of the smoothing entering the roughened field. The fields were most probably carved initially and then the marking lines were incised and smoothed. More rarely, the lines are thin, deeper, less marked and made less carefully (fig. 5.19; 12.11). All lines and the chip carving are mostly grey, and contrast the background colour.

Concentration and placement on the types of vessels

The chip carving motifs in general follow the regularities listed above with respect to the incised decoration. The only differences from the incised decoration with respect to typology are that chip carving is used only on dishes with a cylindrical or an S-shaped ledge and as an exception on dishes with a high ledge (fig. 6.10). They are only found on the outer surface of the vessels, in belt compositions of transitions (fig. 5.9, 15, 18, 19; 6.15, 16; 11.7-12), in the middle bulging portions of larger bowls (fig. 12.21; 13.8) and on the annular stalks (fig. 16.6-9, 11, 14).

Combinations with other techniques

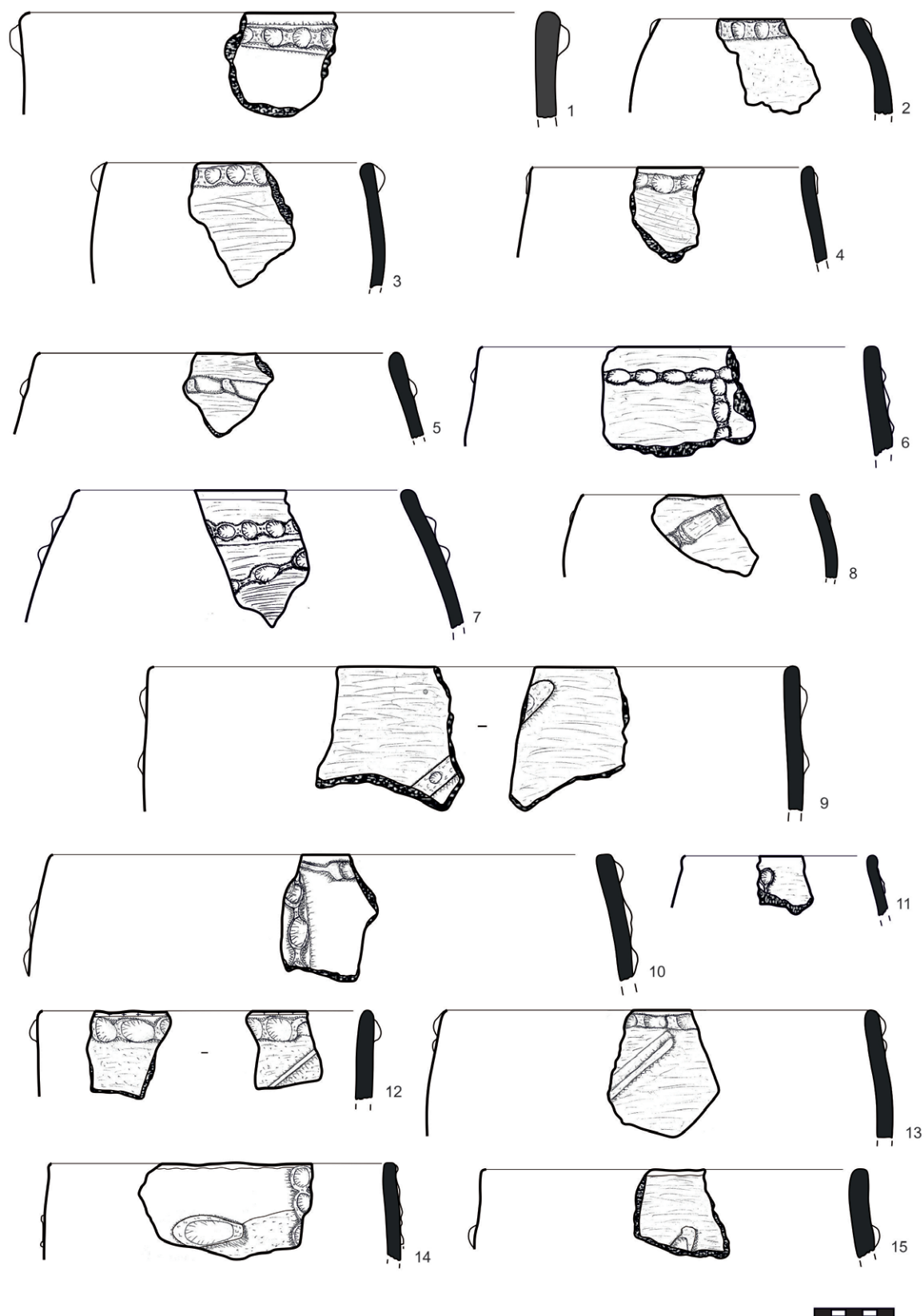


Fig. 9. Pottery from the settlement: pot-shaped vessels with plastic bands (drawings by S. Parvanov)
Обр. 9. Керамика от селището: гърневидни съдове с релефни ленти (рисунки С. Първанов)

Decoration Analysis of the Pottery Assemblage from Devnya Settlement

In almost all cases, chip carving is combined with incised decoration. There are only 2 interesting samples on annular stalks where the chip carving field is not surrounded by an incised line (fig. 16.8, 11). Primarily found in combination only with incised decoration, which should also be a result of the fragmentary preserved compositions. At present, its combination with other techniques is relatively rare: there is one case of combination with graphite painting and paint on the mouth, 1 case of combination with graphite painting only, 2 cases of combination with a plastic rib and 5 cases of combination with paint on the mouth. There are no available samples of channels, plastic band or smoothed/scratched fields.

Motifs:

As the chip carving always goes with markings of incised lines, the motifs produced are the same as those described for the incised decoration:

- rectangle. Presented in negative and positive, but due to the significant fragmentation, more frequent instances are not actually excluded (fig. 5.9, 18).
- circle/ellipse (?). Presented in negative, with not a few cases of isolated preserved motifs that appear to be part of an ellipse or a circle, or possibly an independent motif in positive (fig. 12.6), or form such a motif in negative (fig. 13.7). Some of them may have been part of the lower motif (fig. 6.10).
- segmented spiral-meander. Presented mainly in negative (fig. 7.2; 12.15) and in positive in only two cases (fig. 13.4, 8).
- fields of a presently unclear shape. Certainly intended to form a motif in negative, but their precise shape cannot be determined at the moment (fig. 12. 12, 14, 21). Part of them may be identical to the above motif, but the preserved area is too small to allow us to say for sure.

1.4. Decoration with channels (10 cases – 1.45 % of the samples with decoration and 1.12 % of all cases of decoration).

Technological features

Shallow parallel channels are made on the wet vessel surface by fingers or by a tool with a wide rounded blade, leaving thin edges between them. They are well engobed and burnished, and the surface is homogeneous in relation to the surrounding surface. They are usually narrow and shallow – most of them are 4 to 6 mm wide, some are 2 to 3 mm wide, all of them are applied at a 2 to 3 mm distance. They are carved on the surface more frequently at 1 mm and more rarely at more than a 1 mm depth.

Concentration and layout of the various types of vessels

In 1 case only, they are found on the inner surface of the ledge of a dish (fig. 5.4), and in the other cases, they are on the outer surface of biconical and deep bowls (fig. 7.16-19), vase-like vessels (fig. 13.16) and 1 cup (fig. 7.15). Most of them are found in the upper portion of the vessels, usually in close vicinity to the mouth (fig. 7.19; 13.16) or more rarely starting from the rim (fig. 7.17). In one sample only they are found below the transition (fig. 13.14).

Combinations with other techniques

In 2/3 of the cases they are alone and in 3 cases they are combined with grooves only (fig. 7.15, 18; 13.14). The existence of two samples with horizontal channels in the upper part and vertical grooves in the lower part suggests that there may be other ones like them (fig. 17.1, 2). This is the technique, however, that is found most rarely and in the poorest diversity of combinations with other techniques. This fact must be objective because it is rare to find decoration on the lower part of the vessels, other than vertical grooves or incisions. It is possible to assume only a hypothetical existence of compositions with incised decoration, chip carving and manipulated fields (fig. 7.7; 13.1-6; 14.14; 16.19), and annular stalks with incised decoration (fig. 16.1-15), but they were probably rarely applied to bowls and vase-like vessels such as the samples with channels.

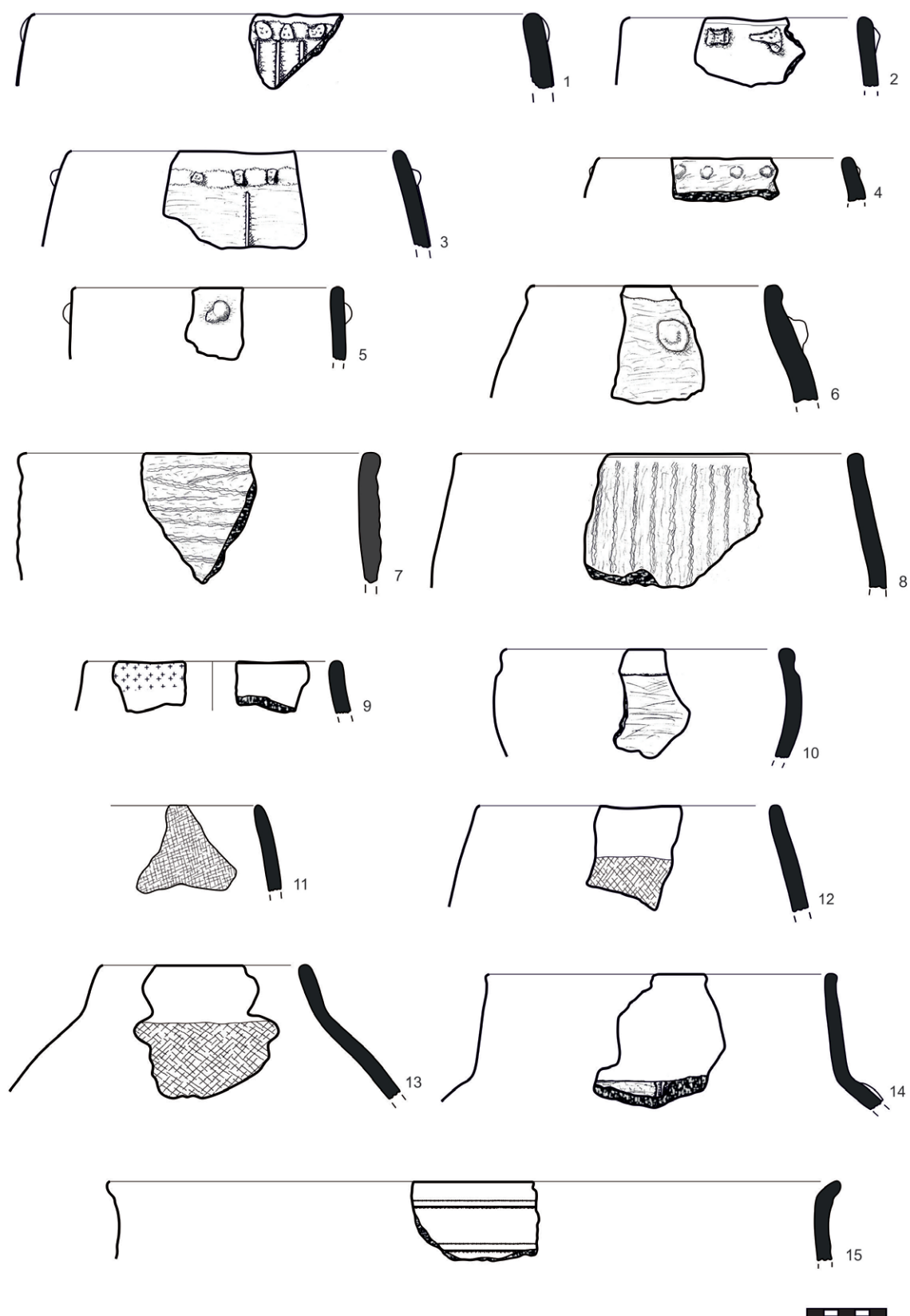


Fig. 10. Pottery from the settlement: pot-shaped and vase-like vessels (drawings by S. Parvanov)
 Обр. 10. Керамика от селището: гърневидни и вазовидни съдове (рисунки С. Първанов)

Decoration Analysis of the Pottery Assemblage from Devnya Settlement

They are found in the following variants:

Horizontal: 9 of the 10 available samples are groups of parallel horizontal channels. In the preserved samples, their number varies between 2 and 4, and they certainly encircle the entire vessel (fig. 7. 15, 17, 18; 13.14).

Inclined: there is only one case where the channels are applied obliquely on the inner side of a dish, with a mouth rim thickened on the inside, forming wider edges (fig. 5.4). They probably run by groups of several, encircling the entire mouth.

1.5. Impressions (8 cases – 1.16 % of the samples with decoration and 0.90 % of all cases with decoration).

Applied on the still soft surface of the vessel. Since there are clear dependencies as to their appearance, technology and location, they may be divided into 2 main types:

- 2 cases of smaller impressions made by carving with a sharp tool (fig. 5.12). They have an oval shape and a 3x1 mm size or a round shape with a 2 mm diameter. In both cases, they are located on the two sides of dishes with a short ledge, in the form of impressions that are dense and chaotically arranged at places, in a line at 1 to 4 mm distance. On the inner side, the impressions are located almost next to the mouth rim and above the transition on the outer side. In both cases they are found in combination with incised decoration on the inner surface and, one of them, on the outer surface. There has probably been incised decoration on the outer side of the second sample.

- 6 cases of impressions of a larger size made by pressing with a finger. They have almost only a semi-circular shape, with only one with a round shape, and a 1 to 1.2 cm diameter. The first ones are densely arranged at 2 to 4 mm distances (fig. 11.14), and the second ones are scattered at 0.6 to 1 cm distances (fig. 11.15). In all cases, they are found on flat lids and are located next to the mouth rims. They certainly encircle the entire lid diameter. In half of the samples, they are carved at an angle next to the edge of the mouth, making it “indented”, while the other ones are carved at a lower depth. Two samples exhibit a combination with plastic ribs, which may have been present in the other ones, which are preserved in much smaller sizes.

1.6. Shell stamps (2 cases – 0.29 % of the samples with decoration and 0.22 % of all cases of decoration).

Technological features

The technique is known as “fingernail”, “shell” or “impresso” decoration. This decoration is achieved by carving with a shell, a fingernail or a specially adapted tool into the still soft surface of the vessel. The stamps are arc-shaped with a length of 0.6-1 cm and a width of 0.15-0.2 cm. The resulting strips are arranged in parallel horizontal rows at a distance of 0.3-0.4 cm.

Concentration and placement on the types of vessels

Concentration and placement on the types of vessels It is difficult to say which formal type the two vessels belong to, but one of them is likely a vase-like vessel (fig. 13.12) and the other is either similar, or a deep bowl (fig. 13.13). In both cases, the decorations are carved into the middle parts of the vessels, and have a smoothed or slightly roughened surface.

Combinations with other techniques

They are not combined with any other techniques, but the specificity of the surface on which the strips are carved allows for the application of paint after the vessel firing.

2. Decoration by application to the vessel surface (352 cases - 51.38% of the samples with decorations and 39.72% of all cases of decoration).

2.1. Plastic (embossed) ribs (156 cases - 22.77% of the samples with decorations and 17.60% of all cases of decoration).

Technological features

The decoration represents either a preformed band, which is applied onto the vessel, or a

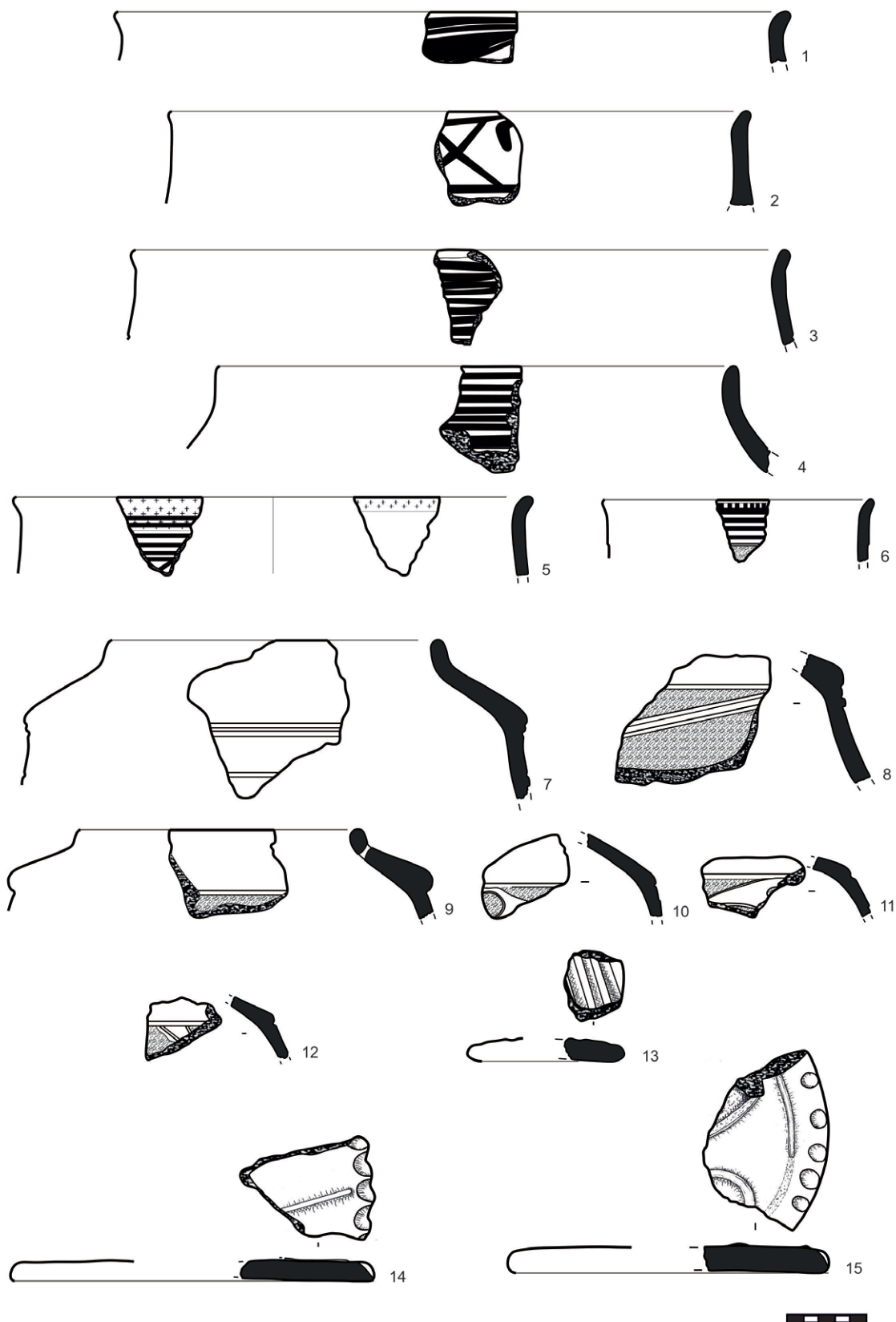


Fig. 11. Pottery from the settlement: vase-like vessels, storeyed vessels and lids (drawings by S. Parvanov)
 Обр. 11. Керамика от селището: вазовидни съдове, етажовидни съдове и капаци (рисунки С. Парванов)

Decoration Analysis of the Pottery Assemblage from Devnya Settlement

layer of clay added thereto, which is shaped as a plastic band by pinching. In the first case, the rib is made of a whole band, with its ends smoothed and levelled down to the surface (fig. 8.2-4; 15.1, 2, 4, 8). In the second case, only a relative middle section of the band forms a rib, while the other part is smoothed to the surface, the edges are well-cut and slightly embossed more frequently, and more rarely, well smoothed but still visible (fig. 8.1; 15.3; 17.4). There are samples where the rib is very smoothly bevelled into the band edges (fig. 8.4; 15.11). Their width varies between 0.2 and 1 cm, most often between 0.4 and 0.7 cm, and is very rarely above 1 cm. Where the band is wider than the rib, the band width varies between 0.6 and 2 cm, but most frequently about 0.8 to 1.5 cm. Based on their height, they are divided into: low – less than 1 mm; medium – 1 to 2 mm; high – usually about or more than 3 mm, but some can reach up to 5 mm. Depending on their cross-section, they are flat (fig. 17.13), triangular (fig. 15.11; 8.4-5, 7; 10.1-2), semioval (fig. 8.2; 10.15; 13.10) and trapezoidal (fig. 15.5; 17.11). The triangular ribs are most often slightly rounded, and more rarely pointed in their upper part. Their top parts are almost always well smoothed, but sometimes less carefully shaped samples are observed. There are 5 cases where the plastic ribs are probably shaped by carving with a flat tool into the surface and smoothing the residual clay (fig. 15.7; 17.12). No cases are reported of ribs made by pinching out of the dish surface. The further finishing of the ribs after sticking obviously depends directly on their size and the type of surface they are applied to. Where stuck to a burnished surface, they have their edges well smoothed and burnished without any visible trace of their application. Where applied to a smoothed surface, they have their edges well cut or slightly smoothed, but the traces of their application are visible. Where applied to a rough or a roughly smoothed surface, the ribs have their edges less carefully smoothed, with unremoved edges of clay at some place. They are almost always in a flat line, but there are ribs that are applied less carefully and slightly crooked. Parts of the ribs have a small embossed appendage at one end (fig. 8.3; 10.14; 15.2).

Concentration and placement on the types of vessels

The ribs are relatively common all along the various types of pot-shaped vessels (fig. 8.1-5, 7; 15.3; 17.5-10), almost certainly in the middle part of the vessels with a low neck (fig. 15.1-2, 4, 5, 8), less frequently on those with a high neck (fig. 10.14-15; 15.4) and usually along the middle and lower parts of the storeyed vessels (fig. 13.10; 15.6-7, 10-11; 17.11). Ribs are rarely observed on flat lids (fig. 11.14-15) and deep bowls (fig. 6.23; 7.22), and extremely rarely on biconical bowls (fig. 12.19). Part of the numerous samples of a very small size may be related to the middle parts of the vase-like vessels. They are not reported on dishes or S-shaped bowls.

Combinations with other techniques

In 80% of the cases, the ribs have been reported individually. In the other 20% of the cases, the combinations are various, most often with other plastic decorations: 7 cases with plastic knobs (fig. 10.3; 17.10), 6 cases with a plastic band (fig. 9.13; 10.1), 1 case with barbotine (fig. 17.5) and more rarely with carvings: 2 cases with impressions (fig. 11.14-15) and chip carving (fig. 13.10), 3 cases with grooves (fig. 11.13; 12.19), 2 cases with incised ornamentation and chip carving (fig. 13.10), 2 cases only with incised lines and, most rarely, with painted decoration: 2 cases of paint applied after firing (fig. 17.11), 1 case with paint on the mouth rim (fig. 6.23) and 1 case with a band and paint (fig. 9.12). There are no samples with channels and graphite. The majority of the samples are highly fragmented and we can most probably accept that the ribs were combined with other types of decoration more often than it seems.

They are observed in the following variants:

- Vertical ribs – 88 cases. Only one rib has remained in most samples (fig. 8.1, 3, 5; 15.3-5). This is certainly due to the high fragmentation of the material and does not objectively reflect the situation. In rare cases, 2 to 5 ribs are observed at 1 to 5 cm from each other, but more often they are relatively densely spaced (fig. 10.1; 15.1, 2, 8; 17.8). Most likely, a small part of the ribs were actu-

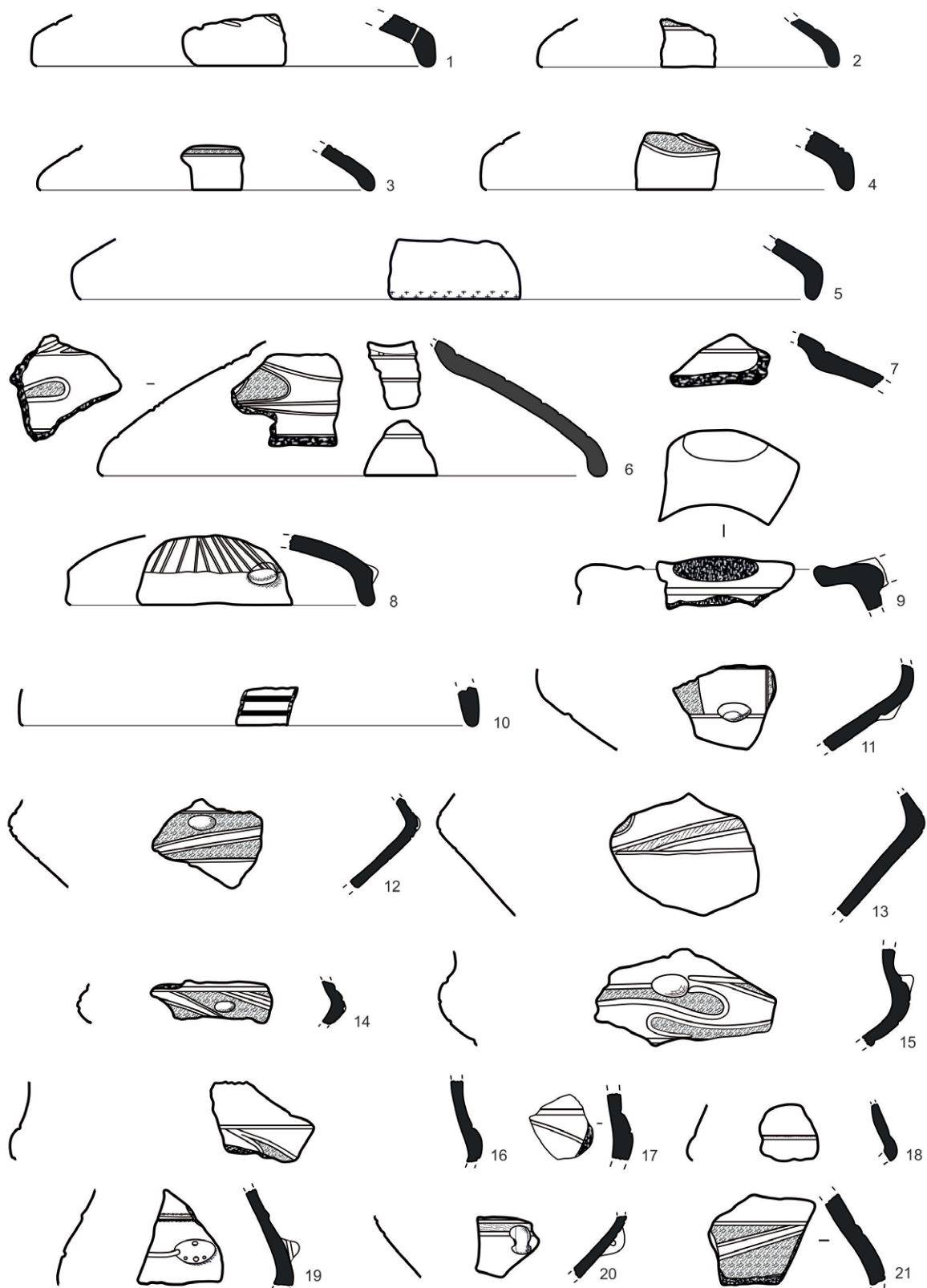


Fig. 12. Pottery from the settlement: lids, stands and examples with incised decoration and chip carving (drawings by S. Parvanov)

Обр. 12. Керамика от селището: капаци, подставки и образци с врязана украса и кербинит (рисуници С. Парванов)

Decoration Analysis of the Pottery Assemblage from Devnya Settlement

ally single and most of them may have been applied sparsely in groups or have encircled the vessel. They run vertically all along the vessel (probably) (fig. 8.1; 10.1, 3; 17.8), only along the middle convex parts (fig. 15.1, 2, 8) or along the lower parts only (fig. 15.10, 11). The ribs reach the very bottom or slightly above it, with no clear dependencies (fig. 17.5, 13).

