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THE EVOLUTION OF ANTLER AND BONE CHEEKPIECES FROM THE BALKAN-CARPATHIAN REGION TO CENTRAL KAZAKHSTAN: CHRONOLOGY OF “CHARIOT” CULTURES AND MYCENAEAN GREECE

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Abstract: It is believed that chariots and cheekpieces for harnessing horses were invented in the steppe in the late 3rd – early 2nd millennium BC. From the steppe, the chariots reached the Carpathians, Mycenae and the Near East. However, these conclusions are based on the use of radiocarbon dates for the steppe complexes and historical ones for the Near Eastern ones. Correlation with the Carpathian materials was made on the basis of chronological schemes outdated for this region. The analysis shows that chariots spread to both regions independently, from the Near East, and the appearance of both chariots and cheekpieces in Mycenaean Greece was associated with the arrival of small elite groups from the Carpathians, probably of Thracian origin. It has made it possible to link the Eastern European and Ural cultures to the historical chronology of the Eastern Mediterranean.

Keywords: *Bronze Age, bone cheekpieces, chariots, Greek and Thracian origins.*

1. INTRODUCTION

One of the most important themes in the Bronze Age archaeology is the spread of chariots. This topic has become extremely popular for several reasons: its connection with the problem of spread of chariots, the theory of the connection between chariots and migrations of Indo-Europeans, supposed new forms of social relations and the emergence of a military elite, the possibility of using cheekpieces in chronological studies, etc. It is believed that chariots were invented in steppe Eurasia, where the homeland of the Indo-Europeans was located. It was the Indo-European migrations from the steppe that led to the spread of chariots to other areas¹. However, there is a theory about the origins of Indo-Europeans in the Near East, which is confirmed by evidences on the spread of not only language, but also culture and genes from there². Moreover, the common belief in the steppe origin of chariots can also be challenged. There is a well-known problem in archaeological chronology: radiocarbon dates show intervals much older than historical dates. AMS dates are somewhat younger, and they drift towards

¹ ANTHONY 2007; KUZ'MINA 2007.

² GAMKRELIDZE/IVANOV 1995; GRIGORIEV 2002.

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historical dates. Supporters of the steppe origin of chariots prefer to use radiocarbon dates for the steppe and historical dates for the Near East. In fact, chariots in the Near East appeared earlier, and penetrated from there into steppe Eurasia together with the Sintashta culture³. However, the remains of chariots or their images are relatively rare finds. A more common sign of their presence is horse harness details, cheekpieces. In 1964 A.M. Leskov published two disc-shaped cheekpieces from Trakhtemirov, accidental finds near Kiev⁴. He showed similarity of these objects with cheekpieces from Kamenka in the Crimea, Balanbash in Bashkiria, and Mycenaean objects from the Shaft Graves, which were previously interpreted as pommels on helmets. It was determined that the tradition of disc-shaped cheekpieces originated in the period preceding the Srubnaja-Andronovo period, this period was defined as late Catacomb and dated to the 16th century BC. Subsequently, the number of these finds increased sharply and this growth continues. Most of them were made between the Dnieper and Central Kazakhstan, and they are mainly associated with the cultures of the final part of the MBA and the beginning of the LBA: Don-Volga Abashevo, Sintashta (and its variant – the Potapovka monuments in the forest-steppe Volga region), Petrovka and Alakul. A huge number of works are devoted to this topic, new finds are published very quickly, with an exact cultural and chronological context. The cheekpieces have been studied in detail typologically, statistically and by use-wear analysis. It is impossible to give a historiography of this problem in the article. This topic is best covered by A.N. Usachuk⁵. Over the years, many classifications of cheekpieces have been created⁶. These studies formed the basis for ideas about their genesis and evolution. But at this stage, significant problems begin. A relatively generally accepted point of view is that rod-shaped cheekpieces arose in the Carpatho-Danubian region simultaneously with the disc-shaped ones in the steppe⁷. Most believe that rod-shaped cheekpieces were used to harness horses to chariots⁸. But how does this agree with the common belief that chariot originated in the steppe and from there spread to the Carpatho-Balkan region?

Another example of such contradictions. There is a common belief that cheekpieces appeared in Mycenae later and they were brought from steppe and forest-steppe Eurasia⁹. But the latter is contradicted by the similarity of the Mycenaean cheekpieces with the archaic Eurasian ones, which was indicated by A.M. Leskov. E.E. Kuz'mina distinguished these cheekpieces with spikes and a round plate as the earliest type I, common to the Mycenaean, Abashevo, Srubnaja-Abashevo, and Sintashta complexes. Later, a type with a plank appeared (Monteoru IC4-IIA, Abashevo, Sintashta, Srubnaja-Babino complexes). The later type is III with a narrow rectangular plank and a row of small

holes on it (Abashevo cheekpieces of the Staroyuryevo type), and very late are cheekpieces without spikes or with pins on the plank. The resemblance to the cheekpieces of the Balkan-Carpathian region led to the idea that they spread from one center, Eastern Europe¹⁰. However, Sintashta belongs to pre-Mycenaean time; the LH I period can be synchronized with Early Srubnaja and Srubnaja complexes. There are ideas about the evolution of Sintashta cheekpieces into more complex forms, and even more developed types appeared in the complexes of Potapovka and Don-Volga Abashevo. Why, then, are cheekpieces of the most archaic Eurasian types present in Mycenae? An attempt to solve this problem was the idea that cheekpieces originated in the Abashevo and Babino cultures¹¹. However, typologically, they are clearly later, as well as the Abashevo complexes on the Don, and in the earlier Abashevo of the Middle Volga there are no cheekpieces. The same problem with the Potapovka cheekpieces, since they, together with the Sintashta and Pokrovsk cheekpieces, are recognized as the earliest¹². But since one of these authors substantiated the formation of Sintashta on the Potapovka basis¹³, why are Potapovka cheekpieces presented, mainly, by the same relatively late type as the Abashevo cheekpieces on the Don?

Therefore, researchers, referring to E.E. Kuz'mina, admit a possibility of the origin of cheekpieces in the Babino culture of Ukraine¹⁴. But such references to the possibility of the birth of chariots and the appearance of cheekpieces in Babino culture are possible only in this form, without detailed argumentation. As soon as it appears, the inconsistency of this hypothesis becomes obvious. This argumentation boils down to the following provisions: 1) the cheekpiece from Trakhtemirov, whose cultural identity is unknown; interpretation of a bone buckle from a children's burial Krasnoe 7/3 as a cheekpiece; 2) interpretation as Babino's of cheekpieces from the settlements of Stepan Razin Utes (Volga region), Ilyichevka (Middle Dnieper), Boguslav (Lower Dnieper) and Kamenka (Crimea), although the belonging of these cheekpieces to Babino culture is not defined or is defined as Srubnaja (Ilyichevka) and late Catacomb (Kamenka); 3) ideas about the formation of Sintashta culture under the Babino influence; 4) ideas about the influence of Babino culture on the origin of Monteoru, where there are buckles similar to those in Babino, and cheekpieces; 5) ideas about the early Eneolithic horse breeding tradition in the steppe Ukraine¹⁵.