- Horizontal ribs – 44 cases. Only in 6 cases there are two ribs applied in parallel, at about 3 cm from each other (fig. 6.23; 10.15; 15.6). In all other cases, the rib is single, most often applied around or on the transitions of the vessels (fig. 7.22; 15.9), but is quite often found at a distance of 1-4 cm from the mouth rim (fig. 8.2, 4, 5, 7; 12.19). Sometimes, the ribs separate the two types of surface of the vessel (fig. 15.11). In a small number of samples, the rib is combined with vertical ribs located below the horizontal one (fig. 8.7; 15.11). There are also some interesting cases where the rib is well visible on one side while the other is more smoothed and less pronounced (fig. 15.7, 10). In some of them, the ribs are 2 and the section between them stands like a concave groove (fig. 15.6, 7). All of them are parts of storeyed vessels. Unlike the other types of ribs, which are found on pot-shaped, storeyed vessels, and less frequently on vase-like vessels, the horizontal ribs are also found on bowls.

- Sloped ribs – 26 cases. Sloped ribs are understood to be those veering by 20° to 80° from the vertical. Most often, they are moderately sloped – about 40-60°. Just like the vertical ribs, because of the high fragmentation, single ribs are found more often, with only 5 cases of two ribs, applied at a distance of 2-3 cm. They are also found on the lower parts of the pot-shaped and storeyed vessels (fig. 17.6, 7, 9, 11), but also perhaps a significant part of the middle sections of pot-shaped and vase-like vessels of a larger size. In two cases, they are combined with a horizontal plastic band below the mouth rim (fig. 9.12-13), and stand alone in the rest of the cases.

- Arc-shaped – 5 cases. Arc-shaped ribs are meant to be those applied horizontally but curved downward. They are only applied alone, on flat lids (fig. 11.15) or on the convex part of the storeyed vessels (fig. 13.10).

2.2. Plastic bands (119 cases – 17.37 % of the samples with decoration and 13.43 % of all cases of decoration).

Technological features

It represents an additional strip applied to the vessel where impressions and knobs alternate in various ways. Their width varies between 1 and 3 cm, most frequently between 1.5 and 2.2 cm. The impressions have a round (fig. 8.14) or oval shape (fig. 8.9, 13), very often outlined imprecisely. Most of them are made by pressing the thumb into the band ridge (fig. 9.1, 2) or slightly against the band side (fig. 8.10; 9.12) and less frequently by carving with a tool with a broad and blunt blade (fig. 9.9). They are about 0.2-0.4 cm deep and reach the vessel wall, or partially recess into the band. They are 0.8-2 cm wide, but most often 1-1.3 cm. The knobs are formed by pressing or pulling with fingers on both sides (fig. 9.8, 13), by pressing the thumb on one side only, and further rough shaping on the other (fig. 8.10; 9.12), or by rough shaping on all sides by a tool (fig. 8.11; 9.5). Their shape is: irregular – without any initial idea of shape, and depends on the way of pressing with the fingers or tool (fig. 8.11; 9.5); arc-shaped – by finger pressing on one side only (fig. 8.10, 12); strip-shaped – obtained by finger pressing on both sides (fig. 15.13, 14); H-like shape – pressed with fingers on their horizontal sides and poorly shaped on the vertical sides with fingers or a tool, depending on their size (fig. 8.14; 9.2, 4; 15.12). They are 0.6-2.2 cm wide, but most often 0.9-1.5 cm. Their height ranges between 0.2 and 0.7 cm, most frequently between 0.4 and 0.6 cm. Depending on what is emphasized in the decoration, the bands may be divided into three main types: emphasis on the impressions – the knobs are very low, raked or absent (fig. 8.6, 9; 9.9), but most often thin strips of removed clay are shaped between the impressions, and formed on all sides as 0.3 cm wide thresholds (fig. 8.14; 9.7, 10, 12, 14); emphasis on the knobs – there are no impressions, and the knobs are at relatively large distances from each other – 2-3 cm (fig. 8.12; 9.5, 8), or the impressions (from which the clay is removed) are



Fig. 13. Pottery from the settlement: samples with various decoration (drawings by S. Parvanov)
Обр. 13. Керамика от селището: образци с различна украса (рисулки С. Първанов)

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slightly suggested and very shallow (fig. 8.10, 11; 9.13; 10.1); on both – at relatively equal distances, with clearly and more precisely shaped impressions and knobs (fig. 8.13; 9.1-4). All three cases are relatively equal in number. The bands are applied on smoothed or roughly smoothed surfaces, with various methods of having their edges shaped: well smoothed and leveled (fig. 8.11; 9.2); cut in a flat line and slightly embossed in relation to the surface (fig. 8.9; 9.1, 9); cut towards the knob/threshold outlines and embossed in relation to the surface (fig. 9.3, 6, 14); roughly shaped, uneven, with edges of non-removed clay visible at some places (fig. 8.10; 9.13). For now, the steadiest combinations between the various variants are the bands with round or oval impressions and thresholds (fig. 8.14; 9.6, 7, 10, 11, 14). The other ones do not exhibit any clear dependencies between the different types, sizes and appearances of the impressions and knobs.

Concentration and placement on the types of vessels

They are only found on the outer surface of pot-shaped vessels. They are visible only in their upper parts, most often stuck next to the mouth rim (fig. 9.1-4) or less often at about 2 cm below the mouth rim (fig. 9.5-7). Not very often, they may be found on the transitions or the most bulging parts of this type of vessels (fig. 15.12-14). The vertical bands probably reach the transition or the most bulging part as no sample of a bottom/lower part with a plastic band has been found.

Combinations with other techniques

In 90% of the cases, they are found alone, and in the very rare cases of combinations, they most often have ribs, and only one instance displays a rib and paint (fig. 9.12), barbotine, a knob – a bulge with a hole (fig. 9.14) and a groove. The plastic band is extremely rarely supplemented and, whenever it is, it is only by other techniques of embossed decoration.

They are observed in the following variants:

Horizontal – 96 cases. In half of the cases, the plastic band is applied around the mouth, in the others – along the bulging parts of the vessels, probably in their upper part. Only 4 cases exhibit a combination with another band – 2 cases of a vertical or sloped band each, but never with a second horizontal one (fig. 9.6, 7). The bands themselves are found to be very rarely discontinued, but this may be due to the high fragmentation and may actually have happened more often (fig. 8.6; 15.12).

Vertical – 13 cases. There are 6 reported cases where the band starts from the mouth or a little below it, but this is likely to be the same in the other samples as the bands' starting points are not known (fig. 9.6, 10, 11, 14). They are found to be always alone, but there may have been several parallel bands.

Sloped – 15 cases. Sloped bands are meant to be those veering by 20° to 70° from the vertical, most often by 50° to 60°. In this case, they start from the mouth or a little below it (fig. 9.7, 8, 9; 9.15). In the other cases, they have probably started from there, applied along the bulging upper parts of the vessels. Only single bands are found, but due to the fragmentation, they may have been applied in parallel groups.

It is important to note 9 cases where due to the small area of preserved embossed decoration, we cannot determine whether it is a band or a plastic knob only (fig. 8.8). There is also 1 similar sample that could be a rib or a knob. At the moment they are not accounted in the total number of both decorations, but are included in the total number of the plastic decoration.

2.3. Plastic knobs (buds) (47 cases – 6.86 % of the decorated samples and 5.30 % of all cases of decoration).

Technological features

They are clay pellets of various sizes applied to the vessel. Some of the samples here are very close to the knobbed handles that are found alone, mostly around the transitions of dishes and bowls (fig. 6.5, 23; 7.11, 15; 12.8, 11, 12, 14, 15, 19, 20; 14.3). So far, the difference of the plastic knobs from such knobbed handles consists in their smaller sizes in relation to the vessel, the different layout



Fig. 14. Pottery from the settlement: samples with painted decoration (drawings by S. Parvanov)
Обр. 14. Керамика от селището: образци с рисувана украса (рисунки С. Първанов)

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and number. The samples found to have a mainly decorative function are examined here. However, in some cases it is possible to assume that they could serve for better gripping the vessel (fig. 10.6; 17.14). The sticking of the knobs to the surface is visible in all cases. The traces are well smoothed in some cases, in others the knobs are more roughly stuck, exhibiting unevenness. The knobs themselves show traces of further shaping by fingers or tools, with a well smoothed surface on a smaller part of them. There are very vague data on the knob being pulled out from the vessel surface. Their shape in the horizontal is indeterminable (by random pinching by the fingers) (fig. 10.2), close to a round (fig. 10.4, 6), or oval shape (fig. 15.17, 18), and very often with irregular outlines. In a vertical direction, they are hemispherical (fig. 10.3-5) or pyramidal with a rounded or blunt peak (fig. 10.6; 15.18; 17.14). Their size varies between 0.7 cm to 5 cm, and therefore they may be mainly divided into 2 groups: 0.7-2 cm in length to 0.5-1.8 cm in width; 3-5 cm in length to 2-3 cm width. Their height varies between 0.3 and 0.6 cm.

Concentration and placement on the types of vessels

They are only found on the outer surface of pot-shaped vessels. They are usually located in their upper part: on the mouth rim or up to 3 cm below it (fig. 8.7; 10.2-6) and around the transition or the bulging parts (fig. 15.16-18; 17.14). Less frequently, they may be found on their lower parts (fig. 17.10).

Combinations with other techniques

In 80% of the cases, it is found alone. The rest are combined with plastic decoration only: 7 times with a rib (fig. 8.7; 10.3) and 1 with a plastic band (fig. 9.14).

They are observed in the following variants:

- Single – 26 cases. No clear dependencies may be determined as to size, shape and layout. It is possible that some of them, probably a small number, are parts of horizontally applied rows and that the knobs are located at a larger distance from each other (fig. 8.7; 10.5). Most of them are likely standing alone (fig. 10.6).

- Two or more – 16 cases. All of them are horizontally located in a row, usually at about 1 cm distance but also found to be spaced by 2 to 2.5 cm (fig. 10.2-4). Thirteen of them exhibit two knobs, two have three knobs and one - four knobs. Most probably, most of them are part of a line of more knobs, but it is not clear whether such a line encircles the entire vessel. It is possible, however, that they are separate pairs of knobs (fig. 17.14). It is also unclear whether they come in groups around the diameter of the vessel.

- A pair separated by a depression – 6 cases. They represent two closely spaced knobs, between which a small depression or an impression is made intentionally. They are made of a ball of clay, transformed into two knobs by a depression in the middle (fig. 15.16-18). Another variant to create the effect of two knobs is by making a round or oval impression in the center between them. The impression is carved by a finger or more commonly by a tool (fig. 15.3).

- Bulge with a large impression – 1 case. It represents a thin oval ball stuck on the vessel wall that is pressed by a thumb or a very large tool to form thresholds of clay on the periphery, which are emphasized and cut from outside at some places (fig. 9.14).

2.4. Barbotine (20 cases – 2.91% of the decorated samples and 2.25% of all cases of decoration).

Technological features

Barbotine is a mixture of clay and water applied with fingers, a brush or a bundle of hay. Applied for roughening the surface. Barbotine stands in relief by up to 1-1.5 mm above the surface.

Concentration and placement on the types of vessels

Barbotine is usually found on the lower part of pot-shaped or storeyed vessels (fig. 17.5, 15-17). There are, however, three cases where barbotine is applied from the mouth rim, suggesting that

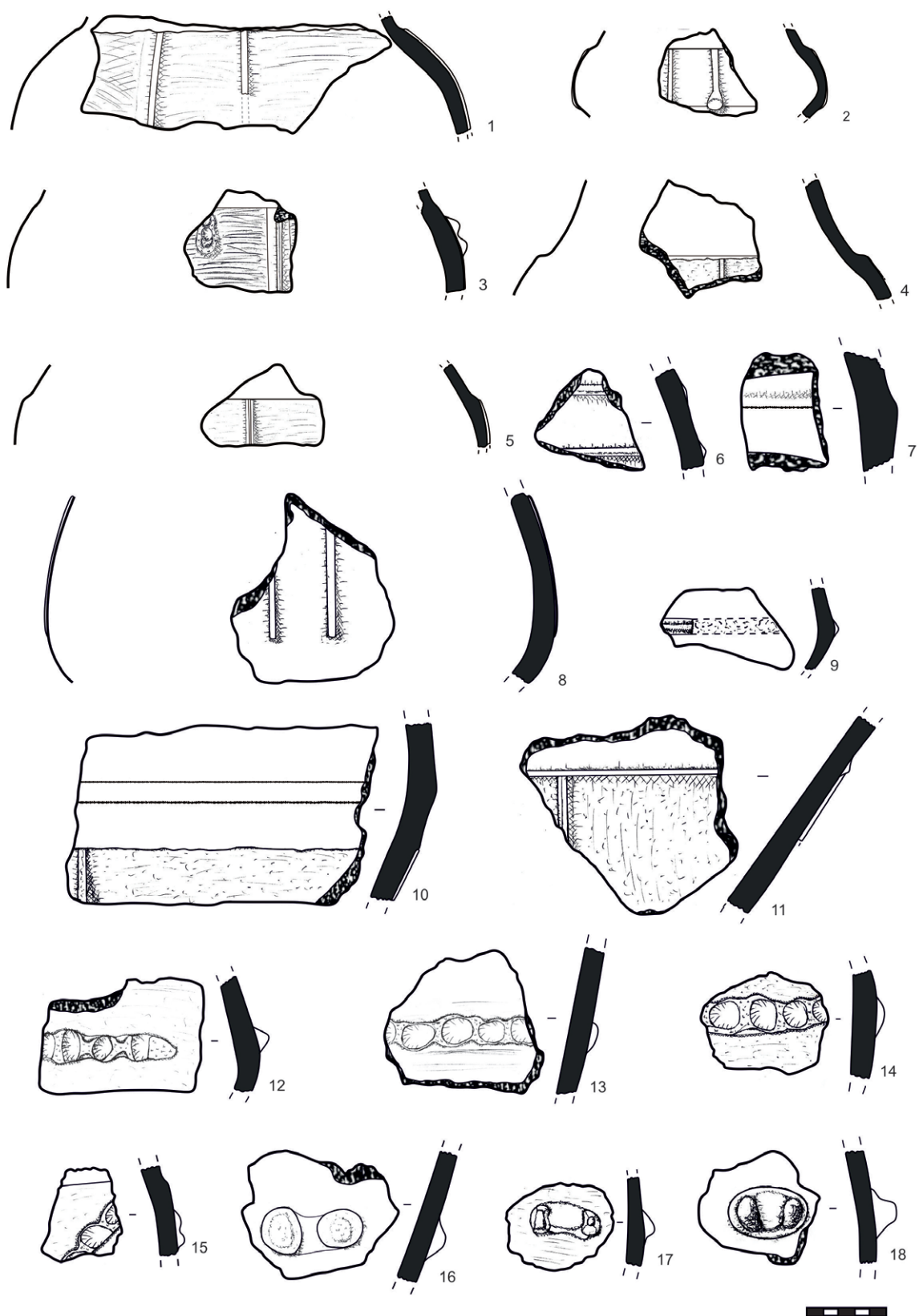


Fig. 15. Pottery from the settlement: samples with plastic decoration (drawings by S. Parvanov)
Обр. 15. Керамика от селището: образци с релефна украса (рисунки С. Първанов)

Decoration Analysis of the Pottery Assemblage from Devnya Settlement

the entire surface of the vessel may have been covered with barbotine (fig. 10.7, 8).

Combinations with other techniques

Barbotine is primarily applied as a sole decoration. In only two cases it is combined with plastic decoration: 1 case with a rib (fig. 17.5) and 1 case with a band.

Barbotine is found in the following variants:

- Arranged – 16 cases. The barbotine is dragged with fingers, forming 0.2-0.5 cm thin ribs at distances of 1-1.5 cm. These ribs are horizontal or, in one case only, slightly sloped (fig. 10.7), and vertical in all other cases (fig. 10.8; 17.15, 16). There may be disordered barbotine between the ribs.
- Non-arranged – 4 cases. The barbotine is chaotic and applied by a brush or a bundle of hay (fig. 17.5, 17).

3. **Painted decoration** (138 cases – 20.14 % of the samples with decorations and 15.57 % of all cases of decoration).

3.1. Graphite decoration (74 cases – 10.80% of the samples with decorations and 8.35% of all cases of decoration).

Technological features

At present, it is not clear whether the graphite was applied on the vessels in a state of liquid solution by means of a brush or in the form of pure graphite by means of a graphite cone. In both cases, this was done after the vessel was engobed and had its surface with the painted sections burnished, thus allowing the graphite to be absorbed into the pores of the walls. After firing, the graphite turns a grayish colour. The surface to apply it on is always burnished, sometimes polished, most often thoroughly striped. It is most often black colour, but light brown is found in rare cases and darker brownish or gray in very rare cases. The lines are 2 to 5 mm wide, more often straight and even, but curved and less carefully applied lines are also found (fig. 6.7, 13). The graphite drawing in the material from Devnya is relatively well visible, and the traces are too faded or erased in rare cases. A problem, again, is the high fragmentation, which makes the identification of the combinations of various motifs made by graphite or other techniques difficult.

Concentration and placement on the types of vessels

Graphite painting is relatively specific to dishes, most frequently to S-shaped ones (fig. 6.1-6), and much less frequently to those with an inward bent ledge (fig. 5.8), with a cylindrical ledge (fig. 5.11) and with a high edge (fig. 6.7). Missing on conical dishes and those with a thickened rim. Found even more frequently on bowls and that on all types: most often on S-shaped bowls (fig. 6.12-14, 18-22), less often on biconical bowls (fig. 7.9, 10, 12; 14.5, 7, 8) and less frequently on deep bowls (fig. 7.3, 4, 7). Graphite painting is often found on vase-like vessels with a high neck (fig. 11.1-6), and also on samples whose typological classification is currently contestable (fig. 7.21). Found on one of the two samples of stands (fig. 12.10). Completely missing on pot-shaped, vase-like vessels with a low neck, storeyed vessels and lids. The graphite decoration is found on the outer and inner surfaces of vessels – 51 cases on the outer surface only, 12 cases on the inner surface only (fig. 6.5; 14.3; 9, 10) and 10 cases on both sides (fig. 5.8, 11; 6.7, 19; 14.1, 2). If applied on the outer surface of the vessels, the graphite is found almost only on the upper parts next to and along the transitions and very rarely slightly just below them (fig. 14.6, 7). The compositions begin directly from the mouth rim or, more rarely, less than 1 cm below it. No case of graphite drawing has been found so far, among all samples, on the lower parts, with or without bottoms. All samples with decoration on the inner side belong to the group of dishes (fig. 14.1-3, 9, 10), except two fragments of bowls, one of which has an uneven horizontal strip on the inner side just below the mouth (fig. 6.19), and the other has sloped lines. Judging by the available parallels, the Devnya fragmentary motifs are part of circular compositions on the inner surface of dishes, which cannot be reconstructed. Most dishes have S-shaped ledges. In all cases with a preserved mouth, the compositions almost reach the mouth rim.

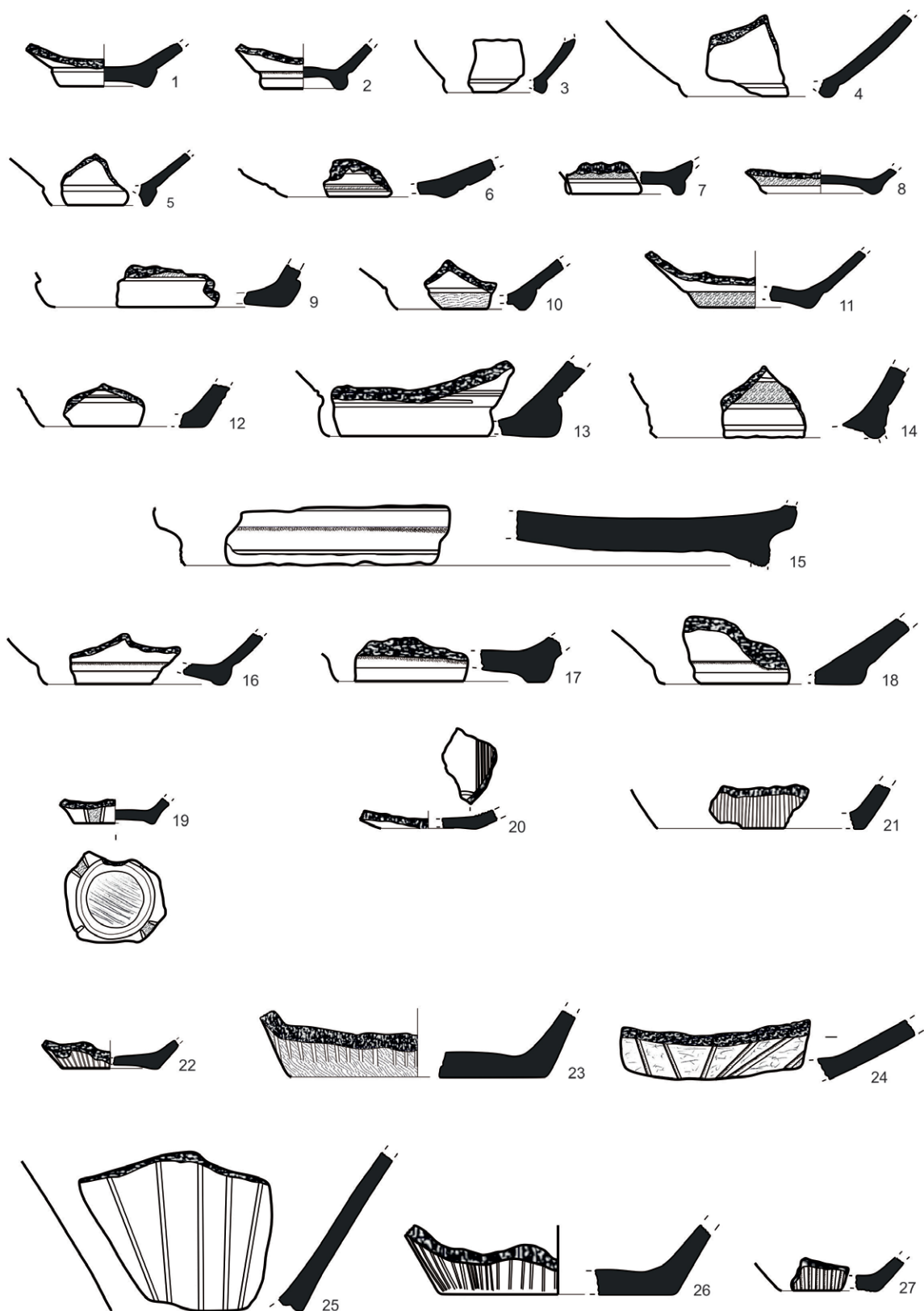


Fig. 16. Pottery from the settlement: bottoms of vessels with incised decoration, chip carving and grooves (drawings by S. Parvanov)

Обр. 16. Керамика от селището: дъна от съдове с врязана украса, кербишит и жлебове (рисунки С. Парванов)

Combinations with other techniques

In about 60% of the cases, the graphite is reported alone (fig. 5.8; 6.3, 6; 7.10, 12). In the rest of the cases it is combined with: paint after firing - 9 times with paint only (fig. 5.11; 6.4, 22), of which in one case even a part of the graphite is drawn on red paint (fig. 11.5), 1 case with paint and incised decoration (fig. 6.2) and 1 case with paint, chip carving and incised decoration (fig. 6.18); and slightly more often with carved decoration: 6 cases with incised decoration (fig. 11.3, 4; 14.9), 3 cases with chip carving and incised decoration (fig. 7.7, 11.6) and 1 case with a groove (fig. 6.12). In slightly more of the cases, the graphite is likely to be actually alone, while in the rest - combined with a few techniques.

The following motifs and compositions are found:

The samples ornamented with graphite decoration exhibit more motifs that are suitable for analysis, as almost all of them are linear and well preserved in the vertical direction. Of course, we must accept that the motifs on most vessels probably remain the same when spread out. This is certainly not true for all of them as in some cases the composition is made of various parts with different motifs (fig. 14.5). For some of them, we may only judge parts of the entire composition (fig. 14.1, 2, 4, 8, 13). Analysis of the motifs and, even more, of the entire compositions is an extremely challenging task, given the level of preservation of the material. However, notwithstanding the great difficulties and uncertainties, the current condition of the decoration must be documented, and an initial attempt for reconstruction should be made. Thus, comparative analysis of the better-preserved samples will allow for determining, at least to some degree, the general appearance of the graphite drawings. As to the cases of decoration on the inner surface, the motifs are marked, but the compositions remain impossible to clarify.

Motifs:

- horizontal line. The most used motif, found in 65 of all cases and only in positive. Found in the following variations:

One line – found in $\frac{1}{4}$ of the cases, usually fencing the composition along the ledges from above or from below. Always in combination with other motifs, in most cases one – vertical or inclined lines (fig. 5.11; 6.1, 2; 7.9; 14.5, 6) and, in rare cases, more (fig. 6.14; 7.4). Also found on the inner side in combination with other motifs (fig. 6.5, 7).

Two parallel lines – also found in about $\frac{1}{4}$ of the cases and with a similar function. Usually applied close to each other, up to 1-3 mm, and always combined with a single motif – slanted short lines, vertical or curved lines (fig. 6.6, 18; 7.10; 14.7). This is probably the case with the worst preserved specimens (fig. 14.1, 2). As exceptions, they are used for fencing the composition (fig. 11.2). They are also found on the inner side (fig. 5.11).

Several parallel lines – found in about $\frac{1}{2}$ of the cases and, on the inner surface, in only one case. There are commonly three or four lines (fig. 6.3, 12, 13), but up to eight may be found (there may have been more in these cases) (fig. 6.11; 11.3, 4). They are usually of the same width and closely spaced to each other, at a distance of 2-4 mm (fig. 6.14; 7.7), but there are lines of various widths in a single composition (fig. 7.20) and some more sparsely applied (fig. 6.11). They are more frequently found alone, with no other motifs (fig. 6.3, 4, 11, 12; 7.3, 21; 11.3, 4). A little less often, they are combined with another motif – slanted or vertical short lines (fig. 6.7, 20; 7.7; 11.5, 6). In a relatively similar number of cases, they are combined with two motifs – short vertical, and slanted lines (fig. 6.13, 14, 22), or one of the lines is discontinued and the empty area is filled with dots (fig. 6.19, 21). There may be other sections along the vessel where some of the lines are discontinued. They are found on S-shaped dishes (fig. 6.3, 4) and bowls (fig. 6.18-22), deep bowls (fig. 7.3, 7) and vase-like vessels (fig. 11.3, 4) in relatively equal amounts. Also found on the lower part of a stand (fig. 12.10).

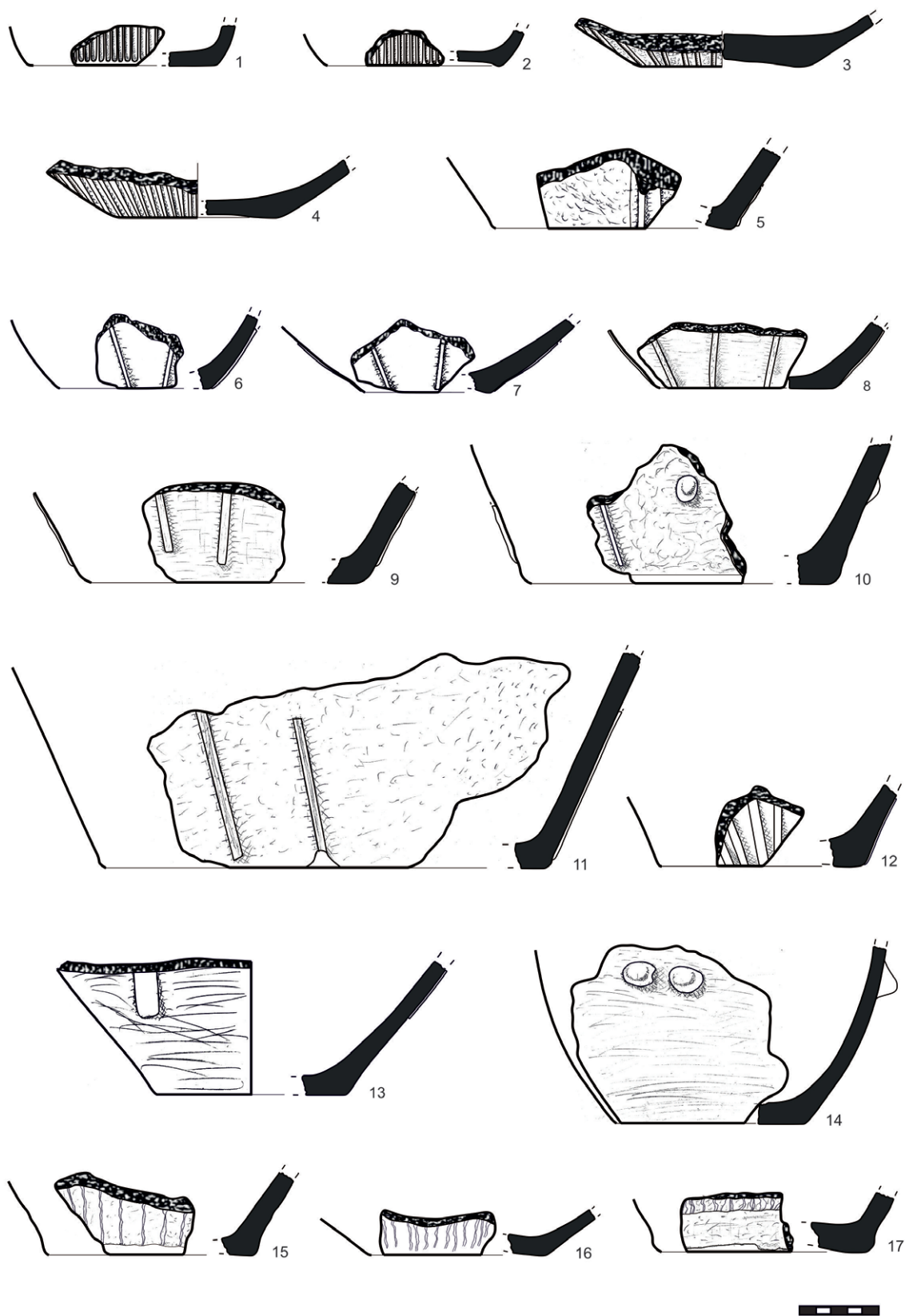


Fig. 17. Pottery from the settlement: bottoms of vessels with grooves and plastic decoration (drawings by S. Parvanov)

Обр. 17. Керамика от селището: дъна от съдове с жлебове и релефна украса (рисунки С. Първанов)

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- dashed horizontal line – found more rarely than the typical one. Found on the outer side, in positive only. There are 5 cases, in 3 of which this decoration is combined with oval or round dots (fig. 7.4), and combined with typical horizontal lines in all cases (fig. 6.19; 14.2). Integrated in the above motif in some cases.

- vertical line – not that frequent – 12 cases. Found as a single line in 2 cases only, but this is certainly due to fragmentation (fig. 14.4). All other cases exhibit several parallel lines with the same width, 2-4 mm. Based on their appearance, they may be divided into two main types, found in equal amounts:

- Short, 0,5 to 1 cm lines, applied densely below the mouth rim or on the transition of dishes and bowls. Some examples show that they may have been applied in groups without encircling the entire vessel (fig. 6.13; 14.5). Found in combination with other motifs, most often horizontal or slanted lines (fig. 6.7, 13, 14, 22; 11.6; 14.5). The upper part of the composition is not known in some cases, but based on the given samples, we may assume that the lines have not been applied alone (fig. 14.8, 13).

- Up to 3 cm long lines that fully encircle the upper parts, reaching the beginning of the transition. They may stand alone (fig. 5.8; 7.12) or be combined with two horizontal lines (fig. 7.10; 14.7). They are possibly present in other cases that are preserved only in too small fragments (fig. 14.5).

- a slanted or inclined line at various angles. They are the second most applied line after the horizontal lines, although twice less common. Found mostly in positive, but there are lines in negative. Dashed lines are much less frequent (fig. 6.19; 14.5), but this may be due to the small preserved fragments. The lines are 2-4 mm wide. The different variations are found in relatively equal amounts:

- One line – least frequent, applied in positive (fig. 14.3, 4) or negative (fig. 6.14; 7.9; 14.6), always in combination with another motif, mostly horizontal lines. Both variants are observed together in one sample (fig. 6.19). A slanted line is also used to exhibit a spiral-meander (fig. 14.1).

- Two or more parallel lines – found a little more often, arranged close to each other, more often combined with another motif (fig. 5.13; 6.2; 14.2, 5) and rarely alone. Found also in negative (fig. 14.10).

- Multiple parallel lines – these may be divided into two subtypes:

- Up to 1 cm short lines, similar to the vertical short lines described above. Found at the same places and always in combination with other motifs (fig. 6.1, 13, 20, 21; 7.7). More often closely arranged and less frequently at larger distances.

- Lines about 3 cm long – 1 case of a distinguishable group of 6 lines located on the inner side of the ledge. Delineated from below by a horizontal line (fig. 6.7).

- arched lines – only 5 cases of flowing horizontal or slightly slanted lines. Found as single lines (fig. 6.18), two parallel lines in positive or negative (fig. 5.13; 11.1; 14.10) and as three lines (fig. 14.3). Always completed by another motif. In most cases, they may be part of the spiral-meander as in one of the certain cases of presentation of this motif (fig. 14.9).

- circle (?) – 2 cases of parts of a circle presented in negative on the inner side of dishes. They are most probably part of a more complex motif.

- round or oval dots – 3 cases of small dots of about 2-4 mm size, of a round or oval shape, applied in positive. No matter how few they are, they are of considerable importance because they are always combined with dashed lines, between which they are arranged in a horizontal direction and fenced by horizontal lines (fig. 6.19, 21; 7.4).

- triangle – 11 cases in total, with dependencies as to appearance and expression:

- By lines - 6 cases where a combination of slanted lines form 1 to 3 triangles arranged close to each other in a horizontal or vertical direction. Curiously, in 4 of the 6 cases, the motif is presented on the inner surface of the ledge of dishes (fig. 5.13; 6.5). In the other 2 cases, it is found on the upper

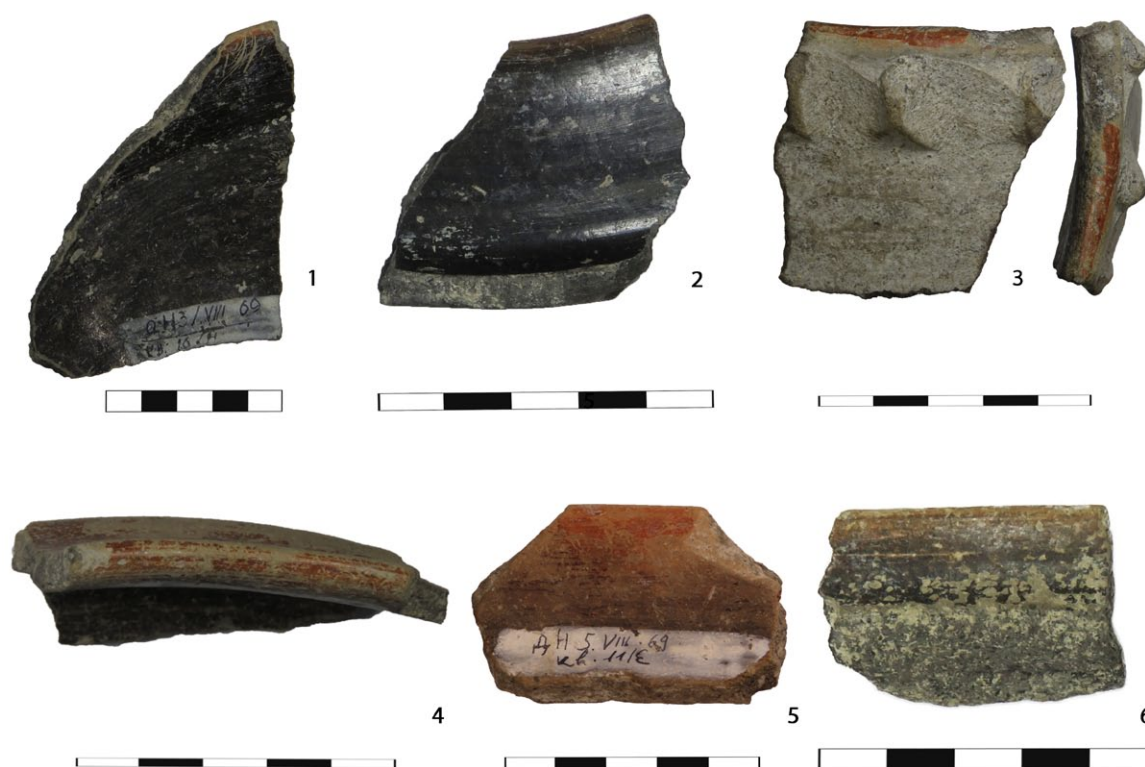


Fig. 18. Pottery from the settlement: samples with paint applied on the mouth (photo S. Parvanov)
Обр. 18. Керамика от селището: образци с нанесена боя по устието (снимки С. Парванов)

parts of a biconical bowl and vase-like vessel (fig. 11.2). In all cases, they are combined with single or double horizontal lines.

A graphite-filled triangle – 2 cases where the triangle is similar to the above, but the field is filled with graphite, forming chess-board-ordered triangles, alternating in positive and negative (fig. 6.5; 14.11). Only found on the inner side of dishes.

Elongated triangle - 3 cases where the triangles are filled with graphite, and are elongated and arranged in a horizontal direction (fig. 7.9; 10.5). They are part of a composition in the upper part of bowls and are always combined with a horizontal line below them.

- segmented spiral-meander - there are 4 certain cases and several questionable, which have a small part preserved, but can be related to another motif (fig. 6.22; 7.4; 11.1). Present in 3 cases on the inner surface of dishes (fig. 5.8; 14.1, 2), and in the upper part of a bowl in a 4th case (fig. 14.9). Arranged in a horizontal direction, in positive in two of the cases (fig. 5.8), and in negative in the other two cases (fig. 14.9). Only one case does not present a combination with other motifs that are usually slanted or horizontal lines. Purely hypothetically, the few preserved cases of arched lines in positive and negative (fig. 5.13; 6.18) or some of the slanted lines in negative (fig. 6.14; 7.9), may be parts of this very motif.

Compositions:

The classification above allows to distinguish most generally 3 types of compositions, divided on the basis of the number of motifs found, which are classified on one, two or three levels, respectively.

Compositions made of one type of motif:

Parallel horizontal lines – 17 cases (fig. 6.3, 4, 11, 12; 7.3, 21; 11.3, 4). Found on all types of vessels with graphite in a relatively equal number of samples.

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Parallel vertical lines – 2 cases (fig. 5.8; 7.12), but they may be more in number (fig. 14.8, 13).

Made of two types of motifs:

Combination of horizontal lines with slanted or vertical short lines – 9 cases (fig. 6.1, 6, 7, 20; 7.7; 11.5, 6). Found in various versions, which depend on the number of horizontal lines and the short lines layout. Only found on S-shaped and deep bowls.

Combination of horizontal lines with slanted or arched lines – 4 cases. The lines are in positive in three cases (fig. 5.13; 6.2) and in negative in only one case (fig. 6.18). There are variants that depend on the number of horizontal lines and on whether the slanted line is applied in positive or negative. Found mainly on dishes.

Combination of horizontal lines with vertical lines – 2 cases (fig. 7.10; 14.7).

Combination of horizontal lines with triangles – 1 case (fig. 11.2).

Combination of a triangle in positive with a horizontal line – 3 cases (fig. 7.9; 14.5, 6). In one case, they may have alternated with vertical lines (fig. 14.5). Found mainly on biconical bowls.

Combination of a spiral-meander with another motif – 1 certain case (fig. 14.9) and 2 questionable (fig. 7.4; 11.1). It is not clear, however, what the entire composition looks like.

Made of three types of motifs:

Combination of horizontal lines, vertical lines or slanted short lines and another motif – 5 cases. Found on S-shaped bowls only (fig. 6.13, 14, 19, 21, 22). It may well be that the composition looks differently in an unfolded form.

3.2. Application of paint before firing (49 cases in total – 7.15 % of the samples with decoration 5.53 % of all cases of decoration; there are also 21 questionable cases).

Technological features

Prior to firing, a thin layer of a composition, which cannot be identified at this time (clay solution or mineral paint?), was applied on some sections and treated as the remaining surface (fig. 18). This layer is well and thoroughly burnished in all cases. It is clearly evident that the surface was not roughened before its application, but is absolutely homogeneous with the remaining sections. After firing, the layer changed its colour. Horizontal traces of the brush are well preserved in some cases (fig. 18.2, 4). The paint was probably of the same thickness as the vessel's engobe as there is no perceptible difference in relief between them. In most cases, the border with the other colour is slightly fuzzy, with the colours blending in each other, but there are samples where such a border is sharper and well distinguishable, more often curved than even. A different colour is also observed under the paint itself, usually dark beige or beige-orange, differing from the basic gray or brown colour of the sample (fig. 18.3, 5). Given that very often, for various reasons, the mouth rims are worn or washed out, some samples exhibit slight, uncertain traces of paint. There are also 4 transitions that may have been painted, but again, this cannot be stated with certainty. At present, these cases are marked with a question mark and are not taken into account in the total number and the analysis.

Concentration and placement on the types of vessels

The technique is most typical of the S-shaped dishes and bowls (fig. 5. 14, 19; 6.2, 4, 15, 17, 18, 22; 18.5, 6), dishes with a cylindrical ledge (fig. 5.10, 11; 18.1), biconical bowls (fig. 7.9, 11, 13, 14; 18.2) and deep bowls (fig. 6.23; 7.6, 8; 18.4). Also found on mouths, the typological classification of which is currently disputable and which could belong to bowls or vase-like vessels (fig. 7.20, 21). Although extremely rare, this decoration is also found on the other types of dishes (fig. 5.3, 6; 6.8). There are only 2 certain cases of vase-like vessels (fig. 11.5), 2 on pot-shaped vessels (fig. 9.12; 10.9; 18.3), 1 on lids (fig. 12.5) and no cases of storeyed vessels were found. There is only one case where a 2.4 cm wide painted field is registered below the transition of a dish/bowl (fig. 14.15). In all other cases, the paint is applied on the mouth rim of the vessel (fig. 18.3, 4). In most cases, the paint is spread on the inner side, in the shape of a 0.3-1 cm wide strip, most often 0.5-0.7 cm wide (fig. 5.6,

11, 19; 6.4, 18; 7.6, 20; 18.1, 2, 5). It is also found on both sides of the mouth (fig. 5.14; 6.17, 23; 7.8, 9, 11, 13, 21; 18.4). The outer side of the mouth is decorated with a 0.2-0.4 cm wide strip less frequently (fig. 6.2, 8; 12.5) and wider one in very rare cases (fig. 7.8; 11.5).

Combinations with other techniques

Almost half of them were registered alone (fig. 5.3; 7.6, 8, 14; 10.9), and the other half exhibits various combinations: with painted decoration: 9 cases with graphite (fig. 7.9, 21; 11.5); with carved decoration: 1 case with incised decoration (fig. 7.20), 5 cases with chip carving and incised decoration (fig. 5.14, 19; 6.15) and 2 cases with grooves (fig. 6.8, 7.13); with plastic decoration: 1 case with a rib (fig. 6.23) and 1 case with a rib and a band (fig. 9.12; 18.3); with 2 mixed techniques: 1 case with incised decoration, chip carving and graphite (fig. 6.18), 1 case with incised decoration and a scratched field (fig. 5.10) and 1 case with graphite and incised decoration (fig. 6.2). None with impressions, channels and plastic knobs have been found. As to the group of uncertain painted samples, the situation is similar, with the only different combination being: 1 case with graphite and channels and 1 case with graphite and incised decoration. Probably because of the fragmentation, only half of the samples are completed by other techniques, and the paint is likely to be combined more frequently with other decoration practices (fig. 14.15). It is worth noting the frequent combination of the paint with two other techniques (fig. 5.14, 19; 6.2, 15, 17) and that paint is found on the only case of 4 techniques (fig. 6.18). Also, the paint is sometimes observed in combination with roughening on the lower part that has probably been made for the purpose of applying paint after firing (fig. 5.6; 7.11, 13; 14.15).

Observed in the following colours and combinations:

Red – 20 cases, with no clear relationships in the combination with the surface colour, most often in various shades of brown, but other colours are also found (fig. 18.1, 3, 5). Brownish-red – 10 cases, found with brown and black in relatively equal numbers (fig. 18.4). Brown – 9 cases, found with dark brown only once, and combined with black in all other cases (fig. 18.2). Light brown – 7 cases, found with brown and black in a relatively equal number of cases (fig. 18.6). Orange – 2 cases, with brownish and black, the second case relating to the described transition (fig. 14.15). Gray-beige – 1 case, combined with black. Red and brownish colours were obviously preferred for the paints. There is no clearly defined primary colour of the surface to combine with the paints as black and brownish in various shades are used in a relatively equal number of cases, and also gray and orange in much less cases. Part of the analyzed samples have been in secondary firing, but it is currently assumed that the colours described above are original.

3.3. Manipulated fields – smoothed or slightly roughened (11 cases – 1.60 % of the cases with decoration and 1.24 % of all cases with decoration).

Technological features

Cases where some sections of the vessels have been specially treated to enable the application of paint after firing. The idea must have been to produce a coarse and rough surface to fix the paint. Traces of it are rare. Although the paints themselves are not preserved, we relate these specific cases to the category of painted decoration. Depending on the type of surface treatment, they are divided into 2 types:

3.3.1. Smoothed fields (7 cases). Their surface is well smoothed and non-engobed (fig. 5.16; 12.13).

3.3.2. Scratched fields (4 cases). Their surface is initially smoothed less carefully but still leveled, with chaotic and very thin strips impressed by a bundle of hay or a harsh tool to make it rough (fig. 5.10; 12.20).

Concentration and placement on the types of vessels and in which variants they are found

Found almost and solely on dishes with a cylindrical and an S-shaped ledge (fig. 5.10, 16), but

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there is one case of a deep bowl where a rectangular field is fenced by 2 thin incised lines. The fields smoothed or roughened in this way are, in most cases, framed by incised lines, forming motifs in positive or negative. In most cases, the initial form of the field shape and size cannot be determined, but it can be said that in general they reiterate similar motifs as those made by chip carving – rectangular or diagonally applied fields (fig. 5.10, 16; 12.13; 14.14). They are often part of a belt composition on the transitions of dishes and bowls, but there are cases exhibiting narrow strips below the transitions of dishes or bowls, which are with or without incised lines (fig. 12.20; 14.12, 13).

Combinations with other techniques

In 10 of the cases this is combined with incised decoration (fig. 14.12, 14), of which only one is completed by paint on the mouth (fig. 5.10). There is only one case without incised decoration – with graphite and paint applied after firing (fig. 14.13). It may be assumed that this technique is not combined with any others, except with incised decoration that delineates the motifs or otherwise completes them in rare cases (fig. 14.12).

3.4. Application of paint after firing (4 cases in total – 0.58 % of the samples with decoration and 0.45 % of all cases of decoration).

Technological features

Cases where the vessel surface is deliberately roughened to apply paint on. The surface is mainly roughened by a thin tool or a bundle of hay. In these cases, however, the paint has been applied after the vessel firing. In the material from Devnya, the paint is clearly visible on 4 samples only, and has a red colour. At the moment, it is not possible to determine whether it is of mineral or organic origin.

Concentration and placement on the types of vessels

One of the samples, a pot-shaped vessel, has its upper (or entire) part roughened and painted (fig. 10.11), and the other three have their decoration on the lower part of a dish or a bowl, respectively (fig. 14.13), and on two large pot-shaped or storeyed vessels (fig. 17.11). In the latter cases, vertical ribs delineate painted and unpainted sections on the vessel.

Combinations with other techniques

In two of the cases, we observe a combination with plastic ribs, so they are very likely to have been often combined with paint. In the third case we have a combination of a smoothed field and graphite. That said, it appears that three of the four available samples of paint have been combined with other techniques, which is interesting by itself.

Surely, the number of vessels decorated this way had been much larger, since a portion of the samples with a rough/roughened surface may have had paint, which has not been preserved until today. It is important to note 33 cases of dishes and bowls where the lower part was treated in a similar manner, while the upper one was burnished or, much less often, smoothed (fig 5.6; 6.9). The lower parts are smoothed or scratched/roughened in relatively equal amounts. The treatment method may be similar to the technique of manipulated fields (fig. 13.13; 14.1-4, 11, 14). The difference is that either the entire lower parts of the vessels, but not separate sections, were treated, or no motifs were applied (fig. 7.11, 13). Most probably, in these cases the roughening or non-burnishing was intended for the subsequent application of paint after firing. The border between both surfaces lies on the transition or rather just below it (fig. 13.15). This border is in the shape of a curve, clearly distinct everywhere, more often non-embossed, or of a slightly shaped threshold in rare cases. Thin vertical lines or grooves, applied relatively close to each other, are incised on some of these surfaces (fig. 5.2, 5, 7; 6.2; 7.13; 14.12). The roughening of the upper part of the vessel, which was probably also made to apply paint on, is extremely rare (fig. 7.1). The cases described above are found on all types of dishes and bowls. However, there is a significant number of samples with both types of surface treatment or with the entire surface treated the same way, which relates them to the pot-shaped, vase-like

and storeyed vessels. The vase-like vessels with a low neck that have their middle or bottom sections rougher than the neck should be noted here (fig. 13.12; 15.1, 4, 5). There are similar cases of vessels with a high neck, but they are fewer (fig. 10.13, 14). Probably all or at least most of the storeyed vessels had their lower sections roughened for this purpose, and as to the cases where plastic horizontal ribs delineate both types of surface, the lower and more roughened surface may have been painted (fig. 15.10, 11). The few samples of pot-shaped vessels are also interesting (fig. 9.12, 14; 10.10, 12). There are also two curious cases of annular stalks (fig. 16.10). For part of the analyzed cases, the rougher vessels may have their lower part roughened, not for enabling the subsequent application of paint, but for a functional purpose – to enable easier taking and holding. At present, we accept as suitable for decoration the cases where the upper surface is burnished or very well smoothed and the lower part is quite different because the situation with the fine vessels is identical.

Conclusions

Several major conclusions may be made based on the above analyses. It should be noted that I. Ivanov's short notice regarding the settlement decoration is currently confirmed (Ivanov 1972, 247-249). The decoration is generally observed on the upper or most bulging parts of the vessels, but is also found on the lower parts in some cases. The most used techniques are the carved and plastic decorations, found on more than half of the samples (fig. 3.a). On fine vessels, carved decoration clearly prevails over painted decoration. A predominance of incised decoration is observed in almost $\frac{1}{3}$ of decorated samples and in $\frac{1}{4}$ of all cases of decoration (fig 3). Incised decoration is mostly used for applying motifs on the representative vessels, and much less for roughening of the lower parts of some dishes, bowls, vase-like and storeyed vessels. There are three techniques used for the application of motifs – incised decoration, chip carving and graphite. Chip carving is the second most common technique for fine vessels, and there were obviously strict rules for its use. The idea of the manipulated fields is probably similar to that of the chip carving, but the efforts for eliminating part of the surface were saved, so as for rough preparation for painting. Their much smaller number compared to chip carving, however, clearly shows that no energy was spared in the decoration of the fine vessels. The other carved decoration techniques are less in number (fig. 3), but clear dependencies were identified. The grooves that seem to have been used in the most diverse combinations and to complement the main decoration show two types of application: single, applied horizontally in the upper parts of vessels, or of annular stalks, generally combined with another technique; multiple, applied vertically or obliquely, in parallel on the lower parts of the vessels. The same applies to the impressions, which are strictly divided into two types: on both sides of shallow dishes and on flat lids. The channels are mostly found on specific types of vessels, with clear dependencies between technology, type and decoration. Plastic ribs are the second most commonly used technique (fig. 3) and traditionally decorate the rough vessels, but even if rarely, they may be found on finer vessels as complementary decoration. The plastic bands are impressive by the huge variety in their appearance. This shows that there are no clear trends in their workmanship, but such are clearly found in their placement – almost and only next to the mouth of pot-shaped vessels. It is interesting to note the rare combination between the various plastic techniques, but the combination between ribs and bands are very likely to have been more frequent. Painted decoration, found on about $\frac{1}{5}$ of the samples with decoration, is less preferred. It is evident that a little less than a half of the examples with painted decoration are combined with another technique. Among these, the combination with incised decoration is more common and less so with another painted technique. Graphite drawing is the fifth most common technique, traditionally found in positive and much less frequently in negative. The motifs are mainly linear and the compositions, although not fully reconstructible, mainly seem to have been composed more simply, not allowing significant diversity. It is notable that graphite decoration is less frequently found, even 3 times less than incised decoration (fig. 3). Both techniques are combined

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in only 11 cases. That is, only one was usually preferred, and the two were rarely combined. Mouth painting is found on 16% of all dishes and bowls. It is also found on all other types of vessels, but as an exception. The application of paint on the lower parts of dishes and bowls after firing may have occurred in at least 7% of the available cases, with a high probability for it to have been more.

It can be concluded that each technique was used with a clear and precise purpose. As a whole, a general canon of ornamentation is observed. However, there are single samples that do not fit this canon by one or more parameters, and their uniqueness may be due to both objective and subjective circumstances (fig. 5.4; 6.12; 11.5; 12.19; 13.9; 14.15; 16.15).

As to the decoration of the various types of vessels, there are clear dependencies too. The first three types of dishes are ornamented on rare occasions – with simple incised lines and grooves (fig. 5.1, 2, 5, 7) and graphite drawing may appear only on the third type (fig. 5.6). They rarely have a roughed lower surface (fig. 5.2, 5-7). The dishes with cylindrical ledges are often ornamented, mainly with belt compositions (fig. 5.9, 10) and less often with paint on the rim (fig. 5.11) or graphite on the ledge (fig. 5.11). About half of the dishes with S-shaped ledges are ornamented. A belt composition is found on the transition (fig. 5.13-19) and less frequently, graphite that forms compositions with one or two motifs (fig. 6.1-6). There are rare cases of paint on the mouth (fig. 18.6) that is combined with the belt composition (fig. 5.14, 19) or the graphite (fig. 6.2, 11). A small part of them has a roughened or ornamented lower surface (fig. 6.2). There are two interesting cases of combinations of incised lines with impressions on both sides, which are found on highly fragmented shallow dishes (fig. 5.12). Half of the cases of the high ledge dishes are ornamented, exhibiting various techniques (fig. 6.7-10).