But the Sintashta culture formed simultaneously with Babino. The idea of Babino's participation in its formation has been preserved since the first publication of the Sintashta materials with a hypothesis about their formation on the basis of Abashevo, Poltavka and Babino¹⁶. In fact, there are no Babino features in Sintashta, and this erroneous idea was justified by the demonstration of one vessel, which was not Babino, but the Middle Don Catacomb

³ GRIGORIEV 2020a.

⁴ LESKOV 1964.

⁵ USACHUK 2013, 6–18.

⁶ For example, KUZ'MINA 1980; HÜTTEL 1981; BOROFFKA 1998; PRYAHIN/BESEDIN 1992; PENNER 1998; 2004.

⁷ BOCHKAREV/KUZNETSOV 2019a, 11.

⁸ BOCHKAREV/KUZNETSOV 2019b, 51.

⁹ KUZ'MINA 1980, 13; PRYAHIN/BESEDIN 1992, 58; BOROFFKA 1998, 115, 116; PENNER 1998, 41, 48, 70, 104, 106, 183–201, 210; 2004, 88; KUZ'MINA 2007, 117–120.

¹⁰ KUZ'MINA 1980, 8, 9, 13, 14.

¹¹ KUZ'MINA 1980, 17.

¹² BOCHKAREV/KUZNETSOV 2019a, 161.

¹³ KUZNETSOV/SEMEANOVA 2000, 129, 130.

¹⁴ CHECHUSHKOV/EPIMAHOV 2010, 202.

¹⁵ VASILENKO 2008, 137, 141, 146, 153.

¹⁶ SMIRNOV/KUZ'MINA 1977.

Tab. 1. Chronology of Eastern Europe and the Urals (after BOCHKAREV 2017).

Groupes	Eastern Europe	The Urals and Kazakhstan
IV	Sabatinovka, late Srubnaja, Suskan	Cherkaskul
III	early Sabatinovka, Srubnaja	Alakul
II	late Pokrovsk, late Babino	Petrovka
I	early Pokrovsk, Seima-Turbino, Babino	Sintashta, Seima-Turbino
0	Abashevo, Lola, Babino	–

vessel¹⁷. There are no signs of chariots in the Babino culture either; it was formed on the Catacomb basis as a result of a powerful impact from the Carpatho-Danubian region, which led to the presence of bone buckles in it, which had earlier origins in Central Europe¹⁸.

It is obvious that the reason for these discrepancies lies in the hypothesis about the Indo-European homeland in the Ponto-Caspian steppes. As a result, for the sake of this hypothesis, researchers try to reconcile logical inconsistencies, and periodization schemes appear in which complexes of different times are synchronized. The second reason for this situation is the careless attitude to chronology. Very often, Mycenaean and Near Eastern dates based on historical sources and radiocarbon dates are used together. In addition to radiocarbon dates, the chronological assessment of the Eurasian cheekpieces is based on comparison with analogs in the Carpatho-Danubian basin. For the Carpathian cheekpieces, extremely wide general dates are accepted within the Central European phases A2 – B1, and then on the basis of old publications, as well as on the basis of the idea that the steppe cheekpieces preceded the European ones, a conclusion is made about the dating of the steppe cheekpieces¹⁹. And this is not an uncommon case when the periodizations created for the Carpathians in the early 60s and found in Soviet literature in the 70s continue to be used.

2. CHRONOLOGY OF CHARIOT COMPLEXES

2.1. Problems of archaeological chronology

Problems of periodization of complexes with cheekpieces in steppe and forest-steppe Eurasia are much more complicated than it is commonly believed. All authors use the periodization of G.B. Zdanovich for the Southern Transurals and Northern Kazakhstan, which assumes a consistent change of cultures: Sintashta – Petrovka – Alakul – Fyodorovka – Sargari²⁰. Similar schemes are used for Eastern Europe. The main problem of these schemes is that a synchronous change of culture is assumed for huge areas. As a result, we have horizontal synchronization of distant complexes, which often contradicts the materials. In the most expressed form it is presented in the periodization of V.S. Bochkarev²¹. It is based on the historico-metallurgical approach and the use of arsenic alloys in the Eurasian MBA

and tin bronzes in the LBA. The method chosen is also quite obvious: the presense of metal objects in closed complexes. As a result, eight chronological groups have been distinguished, of which one group “0” belongs to the end of the MBA and seven (I – VII) reflect different stages of the LBA. The Middle Volga Abashevo, Lola, Babino and Krivaya Luka (Don-Volga Babino culture) have been attributed to the “0” stage, and the Seima-Turbino, Sintashta, and Early Pokrovsk sites to the I chronological group of the LBA. At the same time, the late Pokrovsk, Petrovka and late Babino sites are attributed to group II; the group III includes Srubnaja, Alakul and early Sabatinovka complexes, the IV group – Cherkaskul, Suskan, late Srubnaja, and Sabatinovka cultures, and groups V–VI are represented by complexes with metal of the final Bronze Age, which are beyond the scope of this discussion (Table 1).

In general, this is a correct approach, which really reflects the most general trends in changes in metalworking of Eastern Europe, but in different territories complexes of different groups coexisted. The practical use of this scheme in the study of cheekpieces leads to a rigid horizontal division of all Eurasian cultures from the Dnieper to Central Kazakhstan, and the proposed chronological groups are replaced by stages, which is not the same, and these stages have strong chronological boundaries²². We see also a series of problems. Despite the declared historico-metallurgical principle and the attribution of the Abashevo and post-Catacomb cultures to the MBA based on arsenic alloys, the Sintashta culture with similar alloys is attributed to the I group of the LBA together with the early Pokrovsk complexes. When discussing the chronology of this relatively short period, it is futile to evaluate the complexes by the presence of “Seima spearheads”. In the work of E.N. Chernykh and S.V. Kuz'minykh, the Seima-Turbino artifacts are divided into many final typological categories²³, and they probably reflect shorter intervals than the Seima-Turbino phenomenon as a whole.