S-shaped bowls represent the finest vessels from the complex as most of them are ornamented. Graphite compositions of all types are most frequently found (fig. 6.11, 12, 18, 20), but all cases with three motifs are represented here (fig. 6.13, 14, 19, 21, 22). Belt compositions are less frequently found – alone (fig. 6.16) or in combinations with paint on the mouth (fig. 6.17) and a groove, most rarely (fig. 6.12). Half of the samples of deep bowls are ornamented, and various techniques, of which paint on the mouth is predominant, may be reported here (fig. 6.23; 7.6, 8). The belt compositions (fig. 7.2, 5, 7; 12.16) and the graphite drawings (fig. 7.3, 4, 7) are relatively equal in number, and horizontal ribs are found occasionally (fig. 6.23; 7.22). Less than half of the biconical bowls are ornamented, usually sparingly, but they exhibit the highest diversity. Paint on the mouth is most frequently used (fig. 7.9, 11, 13, 14), and a little less often, simple graphite compositions (fig. 7.9, 10, 12) or grooves (fig. 7.13, 15; 12.18, 19). Most samples with channels probably relate to this type, although the transitions of most of them are not preserved (fig. 7.15-19). Their lower parts are sometimes roughened (fig. 7.11, 13). Ribs may also be seen in very rare cases (fig. 12.19).

The pot-shaped vessels of the first two types exhibit decoration in a little more than 60% of all cases. Of these, about ¼ of the samples have a plastic band on their upper part that is mainly horizontal (fig. 8.6, 8-14; 9.1-7, 13) and very rarely vertical (fig. 8.2; 9.10, 11, 14) or oblique (fig. 9.7-9, 15). About 1/5 of them have ribs (fig. 8.1-5, 7), without any clear dependencies between the various types and 1/10 are with plastic knobs, mainly located next to the mouths (fig. 10.1-6). Roughening with arranged barbotine is relatively rare (fig. 10.7, 8) and as an exception, paint may be found, applied before (fig. 9.12; 10.9) or after firing (fig. 10.11, 12). The third type of the pot-shaped vessels, those with a spherical body and a slightly hinted neck, is very rarely decorated (fig. 15.3).

There is a clear trend with the vase-like vessels with a low neck – most of them are decorated, but only with vertical ribs on the shoulders (fig. 15.1, 2, 5, 8). There is only one exception of incised lines along the shoulders (fig. 13.19). Sometimes, their middle or lower parts are roughened, contrasting the other parts (fig. 15.1, 5). The certain samples of the group of vase-like vessels with a high neck very rarely exhibit ornamentation, which in turn, is highly varied (fig. 10.13, 14, 15; 13.16;

15.4). There are, however, a series of highly fragmented samples that, very likely, belong to this type. They often have a graphite composition of one or two motifs applied on their mouths (fig. 11.1-6), and are sometimes completed with incised decoration (fig. 11.3, 4, 6).

Storeyed vessels are always decorated with incised lines, most often in combination with chip carving (fig. 11.7-12; 13.10). The transition and the most bulging middle part are decorated. Plastic ribs (fig. 13.10; 15.6, 7) that were probably often applied in parallel in the lower parts (fig. 15.10, 11; 17.11) are found.

Clear conformities may be also identified on the lids. The flat lids are almost always ornamented with impressions, sometimes completed with plastic ribs (fig. 11.14, 15). Deeply carved grooves that encircle the entire lid are also found sporadically (fig. 11.13). On half of those with a ledge, the trend is to apply a belt composition on the transition (fig. 12.1-4, 6), as well as on their upper parts (fig. 12.6, 7). As exceptions, paint on the mouth (fig. 12.5) or parallel incised lines on their upper parts (fig. 12.8) are found.

Decoration is found on both fragments of stands – an incised line (fig. 12.9) and graphite-painted parallel horizontal lines (fig. 12.10).

Comparative analysis

We have sufficient amount of ornamented pottery from the other settlements from the lakes area that may serve for a brief comparison. An in-depth comparative analysis would show clearly all interesting dependencies of the pottery from the different settlements. Since no detailed analysis of the decoration of any of the other ceramic complexes is available, it is impossible to make an exhaustive comparative analysis. This would have to wait for the complete study of the materials from other sites. As for now, we may mention only the most general and important patterns, which would allow to date the material and to outline the directions for a further in-depth comparison. It is important to note that the combination of incised decoration and chip carving is most frequently found in the other sites (Todorova, Tončeva 1975, 32; Margos 1972, 272; Parvanov 2019, 73-74). There is full parity of both the compositions and the motifs built by them (Todorova, Tončeva 1975, Abb. 2.15; 4.7, 13, 14, 16; 5.23, 24; 7.6-9; 8.1, 11; Margos 1973, Table VI.1, 2, 4, 5, 7, 8; Parvanov 2019, fig.3, 2, 3; 6.8, 12-14; 7.1, 2, 4; 8.12-14; 9.2-9). The material from Ezerovo gives a better idea of the appearance of the spiral-meander that is also mainly in negative (Todorova, Tončeva 1975, 37; Abb. 4.13; 7.9; 8.11). A roughening of the lower parts by incisions or grooves is also observed there (Todorova, Tončeva 1975, 37; Abb. 6.9, 10, 14). It is clear that the decorated annular stalks are mainly applied on the S-shaped dishes and bowls, which are the most representative vessels in the other settlements too (Todorova, Tončeva 1975, Abb. 5.14-22). We should also mention the dishes with decoration of incised lines and impressions on both sides, which are found in all settlements (Todorova, Tončeva 1975, 38; Abb. 5.1-4; Taf. 15; Margos 1973, 272; Table V.6, 7; VII.10, 11; Parvanov 2019, 65; fig. 4). The grooves and the channels are observed in a similar layout (Todorova, Tončeva 1975, Abb. 6.12, 13, 20, 21; Parvanov 2019, fig.7.4). Shell stamp decorations are also very rare in the other settlements (Margos 1973, 272, 273; Table V.3, 8). The plastic decorations are virtually identical. The same techniques, types of vessels and locations are found (Todorova, Tončeva 1975, 37; Abb. 8.2-5, 9, 10, 12, 14, 15; Margos 1973, 273; Table VII.1-3; Parvanov 2019, 75; fig.7.10, 11; 8.1-4, 6; 9.19-21). As to the graphite drawing, we observe an almost full analogy of motifs, compositions and types of vessels on which they are found, mainly positive, mostly with one or two linear motifs in the other settlements too (Todorova, Tončeva 1975, 32; Abb. 5.2, 5, 8, 10, 12; 3.18, 20, 22; Taf. 10.1-9, 15; Margos 1973, 272; Table VI.4, 10-12; Parvanov 2019, 75; fig.5.1; 6.1, 4, 10, 15, 18; 7.6; 10.6). It may be said that compositions of three motifs are more often found only in Ezerovo. Very exact parallels are found there, and the well-preserved samples from Ezerovo serve to the better understanding of the fragmented compositions from Devnya (Todorova, Tončeva 1975, 32; Abb.2.12; 3.22; 6.15, 17; Taf.

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16.5-8, 10). The data regarding the paint on the mouth are scarce, but as a whole, the samples from the submerged settlements are very badly preserved and hard to distinguish. Traces of white and red paste are still noticeable (Todorova, Tončeva 1975, 32; Margos 1973, 272). In the other complexes, roughening of the lower parts that could have been used for the application of paint is also observed (Todorova, Tončeva 1975, Abb. 3.15; 7.20; Taf. 10.5; 12.3; Parvanov 2019, 63; fig. 3.11, 15; 7.3). In general, the observations on the ornamentation of the Ezerovo and Strashimirovo pottery may be fully applied to the material from Devnya (Todorova, Tončeva 1975, 32, 37; Margos 1973, 272-273).

Conclusions

The review of the pottery from the other settlements from the lakes leads to the conclusion that the similarities with the Devnya material are enormous. The trends in the decoration are practically identical. In general, the differences are minor, and may largely be due to subjective factors. Certainly, an in-depth analysis of the types of techniques, types of vessels, location of the decoration and the types of combinations would highlight interesting differences. Also, an analysis of a better preserved material with a clear stratigraphic position would bring more weight to the conclusions. It is possible to assume at this stage of research that Devnya presents the specifics of the pottery decoration from the lakes well. Based on observations about the decoration of the vessels, it may be assumed that the settlement in Devnya is synchronous with the other ones of the lakes. However, like in Poveljanovo, there are single samples that, by their general workmanship, do not match the characteristics of phase II of the late Eneolithic entirely (fig. 6.9, 10; 7.15; 9.14; 11.13-15). They may have an earlier chronological position as they have exact parallels in the preceding period (Slavchev 2003, Abb.3; 9.2, 5; 16.1, 4). Interestingly, whilst their shape could be earlier, their decoration in general matches that of the late Chalcolithic, and does not fit the period of the middle Chalcolithic. It remains possible that these samples, as well as other non-ornamented ones, relate to the earlier Phase I of the Varna Culture. This, however, remains a hypothesis only, and material of certain stratigraphic position is needed to allow the more confident dating of these samples, as well as of the samples of Poveljanovo. It is important to note that the material from Devnya comes from a one-layer settlement with a thin cultural layer, which reduces the possibility of having had a long period of existence. For the moment, we may assume that for the most part, the pottery from the settlements is dated to Phase II of the Varna Culture, with a possibility for part of it to relate to Phase I.

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Анализ на украсата на керамиката от селището при Девня

Станимир Първанов

(резюме)

Целта на изследването е да анализира по-детайлно украсата на керамиката от селището при гр. Девня. То е проучено чрез спасителни археологически разкопки през 1969–1970 г. Намира се на първата незаливна тераса на западния бряг на Белославското езеро и е определено като еднослойно селище от късния енеолит. Заради значимите открития от късно-енеолитните некрополи Варна I и Девня, регионът на Варненските езера е силно дискутиран в литературата. Изказвани са многобройни твърдения, според които регионът се отличава от останалите през късния енеолит в икономически план, със силно развита търговия и металургия и ясно откроява социална диференциация. Повечето от мненията се базират на данните от некрополите, но за самите селища като цяло знаем твърде малко. Материалът от Девня е един от много малкото от региона, които произхождат от археологически проучено селище. Обработката на керамика от еднослойно селище би помогнала в известна степен за изясняването на въпроси, свързани с относителната хронология на селищата в езерата. В допълнение, изследванията на керамика от региона не са многобройни и напълно липсват такива, които да представят по-подробно спецификите на украсата. Важно е да се отбележи, че от публикацията на селището през 1972 г., в научната книжнина му е обърнато изключително малко внимание.

От всичките налични и обработени 1282 образца, се среща украса върху 685. Тя е класифицирана според различните техники на декориране. Анализът на орнаментацията позволява да се направят сигурни изводи за технологията на нанасяне на всяка от украсите, зависимостите при разположението им върху отделните части на съдовете, закономерностите при комбинациите между различните техники, както и вариантите и мотивите, с които се срещат всяка от техниките. Вдълбаната и релефна украса, са върху повече от половината от образците. При паниците и купите има очевиден превес на вдълбаната пред рисуваната украса, като най-често се наблюдава врязаната украса, която е представена в почти една трета от образците с украса. Графитната рисунка, която е петата най-често срещана техника, традиционно се среща в позитив и много по-рядко в негатив. Композициите са семпли и са съставени основно от линейни мотиви. При гърневидните съдове впечатление прави честото предпочитание към релефни ленти, ребра и пъпки, които са най-често разположени до самото устие на съда. Интересни са също така и етажовидните съдове, които са задължително украсени с врязана украса и кербшнит. Общото наблюдение е, че всяка от техниките се е използвала с ясно и точно предназначение и се наблюдава общ канон на орнаментацията. От краткото сравнение с керамиката от останалите селища се заключава, че приликите са огромни и на практика тенденциите в украсата са идентични. Може да се твърди, че Девня добре представя спецификите на украсата на керамичния комплекс от езерата и че е синхронна с останалите селища. Те от своя страна са датирани във II фаза на култура Варна, посредством конкретни паралели от некропола при Дуранкулак и селищната могила при Голямо Делчево. Остава малка възможност, част от материала да има малко по-ранна хронологическа позиция и да се отнася към по-ранната I фаза на култура Варна, но на този етап на проучване, тя остава хипотетична.



Hellenistic Net-Pattern Vessels from the Territory of Bulgaria

Eva Tonkova ^{a*}, Veselina Dimitrova ^b

^a Department of Archaeology, Faculty of History, Sofia University “St. Kliment Ohridski”, 15 Tsar Osvoboditel Blvd, 1504 Sofia, Bulgaria; e.n.tonkova@gmail.com

^b Department of Archaeology, Faculty of History, Sofia University “St. Kliment Ohridski”, 15 Tsar Osvoboditel Blvd, 1504 Sofia, Bulgaria; veselina-dimitrova@mail.bg

* Corresponding author

ABSTRACT

The present paper discusses a small group of imports found within the territory of Bulgaria during the last few decades. The so called net-pattern vessels are mostly represented by ceramic hemispherical cups decorated with a network of incised lines. This type of decoration can also be observed on other shapes, such as askos or inkwell. While net-pattern cups are usually wheelmade, there are also moldmade bowls, and such made of glass and silver. It is considered that the pentagon net decoration is inspired by the style of toreutics and that the ceramic vessels imitate the metal ones. Unfortunately, the metal specimens are often without a clear context, which could otherwise help for the identification of their chronology. This type of vessels is widespread over vast territories of the ancient world, but it is comparatively rare in principle, as is the case with the finds from Bulgaria. Up to the present, three whole examples are known - one ceramic and one silver bowl, as well as fragments from a glass vessel.

The analysis of the material indicates that from the second quarter of the 3rd c. to the 1st c. BC a group of vessels with net-pattern decoration made of clay, silver, and glass were spread in the whole Hellenistic world, including Thrace.

KEYWORDS

Hellenistic pottery, Black-glazed pottery; Hemispherical silver bowl

In the course of development of drinking cups in the early Hellenistic period, hemispherical cups without feet or handles appear in several varieties (Rotroff 1997, 107). A specific variation is the so-called net-pattern cup, which is decorated with lines that form a net of pentagons. This ornamentation occurs on vessels made of clay, glass, and metal. The present paper focuses on a few representatives of this tendency found in Thrace.

In the scientific literature, these vessels are most often compared to a tortoise shell, football, net, etc. (Edwards 1975, 90; Lungu 2013, 228; Rotroff 1997, 108, note 103). Identical ornamentation can be seen on other shapes, such as askos, inkwell, etc. (Rotroff 1997, 108, note 104). The distribution of this specific group of vessels can be traced from the second quarter of the 3rd c. BC to the 1st c. BC (Rotroff 1997, 109; Rotroff 1982a, 39).

The metal bowls with net-pattern ornaments are made of silver-gilt. They have similar morphological characteristics – a hemispherical shape, rounded bottom and a straight mouth with a horizontal, thickened and slightly incurved rim. An ornamental band goes along the lip. Under this band, some specimens have engraved or applied plant decorations on opposite sides (Bothmer 1984, 57, No 97; Carter 2015, 172-175, cat. No 38; Guzzo 2003, 53-54, fig. 22). The net ornament begins



Fig. 1. Distribution of the net-pattern vessels in Bulgaria (map by the authors)

Фиг. 1. Разпространение на съдовете с мрежеста украса в България (карта от авторите)

from the bottom, covers the walls and ends beneath the band around the lip. It is outlined by dotted points and/or incised lines (Symonenko 2011, 32, ris. 15, 1-5; Carter 2015, 172-175, cat. No 38; Guzzo 2003, 54).

Of the wheelmade pottery, the hemispherical black-glazed cups are those most often decorated with the net pattern. The ornament is made of lines, incised after the application of the glaze – a treatment characteristic of the West Slope style decoration (Bruneau 1970, 498, No 185.18). Two main approaches to the handling of the area immediately below the rim can be observed. The first consists of one or two horizontal incised lines – a feature characteristic of the net-pattern cups from the Athenian Agora (Rotroff 1997, 109). Other examples are known from Sardis (Rotroff, Oliver 2003, No 135); Ephesos (Gassner 1997, taf. 12, No 187); Pergamon (Schäfer 1968, 117, abb. 10); Tarsos (Goldman 1950, No 113, p. 219, pl. 125); Chaika (Egorova 2007, ris. 2, No 12); Istros (Lungu 2013, pl. 27, No Che 1, 1a, 228), etc. The second common treatment of the zone below the rim is a reserved¹ band, which is considered to hint towards a production in Asia Minor (Rotroff, Oliver 2003, 40). Examples are observed in Sardis (Rotroff, Oliver 2003, No 133, 134); Pergamon (De Luca, Radt 1999, taf. 15, No 433, 434; Pinkwart, Stammnitz 1984, taf. 25, No K41), etc. There are some exceptions, for instance a cup from Delphi with a decorative band below the rim, consisting of incised vertical zigzags and dots made with white paint (Perdrizet 1908, 173 – fig. 733; 174). Another one (from the Athenian Agora) has a similar decoration (Rotroff 1997, No 322). The bottom of the net-pattern cups can be rounded, flat or underlined with a low ridge and a scraped groove, forming a low ring foot (Rotroff 1997, 109). A relative development of the shape has been noted – from hemispherical in the beginning to a more conical profile in the later stages of the production (Lungu 2013, 229).

Later on, the net-pattern decorative scheme occurs also on moldmade bowls. Here the outline

1 Left unglazed

Hellenistic Net-Pattern Vessels from the Territory of Bulgaria

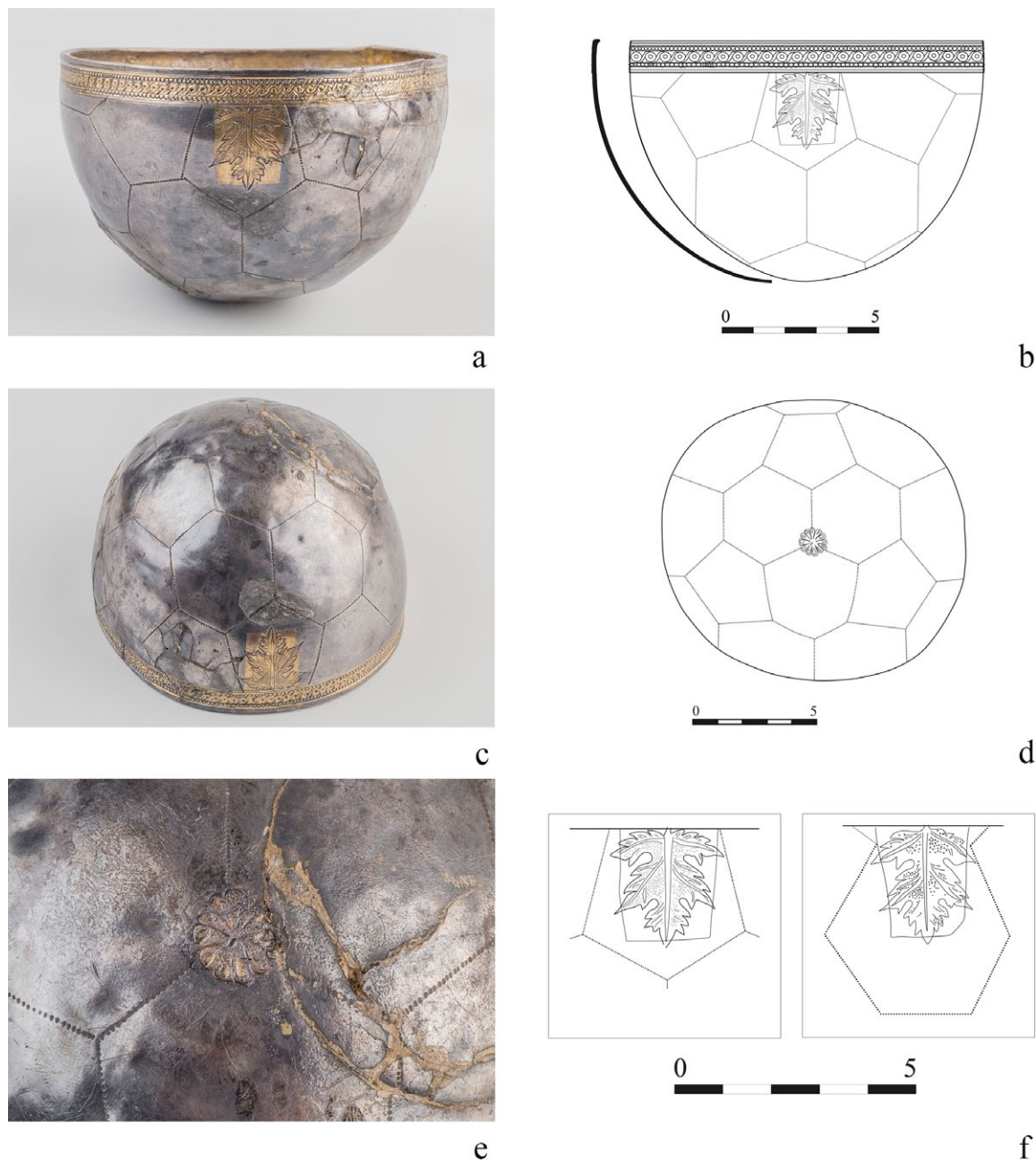
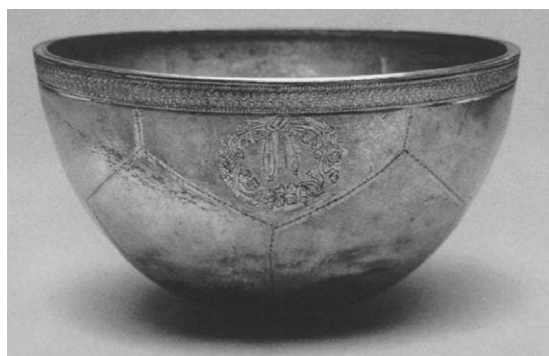


Fig. 2. Silver bowl with gilding from Zareva mound – a, c, e (photo NHM), b, d, f (drawings by the authors)
 Фиг. 2. Сребърна купа с позлата от Зарева могила – а, с, е (снимки НИМ), b, d, f
 (рисунки на авторите)

is made in relief, and the pentagons are separated from each other by pearls, simple lines or double lines (Bruneau 1970, 498, No 185.18; Rotroff, Oliver 2003, 40).

Susan Rotroff (1997, 109), who has worked with the materials from the Athenian Agora and elsewhere, suggests that the net-pattern cups were produced as early as the second quarter of the 3rd c. BC, and their use can be traced to at least the third quarter of the 2nd c. BC. The metal and the moldmade ceramic bowls can be traced to the 1st c. BC as well (Retroff 1982a, 39).

Vessels with net-pattern decoration are comparatively rare in principle, as is the case with the finds from Bulgaria (fig. 1). We know of two ceramic vessels (a cup and an askos), a silver bowl and fragments from a glass cup.



1



2



3



4



5



6

Fig. 3. 1. Bowl from Metropolitan museum (after Guzzo 2003, 54, fig. 22); 2. Bowl from Olbia (after Christodoulou 2015, 88, fig. 70); 3. Bowl from Velikoploskoe (after Mordvinceva, Redina 2013, 392, fig. XV.1); 4-5. Bowls from Kuwait (after Carter 2015, 172, 175, fig. 38); 6. Bowl from Iran (after Pfrommer 1993, 106, fig. 72).

Фиг. 3.1. Купа от Метрополитън музей (по Guzzo 2003, 54, фиг. 22); Купа от Олбия (по Christodoulou 2015, 88, фиг. 70); 3. Купа от Великопловское (по Mordvinceva, Redina 2013, 392, фиг. XV.1); 4-5. Купи от Кувейт (по Carter 2015, 172, 175, фиг. 38); 6. Купа от Иран (по Pfrommer 1993, 106, фиг. 72).

The silver bowl

A silver net-pattern bowl² is kept in the National Museum of History (NMH) in Sofia. It comes from Zareva mound, southeast of the village of Yasenovo, Kazanlak (fig. 1). The vessel was discov-

² Inv. No 36379

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ered in 1995 in the grave of a warrior who was laid with his horse on a leveled surface in the high layers of the embankment. Among the finds, there is a bronze helmet of the “Thracian” type, armament, metal objects, and ceramic vessels. The bowl was located directly next to the right shoulder of the buried man, placed with the bottom up (Kitov 2008, 77-80; Kitov 2003, 39-40).

The vessel has a hemispherical shape, its height is 7.5 cm and the diameter is 11-12.5 cm³. It is hammered from silver sheets. Individual elements of the ornamentation are gilded (fig. 2.a). The decoration, located mainly on the outside, starts from the center of the bottom, where a 12-leaf rosette is depicted (fig. 2.e). There are traces of leaf-gilt on the leaves of the rosette. Three radially situated hexagons emerge from it. On the next row three pentagons (fig. 2.c-d) are placed between them. Above them, there are hexagons again and the network ends at the mouth with unfinished and irregular polygons. The entire net-pattern ornament is outlined, whereafter pricked dots are superimposed. The decoration under the rim consists of a grainy ornament, which delineates an ornate band of a double braid motif with a dot in the middle. The grainy pattern is made with a punch and some grains overlap. The entire decorative band is gilded with the same technique as the rosette on the bottom. A band with a double braid and grainy ornament, but on the inside of the vessel, is also known from a silver-gilt bowl, coming from the nearby Sashova mound (Bozkova 2013, 125-126; Kitov 2008, 93, fig. 117).

On the two opposite sides of this vessel, just below the band under the rim, two vine leaves are engraved (fig. 2.a). They are gilded with a trapezoidal leaf that does not cover them completely (fig. 2.f). Their presence points to the idea of Wine and Dionysus Worship, which would also determine the purpose of the vessel – for drinking wine.

Several more silver vessels of this type are known to date. They were found in Magna Graecia, the Northern Black Sea coast and Asia. A close parallel to the Zareva mound bowl is a vessel from the Metropolitan Museum (fig. 3.1), which is supposed to originate from Southern Italy or Sicily (Guzzo 2003, 83-86, fig.22). The decoration and dimensions⁴ are similar, but the workmanship is more skilled. The net-pattern ornament of pentagons is gilded, and the lines are incised and pricked. The lip is decorated with a continuous beading and a band of a guilloche motif. As with our vessel, there are engraved motifs of gilded wreaths on both sides (Bothmer 1984, 57, No 97, Guzzo 2003, 53-54, fig. 22).

Two silver bowls with decoration identical to the Metropolitan one were found near the northern Black Sea coast – at Olbia (fig. 3.2) (Christodoulou 2015, 88, fig. 70) and Velikoploskoe (fig. 3.3), Ukraine (Symonenko 2011, 32, ris. 15, 1-3). The decoration repeats the same pattern, but the engraved ornaments on the sides of the vessel are missing. The dimensions of the cup of Velikoploskoe are also similar – a height of 7 cm and a diameter of 14 cm, but the cup lacks gilt. The two bowls were interpreted as Greek imports from the middle of the 3rd – the first half of the 2nd c. BC (Symonenko 2011, 33-34; Christodoulou 2015, 88; Mordvinceva, Radina 2013, 388-390).

Two vessels from the territory of Kuwait have also been placed in the same chronological framework (Carter 2015, 172). They are hammered from silver sheets, and some elements of their decoration are leaf-gilded. Both bowls have applications of acanthus (vine leaves?) on the two opposite sides under the lip, although they have been preserved only on one of them (fig. 3.4-5). These vessels were probably made in a Bactrian or Western atelier (Carter 2015, 172-175, cat. No 38).