In general, the used approach is fair, it was implemented on the materials of southern Germany, where, based on the presense of metal artifacts in closed complexes, Paul Reinecke proposed the periodization of cultures of the Bronze and Early Iron Ages. But it is relevant for an incomparably smaller region, first of all, Bavaria, and regional schemes are applied in neighbouring territories. In addition, in its primary form, Reinecke's scheme with its periods Bz A – Bz D and Ha A – Ha D cannot be used today, it has undergone significant detailizations, for example, period A has been divided into periods A1 and A2, and then into

¹⁷ LITVINENKO 2006, 93; GRIGORIEV 2018a; 2018b.

¹⁸ LITVINENKO 2005, 37–44; LYTVYENKO 2013, 138; GRIGORIEV 2019.

¹⁹ for example, BROVENDER 2008, 200; PYSLARU 2000, 337, 338.

²⁰ ZDANOVICH 1988.

²¹ BOCHKAREV 2017.

²² BOCHKAREV/KUZNETSOV 2019a; BOCHKAREV/KUZNETSOV 2019b.

²³ CHERNYH/KUZ'MINYH 1989.

A1a, A1b, A1c, A2a, A2b, A2c, and only in this form does this scheme become useful for modern chronological studies. The possibilities for this are caused by the fact that in Central Europe there are incomparably more hoards and other complexes with metal objects than in the east, and these objects are typologically more diverse. Nevertheless, many aspects of periodization and chronology remain a matter of debate and detailed research.

Unfortunately, it is almost impossible to create such a scheme using Eastern European or Transural materials. The scheme proposed by V.S. Bochkarev, reflects the general trends in the development of metalworking, but it is very far from the real chronology of the LBA in Eastern Europe and the Urals. These are quite objective difficulties, so most people prefer using radiocarbon chronology, which very often confuses the situation. There is an inexplicable difference between the dates obtained by liquid scintillation method (LSC) and modern methods using accelerator technology (AMS). The former usually show an older age of the samples. This is often not taken into account, and the dates obtained by different techniques, in different years, in different laboratories are compared. The second problem is that the discrepancy and confidence intervals of radiocarbon dates is large, which makes it difficult to use the method to solve specific problems of a chronologically limited period. We deal with probabilistic confidence intervals, but in the case of using a more reliable interval with a probability of 95.4%, we get wide ranges of dates that do not allow us to understand the chronological relationship of the complexes. In the case of using intervals with a probability of 68.2%, the dates become more comparable, but one should remember about a low degree of probability. As a result, we can estimate the ratio of intervals of individual cultures (only if the dates obtained using the same techniques), but it becomes problematic to estimate the ratio of two sites. If we got for them two consecutive intervals A and B, which partly overlap each other, it is more likely that the first one was earlier, but the possibility of their synchronization is not excluded. If we choose any of these decisions, the probability of the truth of the conclusion becomes below 68.2%. However, when we approach the probability of 50%, we return to the beginning, since in solving any problem there are fundamentally two answers (YES and NO) with a hypothetical probability of 50%.

In recent years, a way has appeared to solve this problem in the form of using Bayesian statistics for AMS dates with relatively narrow confidence intervals. But its correct use requires knowledge of the sequence of events. This is possible when analyzing finds from a credible context with reliable historical dates, when analyzing successive tree-rings, or materials from reliably stratified sites. The application of this approach to Egyptian materials of the beginning of the New Kingdom, late Shang oracle bones and wooden beams in Anatolia gave dates that are close to historical ones or even coincide with them²⁴. The use of a reliable chronological marker, the Santorini eruption, made it possible to date the Seima-Turbino bronzes and show the correspondence of the Chinese, Eastern Mediterranean

and Near Eastern ("Middle") historical chronologies with dendrochronology²⁵. Probably, in the future the results of the radiocarbon method will come closer to the historical chronology.

Unfortunately, the possibilities for applying the Bayesian statistics of AMS dates for steppe Eurasia are limited due to the lack of sites with thick layers and archaeological trees. Therefore, in the study of relatively short chronological intervals, traditional stratigraphic and typological methods remain relevant. But they also have problems. In a case of two at least partly synchronous cultures, we can get their different relation at different sites, even in the same area. A reliable stratigraphy of complexes in one area cannot be automatically applied to other areas. For example, the change of the Sintashta culture by the Petrovka culture on the settlement of Ustye in the Southern Transurals²⁶, is true only for the eastern zone of Sintashta sites in the steppe Transurals. But it does not say anything about relationship of Sintashta with the Petrovka sites in Kazakhstan or early Alakul sites in the forest-steppe.

The problems of the typological method are similar. In principle, we may build a line of succession of some types, having a logically justified or even reliable their development: A1 – A2 – A3 – A4. We may have a reliable stratigraphic confirmation of the precedence of type A1 to type A2 for a certain area. But we must take into account that the transformation into type A2 could be taken place not after the end of the existence of type A1, but at its very beginning, and these types coexisted for a long time.

As a result, with any approach, we get a very shaky support, and the way out is the simultaneous use of all these methods and taking into account the processes of cultural genesis. Comparison with European materials is extremely promising, especially for Eastern Europe. This is an extremely long and difficult way, and the task of this work is only to outline the general correlation of the cultures of the end of the MBA – the beginning of the LBA in Eastern Europe, the Urals and Northern Kazakhstan in relation, first of all, to the so-called "block of chariot cultures".

2.2. Chronology of complexes with cheekpieces in steppe Eurasia

In fact, the generally accepted sequence "Sintashta – Petrovka – Alakul" reflects the most general trend, but almost simultaneously with Sintashta, the early Alakul (to the northeast in the forest-steppe) and Petrovka (to the east in the steppe) cultures appeared, which is also confirmed by analyses of closed complexes and the latest radiocarbon dates²⁷. At the end of the Sintashta period, Petrovka stereotypes penetrated to the southwest, into the former Sintashta area, and soon Alakul stereotypes widespread everywhere. Thus, most of the Alakul complexes were certainly later than the Petrovka and Sintashta complexes, but some were synchronous. Therefore, even in relatively narrow areas, we may have doubts about the chronology

²⁵ GRIGORIEV 2020b.

²⁶ VINOGRADOV 2013, 68, 71, 135, 423.

²⁷ GRIGORIEV 2016, c. 209; GRIGORIEV *et alii*, 2018, c. 158–175; KRAUSE *et alii* 2019, 61, 62; GRIGORIEV 2021a.

²⁴ BRONK RAMSEY *et alii* 2010; MANNING *et alii* 2016; LIU *et alii* 2020.

of individual sites. So, at the settlement of Ustye in the eastern part of the Sintashta area, the Sintashta tradition is replaced by the Petrovka one. However, this was a smooth evolution on a local basis, which could have been stimulated by contacts with the Petrovka people in the east²⁸. Thus, these complexes, even within the steppe Transurals, could be synchronous with the Sintashta stereotypes that persisted in the western part of the area. We have no real information about this.