In Asia, the tradition of making bowls with net-pattern ornaments continued in the 1st c. BC. From the territory of Iran comes a bowl (fig. 3.6), which, although distinct with its splendid decoration in the interior of the vessel (a characteristic feature of Middle Eastern art), follows the Greek

3 The vessel was broken.

4 The vessel has a height of 7.7 cm and a diameter of about 14 cm (Bothmer 1984, 57).

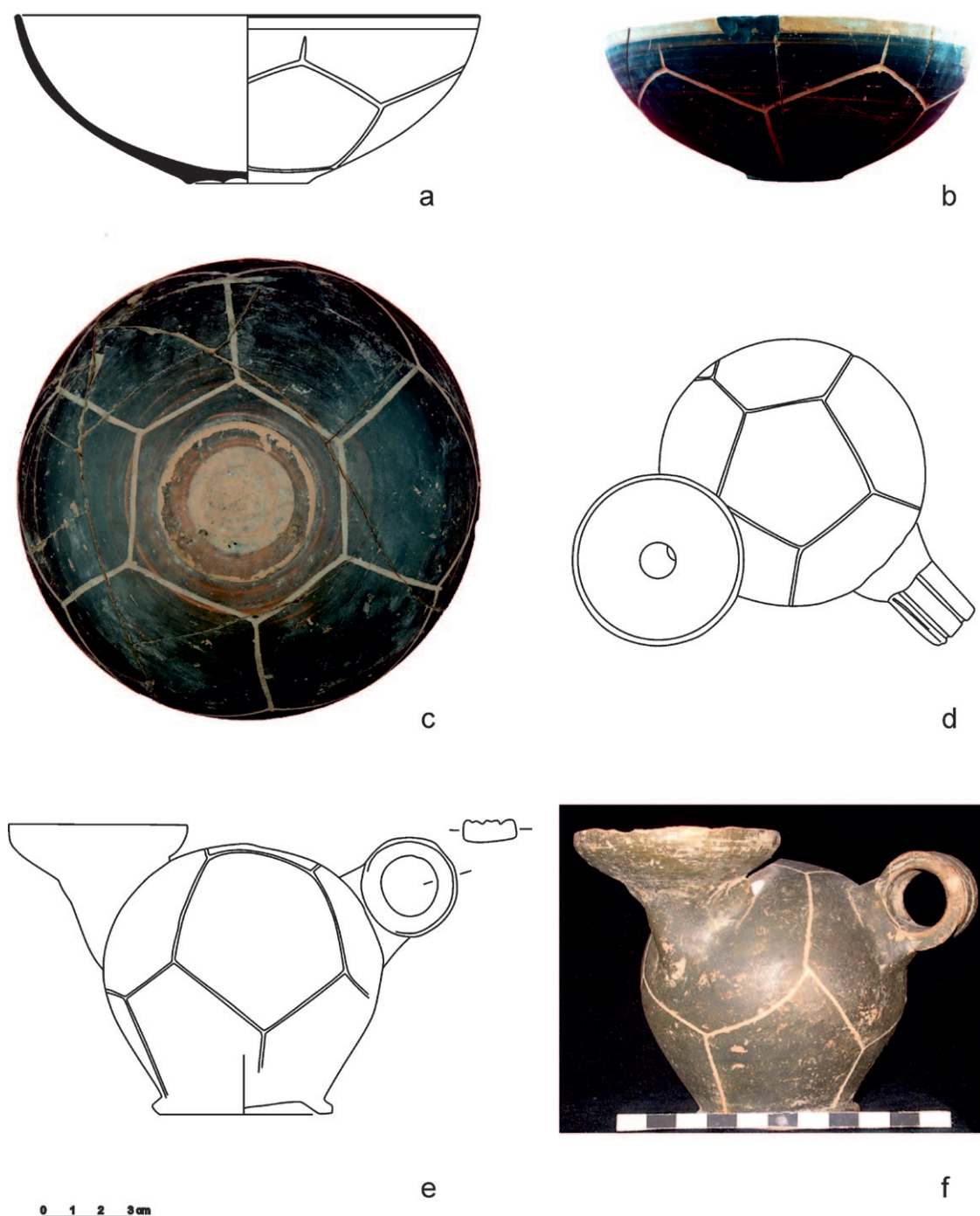


Fig. 4. Clay vessels with net-pattern decoration from Bulgaria. a, b, c – the cup from Nessebar (images by the authors); d, e, f – the askos from Kableshkovo (archive Anelia Bozkova).

Фиг. 4. Керамични съдове с мрежеста украса от България. а, b, c – чашата от Несебър (изображения на авторите); d, e, f – аскосът от Каблешково (архив Анелия Божкова)

model of the Hellenistic Age (Pfrommer 1993, 51-53, 187-188, No 72).

The Zareva mound bowl also has some parallels among the Greek ceramics with net-pattern ornaments found in Athens (Rotroff 1982a, 39, No 403; 1997, 108-109, No 318-323; Thompson 1934, 382-383, fig. 69 a-b), Corinth (Edwards 1975, 102, No 605-607, pls 19, 58; 179-182, No 908-920, pls. 36, 38, 78-80), Pergamon (Piçon, Hemingwey 2016, 171, No 86), the Northern Black Sea coast (Symonenko 2011, 32, ris. 15, 6-8; Usacheva 1978, 103, ris. 2, 5) and Thrace (Nessebar and

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Kableschkovo), whose chronological development coincides with that of the metal vessels.

Although silver vessels with net-pattern ornamentation are extremely rare, they are spread over large territories. The bowls from Ukraine, the Metropolitan, and Kuwait have the same network scheme on the vessel. All five bowls have an uncertain context and place of discovery. Their origin has been sought either in local workshops, where traveling craftsmen worked, or in the Greek poleis, from where they were directly imported (Symonenko 2011, 33-34; Christodoulou 2015, 88; Guzzo 2003, 83-86).

The only vessel that follows the Greek model, but at the same time differs in its composition and decoration, is the bowl of Zareva mound. The irregular polygons that complete the net ornament, the gilding that does not fully cover the elements of the decoration, the overlapping grainy ornament, the placement in two fields of one of the sheets, the unskillful rosette on the bottom, are evidence that the bowl was made in a workshop, probably in southern Thrace, which worked under the influence of Greek fashion, but not to such a high standard. It is the only one from the group of metal finds, cited in the text, discovered in a dated complex in the interior of Thrace. It was originally dated by analogy to the bronze helmet from the grave from the middle of the 4th c. BC (Marazov 1998, 103, 14)⁵ or the end of the 4th – the first half of the 3rd c. BC (Kitov 2008, 80). On the basis of the known vessels with net-pattern decoration, the bowl of Zareva mound can be dated to the middle of the 3rd – first half of the 2nd c. BC. Still, the question remains open, as there is no information about other finds from the grave that would clarify the chronology of the complex.

The ceramic cup

In 1952 in the necropolis of the ancient Mesambria Pontica (today Nessebar) a net-pattern, black-glazed cup was found as a single item in a grave (Kiyashkina, et al. 2012, 52, No 17)⁶. It was restored almost to its entirety from many fragments. Its body represents approximately one third of a sphere, which rests on a low ring foot (fig. 4a-c). The cup is shaped from fine beige clay and is covered with black glaze. On the outside of the vessel there is a reserved band under the rim and one on the bottom. The border line between the former and the black glaze below is emphasized by a thin line of brownish-red color⁷. On the exterior walls a net of pentagons is incised (Kiyashkina, et al. 2012, 52, No 17). As it was mentioned above, the specific reserved band under the rim suggests an East-Aegean origin of the vessel (Kiyashkina, et al. 2012, 52, No 17; Rotroff, Oliver 2003, 40).

The shape of the cup finds parallels at the Athenian Agora, which are dated to the 240-150 BC (Rostroff, 1997 No 318 - 320 – p. 276; pl. 32, fig. 20). An analogous manner of incising the net pattern, as well as the presence of a reserved band under the lip, is observed on specimens from Pergamon – one is dated to the end of the 3rd – the first half of the 2nd c. BC (Picón, Hemingway 2016, 171, No 86); another is dated to the second half of the 3rd c. BC (De Luca, Radt 1999, 84-85, taf. 15, No 433). A third example from Pergamon – a small fragment with a reserved band under the rim, is dated to the first half of the 2nd c. BC (Pinkwart, Stammnitz 1984, 126, taf. 25, No K41).

The ceramic askos

Near the present-day town of Kableschkovo, Burgas district, a black-glazed net-pattern askos

5 In the Iv. Marazov's catalogue the vessel was published as a phiale from Tsvyatkovia mound (Marazov 1998, 103).

6 The same cup has been published also in Bouzek 1990, 155, pl. II, as coming from Apollonia Pontica.

7 It is possible that this was not intended, but nevertheless it adds to the aesthetic value of the vessel.

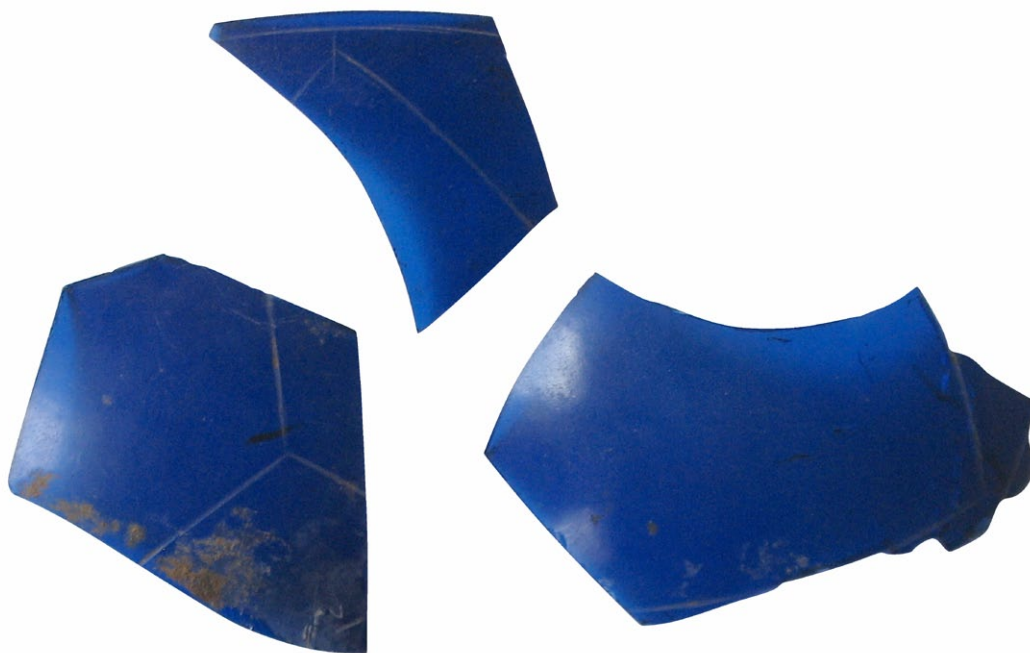


Fig. 5. Fragments from a glass vessel from Neofit Bozvelievo (archive Anelia Bozkova)
 Фиг. 5. Фрагменти от стъклен съд от Неофит Бозвелиево (архив Анелия Божкова)

has been found by chance (Gyuzelev 2009, 225, t. 5.4). The vessel has a spherical body, a ring foot, a ring handle and a round lip. It is covered with a blackish-brown glaze. On the entire reservoir of the askos, there are incised lines which form a net of pentagons (fig. 4d-f). Close, though different in detail, parallels come from Corinth. They are dated to 330-150 BC (Edwards 1975, 102-103, No 605-607, pl. 19, 58). Despite the wide date range of the Corinthian vessels, it is most likely that the production of the askoi coincides with that of the cups – from the second quarter of the 3rd c. BC (see Rotroff 1997, 109).

The glass cup

Near the village of Neofit Bozvelievo, Kardzhali district, fragments from another vessel with net-pattern decoration were found in a grave, pried open by treasure hunters. The vessel is a hemispherical cup made of matt blue glass (fig. 5). On the exterior, there are incised lines, forming hexagons (Dimitrov 2016, 60-61). A parallel, although not a close one, is a hemispherical bowl in gold sandwich technique from Gordion, dated to the second half of the 3rd c. BC (Jones 2009, 24, fig. 5; Saldern 1959, 45, fig. 31). In Gordion a vessel with an incised net-pattern decoration was found as well. It is a simpler and cheaper version (Jones 2009, 25), and perhaps it would be a closer parallel to the cup from Bulgaria. In the same context near Neofit Bozvelievo, in the soil dug out by the treasure hunters, apart from the glass cup, fragments from three black-glazed kantharoi were found as well. They are decorated in the West Slope style and date back to the second half of the 3rd c. BC (Dimitrov 2016, 60, tabl. 7).

Conclusions

After the military success of Philip II and Alexander III in the second half of the 4th c. BC, over vast territories in Europe, Asia, and Africa, common cultural and artistic elements were spread, which formed the Hellenistic koine. This influence could be seen in daily life, as well as in the re-

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ligion and culture of the inhabitants of the conquered territories. It appears that in this age the net-pattern vessels were a kind of fashion. It is worth noting that some peculiarities in the spread of the ceramic and metal examples are observed. Those made of clay occur in the Greek poleis (Athens, Pergamon, Corinth, etc.) and in the colonies situated at the north and west coasts of the Black Sea, while the metal ones are found in a non-Greek milieu, even though they are considered to be the work of Greek silversmiths, or some of them even of Greek workshops. Despite being only single finds, these vessels are widespread in territories occupied by a population which was in touch with the highly-developed Hellenistic culture. A possible explanation of the dissimilarities in the distribution can be sought in the different semantics implied in the precious-metal vessels in the “barbarian” nations versus the Greek world (Rabadzhiev 2009, 104-117).

The analysis shows that the net-pattern vessels exist approximately from the second quarter of the 3rd c. to the 1st c. BC. It is considered that the pentagon net decoration is inspired by metalware, and that the ceramic vessels imitate the latter (Lungu 2013, 229; Rotroff 1997, 109; Rotroff, Oliver 2003, 41). Unfortunately, the metal specimens are often without a clear context, which could otherwise help for the identification of their chronology. The sole silver cup found in a closed context is from Zareva mound, but it has some particularities compared to the others. The chronology of the complex itself has not been clarified yet. The clay vessels are better dated, which is helpful when trying to determine the date of the similar metal or glass ones (Retroff 1982b, 330). Precisely because the clay specimens are the only ones with a clarified chronology, the metal cups without a context of finding are dated by analogies with them. On these grounds, all of the metal vessels with net-pattern decoration are dated back to the second quarter of the 3rd c. – the third quarter of the 2nd c. BC. Due to these peculiarities in the dating methodology, the logical presumption that the metal vessels appeared first, and those from clay imitate them, remains unproven for now.

Acknowledgements

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Елинистически съдове с мрежеста украса от днешните български земи

Ева Тонкова, Веселина Димитрова

(резюме)

В ранноелинистическата епоха се появяват съдове с украса от мрежа от петогълници или шестогълници. Тази декорация се среща при полусферични чаши, аскоси, мастилници и др., изработени от керамика, стъкло и метал. Металните купи са изработени от сребро с позлата. Измежду керамиката правена на колело, чернофирнисовите полусферични чаши са най-често декорирани с мрежестия орнамент. Тук украсата се състои от линии, врязани след нанасянето на фирниса – третиране, характерно за украсата в стил West Slope. По-късно тази декоративна схема се среща и при чашите, правени в калъп. Смята се, че тези правени на колело се срещат от втората четвърт на III в. пр. Хр. до третата четвърт на II в. пр. Хр., докато керамичните чаши правени в калъп и металните представители на групата могат да се проследят и в I в. пр. Хр. Съдовете с мрежеста украса са сравнително редки, такава е картината и в българските земи. Известни са два керамични съда (чаша и аскос), купа, изработена от сребро и фрагменти от стъклена чаша. Сребърната произхожда от Зарева могила, югоизточно от село Ясеново, Казанлъшко. Изработката ѝ показва, че тя е изделие на ателие, намиращо се вероятно в Южна Тракия, което работи под влияние на гръцката мода, но не на толкова високо ниво. На базата на паралели, купата от Зарева могила може да се отнесе в периода от втората четвърт на III – първата половина на II в. пр. Хр. Керамичната чаша произхожда от некропола на Месамбрия Понтика. Най-вероятно тя е внесена от Източна Егеида. По аналогии е датирана във втората половина на III – първата половина на II в. пр.Хр. Аскосът е случайна находка, открита до град Каблешково и неговото точно датиране е по-проблематично. Фрагментите от стъклен съд с врязани шестогълници са открити в разбит от иманяри гроб до с. Неофит Бозвелиево, област Кърджали. Заедно с тях са намерени и фрагменти от три чернофирнисови кантароса с украса в стил West Slope от втората половина на III в. пр. Хр.

Направеният преглед показва, че от втората четвърт на III в. пр. Хр. до I в. пр. Хр. група съдове с мрежеста украса, направени от глина, сребро и стъкло са разпространени в целия

елинистически свят. Рядко, в сравнение със съдове с други декоративни схеми, този вид находки се откриват в широк ареал от Велика Гърция, Северното Черноморие и Гърция до Азия. През елинистическата епоха тези територии са част от гръцкото артистично и културно койне, от което без съмнение Тракия е част също.



Early Medieval Weapons for Close Combat of North European Origin Found within Present-day Bulgarian Territory

Samuil Kamburov ^a

^a Department of Archaeology, Faculty of History, Sofia University “St. Kliment Ohridski”, 15 Tsar Osvoboditel Blvd, 1504 Sofia, Bulgaria; sami4ar@gmail.com

ABSTRACT

This article is focused on the problems related to cut- and thrust weapons, their constructive elements and applications and their parallels in Northern Europe and Scandinavia dated between the 9th and 11th centuries, found within the present-day Bulgarian territory. An attempt is made to trace the paths and discover the reasons which brought them to the Balkan Peninsula. The chances of finding North European weaponry artifacts on the Balkans vary. Evidence of various relations can be found in medieval Byzantine written sources – from well-armed Varangians and military units from the North, to trade relations between Vikings and the Eastern Roman Empire. It is well known that Scandinavians during this period traded mainly honey, wax, precious animal furs and probably some armament elements. So the availability of North European armament elements in Bulgaria may not be evidence only of the presence of military units, or of Varangian military campaigns toward the Balkans, but also of trade contacts with Constantinople. The manufacturing of local Balkans imitations of some North European elements of armament is also possible. Even now, there is a lack of data regarding the manufacturing of imitations within Bulgarian territories.

The presence of Varangians within the present-day Bulgarian territory is evidenced mainly by items related to military armament and weaponry. This article pays particular attention to the development of the so-called „Nordic art styles“, whose traces are most clearly observed on the ornamentation of weaponry of North-European origin. The research on findings related to weapons for close combat (so-called „Cold weapons“) of Scandinavian origin in Bulgarian lands is of particular importance for the study of the Early Medieval warfare in the Lower Danube area because this type of artefacts makes up a large part of the arsenal of cut- and thrust weapons found south of the Danube and dated to the period between the 9th and 11th c.

KEYWORDS

Early Medieval swords, Warfare, Weapons, Vikings, Varangians, Balkans, Scandinavia, Byzantine Empire

This is not the first research related to the Viking / Varangian armament in Bulgarian lands today. Numerous scientific works by various Bulgarian scientists such as Valeri Yotov (Yotov 2004), Oksana Minaeva (Minaeva 2013) and others are available in the Bulgarian scientific literature. They have paid considerable attention to the issue of the presence of warriors of Scandinavian origin south of Danube. The main purpose of this article is to summarize and analyze archaeological material already known in scientific circulation, adding new weapons of Scandinavian origin from the Bulgarian lands. As is well known, the Early Medieval Scandinavian weapon masters have been specializing workmanship of the separate structural elements of sword, such as pommels, crossguards, scabbard tips, suspension applications, and e.c. However, the blades have often been imported into Scandinavia from the territories of Western Europe and in particular from the Rhine region. The availability of weapons of this kind is of course not a definite indicator of the physical presence of warriors with



Fig. 1. Map of the trade routes of the Varangians from Scandinavia to Eastern Europe and Asia (in blue - the road to Constantinople is presented, and in red - the so-called "Volga Road") (figure by S. Kamburov)

Обр. 1. Карта на търговския път на варягите от Скандинавия към Източна Европа и Азия (в синьо – варяжкит път към Константинопол, в червено – т.нар. „Волжски път“) (изработка С. Камбуров)

northern origin. The weapon itself can't be a testimony of the presence of representatives of the same ethnicity that links its manufacture, especially as far as it is concerned for territories thousands of kilometers remote from one another.

It is necessary to note that some of the Scandinavian weapons might have fallen into the lands of Southeast Europe as a result of military prey, gift or trade, not only through the physical presence of Varangians, which is anyway testified in the written and artistic sources. The present scientific paper also aims to present some interesting conclusions which is reached after a more detailed analysis of the morphological features of some types of cut and thrust weapons.

The Balkans are subject of attacks mainly by the so-called "Eastern Normans" or known as Varangians in the second half of the 10th century, after the consolidation of tribes in Southern Russia and the appearance of Kievan Rus. It is about the march of the Kiev prince Svetoslav in the period 968-971 to the Bulgarian lands and Constantinople during the period of rule of the Byzantine emperor John I Tzimiskes (969-976). The main route through which the Varangians were contacted with Byzantium and the Near East was described by the Emperor Constantine VII Porphyrogenitus (913-959) "The Varangians Route" or also known by its Russian name "Путь из варягов к грек" exactly this information concerning this trade route from the essay "De Administrando Imperio" allows us to understand that the Vikings except warriors and seafarers were also very good traders. The Scandinavians mainly traded valuable animal skins, honey, wax, and perhaps elements of armaments, such as some constructive sword elements as pommels, crossguards, scabbard's tips etc. On their way,



Fig. 2. Detail from Oseberg ship
(<https://commons.wikimedia.org/wiki/File:Osebergskipet-Detail.jpg>)
(31.03.2021)

Обр. 2. Детайл от ладията в Oseberg (<https://commons.wikimedia.org/wiki/File:Osebergskipet-Detail.jpg>) (31.03.2021)

the Varangians met eastern merchants with whom they exchanged their goods and in return received precious fabrics, jewels and especially silver Arabic dirhams, for which we have data that they are found in a particularly large quantity in the Baltic Sea area of Gotland Island (so-called The Varangians Sea) – the starting point of the “Varangians Route” (Minaeva 2012, 109-111).

From Gotland Island, the road passes through the Gulf of Finland and the River Dvina to Novgorod (the center of power in the Russian territories before the founding of Kievan Rus) and through the northern large trade center Ladoga (one of the first Varangians-Russian trade centers in Eastern Europe). Lake Ladoga is a crossroad where the two main merchant roads of Varangians are divided (fig. 1).

The first is to Constantinople (Miklagard) serving the Byzantine trade, and the second route is known as the “Volga Route”, it diverges along the Volga River to the southeast toward the Caspian Sea and Derbent. He served the trade contacts mainly between the Varangians-Russians, the Khazars, Persian and the Arabs. Regarding the “Varangians Route” to Constantinople from Novgorod, the route continued along the Dnieper River and reached the shores of the Northern Black Sea, the Danube Delta at the Sulina branch and the Crimean Peninsula, from there by sea the route ended in the Byzantine capital.

The data for this Early Medieval trade road artery with the Varangians determines the presence of findings with Northern European origin in the area of North-East Bulgaria and the Northern Black Sea coast since the so-called “Viking period” end of 8th / beginning of 9th–middle of 11th century. According to Constantine VII Porphyrogenitus, it is clear that during the passage of the Varangians through the separate river thresholds in the southern Russian steppes on their route to Byzantium,



Fig. 3. Style "Borre" (<http://viking.archeurope.info>) (31.03.2021)

Обр. 3. Стул „Borre“ (<http://viking.archeurope.info>) (31.03.2021)

they are often attacked by the Pechenegs, that is why it is quite likely that part of the objects, including and elements of North European armaments to have come to Pechenegs as a result of military prey or robbery.

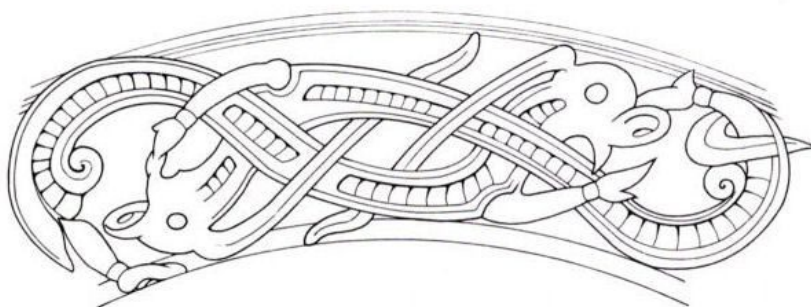
It is possible that part of the findings of weapons, and in particular of swords or their constructive elements, which are of undisputed Scandinavian origin, have entered the Bulgarian lands precisely through the Pechenegs during their intensified invasions in the 11th century. Shortly after the baptizing of Kievan Rus in 988, Emperor Basil II (976-1025) hired about 6 000 Varangians for his personal guard, and thus created the so-called "Varangians Corps", personally responsible for guarding the Basileus. The presence of Varangians on the Bulgarian lands is mainly evidenced by findings related to elements of the military suit (equipment) and armament. The main features that make this type of findings to belong to the Northern European material as well as spiritual culture are the ornamental motifs found on most of them.

In the 6th century, appeared the so-called „German Beast Ornament“, it combines Celtic and



Fig. 4. Style “Jellinge”
(<http://viking.archeurope.info>)
(31.03.2021)

Обр. 4. Чаша „Jellinge“
(<http://viking.archeurope.info>)
(31.03.2021)



Eastern elements into itself, embracing the zoomorphic and plant motifs. It is supposed that this type of ornamentation originates from the Late Antique Roman art. Exactly the “German Beast style” is on the basis of Scandinavian art. One of the main production and craft centers associated with artistic craft products in Scandinavia is Helgö to Lake Mälaren.

Its production (mainly ornaments) is spread throughout Scandinavia, but the most common findings of this origin are found in Gotland Island. In the 7th–8th centuries, along with the main burial custom of the Vikings – cremation, a new form appears directly related to the Viking occupations and crafts, namely the laying of the dead man in a boat and filling with the mound embankment

Similar tumuluses are registered in Vendel (whose name is called a whole stage in the development of Scandinavian culture), Valsätra, Ultuna, near Uppsala (Sweden). The Beast style is transformed under the influence of a bandage ornament, which is a tangle whose ends usually end with heads of animals. This change in ornamentation marks the beginning of the actual “Viking tradition” in ornamental art.

The earliest monument on which ornaments related to early Viking art are discovered is the wooden boat found in a tumulus in Oseberg (Norway) dated 9th century (fig. 2). It is for this reason that the early Viking ornamental style is called “Oseberg”, which develops in the second half of the 8th century. This style is characterized, besides with beast motifs, also with the appearance of an anthropomorphic ornament in the form of a human face. In the second half of the 9th–10th centuries, the beast ornament became more schematic, with well-defined zoomorphic images, and the human face, as a motif, became more and more established as a leader in ornamentation. This style is called “Borre” and presents Norwegian art in the 9th century – the second half of the 10th century (fig. 3).



Fig. 5. Style “Mammen” (<http://viking.archeurope.info>) (31.03.2021)

Обр. 5. Смул „Маммен“ (<http://viking.archeurope.info>) (31.03.2021)

Its name originates from a tumulus in Vestfold (Norway). This type of ornament has the largest distribution range, reaching West to Britain, East to the Volga River and the Dnieper River, and to the Southeast to Byzantium and Caliphate. In parallel with Borre style, another branch of the Viking art – Jellinge, which is characterized by the combination of intersecting band ornamentation and zoomorphic motifs (fig. 4), was developed in the end of IX century - beginning XI century. The three mentioned ornamental styles in Northern European art are influenced to some extent by the Frankish Empire, Byzantium, and Eastern Europe, which is explained by the great Viking movement during this period west, south, and east for commercial or military purposes. The spread of Christianity to Scandinavia has a direct impact on the development of Norse art. An example of this is the so-called “Harald’s Stone” and the ornamental compositions on it. The stone is located in the old Danish capital Jellinge (hence the name of the ornamental style) and is dated around 980 a.c.

On one of the three sides the Crucifixion is represented, with the Cross of Christ having overflowing lines, distinctive for the Jellinge style. The second side of the stone is occupied by a scene representing a battle between a lion and a dragon, and a runic inscription on the third side. The Mammen style, named after the Mammen area, near the town of Viborg (Denmark) were developed within the period middle 10th–middle 11th, where a silver axe with a silver inlay was found (fig. 5). For this style are typical images of mythological monsters, mainly dragons, as the inheritance of the styles “Borre” and “Jellinge” the knot is kept. For “Mammen,” the animal figure is larger than the “Jell-

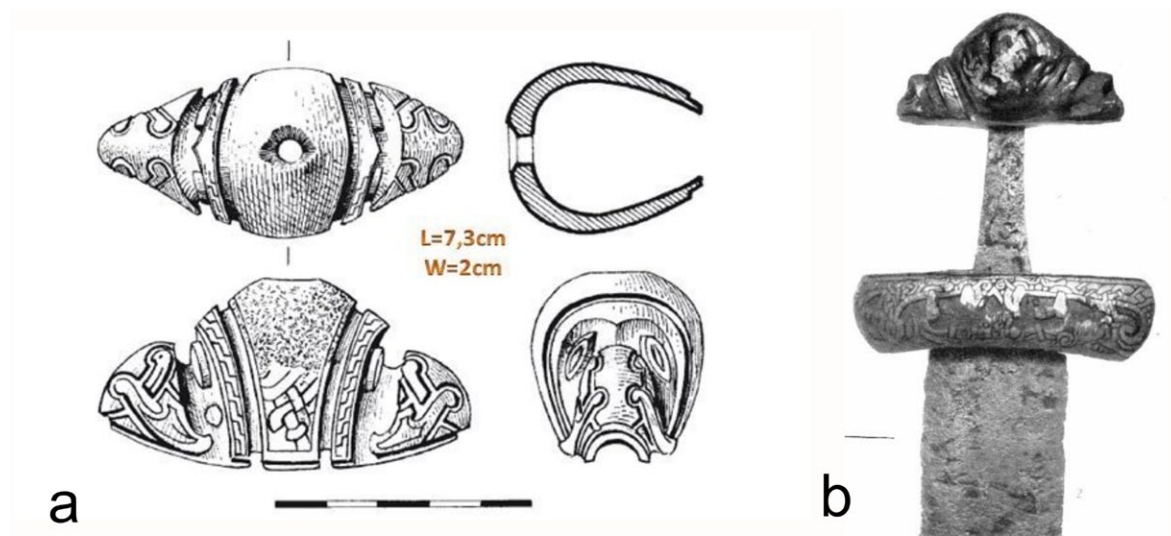


Fig. 6. Bronze pommel of the sword and sword from: a. Pacuiul Iiu Soare (Popa, 1982); b. Monastirishte, Orlovskaya district (Russia), (without scale) (Kirpichnikov 1966, 109, tab.III)

Обр. 6. Бронзов помел на меч и меч от: а. Рациул лиу Соаре (Пора, 1982); б. Манастирище, Орловска област (Русия), (без мащаб) (Kirpichnikov 1966, 109, tab.III)

inge". It also shows images of acanthus plant. Exactly this element of Mammen-style is taken from the European artistic ornamentation, where the plant motif is particularly popular in the 10th century. The other two ornamental styles – "Ringerike" and "Urnes" – developed during the end of 10th- middle of 12th century. "Ringerike" is also known as the "Runic Stones" style, which is again characterized by dragon images but more stylized and plant motifs are added. The style "Urnes" is similar to "Ringerike", but it is mainly crafted with carving on the wooden churches of Norway. Its name comes from a small wooden church in the village of Urnes (West Norway) decorated with carving. These two "late-Vikings" art styles are directly influenced by Byzantine art and appear along with the Christianization of Scandinavia. They are also often affected by Christian symbolism. In these two Nordic styles, cross-section images for the first time appeared (fig. 11). Here I have to mention one good research over development of the Viking "beast style" in the period 8th–12th century in Northern Europe according to data of dendrochronological analyzes. It is done from German researcher and specialist Michael Wille (Wille 2001, 215-250). In his article he pays particular attention to the elements of armament, warrior's costume, wooden churches in Norway and elements of Vikings warships decorated in the so-called "beast style", discovered in a graves during an archaeological excavations in Scandinavia.

It is important to note that the Early Medieval elements of armament in the lands south of the Danube, especially after the second half of the 9th century, are found outside the burial context, i.e. outside the closed archaeological context. This is a fact because of the conversion in Christianity of the Bulgarian lands, and in the Christian norms the burial custom forbid the burial gifts to be placed, even more – the weapons. Swords or their constructive elements are mainly found near to or in fortresses, as well as in shafts, but many of them are out of a clear stratigraphic context and others even have an unknown location. The lack of a clear archaeological environment of discovery seriously hinders their accurate dating and interpretation of historical events that led to their fall into the lands south of the Danube.

The first artifact of Northern European origin I would draw your attention is the bronze pommel found in the fortress of the Romanian island of Pacuiul lui Soare in the 1980s and published by R. Popa (Popa 1982, 425-431). It is defined as a finding with undoubted Scandinavian origin, and

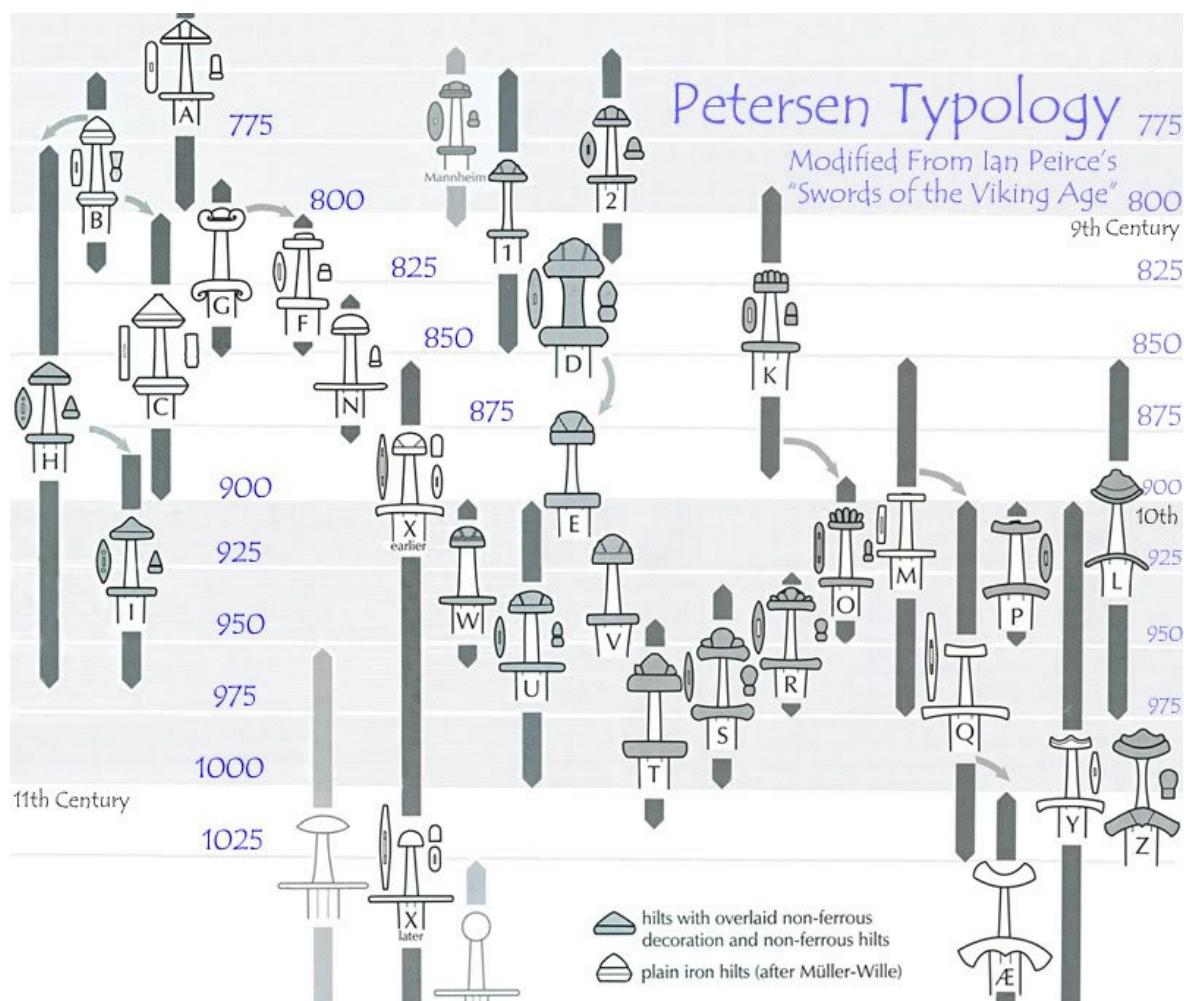


Fig. 7. Petersen's typology of the Viking swords (Peirce 2002, 18-19; Petersen 1919)

Обр. 7. Типологията на Petersen за викингските мечове (Peirce 2002, 18-19; Petersen 1919)

three variants are supposed for its location there. The first is connected with the Russians' marches led by Prince Svetoslav (968–971), the second option is that the pommel was part of the sword of a Viking who served as a mercenary in the Viking corps of first half 11th century, and the third option is the pommel to be found into the fortress as a military prey to a Byzantine soldier who has appropriated his sword after the successful military campaign of John I Tzimiskes against the Russians. Popa, however, notes as the most acceptable the first option. The bronze pommel is silver-plated, showing signs of gilding in some places. The precious work of this bronze and silver-plated pommel with gilded traces, however, gives rise to another type of reasoning – that it is likely that the sword to which it was attached was deprived of the utilitarian functions of a weapon and served only, as a representative parade armament. The pommel has a weight of 148 grams and a length of 73 millimeters, and it is 20 mm wide. The archaeological excavation in the island's fortress have been executed since 1956. The fortress is defined as a Byzantine built during the reign of Emperor John I Tzimiskes and more precisely in the period 971–976. The 1972 research by R. Diaconu proves that the main function of the fortress was probably to serve the Lower Danube Byzantine Navy in the area of Drastar (Diaconu 1972). The bronze, silver-plate pommel is found out of a clear archeological context, and the only way to be properly dated and addressed to certain historical events is through the parallels and style of the ornamentation. It is trilobate, and its two extreme parts are lower than the middle and are shaped like an animal head. The attachment hole on the hilt has a beveled edge, and a pin

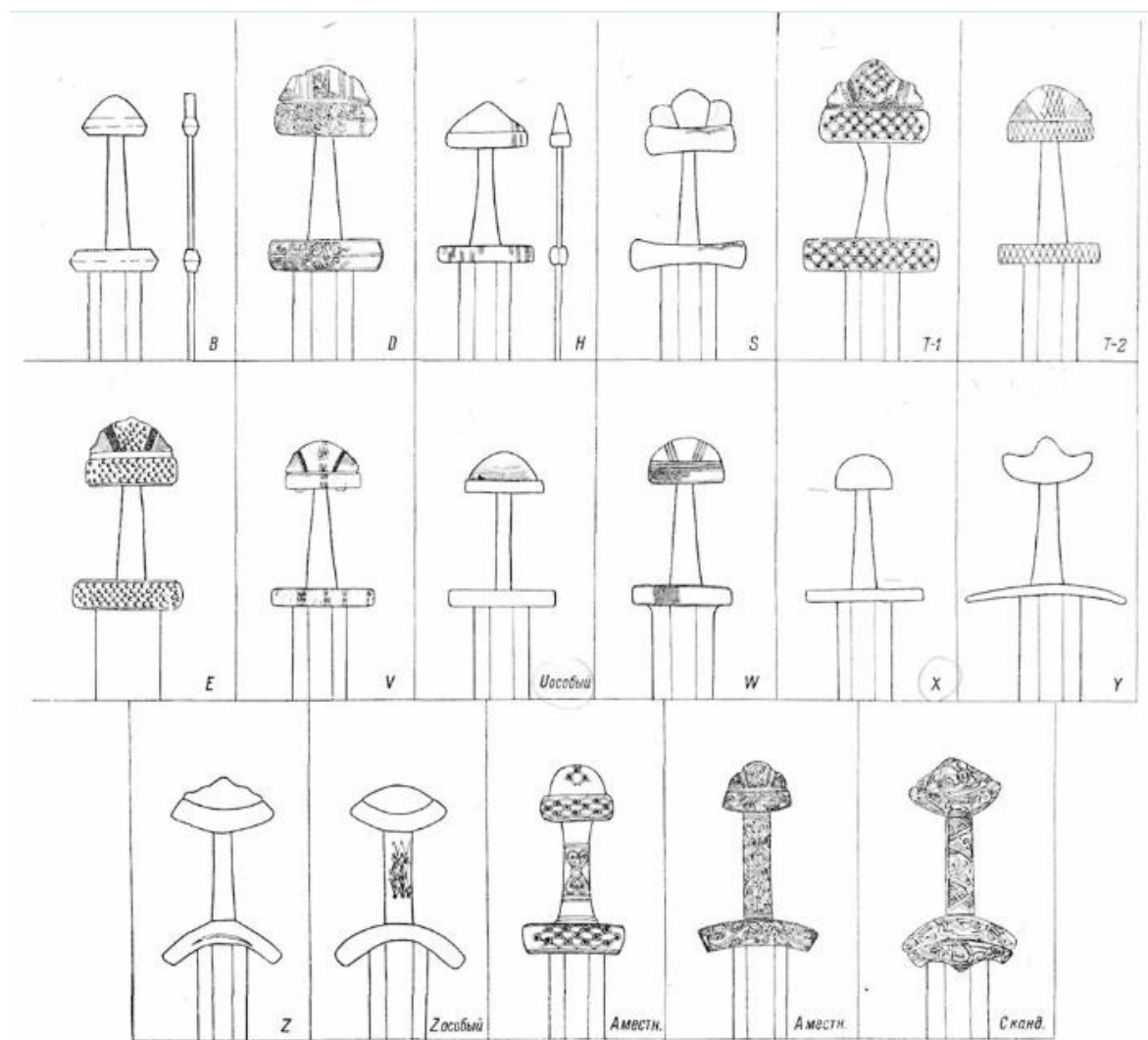


Fig. 8. Typology of Kirpichnikov (Kirpichnikov 1966, 19)
 Обр. 8. Типологията на Kirpichnikov (Kirpichnikov 1966, 19)

that secures the pommel to the hilt is preserved. An ornament of interlacing strips is recorded on the middle part, which part is separated from the two edges by two deep-cut strips on which gilded traces are found. The finest pieces were probably gilded, as traces of gold leaf are also found on the shaped heads of animals that have detailed almond-shaped eyes. The style and ornamentation of the pommel refers to objects made under the influence of Northern European art, and more specifically to the Scandinavian ornamental style Jellinge, which developed during the middle of 9th century – the beginning of the 11th century. Popa takes this pommel to type S according to the typology of Petersen and dates back to the second half of the 10th century (fig. 6a).

This typology is based on the chronological development of the sword hilt (the pommel and sword crossguard) from Scandinavia, as well as on their specific ornamentation. Its typology is based on the study of more than 2000 Norse swords, which are divided into 26 groups with separate sub-groups, all of which are from well-established archaeological complexes of the 9th–11th century (Petersen 1919). Swords are found in a well-dated burial complexes in Norway, Sweden and Finland). It is possible, however, to refer to the type T-1 on the typology of Kirpichnikov (fig. 8). His typology is borrowed from Petersen (fig. 7). From the 26 types of Petersen, Kirpichnikov takes 13 types of swords found in Russian territories dated end of 9th – the first half of the 11th century, again differenti-

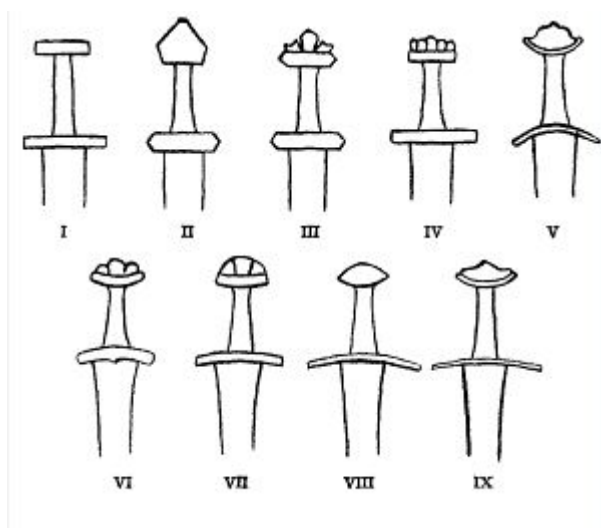


Fig. 9. Typology of Scandinavian swords of M. Wheeler (I to VII type) to which two additional types of swords of E. Oakeshott (type VIII and type IX) (Wheeler 1927; Oakeshott 1960, 133, fig. 57)
 Обр. 9. Типология на скандинавските мечове на M. Wheeler (от I до VII тип) с два добавени типа мечове по типологията на E. Oakeshott (тип VIII и тип IX) (Wheeler 1927; Oakeshott 1960, 133, fig. 57)

ated according to the type of the sword hilt), whose main characteristic, distinguishing it from type S, is the zoomorphic design of the edges. Type T-1 also dates back to the second half of the 10th century – beginning of 11th century, similar pommels are registered in the territories of Russia. In many cases, these two types almost do not differ, but some researchers define the first as a “Carolingian type” and the second as “Scandinavian” (Kirpichnikov 1966, 27).

The exact parallel of the pommel of Pacuiul lui Soare was found on the sword from Monastirishte - Orlovskaya district (Russia) (fig. 6b). A Latin inscription “NRED” is registered on the sword crossguard. According to Kirpichnikov, this inscription is the name of the Franks Workshop specializing in swordsmanship, “Ingelred”, which gives reason to assume that the sword was produced in Western Europe (Kirpichnikov 1966, 109, tab.III,35). From written records, it is known that some of the greatest swordsmen in the Middle Ages were the Franks. Probably most of the blades are made in specialized weaponries in Western Europe and more precisely in the Frankish Empire, while the other sword components have been produced and mounted separately in local workshops by local masters and ornamented according to the local art traditions.

For the use of the Frankish swords by the Varangians, we have information from the Arab chronicler Al Kindi (801–866) and Ibn Fadlan, who personally visited the Varangians in the period 921–922 AD and described their swords by calling them “Frankish” (Ibn Fadlan 1992, 22). Much of sword type S have Latin inscriptions „Ulfberht“ incrustated along a blade. This type of sword is widespread in Northern and Western Europe, suggesting that the inscription is a well-known brand of sword made in the 9th–11th centuries along the Rhine in the area between Mainz and Bonn.

Another artifact, related to the arms for close battle and again of Scandinavian origin, is the sword's scabbard tip of the „Stana“ fortress (Novi Pazar) (fig. 10a) (Yotov 2003, 12). It was published by Pavel Georgiev in 1986 in his article “Finding of Viking Time” (Georgiev 1986). It is important to note that the tip is found out of context and is a random find. Georgiev suggests that his location into the fortress is related to the marches of Prince Svetoslav in Northeastern Bulgaria or was part of the sword scabbard of a warrior, a part of the Varangians corps of the 11th century. The tip is cast from bronze and has an openwork decoration, but unfortunately it is not entirely preserved because it has a broken lower part. The decoration is represented by anthropomorphic motifs depicting a human face in combination with a strip-like ornament. The ornament representing a human face with mustache is particularly characteristic of the early Viking style “Oseberg” in the second half of the 8th century – middle of 9th. Subsequently, some of the motifs were added to the later Nordic ornamental styles – “Borre” and “Jellinge”. Round and quarter holes made in the tip serve to attach it to the tip of the

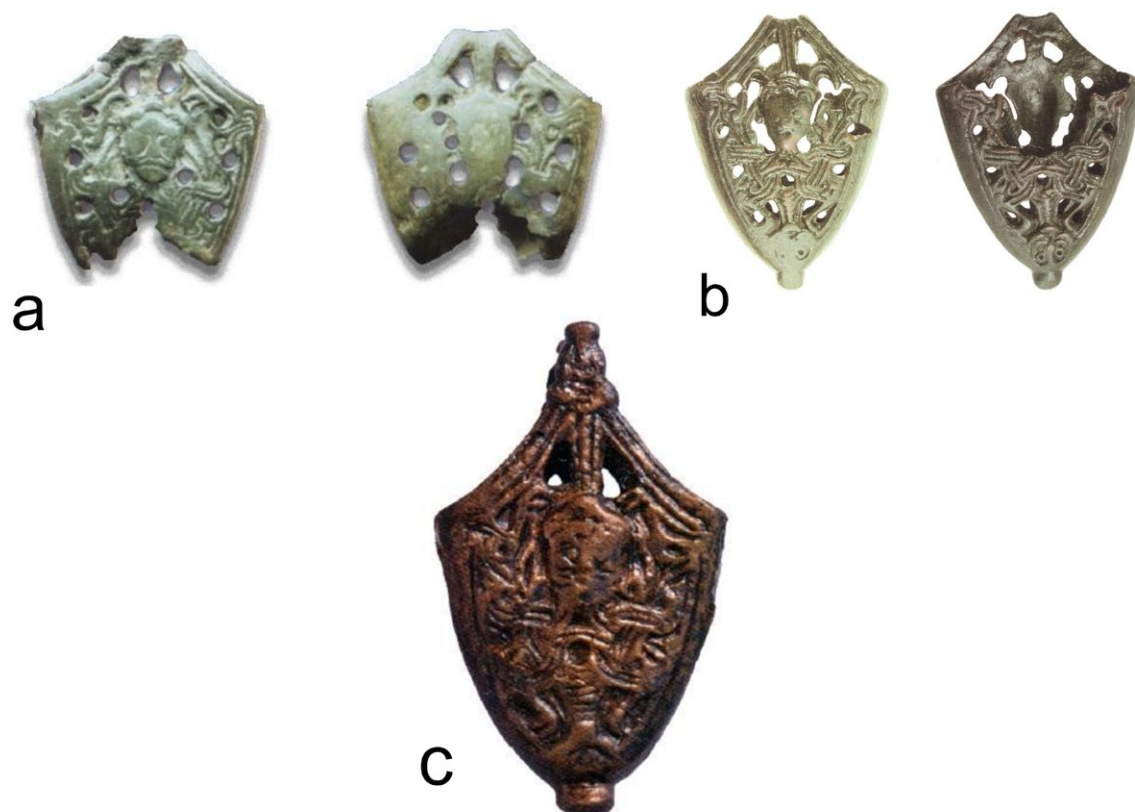


Fig. 10. Bronze scabbard tips from: a. „Stana” fortress (Novi Pazar), (without scale) (Yotov 2003, 12); b. Vicinity of Varna, (without scale) (Zlatkov 2014g, 150; Yotov 2004); c. Chersonesus (Crimea), (without scale) (Baranov 2017, 42, fig. 8b)

Обр. 10. Бронзови накрайници на ножници от: а. Крепостта „Стана“ (Нови Пазар), (без мащаб) (Yotov 2003, 12); б. Околностите на Варна, (без мащаб) (Zlatkov 2014g, 150; Yotov 2004); в. Херсонес (Крим), (без мащаб) (Baranov 2017, 42, fig. 8b)

scabbard. Typically, the scabbard itself is made of wood and less often than of bone, and has been reinforced with an iron or bronze tip at the top. The Stana Fortress tip is 41 mm high, 42 mm wide, and a thickness of 9 mm. Due to the fact that it is a random finding beyond a clear stratigraphic context, the date could only be terminus post quem. The period of fall of this type in the Bulgarian lands could be around of the second half of the 10th century when the earliest military marches of the Russians (including Varangians) to the lands south of the Danube were documented. Of course, we don't have to look at every single element of armament as a trace of military presence. It can be also an evidence for a trade contact between Scandinavian merchants and Byzantium – something well attested in the medieval written sources. The ornamentation of the Stana tip is well preserved only on one side, and on the other it is highly worn, which in turn could be an indicator of prolonged use. Exact analogies of this type of tip are found not only in Northern Europe – Scandinavia, but also in the eastern parts of the continent in the territories of today's Russia, Ukraine and the Baltic. Chronologically, their spread dates back to the 9th century, massively in the 10th century, until the 11th century, when the Vikings were finally assimilated in Northern and Eastern Europe and Christianized. The Varangians abandoned their pagan cults, whose image was clearly perceived in the specific ornamental tradition.