The situation with the Sintashta and early Alakul complexes of the steppe Urals is equally ambiguous. V.V. Tkachyov suggests for this region the replacement of late Catacomb complexes by Sintashta, and then by two successive early Alakul stages²⁹. The question of cultural characteristics of these late Catacomb complexes is difficult. O.D. Mochalov believes that they are represented by a mixture of different cultural traditions (Poltavka, Volsk-Lbische, Don-Volga, possibly Sintashta-Potapovka), and R.A. Mimohod considers them as the Volga-Ural post-Catacomb group³⁰. We have already discussed in detail the stratigraphy of the Sintashta burials in this region, and have demonstrated that these post-Catacomb burials were synchronous with the Sintashta ones³¹. But the periodization of the two early Alakul stages (Petrovka and Kulevchi) also raises questions. It is based on the scheme of G.B. Zdanovich, therefore, complexes with inclusions of some Petrovka features are attributed to the first stage³². All of them undoubtedly evolved into Alakul, directly replaced Sintashta, thus being the early Alakul stage of the steppe Urals. However, they are later than the early Alakul sites of the forest-steppe Transurals synchronous to Sintashta. As a result, even the term “early Alakul” can be applied to asynchronous sites. On the other hand, the internal chronology of these two early Alakul stages is questionable. For example, in the complex of Zhaman-Kargala I, 14/2 of the early stage³³, typologically later cheekpieces with a trapezoidal plank and inserted spikes were found. In East-Kuraili I, 11/4, a complex of the second stage (Kulevchi) – a cheekpiece with monolithic spikes and analogues in Sintashta sites³⁴. After the collapse of Sintashta system, both the Petrovka and Alakul groups could have taken part in migrations to the southwest (and it is important to understand in the following discussion of the cheekpieces). Therefore, individual vessels of one type or another do not reflect the chronological difference and do not allow to distinguish the declared stages. Today, we do not have reliable typological and stratigraphic grounds for separating various phases of Sintashta and Petrovka. Only for Alakul, we may discuss sites of the early phase and the classical one (with the Fyodorovka features), but this is applicable only to those complexes that were subject to Fyodorovka influence, therefore this is not a universal sign.

We may speak with relative confidence about the synchronization of Sintashta and post-Catacomb cultures,

but we may not say the same about the Potapovka type³⁵. The Don-Volga steppe and forest-steppe in the Sintashta time were occupied by tribes that left the Don-Volga Babino, late Poltavka and Volsk-Lbische sites, and in the south, to the north of the Caucasus, the Lola sites³⁶. At the same time, it is assumed that in the Volga-Ural region the sites of the Volsk-Lbische type were synchronous not only with the Poltavka, but also with the Abashevo and Middle Don Catacomb cultures³⁷. Farther west, the Babino cultures belong to the synchronous complexes, and on the Don, probably, the late Middle Don Catacomb culture³⁸. In the Volga forest-steppe, to the north and northeast of Samara, there was the area of Abashevo culture. There is an opinion that it was earlier than Sintashta³⁹, but there are no real grounds for attributing Sintashta and Abashevo to different periods⁴⁰. The radiocarbon chronology of the Abashevo culture is based on a limited number of dates made using different techniques, in contrast to many Sintashta dates in the Transurals (more than 100). Abashevo of the Urals, in general, was synchronous with Sintashta, and only for Abashevo of the Middle Volga may we suppose earlier origins around 2128–1959 BC, and its final in 1944–1823 BC, while the Sintashta interval is 1960–1770 BC⁴¹. It is possible that the situation will change with the accumulation of new dates. R.A. Mimohod suggested the formation of Abashevo culture of the Middle Volga simultaneously with the post-Catacomb block under the influence from Central Europe⁴². I agreed with this conclusion, but thought that it was not yet sufficiently worked out in terms of detailed parallels, most of which have too wide chronological frames, although glass-shaped pendants did not appear in Europe earlier than phase A1c, which was simultaneously with the formation of post-Catacomb block and the Sintashta culture⁴³. But it is difficult to reliably judge the chronology on the basis of one type.

The situation is different with the Potapovka type, which in some works is called the Potapovka culture. Often ones synchronize it with Sintashta or even suggest the Sintashta formation on its basis; a chronological horizon is assumed, represented in the Volga region by these monuments, formed on the basis of the Poltavka and Abashevo cultures of the Volga region⁴⁴. Other authors are inclined to associate the appearance of these sites in the Volga region with the Sintashta migration from the Transurals⁴⁵. Unfortunately, these are practically identical monuments in the cultural sense; therefore, it is impossible to determine their relationship by the occurrence of Sintashta materials in the Potapovka complexes and *vice versa*. Stratigraphic correlations are also excluded. In my opinion, even raising the question about the Potapovka type (not to mention culture) was premature.

³⁵ GRIGORIEV 2018a; 2019.

³⁶ MIMOHOD 2018a.

³⁷ VASIL'EV/KUZNETSOV 2000.

³⁸ GRIGORIEV 2006, 195; 2018a; 2019.

³⁹ KUZ'MINA 1999; 2000.

⁴⁰ PROISHOZHDENIE 2010, 194, 195; GRIGORIEV 2018a, 39.

⁴¹ EPIMAHOV 2020.

⁴² MIMOHOD 2018b, 41.

⁴³ GRIGORIEV 2019.

⁴⁴ KUZNETSOV/SEMENOVA 2000, 129, 130.

⁴⁵ OTROSHHENKO 1996; GRIGORIEV 2002.

²⁸ GRIGORIEV *et alii*, 2018, 137, 138.

²⁹ TKACHYOV 2007.

³⁰ MOCHALOV 2010, 246; MIMOHOD 2009–2010, 67–74.

³¹ GRIGORIEV *et alii*, 2018, 144, 145.

³² TKACHYOV 2007, 327–335, Fig. 78.

³³ In fact, it is impossible to date its pottery: it is one undecorated vessel and two sherds with a combed rombic pattern.

³⁴ TKACHYOV 2004, 23, 24.