A completely similar scabbard tip with that of the „Stana” fortress was found in the village of Nimschütz (Germany) and published by Coblenz (Coblenz 1975, 91-97). It is again made of bronze, something very characteristic of this type of finds with Scandinavian (Viking) origin and with open-work ornamentation. Pavel Georgiev suggests that it is quite possible that the two tips are cast in

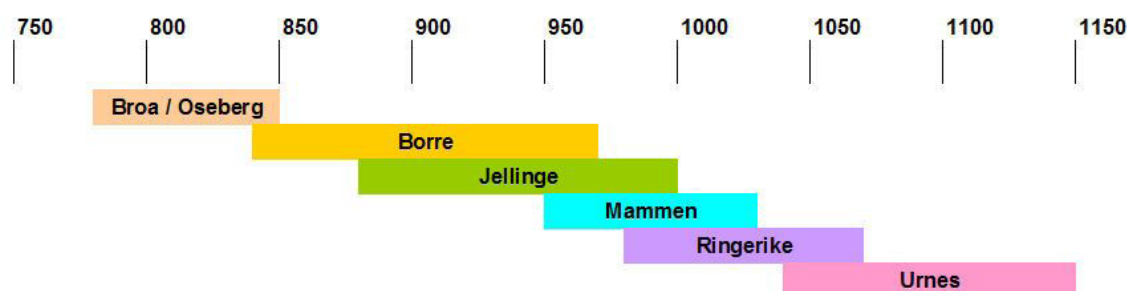


Fig. 11. Chronological chart of the development of styles in Viking art (<http://viking.archeurope.info/index.php?page=viking-art-styles-timeline>) (11.08.2018)

Обр. 11. Хронологическа скала на развитието на стиловете във Викингското изкуство. (<http://viking.archeurope.info/index.php?page=viking-art-styles-timeline>) (11.08.2018)

the same matrix, because the human face and zoomorphic motifs on both finds are very similar. The Nimschütz tip was discovered during excavations in a Slavonic settlement. Almost completely analogous are the places where the holes on the two tips are made. These type of tips belong to the type of “four-paw beast” according to Paulsen typology, widely distributed in the territory of Sweden and Norway in the 10th century. There is probably a large production center for making bronze tips on scabbards, pommels and sword crossguards. In 2001 in the vicinity of Varna was discovered a tip (fig. 10b) (Zlatkov 2014g, 150), which also belongs to the type of “German four-paw beast” and is a perfect parallel of the find of the Stana fortress, which probably was captured during the Svetoslav military campaigns in Northeastern Bulgaria, and it was the first one in 968-969 (Yotov 2003, 132-135). Subsequently, it was under the control of Byzantium after the successful military campaign of John I Tzimiskes against Svetoslav’s Russians in 971, passing from Preslav to Drastar. The fortress is situated on the plateau „Stana“ - east of Novi Pazar (Shumen Province). One of the hypotheses is that there was the late antique and medieval fortress of Dinaya. An interesting fact is that an analogous sword tip of the Stana was found in the probable tomb of Prince Igor (912-945), the father of Prince Svetoslav, in Iscrostene where he was supposedly killed in 945AC (Georgiev Yotov 2003, 12 1986). This gives additional grounds to assume that the Northeast Bulgaria tip was part of the armament of the Russian troops led by Prince Svetoslav Igorjevic. This type of hilts combine Norwegian styles Borre (840–980 AC) and Jellinge (870–1000 AC) in their ornamentation. The parallel of the Stana artifact is also a scabbard tip found in Chersonesus (Crimea), again with a stylized human face and zoomorphic motifs (fig. 10c) (Baranov 2017, 42, fig. 8b). From the typology of Korzuhina G.F., who published studios for the sword tips from the Russian territories, this type of tips belongs to type II, which is widely distributed in the Swedish lands and especially in the Gotland, Island, Volga river area and the Middle Dnieper. The tips of this type are dated 10th – beginning of 11th century. This type of bronze tips were discovered massively in Gotland Island, where they were probably made. From the starting point of the so-called „The Varangians route“, these artifacts are spread mainly in three directions. The first route is to Gnezdovo (Upper Dnieper), southern Priladojie and then to the Middle Dnieper and the Crimean Peninsula. The second route is to the Oka river, the Volga river and the Kama river region, and the third direction is to Central Europe and mainly to the territories of present Poland and Hungary. Thus some of this type of findings fall precisely in the lands of North-eastern Bulgaria, probably imported by Varangian warriors. The route described by Constantine VII Porphyrogenitus, the famous „Varangian road“ (fig. 1), coincides completely with the first two routes described above for spreading artifacts of Scandinavian origin. This fact further supports the thesis that these subjects are undoubtedly of North European origin. From the research on the decoration of these types of findings, it follows that the ornamentation on the bronze of the scabbard tips, and

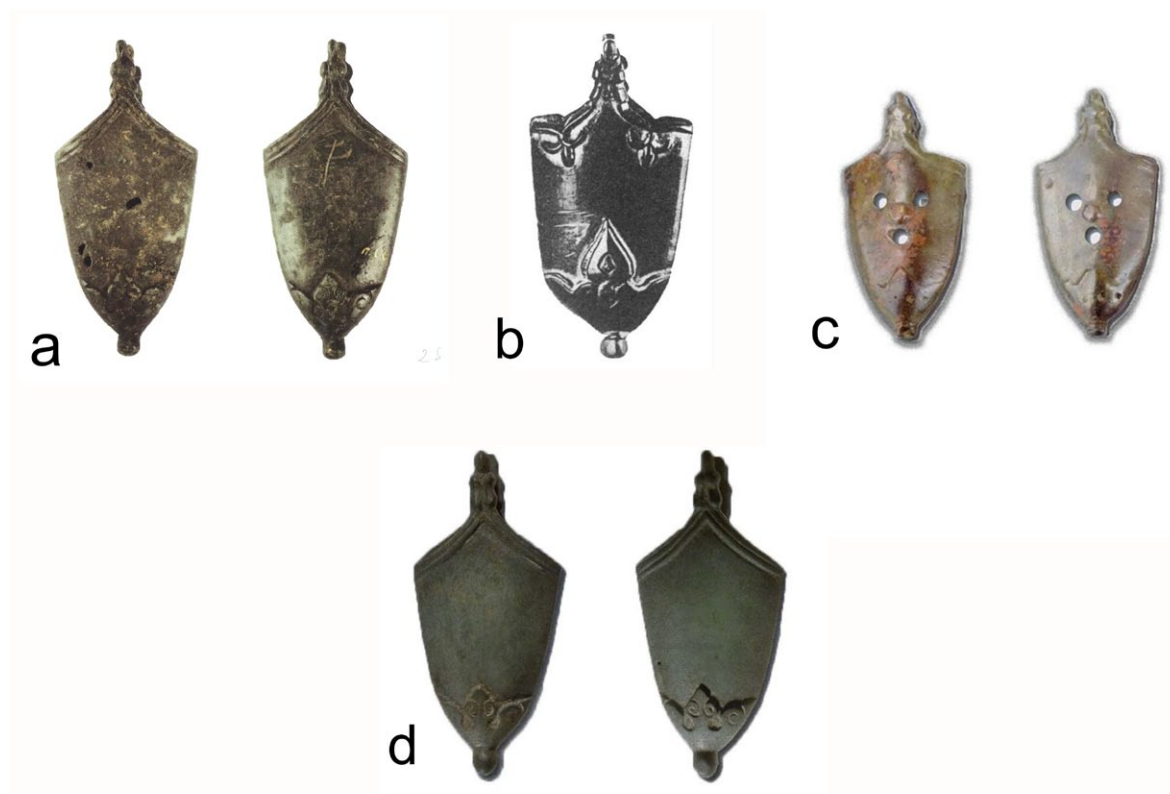


Fig. 12. Bronze scabbard tips from: a. Madara, (without scale) (Zlatkov 2014f, 151; Yotov 2004); b. Rupkite (Chirpan), (without scale) (Fehér 1931); c. Oescus (Gigen), (without scale) (Yotov 2003, 17); d. Vicinity of Razgrad, (without scale) (Yotov 2003, 26)

Обр. 12. Бронзови накрайници на ножници от: а. Мадара, (без мащаб) (Zlatkov 2014f, 151; Yotov 2004); б. Рупките (Чирпан), (без мащаб) (Fehér 1931); в. Ескус (Гиген) (без мащаб) (Yotov 2003, 17); д. Околностите на Разград, (без мащаб) (Yotov 2003, 26)

indeed on most of the elements of the weaponry of Northern European origin, represents precisely the motifs of the Scandinavian mythology. The presence of Odin's image on scabbard tips is not by accident, since Odin is a god of war besides the fact that also is a god of Scandinavian poetry. For the Vikings, the decoration of the scabbard tips had a cult value, closely tied to Edda. The images of the bird and the dragon had functions of the amulet, believing that they increase the weapon's combat qualities.

Two other bronze scabbard tips found in Madara (fig. 12a) (Zlatkov 2014f, 151) and Rupkite (Chirpan) (fig. 12b) were published by Geza Feher in 1931, suggesting East European origin (Фехер 1931). They refer to type V of the Korzuhina classification and date back to the early 11th century. This type of tips is widely distributed in East Europe and the Baltic. Their ornamentation is considerably simpler than the one mentioned above. Ornamented only with plant motifs and palmettes and are without openwork decoration. Some researchers believe that these are East European imitations of Scandinavian scabbard tips made in the western parts of Russia and the Baltic. The presence of the palmette, as an ornament, gives grounds for assuming eastern influence in the decoration, some researchers attributing this to the longer contact between Kievan Rus and Byzantium. Another scabbard tip was discovered in the medieval settlement over the late antique Oescus (fig. 12c) (Yotov 2003, 17) and is currently located in the Pleven historical museum with A3165. It was discovered during regular archeological excavations under the eastern wall of the city basilica. The tip is made of bronze, decorated and edged with a narrow relief strip on both sides whose edges are assembled into a stylized, flattened animal head. Three round holes are provided in the central field for the at-



Fig. 13. Map of the distribution of finds related to the Varangians in the Bulgarian lands in the 10-11 centuries (Kolev 2015, 68, fig. 1)

Обр. 13. Карта на разпространението на находки свързани с варягите в българските земи X-XI век (Kolev 2015, 68, fig. 1)

tachment of the tip to the wooden scabbard. The tip ends with a papular top with a fine concentric groove. From the top, a three-leaved palmette with low relief is dissolved. The artifact was published by M. Asparuhov in 1993, which dates back to the second half of the 10th century, but the fall of the tip in the Bulgarian lands could also be related to the Pechenegs' raids in the 40s of 11th century (Asparuhov 1993). The size of the tip is: height 83 mm, width 42 mm and thickness 14 mm. It belongs to type V on the typology of Korzuhina and the so-called "Eastern-Prussian Group", based on Paulsen's typology dating back to the 10th–11th century. The three described tips (from Madara, Rupkite and Oescus) refer to the same type, namely V-type Korzuhina.

In the sample of the Rupkite (fig. 12b) (found in the medieval layer of the late antique fortress Karasura), a heart-shaped sheet is made in the lower part, and in the upper two symmetrically located, at both ends, three-leaved palmettes. The edged top sides are assembled to form a stylized, flattened animal head with well-defined eyes. His fall into the lands south of Hemus could be related to the information of Leo Deacon in his essay "History" about the second march of Prince Svetoslav when he crosses the Stara Planina Passes and reaches Philippopolis. The three tips have accurate parallels in Hungary, Ukraine, Crimea, Volga river area, Gnezdovo, Podgorica (Ukraine) and date back to the second half of 10th century – beginning of 11th century. It is important to note that the territorial distribution of the V-type tips of the Korzuhina classification is to the north to East Prussia and Latvia, to the south by Chersonesus (Crimea) and are completely absent in Scandinavia as artifacts. The availability of the east origin ornamental motif - the palmette on these findings, gives grounds for looking for eastern influence in their making. The oriental influence on the material culture of the Varangians is also obvious on other objects, such as belt appliques, amulets and others. Gradually from the 11th century, in the findings of northern origin there was a displacement of the beast ornamental

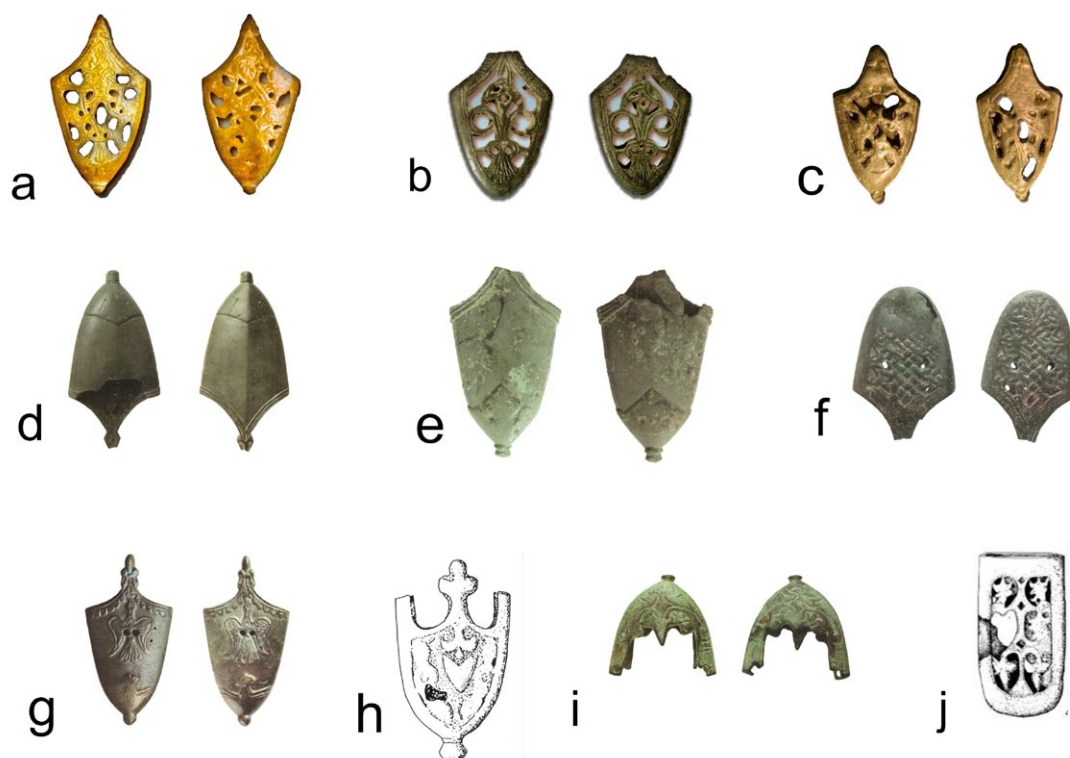


Fig. 14. Scabbard tips from: a. With an unknown location in Northeastern Bulgaria, (without scale) (Yotov 2003, 13); b. “Zavet” fortress near to Razgrad, (without scale) (Yotov 2003, 9); c. fortress near Miladinovtsi (near Targovishte), (without scale) (Yotov 2003, 10); d. fortress near Miladinovtsi (near Targovishte), (without scale) (Zlatkov 2014e, 153; Yotov 2004); e. with an unknown location in Northeastern Bulgaria, (without scale) (Zlatkov 2014h, 154; Yotov 2004); f. Pavlikeni, (without scale) (Zlatkov 2014d, 149; Yotov 2004); g. with an unknown location in Northeastern Bulgaria, (without scale) (Zlatkov 2014c, 152; Yotov 2004); h. with an unknown location in Northeastern Bulgaria, (without scale) (Yotov 2003, 23); i. with an unknown location in Northeastern Bulgaria Bulgaria, (without scale) (Zlatkov 2014b, 155; Yotov 2004); j. fortress “Sveti Duh” near to Haskovo Mineral Baths (South Bulgaria), (without scale) (Yotov 2004, 55)

Обр. 14. Накрайници на ножници от: а. С неизвестно местонамиране в Североизточна България, (без мащаб) (Yotov 2003, 13); б. крепостта „Завет“ близо до Разград, (без мащаб) (Yotov 2003, 9); в. крепостта близо до Миладиновци (обл.Търговище), (без мащаб) (Yotov 2003, 10); д. крепостта близо до Миладиновци (обл.Търговище), (без мащаб) (Zlatkov 2014e, 153; Yotov 2004); е. неизвестно местонамиране в Североизточна България, (без мащаб) (Zlatkov 2014h, 154; Yotov 2004); ф. Павликени, (без мащаб) (Zlatkov 2014d, 149; Yotov 2004); г. неизвестно местонамиране в Североизточна България, (без мащаб) (Zlatkov 2014c, 152; Yotov 2004); х. неизвестно местонамиране в Североизточна България, (без мащаб) (Yotov 2003, 23); и. неизвестно местонамиране в Североизточна България, (без мащаб) (Zlatkov 2014b, 155; Yotov 2004); ж. крепостта „Св.Дух“ близо до Хасковски минерални бани (Южна България), (без мащаб) (Yotov 2004, 55)

motif from the plant. This trend is also registered in Scandinavia, where Byzantine and eastern elements have an increasing impact on Norman culture. The tips of Madara, Rupkite and Oescus are the southernmost point of the spread of this type of artifacts. Due to the fact that they are not found in a clear archaeological context, their dating could only be terminus post quem. Most findings of swords and their constructive elements of northern European origin are concentrated in Northeastern Bulgaria and most of them are associated with the marches of the Kiev prince Svatoslav or with the Varangian corps. The Oescus tip is far away from this area, and precisely because of that it could be assumed that it was caught there during the intensified Pecheneg’s invasions during the middle of 11th century. It is possible that the weapon was caught in the “Pechenegs hands” as a military prey,

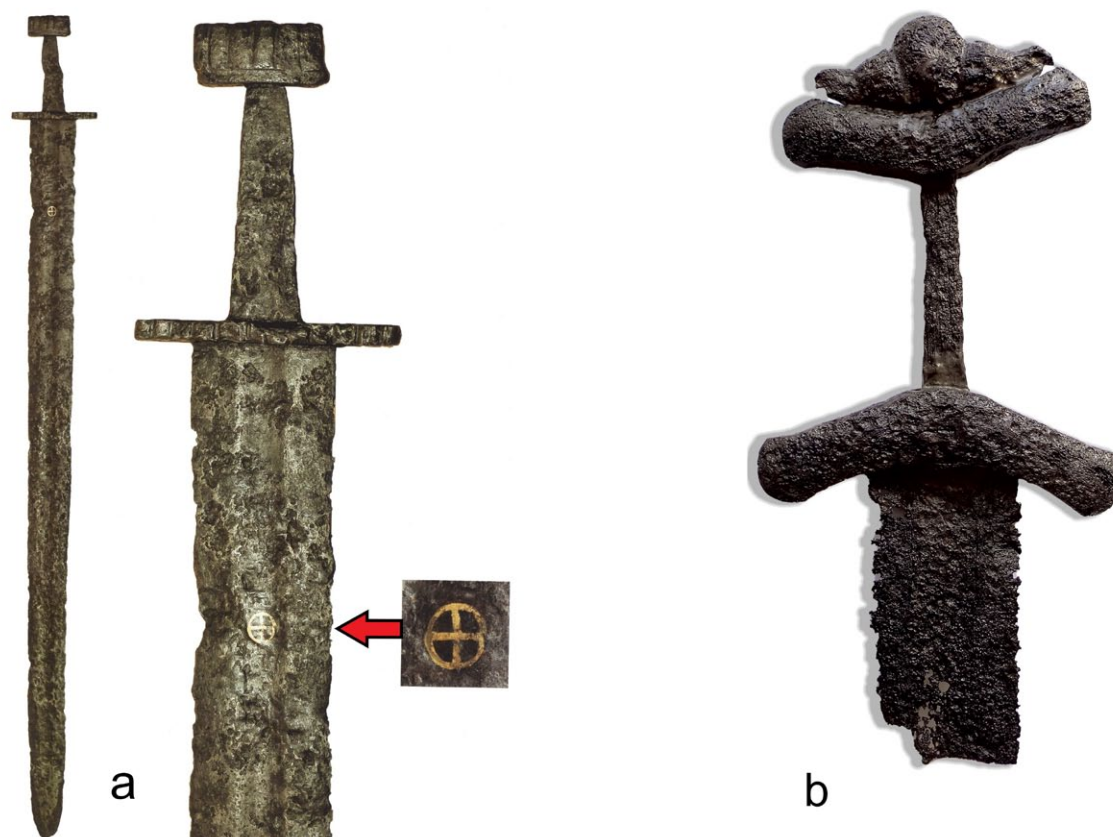


Fig. 15. Swords from: a. *Opaka* (Popovo), (without scale) (Zlatkov 2014a, 140; Yotov 2004); b. *Gradeshnitsa* (Vratsa) (photo S. Kamburov)
 Обр.15. Мечове от: а. Опака (Попово), (без мащаб) (Zlatkov 2014a, 140; Yotov 2004); б. Градешница (Враца) (снимка С. Камбуров)

as a result of the frequent military clashes between Varangians and Pechenegs during 10th century, for which we also have written information from Constantine VII Porphyrogenitus in his essay “De Administrando Imperio”. The concentration of weapons and armament items of North European origin in North Bulgaria, and particularly in the northeastern parts of the country (fig. 13) (Kolev 2015, 68, fig.1), could be due to the less well-researched middle age archaeological sites south of Hemus.

Out of the total of sixteen tips, from the Bulgarian lands which V. Yotov included in his study, fifteen were made of bronze and only one sample of iron (Йотов 2004, 46-58). To these fifteen are mentioned the specimens mentioned above. The other bronze tips are respectively:

Tip with unknown location in Northeastern Bulgaria (fig. 14a) (Yotov 2003, 13). It is made of bronze with openwork ornamentation, on one side is represented a bird figure, and around it a tangle. On the other side is an ornament of intermingling dragon with heads in profile. Exact parallels of this tip are found in Scandinavia and Russia, and particular in Birka (Sweden) and Gnezdovo (Russia). The ornament gives grounds to refer to the Paulsen classification as a German “four paw beast”, as the motif of intertwining dragon is characteristic of the Norse style Jellinge (870-1000) (Paulsen 1953). Indeed, in its ornamentation are combined two separate types of motifs – “German bird motif” and “German four-paw beast” on Paulsen’s typology. Most probably, this tip could refer to the elements of North European armaments. Its dating on the basis of analogies is the second half of the 10th century and its fall into Northeastern Bulgaria could be related with the Svetoslav military campaigns in the period 969–971.

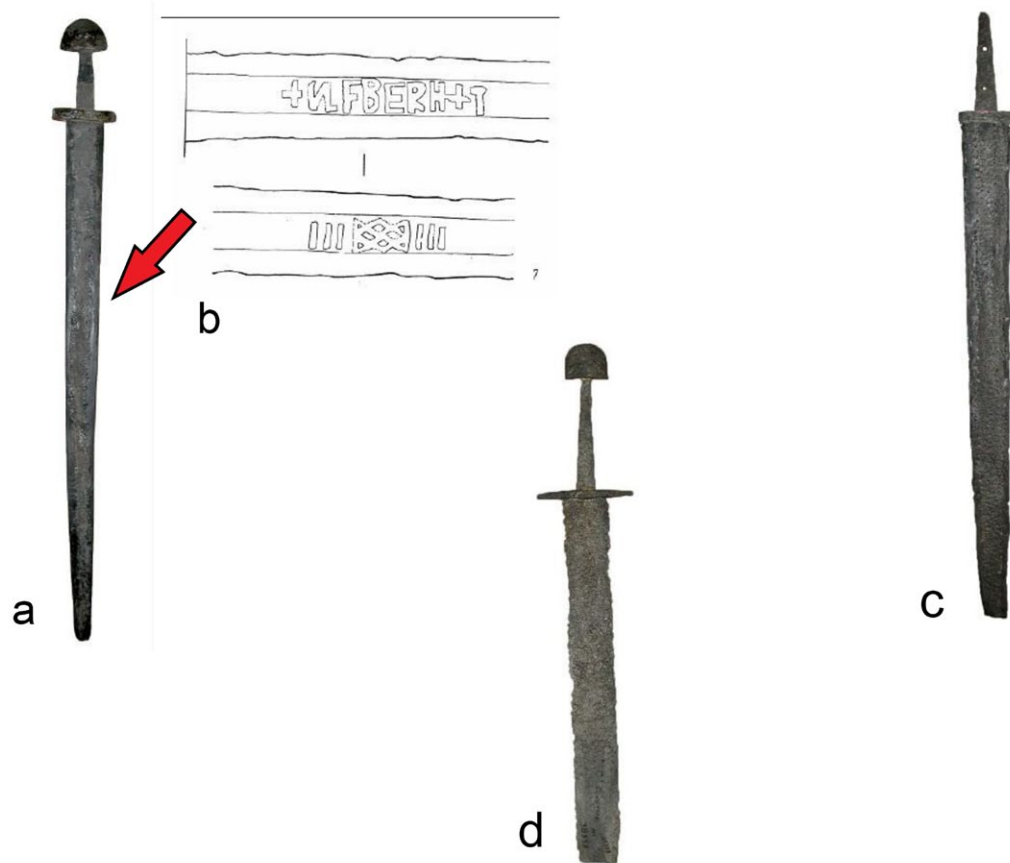


Fig. 16. Swords from: a Albești (Romania), (without scale) (Yotov 2011, 45); b. Latin inscription with embossed letters “Ulfberht” along the blade of the sword from Albesti (Yotov 2011, 45); c. northern Dobrudja with an unknown location, (without scale) (Yotov 2011, 45); d. Northern Dobrudja with an unknown location, (without scale) (Yotov 2011, 45)

Обр. 16. Мечове от: а. Albești (Румъния), (без мащаб) (Yotov 2011, 45); б. Латински надпис с релефни букви „Ulfberht“ по дължина на острието на меча от Albesti (Yotov 2011, 45); в. Северна Добруджа с неизвестно местонамиране, (без мащаб) (Yotov 2011, 45); д. Северна Добруджа с неизвестно местонамиране, (без мащаб) (Yotov 2011, 45)

Other bronze tip is found in “Zavet” fortress near to Razgrad (fig. 14b) (Yotov 2003, 9). The ornamentation is openwork. It shows a stylized figure of bird and knot. Exact parallels of this artifact there are in Poland and East Prussia. This type of tips refer to type “German bird motifs” after Paulsen. It is dated back to beginning of 10th century. But as the previous artifact this tip is not found in clear stratigraphical context. For its fall into Bulgarian lands could be pointed the Russian military campaigns in the second half of the X century.

The tip of the sword scabbard, again cast from bronze, was found in the fortress near Miladinovtsi (near Targovishte) (fig. 14c) (Yotov 2003, 10). The sample has a polished surface on both sides, the ornament is highly erased and barely visible. However, the tip could refer to the group of the “German four paw beast” or analogies with similar findings from the Upper Dnieper, to the group “Gnezdovo III”, made in the Norwegian ornamental style “Jellinge”. Generally, the date of this tip found out of context is the second half of the 10th – middle of the 11th century.

There is another bronze scabbard tip from Miladinovci fortress, which is entirely without ornamentation with a smooth surface (fig. 14d) (Zlatkov 2014e, 153). Several incised lines are recorded on the imitating sleeve plate at the tip. It is dated second half of the 10th – middle of the 11th century.

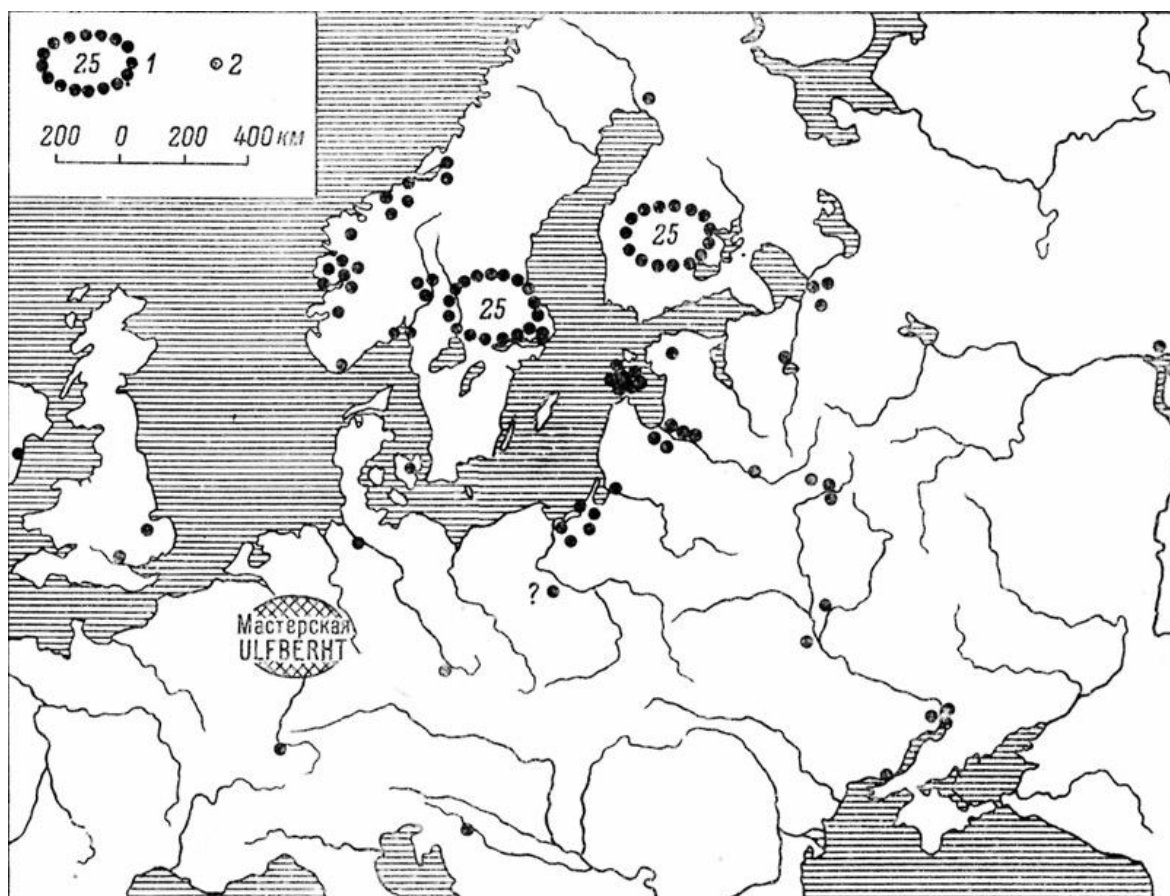


Fig. 17. Map of distribution of “Ulfberht” swords (Kirpichnikov 1966, 38)

Обр. 17. Карта на разпространението на „Ulfberht“ мечове (Kirpichnikov 1966, 38)

Another similar to this sample is from unknown location in Northeastern Bulgaria, which on one side, on the upper part, is decorated with a palmette, and on the other is a registered triangular ornament (fig. 14e) (Zlatkov 2014, 154). These tips could refer to the “East Prussian group” of the Paulsen typology or to the Korzuhina type V. As mentioned, this type of tips are absent from the Scandinavian findings and their production is associated with the territories of East Prussia and Russia. Korzuhina suggestion differs with the opinion of Paulsen concerning the manufacture location of the tips from “east-Prussian group” or also known as a type of “east palmette”, dated after the second half of 10th century. According to her, the center of production is not the Baltic’s but the area of the Lower Danube because the mapping tabs of this type is spread south of Kiev, namely in the region around the Danube delta (Korzuhina 1950). Since the middle of the 10th century, more and more eastern elements have been recorded in the ornamentation of the tips, resulting in the replacement of the northern „beast ornament“ with a plant (mainly palmette), this decoration become a characteristic feature of the Kievan Rus region.