It is postulated that the Potapovka materials are represented by 100 burials in 12 burial mounds of the Potapovka, Utevkа VI, Lopatino II and Grachevka II cemeteries and one settlement of Barinovka I⁴⁶. However, in reality, only the first two cemeteries can be included in this list, the amount of this material is very small, it can be dated from the final Sintashta phase, and reflects the penetration of the Transural Sintashta people into the Volga region. The Lopatino and Grachevka cemeteries belong to the early Srubnaja culture, and in the Utevkа and Potapovka cemeteries there are many earlier burials of the Yamnaya-Poltavka period. The real number of Potapovka burials is 40 in two cemeteries, as well as several ceramic fragments in the settlement of the Abashevo culture. The ceramics of the Potapovka cemetery contain talc impurities, which is not typical for the Volga region, but typical for the Sintashta culture in the Transurals. Even stone tools were made from the Ural raw materials. Radiocarbon dates are also very unreliable and few in number⁴⁷. Due to the small number of newcomers, their cultural stereotypes had to be quickly blurred in the local environment. Accordingly, these materials reflect a very short period of the penetration of Carpatho-Mycenaean ornaments to the east. Since these ornaments are almost never found in the Sintashta culture, we can synchronize these Volga cemeteries with its final stage and with the Don-Volga Abashevo (Pokrovsk-Abashevo) monuments.

These Potapovka complexes in the Volga region are synchronous with the late Poltavka complexes, while the classical ones preceded them⁴⁸. Thus, we may partly synchronize the latter with the Sintashta culture, although the lower date of the Poltavka culture is noticeably deeper. This is confirmed by the presence of "classical" Poltavka features in the early Alakul and Petrovka ware⁴⁹.

In the Don region, complexes with chariots were preceded by the Middle Don Catacomb, Voronezh and Babino cultures. The Volga-Don Babino culture can be synchronized with the Voronezh culture on the basis of ceramics with mixed features and the presence of ware in the Babino complexes. But the Voronezh ceramics are also found in burials of the Middle Don Catacomb and Dnieper-Don Babino cultures; and it was synchronous with the Middle Volga Abashevo and probably survived until the time of the chariot complex appearance. On the basis of radiocarbon dates, the culture falls within the interval of the 25th–20th centuries BC, and it is assumed that its early stage was partly synchronous with the developed and completely with the late stage of the Middle Don Catacomb culture, and its late stage with the first and second phases of the post-Catacomb block (Babino and Lola)⁵⁰. But radiocarbon dates were obtained from ceramics in the Kiev Laboratory and are not reliable. I assumed that the formation of the culture coincided with the impulse from Central Europe of the A1c period, which led to the formation of the Babino culture, and it is confirmed by the presence of a neck ring made of twisted rod, relatively short spiral beads,

hemispherical plaques⁵¹. But these items may not get into the Voronezh burials at an early stage, it could happen later, in the period of formation of the post-Catacomb cultures. Synchronization of the Sintashta culture with the post-Catacomb culture and, at least with the end of the 2nd stage of the Middle Don Catacomb culture, is also quite consistent with this⁵². Therefore, the earlier position of the Voronezh culture has not yet been proven, but it is obvious that it was synchronous with Sintashta and immediately preceded the appearance of Abashevo monuments in this area, which can be synchronized with the Sintashta burials of the Potapovka and Utevkа cemeteries on the Volga.

The appearance of chariots on the Don may be demonstrated by cheekpieces in the Abashevo monuments, and these complexes contain artifacts decorated in Carpatho-Mycenaean style, therefore they chronologically correspond to those of Potapovka, and were later than Sintashta. Materials that are described as an early stage (for example, Sokolskoye settlement) are extremely scarce here. The most Abashevo monuments in this region were formed as a result of the Sintashta and Abashevo migrations from the east. This relatively late position of these complexes, as well as many cultural features, caused their understanding as Pokrovsk-Abashevo sites, and they replaced the sites of the third stage of the Middle Don Catacomb culture⁵³. It is not excluded that it is these complexes that underlie the formation of the early Srubnaja Pokrovsk sites. In the literature on cheekpieces, they can be called Abashevo or Pokrovsk, which confuses the situation. To avoid this confusion, we will call them Pokrovsk-Abashevo or Don-Volga Abashevo.

Previously, there was a hypothesis that the early Srubnaja Pokrovsk complexes were formed on the basis of Potapovka, and the steppe Berezhnovka complexes on the basis of the Poltavka ones, which explains the Abashevo features characteristic of the Pokrovsk ceramics⁵⁴. The early Srubnaja pottery has many Sintashta features, and the Pokrovsk pottery has indeed some Abashevo features, but to a greater extent they are present in the steppe Pokrovsk ceramics, and these are features of the Don-Volga Abashevo culture⁵⁵. In addition, the Pokrovsk cheekpieces are usually decorated, like the Don-Volga Abashevo cheekpieces⁵⁶. Taking this into account, it can be assumed that the Pokrovsk culture was formed on the basis of the Don Pokrovsk-Abashevo culture. On the Seversky Donets, the Don Pokrovsk-Abashevo sites were quickly replaced by the Pokrovsk sites, and it is difficult to distinguish them⁵⁷. As a result, it is possible that the Pokrovsk stage was very short, and we can synchronize it with the final stage of the Babino culture in Ukraine and with the early Srubnaja complexes formed in the forest-steppe Volga region on the basis of the Sintashta (Potapovka) complexes. At the same time, it is possible that the Pokrovsk complexes, which were forming in the Don-Volga steppe, were synchronous with the

⁴⁶ KUZNETSOV/SEMENOVA 2000, 122.

⁴⁷ See in details GRIGORIEV 2021b.

⁴⁸ MOCHALOV 2008, 139, 140, 165–167, Fig. 51.

⁴⁹ GRIGORIEV 2016.

⁵⁰ MIMOHOV 2019, 121, 127–130; 2020.

⁵¹ GRIGORIEV 2019.

⁵² GRIGORIEV 2018a.

⁵³ SINYUK 1996, 190–210; SINYUK/MATVEEV 2008, 88.

⁵⁴ VASIL'EV/KUZNETSOV/SEMENOVA 1994, 93.

⁵⁵ MOCHALOV 2008, 177, 195, 208, 210, 223.

⁵⁶ MALOV 1999, 248.

⁵⁷ LITVINENKO 1998, 92–97.