From the area of Pavlikeni, near Nicopolis ad Istrum, outside a clear stratigraphical context, a bronze tip is found, which at the top has several small openings, probably serving its attachment to a wooden scabbard (fig. 14f) (Zlatkov 2014d, 149). A cut ornament resembling a fish bone is recorded at the edges of the tip. The two faces of the tip are ornamented with intertwined rhombuses, and on some parts are found traces of golden coat. The stylistic parallels of this model are again the type of “German four-paw beast” and date back to the second half of the 10th century.

An unknown location from North-East Bulgaria is the next bronze tip, which on its two sides

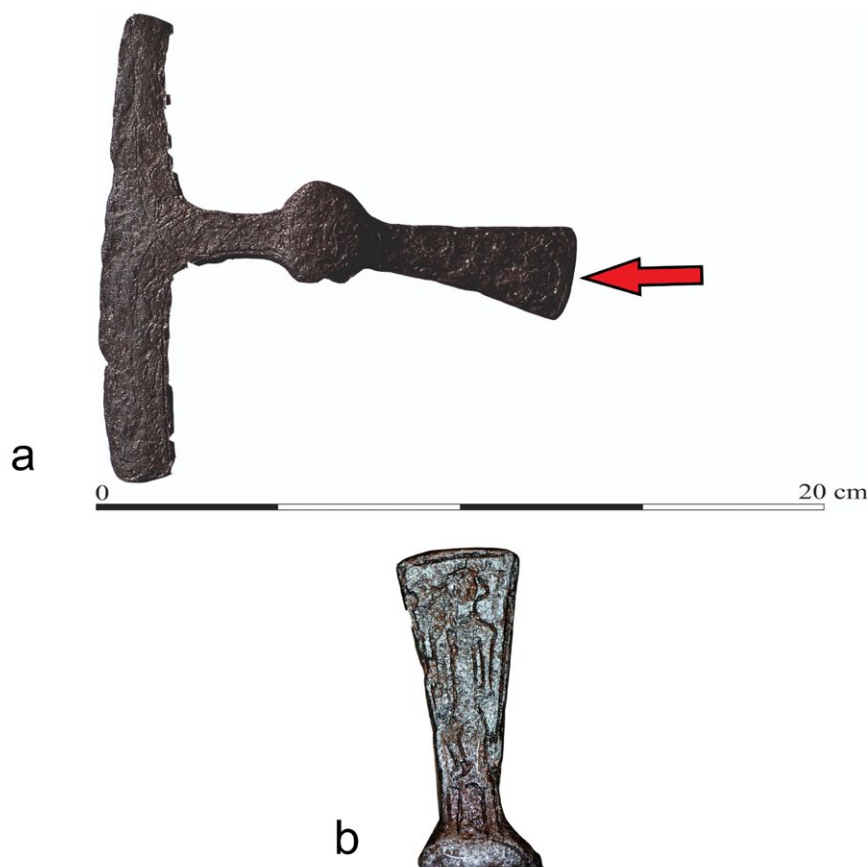


Fig. 18. Battle axes from the village of Barzina, Vratsa municipality: a. front view; b. top view (photos S. Kamburov)

Обр.18. Бойна брадва от с.Бързина, обл.Враца: а. изглед отпред; б. изглед отгоре (снимки С. Камбуров)

has embossed images of birds (fig. 14g) (Zlatkov 2014c, 152). The interesting thing about it is that the ornamentation is not openwork. It is likely that a stylized figure of a falcon is presented, similar to some of the Gnezdovo I and “German bird’s motif” in the territories of Russia and Scandinavia.

Another interesting scabbard tip was found again in Northeastern Bulgaria, but its exact location and archaeological context are unknown (fig. 14h) (Yotov 2003, 23). Its two deeply curved inward grooves form a cross, and a relief palmette is formed in the center of the “shield”. According to Paulsen’s classification, this tip belongs to the “Cross with rinceau” type, which dates back to the 10th–11th century (Paulsen 1953). In the Baltic, this type of tips, according to Korzuhina, are spread in the 11th–12th century (Korzuhina 1950). The ornament suggests the significant influence of Christianity on material culture, including on the craft making of armament elements during this period. The North European origin of this type of tips could certainly be questioned, and the center of work could be searched within the borders of Byzantium or Christianity, Kievan Russ (after 988).

An interesting scabbard tip, which in its form differs from the others, is found in Northeastern Bulgaria, but its exact location is unknown (fig. 14i) (Zlatkov 2014b, 155). The walls of this sample are deeply cut and a triangle is formed in the center of the top. The ornamentation is entirely with floral motifs. Paulsen defines this type of tip as “low” and dates back to 10th–11th centuries (Paulsen 1953).

Another scabbard tip is found near to Razgrad but with unknown archaeological context. It is exact parallel of the tip from Madara (fig. 12d) (Yotov 2003, 26).

The only one scabbard tip made from iron is found in fortress “Sveti Duh” near to Haskovo Mineral Baths (South Bulgaria) (fig. 14j) (Yotov 2004, 55). The fortress is dates back to Late Antiquity. The item is found out of the clear stratigraphic context. It has an openwork decoration, representing three pairs of triple clovers.

Among the double-edged swords with North European origin in the Lower Danube area, it is important to note some well-preserved findings. An example of this is the published by V. Parushev, a sword bought and currently located in the museum of Dobrich, which is reported to have been found in the region of Opaka (Popovo) (Parushev 1999, 31-32) (fig. 15a) (Zlatkov 2014a, 140). According to the form of pommel, the sword refers to Type K on the typology of Petersen’s „Viking Swords“ dating back to the second half of the 8th– middle 9th century. I have to mention that this type of swords is absent completely among the findings from the Russian territories and probably for this reason type K is missing in the classification of Kirpicnikov (fig. 8) (Kirpichnikov 1966). Exact parallels of this type of sword are found in the territories of today’s France, suggesting that their fall there is related to the Viking military crusades to the Frankish Empire in the period 850-900. At the point, on the double-edged blade, on the sword of Opaka, is a recorded inlaid swastika. Here is the time to pay attention to the al-Kindi report, which makes a description of the Frankish swords, and mentions that they have a wider blade from the hilt that gradually narrows towards the top. Frankish swords, according to the Arabian chronicler, featured with a wide fuller along the length. Kindi, mentions that often in the upper part of the Frankish swords blade are inlaid different symbols, made of brass or gold or cut in the forms of crosses, swastikas, half moons, etc. This information gives rise to a reflection on the origin, if not the entire sword of Opaka, at least on its blade. Probably the blade was made in a specialized forging workshop in the territory of the Frankish Empire, where there is evidence of the mass production of double-edged swords in the period 9th-11th centuries. The presence of pommel with corresponding shape that is characteristic feature of the Nordic swords (more specifically, of Scandinavia), gives the reason to assume that the pommels was made exactly there and subsequently mounted on the blade made in the West European armory. Swords with local Scandinavian origin, unlike the “Frankish”, are single-edged. The single-edged Norse swords are one of the main weapons for the close combat of the Vikings, along with the battle axes. Probably, double-edged blades are also being developed in Scandinavia, as imitations of Frankish specimens. As proof of such an assertion, Ibn Fadlan’s information, where is mentioned that the Russians’ swords are “flat with fuller on them, Frankish,” could be accepted (Ibn Fadlan 1992, 22).

The fall of the sword from Opaka in northeastern Bulgaria could be related to the marches of the Kiev prince Svetoslav (968-971) (Yotov 2004, 42). Another option is that the sword belonged to a Scandinavian warrior, part of the Varangians corps in the Eastern Roman Empire. The weapon was not discovered during archaeological excavations, its exact location was not elucidated, these problems did not allow for accurate date as well as its association with specific historical events. The fact that this type of sword dates back much earlier from Petersen (the second half of 8th–9th century) it would be possible to suggest an earlier date for using this weapon.

Another partially preserved sword of North European origin was found near the village of Gradeshnitsa (Vratsa), and is currently kept at the museum in Vratsa. From it is preserved the pommel, the grip, the crossguard and the upper part of the blade (forte) (fig. 15b). Pommel, in its form, refers to type Z of the Petersen Viking Swords typology (fig. 7) (Peirce 2002, 18-19; Petersen 1919). This type of sword dates back to the second half of 10th– the first half of the 11th century, at the end of the so-called “Viking Age”. The pommel has an elliptical base and a convex, five-part, annular top. The Gradeshnitsa sword crossguard has a curved down shoulder that is a characteristic of the Z-type specimens. A wide fuller is recorded on the top preserved part of the blade. This type of sword has a wide geographic spread throughout Europe except in Scandinavia, findings of this type are found

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in Western, Central and Eastern Europe, and precisely for this reason type Z is also included in the typology of Kirpichnikov for the swords of the Russian lands in the period 9th–11th century (fig. 8). According to J. Zak, the Z-type swords combine the specific elements of the Frankish “Carolingian Swords” and the oriental sabers, making a comparison with the curved down shoulders of this crossguard with the crossguards of some sabers - the “Hungarian type” (Žak 1960, 333-334). Z type swords are not of clear origin, according to Petersen they are of eastern origin and, according to other researchers, with Scandinavian. Arbman argues that this type of swords has Central European origins (Arbman 1937, 227), and according to Sarnovska, the center of their production should be sought eastwards towards the Baltic area (Sarnowska 1955, 308-309).

Similar to Type Z are the bronze pommels V-type of M.Wheeler typology for the Viking Swords, spread between 875 and 950 (fig. 9) (Wheeler 1927; Oakeshott 1960). The researcher suggests that these specimens have Anglo-Saxon origin. Swords of type Z represent a change in the shape of the hilt of the traditional Frankish double-edged blades. The crossguard is curved down to the blade, which also represents a change in fencing methods. Probably, except for the repulsion of enemy strikes and the protection of the hand, the crossguard can now „snap“ and take the sword from the opponent’s hand. Towards the 10th-11th century, swords with curved crossguards became wide spread throughout Europe

According to Kirpicnikov, the curved crossguard is suitable for horse skirmishes and is characteristic of the swords of the western European cavalry, which in turn borrows it from the sabers of the eastern steppe horsemen (Kirpichnikov 1966, 33-34). The fact that the sword from Gradeshnitsa is found in the northwest region of the Bulgarian lands, somewhat excludes the possibility that it has been fallen there after the Svetoslav marches, for which we have data that have affected mainly Eastern Bulgaria. Again, a serious obstacle to the correct connection of the finding with specific historical events is the fact that the sword is not found in a clear archaeological context. In my opinion, the sword fell in Northwest Bulgaria, either as a result of Harald Hardrad’s military campaign to the Western and South-Western Balkans in the period 1040-1041, as a Byzantine ally, against the rebellion of Peter Delyan in the region between Belgrade and Nis or as a result of the Pecheneg’s incursions of the 40s of 11th century. The possibility that the sword of Gradeshnitsa was owned by a Varangian warrior-mercenary, part of the Varangians corps of the Byzantine emperor could not be excluded.

I will also draw attention to three swords not found in the Bulgarian lands, but on the northern coast of the Lower Danube in the territories of Romania, as their fall there is also connected with the marches of Prince Svetoslav or with the Varangians-mercenaries in Byzantium. The three findings are currently in the Constanta Museum. One of them is located near Albești, west of Mangalia (fig. 16a) (Yotov 2011, 45), and the other two are from North Dobrudja with an unknown location (fig. 16c, d) (Yotov 2008, 321-327). On one side of the blade of the sword from Albești is a registered Latin inscription with embossed letters – “Ulfberht”, written along the blade, and on the other is printed symbol (fig. 16b) (Yotov 2011, 45, fig.5). According to the pommel form, the sword refers to type V of Petersen typology dating back to beginning of 10th - the second half of 10th. The presence of this inscription requires attention to the distribution of the blades with the inscription “Ulfberht” (fig. 17) (Kirpichnikov 1966, 38) and the data that gives us for the origin, if not of the whole swords, surely of their blades.

A lot of the blades of this type of swords are recorded with Latin inscriptions, such as “Ulfberht”, which is probably the name of a large-scale, Rhine blacksmith workshop specializing in swordsmanship that functioned in the 9th–11th century. The great variety of inscriptions and symbols on swords originating from the Frankish Empire is probably due to the obligation to place various stamps and markings on the weaponry produced in the Empire. According to philologists, “Ulf” is a

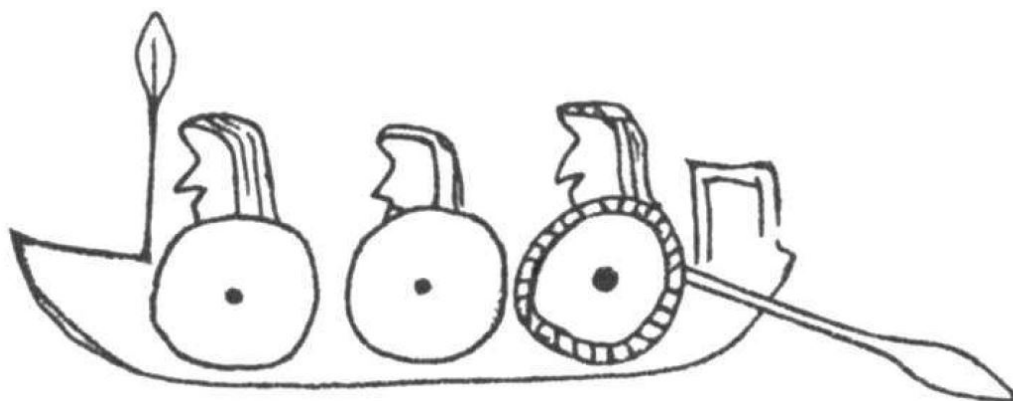


Fig. 19. Bone figure from museum in Vratsa, inv. N B 263 (Minaeva 2013, 68)
Обр. 19. Фигурка от кост от музея във Враца, инв. № B 263 (Minaeva 2013, 68)

word of Scandinavian origin, meaning “wolf” and often accompanying the names of the Varangians leaders, and “berth” is a fragment of Frankish origin. Swords with these blades are distinguished by their strength and lightness, whereby the balance point is closer to the hilt, which in turn allows more shifting movements and more effective cut and thrust hits during hand-to-hand combat. Therefore, we could identify the swords with this brand of blades as a high-class cold blade weapon for close battle. The production of double-edged blades requires extremely high qualification and master skills, which were not widespread during the Early Middle Ages in Europe. This in turn suggests a limited number of centers specialized in this production, which were probably under direct control of the central government and the elite. The other sword construction elements required another type of master’s qualification and were therefore produced in local forging workshops, with local traditional ornamental motifs often appearing on them. It is quite possible that during the 9th–11th century there was a trade in double-edged blades of swords produced in the lands of the Frankish Empire and exported to Scandinavia, Eastern Europe and Byzantium, where the other swords elements were constructed and subsequently assembled. Trading in “Frankish” double-edged blades is mentioned even in the Middle East where, according to Arabic writing, a “Frankish sword” cost about 1,000 Egyptian dinars, which made it 300 times more expensive than local swords.

The other two swords from the Constanta Museum are found in Northern Dobrudja, but their exact location is unknown. Their fall into this region could be related to the military campaigns of Prince Svetoslav or to the Varangians Corps, as well as to the Pechenegs invasions in the middle of the 11th century. One of these two swords is without preserved pommel with an extremely short crossguard, as the investigators do not particularly convincingly define it as an intermediate type E / W of the Petersen classification based only on the shape of the blade (fig. 16c) (Yotov 2011, 45, fig.7). In my opinion, such a determination of the type of sword whose pommel is missing, by typology based on the shape of the pommel and the crossguard, not on the characteristics of the blade, is controversial.

The third sword from the Constanta Museum is again without any data on the stratigraphic context in which it was discovered (fig. 16d) (Yotov 2011, 45, fig.6). According to the form of pommel, it is defined as type X of the Petersen typology. This type of pommels is of semi-circular shape and is cast from bronze along with its base, which is actually a top sword crossguard. The crossguard, in this type, is straight, elongated and has no ornamentation. The dating of type X is within wide ranges, the earliest findings are from the second half of the 9th century, the development of this type continued until the 12th century, when the crossguard changed and became considerably thinner and longer, and the pommel is in smaller sizes.

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A pommel of this type is also found in the Bulgarian lands from the territory of Preslav. It has a hemispherical shape with an elliptical section and refers to the developed, later variation of type X. The context in which it is found is again obscure.

Recently in the museum in Plovdiv were exposed weapons from the private collection of the collector Boyko Vatev and his father. The Vatevi Collection has collected elements of armament from different epochs - from the Late Bronze Age to the Middle Ages. Collected weapons are actually a large number (about 4800 items), only the swords are over 50 specimens. Among the double-edged Early Medieval swords, there are specimens whose pommels, I think, could relate to types N, X, V on the typology of Petersen. It is for this reason that their northern European origin could be presumed. Up to this moment is still expected that these weapons will be published in several volume catalogs.

Regarding the other main element of the Scandinavian armament - the battle axe and the findings of this type of weapon in the Bulgarian lands, my study is considerably more limited. The main problem with them is that (including undoubtedly in the Middle Ages) they have a dual function - as tools and weapons. It is for this reason that it is difficult to establish the exact function of this or that type of axe; there are enough eloquent examples of how not just the same types, but the same specimens are being discussed by different authors in their function either of the tool or the weapon. The other problem is related to their utilitarianism and too weak variability of forms over the time; this, together with the lack of (clear) context, makes it impossible to determine their exact date. And while the non-contextual sword or saber is any way a sword or a saber, then the non-contextual axe is ... just an axe. However, there are some axes that could be linked to northern European origins on the basis of ornamentation. An example of this is the so-called "battle axe" from the village of Barzina (Vratsa), which I think could be attributed to ceremonial weapons (fig.18 a, b). It is found outside of a clear archaeological context. It is stored in Regional Historical Museum Vratsa with Inv. № D 291 (Ivanov 1994, 65-79). The entire surface of the axe is covered with engraved images. Each one is enclosed in a frame. It is assumed that these engravings were filled with silver wire, but due to the corrosion and cleaning of the item, much of the inlay was destroyed. The rich decoration of the axe gives reason to suppose that it was used as a ceremonial weapon. On one side of the back of the axe is an engraved human figure in full-length, frontal. The body is lengthened with his hands relaxed, his eyes, nose and mouth marked with points and lines. The legs are disproportionately short and slightly curved in the knees. A part of the silver inlay is retained on the left leg's outer line, and a copper thread is seen in the left corner of the frame. The axe sleeve also retains part of the silver inlay. The left half of the blade is ornamented with plant motifs. Similarly, it was probably the ornamentation on the right half, but unfortunately it was severely damaged by corrosion. On the other side of the item, the engraved figure of a dragon or an open-mouth dragon is engraved on the back. The sleeve on the other side is engraved with a horse image where copper thread parts are retained. Below the axe blade is recorded a vertical broken line in a frame. On the blade of the axe are engraved figures of two snakes against each other with open mouths. Each of them is framed in a rectangular shape. The axe resembles the T-shaped axes distributed in the steppe and woodland steppe region of Eastern and Central Europe in the chronological range of 8th–12th century. Similar axes are also known by late Avar necropolises in Hungary and Slovakia dating back to the 8th–9th century. The axe could refer to type II on Kirpichnikov typology.

The rich decoration on the structural elements (mainly on pommels and crossguards) of the Scandinavian swords and on some axes representing by separate motifs from Scandinavian mythology suggests the „loading“ of these types of weapons of close battle with a certain symbolism. The question arises whether these elements of armaments are accepted in the Viking society with their functional purpose as a weapon? The valuable and precise craftwork of the structural elements of these North European weapons has also determined their high value, which in turn excludes their

mass use in the Varangians armaments and gives the reason to look at them as ceremonial weapons available only to the ruler's caste and persons with a high military rank.

An interesting finding that is not specifically related to close battle armaments is a bone figure, which is stored in the fund of the museum in Vratsa with Inv.No 263 (fig. 19) (Minaeva 2013, 68). The archaeological context is not clear. It is found near to village Harlets (Vratsa Province). On the figure there is an engraved image of a warrior (probably kneeling or running) with a cut and thrust weapon (sword or saber) and a helmet (or a hat) on his head. In the lower part are engraved three warriors in a ship (a boat) with round shields attached from the sides of the ship (like the Viking war-ships). Next to the warrior on the right a paddle is depicted.

Recently, another interesting artifact has been discovered, awaiting its publication. This is a bronze pommel of a Scandinavian sword found near Aquae Calidae at Bourgas Mineral Baths. It is dated back to the second half of the 10th-11th century. On one side of the trilobate pommel there is a preserved ornament of a knot, which is erased at the upper parts. It refers to Type S on the Petersen typology. Finding parallels with the bronze pommel from Pacuiul lui Soare.

The marches of Prince Svetoslav could be considered as one of the reasons for the fall of elements of North European armament in the Bulgarian lands. These are the first recorded Varangians ground military operations south of the Danube, detailed described in the "History" of Leo Deacon. The marches of his predecessors, princes Oleg and Igor, were carried out entirely on water, which does not exclude the existence of material traces of military presence of Varangians in the area of Western Black Sea ports and coast in the first half of the 10th century. Some of these ports are reported as stops for relaxing and supplying of provisions on the "Varangian road" to Constantinople. Another option is that some of these types of findings may have fallen into Bulgarian lands as a result of trade contacts between Scandinavian merchants and Byzantium. The Varangian trade roads to Constantinople are well described in medieval Byzantine written sources such as "De Administrando Imperio" by Emperor Constantine VII. As mentioned, the territory with a concentration of findings of Scandinavian origin is Northeastern Bulgaria. After the conquest of this part of the Bulgarian lands by Emperor John I Tzimiskes, the territories were organized in new Byzantine provinces and their management was entrusted to the provincial governors appointed by the emperor. "Taktikon Scorialensis" from the second half of the 10th century, mentions the newly emerging Western Mesopotamia theme, but its main city center is not mentioned. According to N. Oikonomides, the main reason for creating the themes of Thrace and Western Mesopotamia was to deter Russian invasions from the northeast (Oikonomides 1972, 101). This provides military defense of the region and controls the trade of Byzantium with the Russians and the other steppe peoples, with customs located in the region around the Danube delta.

The possibility that findings related to elements of Scandinavian armaments have entered the Bulgarian lands as a consequence of trade and not of military presence of Varangians is very small, as these types of finds are found in a very limited amount and in limited territory, outside of archaeological context, which prevents their occurrence, in the lands south of the Danube to be categorically interpreted as a consequence of commercial exchanges.

There is a striking contrast between the number of weapons found and the written sources of the active military action in the region of Northeast Bulgaria in the second half of the 10th century. The answer to this problem, to some extent, gives the information from the "History" of Leo Deacon related to Drastar's siege by the Byzantine army: "In this battle, 15,500 Scythians died. There were taken 10,000 shields and a large number of swords" (Duichev 1964, 272). From here it is clear that after the Byzantine siege of Drastar, Tzimiskes's army took as a military prey the defensive and offensive armament of the Russians. Another issue is the lack of „Varangian“ graves in this area, as there is evidence of such a large number of Russians killed (we must not forget that often, the nu-

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merical values mentioned in the written sources are highly exaggerated with propaganda purpose). As one of the explanations of this fact, we could give the information of Leo Deacon, who describes in detail the Drastar siege: „They (the Russians) came to the field and look for their dead men. They gathered them in front of the city walls, ignited many fires and burned them“ (Duichev 1964, 269).

In recent years the number of finds associated with Scandinavian weaponry growing. Unfortunately, most of them are found out of context. In the near future it is necessary to carry out a new detailed study of this type of finds from today's Bulgarian lands, including newly discovered weapons with Scandinavian origin and their constructive elements.

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Ранносредновековни оръжия за близък бой със северноевропейски произход в днешните български земи

Самуил Камбуров

(резюме)

Периодът от началото на IX век до към средата на XI век в европейската история е известен като „викингски период“. Това е период, когато скандинавските племена започват своите военни походи от земите на днешна Норвегия, Швеция, Финландия и северозападните части на Русия към Западна, Централна и Югоизточна Европа. За политически център на викингите е определен остров Готланд в Балтийско море (Южна Швеция). Именно оттам започвал, описаният в съчинението на Константин Багренородни (913-959) „За управлението на държавата“, „варяжки път“ към Константинопол (Миклагард – скандинавското наименование на града), който бил основна търговска пътна артерия за обмен на стоки между Византия и Скандинавия. Този търговски път преминавал по реките, намиращи се днес в Западна Русия и завършвал при устието на р. Днепър. От Северното Черноморие, варягите продължавали към устието на Дунав и оттам по море достигали византийската столица. Балканите стават обект на набези основно от страна на т.нар. „източни нормани“ или известни още, като варяги, през втората половина на X век, след консолидацията на племената в Южна Русия и възникването на Киевска Рус. Става въпрос за походите на киевския княз Светослав в периода 968-971 година към българските земи и Константинопол, в периода на управление на византийския император Йоан Цимисхи (969-976). Това са и първите засвидетелствани варяжки сухопътни военни операции южно от Дунав, описани подробно в съчинението „История“ от Лъв Дякон. Малко след покръстването на Киевска Рус през 988 година, император Василий II (976-1025) наема около 6000 варяги за своя лична гвардия и по този начин създава т.нар. „варяжки корпус“, отговарящ лично за охраната на василевса.

Настоящата статия обръща внимание на проблемите свързани с разпространението в днешните български територии на прободно-сечащи оръжия, техни конструктивни елементи и приложения с паралели в Северна Европа и Скандинавия, датирани IX-XI век. Направен

е опит да се проследят пътищата и причината за тяхното попадане в ареала на Балканския полуостров. Част от възможните варианти за откриването на северноевропейски находки на въоръжение на Балканите, варират от документираното присъствие на добре въоръжени варяги и военни контингенти от Севера, до чисто търговски отношения между викингите и Източната римска империя, които също са добре засвидетелствани в средновековните византийски писмени извори. Известно е, че скандинавците през този период търгували основно с мед, восък, ценни животински кожи и вероятно с елементи на въоръжението, например с някои конструктивни части на мечове (помели, гардове, накрайници на ножници и др.). Тоест наличието на северноевропейски елементи на въоръжението у нас не е свидетелство единствено за присъствието на военни контингенти или за военни кампании на варягите към Балканите, но също така и за търговски контакти с Константинопол. Възможна е и изработката на местни балкански имитации на някои елементи на въоръжението със северноевропейски произход, макар и към момента да липсват данни за наличието на производството им конкретно в българските земи.

Присъствието на варяги в българските земи основно е засвидетелствано по находки, свързани с елементи на военния костюм (снаряжение) и въоръжение. В настоящата разработка ще се обърне особено внимание и на развитието на т.нар „нордически художествени стилове“ чиито следи най-ясно се проследяват върху орнаментацията на елементи на въоръжението със северноевропейски произход. Изследването на находките на въоръжение за близък бой (т.нар. хладни оръжия) със скандинавски произход в българските земи е от особено значение за проучването на ранносредновековното военно дело в ареала на Долен Дунав, тъй като именно този тип артефакти съставляват голяма част от арсенала от мечове и техни конструктивни елементи открити южно от Дунав и датирани в периода IX-XI век.