Tab. 2. Synchronization of the Eurasian and Carpatho-Danubian cultures and their dates in the chronological system of the Eastern Mediterranean

Reinecke phases/historical dates	Greece	Hungary	Romania	Ukraine	Don	Volga, forest-steppe	Volga, steppe	Western Urals, steppe	Transurals, steppe	Transurals, forest-steppe	Kazakhstan
B1	LH IIA	Koszider	Noua, Monteoru-Campina, Wietenberg	Sabatinovka, Srubnaja	Srubnaja	Suskan	Srubnaja		Alakul	Cherkaskul	
1560	LH I		Monteoru IIb								Alakul
A2c	LH I	Koszider	Hajdúsámson-Apa, Monteoru Ia-IIa, Wietenberg, Mureş	Srubnaja	Pokrovsk	Early Srubnaja	Pokrovsk	Alakul	Alakul, Petrovka	Cherkaskul, Fyodorovka, Alakul	
1600											
A2b	MH III	Otomani-Füzesabony	Monteoru Ic3, Wietenberg, Mureş		Pokrovsk-Abashevo Babino, Voronezh, Post-Catacomb	Potapovka, Abashevo, Post-Catacomb, late Poltavka, Volsk-Lbishe		Sintashta, Post-Catacomb	Petrovka	Seima-Turbino, Alakul	
1650											
A2a	MH IIA		Monteoru Ic3, Mureş, Wietenberg (?)	Babino	Voronezh, Post-Catacomb, late Middle Don Catacomb		Post-Catacomb, Volsk-Lbishe, Poltavka		Sintashta		Petrovka
	MH IB										
A1c	MH IA	Otomani	Wietenberg (?), Monteoru Ic3, Mureş, Costişa		Voronezh, late Middle Don Catacomb	Abashevo, Post-Catacomb, Volsk-Lbishe, Poltavka		Post-Catacomb		Alakul	
1830-1730											

complexes of the Pokrovsk-Abashevo culture preserved in the Don region. Unfortunately, these dynamic processes are very difficult to estimate with radiocarbon dates. But one of the ways is a comparison with the chronology of the Balkan-Danubian region, where complexes with cheekpieces are also present. The most famous of them are the Mycenaean Shaft Graves of the early Late Helladic I period, with which synchronization was carried out. However, an opinion was expressed that in the Carpathians these ornaments have an earlier date than in Mycenae, therefore, in the east, it is not necessary to date them to the LH I period⁵⁸.

Our next question will be the synchronization of the Eurasian complexes with the Balkan-Carpathian and Central European ones (Table 2).

2.3. Comparison of Eurasian and Carpatho-Danubian chronology

Comparison of the Sintashta and Babino materials with the Central European ones made it possible to synchronize the beginning of these cultures with the beginning of the A1c phase. Since the Carpatho-Mycenaean ornaments almost absent in Sintashta, I assumed that Sintashta only survived until the beginning of this phase, but was generally limited to the end of phase A2b⁵⁹. It was assumed that the later complexes (Potapovka, early Srubnaja and Srubnaja) began with the A2c phase, and some of them already belong to the B period, which is close to the time of the Mycenaean Shaft Graves. However, the actual situation is somewhat more complicated.

Rod-shaped cheekpieces existed in the Carpatho-Danubian basin for a long time up to the Hallstatt period. Some of them are associated with the cultures of Věteřov

and Maďarovce, Mureş, Tei, Otomani and Noua⁶⁰. The first two cultures started in the Reinecke's phase A2b. The Mureş culture formed at the end of the EBA – the beginning of the MBA of the Carpathians, its second phase in radiocarbon dates began since 2100 BC, but it existed up to the Koszider horizon. The Tei culture was synchronous with Otomani-Füzesabony and Monteoru. They formed at the beginning of the MBA, dated from 2000 BC, and the Noua culture in AMS dates is placed between 1500 and 1200 BC⁶¹. Disc-shaped cheekpieces in the Carpathians are present in the context of the Monteoru and Wietenberg cultures. The periodization of Moteoru was created by Ion Nestor on the basis of excavations at Sărata Monteoru, where he distinguished successive layers with distinct ceramic styles from the lower layer Ic4 to layer Ib. Currently, the most recent style is IIb. However, the distinction between some of these styles is not very reliable, as is their stratigraphic relationship. Recent work has made it possible to combine these styles into separate packages and obtain a consistent sequence of radiocarbon dates: Ic4 and Ic3 and probably also Ic2, are combined into an early Ic3 package (2200–1800 BC). The next group is styles Ia-IIa (1800–1700 BC), then IIb (1700–1500 BC) and the Campina package (1500–1100 BC) synchronous with the Noua culture closes this grouping⁶². We may assume that the early dates are wrong. In general, they correspond to the Babino and Lola dates proposed by R.A. Mimohod within the 23rd–18th centuries BC⁶³. The latter are formed by the old analyzes of the Kiev laboratory, that gave this interval for Sintashta, which was rejected⁶⁴. In this case, it is indicative that the discussed Monteoru complexes contain those artifacts on

⁶⁰ BOROFFKA 1998, 89–93, 103, 104.

⁶¹ GOGĂLTAN 2015, 54; BĂLAN/QUINN/HODGINS 2016, 79, 80, 87.

⁶² MOTZOI-CHICIDEANU/ŞANDOR-CHICIDEANU 2015; PUSKÁS 2015, 97.

⁶³ MIMOHOĐ 2011, 43, 48.

⁶⁴ EPIMAHOV 2010, 50.

⁵⁸ OTROSHHENKO 1986, 231.

⁵⁹ GRIGORIEV 2019.

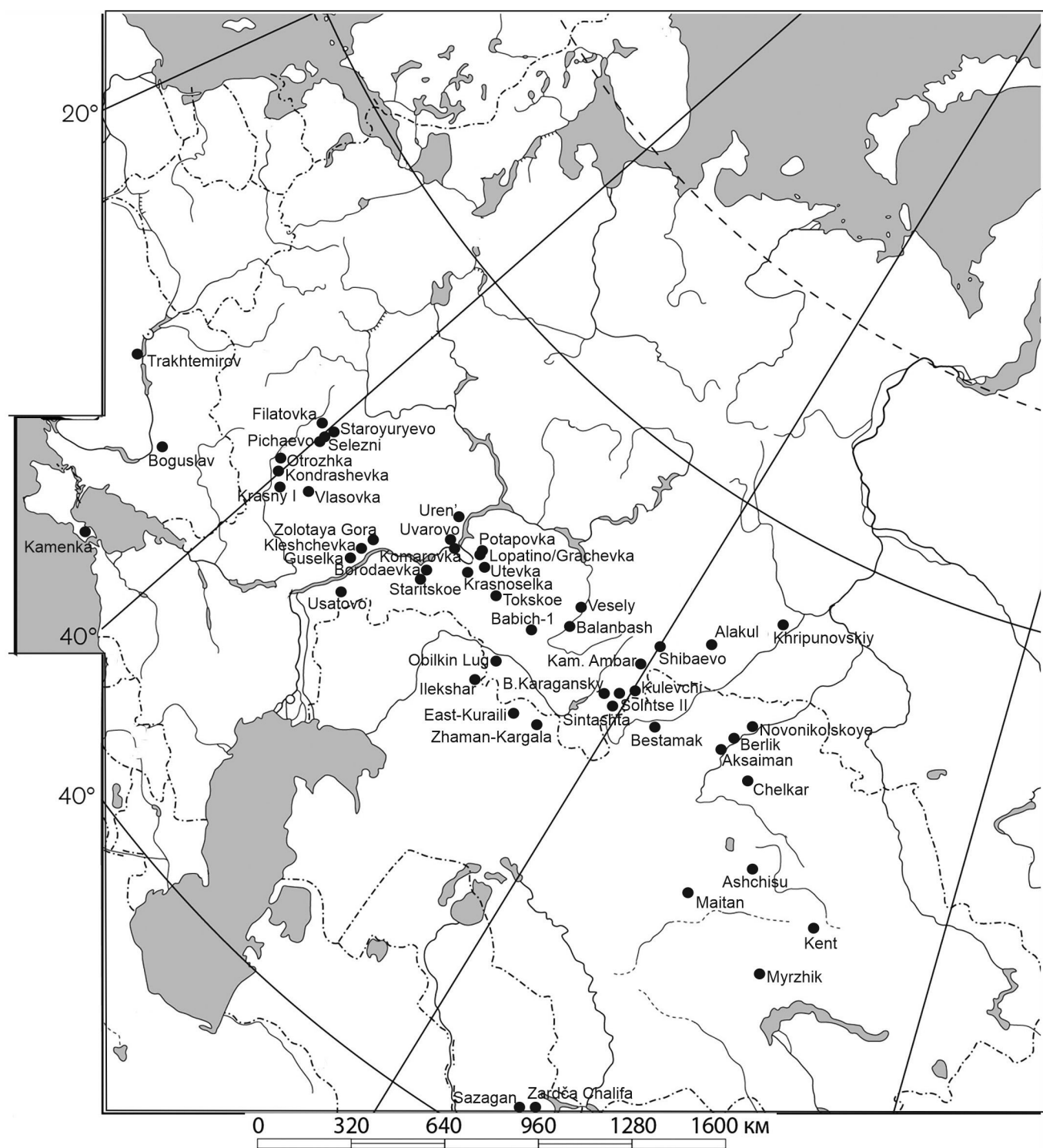


Fig. 1. Map of the archaeological sites of Northern Eurasia mentioned in the text.

which basis the post-Catacomb cultures were synchronized with the Central European ones: *Dentalium* shells, spiral bracelets and rings, faience and bone beads, neck rings with looped ends (Ösenhalsring), one spiral neck ring, perforated disc-shaped bone buckles. As parallels are suggested objects of the Únětice, Otomani-Košťany, Nitra, Unterwölbling, Wieselburg, Wietenberg, Nagyrév, Otomani-Füzesabony, and Babino cultures. In general, these parallels and cultures can be synchronized with the Reinecke's phases A1b and A1c, but the presence of pendants in the form of willow leaf, which

are absent in Babino, is indicative, because in Central Europe their upper date is phase A1b⁶⁵. Therefore, the formation of the early phase of Monteoru somewhat earlier than Babino and other post-Catacomb cultures is quite probable. Nearby, also east of the Carpathians, is the area of the Costișa culture synchronous with the early phase of Monteoru. Contacts of this culture with Monteoru are recorded already at stages Ic4 and Ic3, but then in Romanian Moldova its layers are covered

⁶⁵ MOTZOI-CHICIDEANU/ŞANDOR-CHICIDEANU 2015, 16, 18, 19, 23, 24; GRIGORIEV 2019, Tabl. 1, 2.

by layers of Monteoru Ic2–Ib⁶⁶. The beginning of this culture is dated to 2200–1950 BC. Analysis of the MBA dates of this region made it possible to divide it into three phases, and the MBA I is dated to 2191/2033 – 1878/1733 BC. In the case of using a model with partial overlapping of individual stages, the dates are as follows: MBA I – 2202/2038–1880/1687 BC, MBA II – 1940/1775–1730/1608 BC, MBA III is represented so far by a single date within the interval 1645–1527 BC⁶⁷.

The Monteoru layers Ic4 and Ic3 are synchronous with the early phase of Wietenberg culture, which replaced the EBA cultures and which also has a new periodization with the early (synchronous also to the layers Monteoru Ic2-1, Otomani II, Mureş / Periam Pecica Ib, Hatvan II), classical and late phases. The early phase is dated to the 20th – first half of the 18th centuries BC, although most reliably AMS dates show the interval 1830–1774 BC. The classical Wietenberg phase is synchronized with the Monteoru Ia-IIa and Otomani III, IIIA layers and is dated from the mid-18th century BC until the mid-16th century BC. The late phase corresponds to the Reinecke's B2–C phases and ends between the 16th century BC and the first half of the 15th century BC⁶⁸. Other researchers write about an earlier time, dating the second phase of the culture to 2000/1900–1700/1600 BC, and the third to 1700/1600–1450/1400 BC, but they also synchronize the early Monteoru and the Costișa culture with the I and partly II Wietenberg phases⁶⁹.

To the west of the Carpathians, in the area of the Mureş, Wietenberg, Vatin, and Otomani-Füzesabony cultures, the transition from EBA III to MBA occurred between 2300 and 1950 BC. Thereby, these dates overlap partly the earlier MBA dates discussed above. The MBA I began with the formation of the Mureş and Vatin cultures. This corresponds to the late part of the Central European A1 phase and the beginning of the MH period in Greece. The MBA II and Otomani-Füzesabony culture are marked by metalwork of the Hajdúsámson-Apa horizon, correspond generally to the Central European A2 phase and therefore is dated by the interval 1900–1650 BC, although the last culture may have begun earlier, and the Hajdúsámson-Apa artifacts are present only in the MBA III. The latest AMS dates for these periods from the Pecica-Şanţul Mare settlement showed the following intervals: MBA I – 2000/1900 – ca. 1900 BC, MBA II – between ca. 1900 and ca. 1700 BC, MBA III – ca. 1700 – ca. 1550 BC). The beginning of all the other MBA cultures is close to 2000 BC⁷⁰. But the first features of the Otomani-Füzesabony ceramic style appeared in the period 2200–2000 BC, although its wide distribution falls in the period 1900–1450 BC⁷¹.

Thus, the Carpathian chronology is well balanced, and on this basis we can conclude that the early phase of the Monteoru culture noticeably preceded the early Srubnaja, Don-Volga Abashevo and Potapovka complexes, and was synchronous with the Sintashta culture and the post-Catacomb block, although the Carpathian MBA may start earlier. Significant transformations in the Carpatho-

Danubian basin occurred during the MBA/LBA transition, at the beginning of the Koszider horizon (A2c–B1). At this time, the Hungarian tells are empty. This transition to the LBA occurred around 1600 BC or between 1650 and 1500 BC⁷². In Transylvania (ca. 1600 BC) the III phase of the Wietenberg culture started, which ended in the late 15th century BC with the penetration of the Noua culture⁷³, although there is also an opinion that the latter happened at the turn of the 16th and 15th centuries BC⁷⁴.

3. SYSTEM OF HARNESS AND CHEEKPIECES

The typology of cheekpieces is closely related to their function and method of attachment to the harness (Fig. 2). The spiked cheekpieces served to put more pressure on the horse's cheeks and provide better controlling when turning. As experiments with the reconstructed chariot showed, the main role in controlling the horse was played by the bit, which exerts pressure on the toothless edge of the lower jaw. Metal bits, as in the Near East and Central Asia, were absent in this region, and what they were made of remains a problem. It is generally accepted that they were made of leather. But the horse chewed a bit made of leather in two hours, although this largely depends on the behavior of a particular animal. A rein was attached to the ends of the bit passed through the central hole of the cheekpiece⁷⁵. Accordingly, the bit and the rein are firmly connected elements. It is also assumed that due to the fragility of the leather, bits were made of hair or wool, which retain their properties in wet conditions⁷⁶. But such bits are very fragile⁷⁷. Additional questions arise from

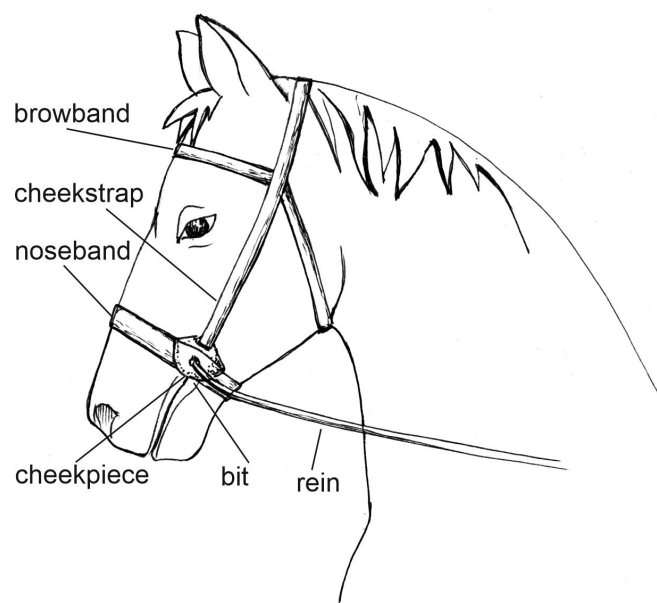


Fig. 2. Horse harness.

⁶⁶ BOLOHAN 2003, 195, 196.

⁶⁷ BOLOHAN/GAFINCUL/STOLERIU 2015, 136.

⁶⁸ BĂLAN/QUINN/HODGINS 2016, 67, 69, 78–80, 82, 87.

⁶⁹ PUSKÁS 2015, 105, 107.

⁷⁰ GOGĂLTAN 2015, 54, 55, 73–76, 78.

⁷¹ TÓTH 2019, 57.

⁷² FISCHL/KISS/KULCSÁR/SZEVEŘÉNYI 2013, 357, 366; GOGĂLTAN 2015, 55.

⁷³ PUSKÁS 2015, 108.

⁷⁴ CIUGUDEAN/QUINN 2015, 156.

⁷⁵ EPIMAHOV/CHECHUSHKOV 2004, 41, 42; BROWNRIGG/DIETZ 2004; BROWNRIGG 2006, 169.

⁷⁶ KUZNETSOV 2004, 31.

⁷⁷ USACHUK 2013, 144.

evidence on the Mycenaean cheekpieces. A bronze pipe with remains of wood was found in their central hole, and a round cap on one side⁷⁸. It is possible that these are fragments of a bit covered with a copper sheet. Unfortunately, these cheekpieces, which are constantly discussed in the literature, have not been studied in detail.

From the results of experimental work, it can be concluded that initially the bridle might not have cheekpieces. Later cheekpieces do not have spikes. This can be explained by two reasons: the use of carts for transportation and ceremonies, rather than as a means of war, and, accordingly, the use of calmer⁷⁹ or better trained⁸⁰ horses. But the cheekpieces were preserved, since their second function is to redistribute the belts of the headstall. It should be noted that it is difficult to get the horse to obey commands by the pressure of harness, and training the horse is critical. The harness was needed, first of all, to give signals to the horse⁸¹. Therefore, cheekpieces could not have a significant effect on the horse, they only helped to transmit a signal from the driver. A cheekpiece from the Kamenny Ambar, which has two sharp spikes, is very indicative. It has no traces of use and it is assumed that it is an imitation of cheekpiece⁸². However, two cheekpieces with the same spikes were found at Oarța de Sus in Romania, in the burial with a horse skeleton⁸³. Therefore, such spikes were not accidental, and probably served to train horses.

For further discussion, it is necessary to touch upon the issues of terminology. Cheekpieces consist of a round or rectangular plate, some have a plank, and on the reverse side there may be monolithic or inserted spikes (Fig. 3). In addition to the central hole, there are additional holes on the periphery of the plate or on the plank, in some instances there is a hole in another plane at the edge. The number of holes and the pattern of their location differ, which reflects different ways of attaching the cheekpiece to the headstall.

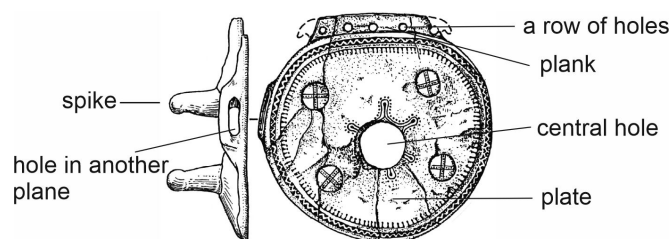


Fig. 3. Basic term for cheekpieces description.

The headstall is a set of belts, consisting of two main elements: cheekstrap and noseband (Fig. 2)⁸⁴. All interpretations of certain elements of the cheekpieces are related to this. The problem is connected with their function

and how they were attached to the headstall. It is the subject of a long debate that has not been finally resolved, despite numerous studies, rare Greek images of cheekpieces (Tiryns, Orchomenos, Mycenae) and the finds of cheekpieces with horse skulls. We can not reliably judge how the cheekpieces were fastened, we do not even know where the plank was directed. The essence of the “90 ° problem” is what was attached to the plank: the cheekstrap or the noseband⁸⁵. There are two opinions. According to A.D. Pryahin and V.I. Besedin, the noseband was attached to the plank, and the cheekstrap was attached to the peripheral holes. The wide planks of the Staroyuryevo cheekpieces served to attach the wide noseband. Three cheekpieces from Eastern Europe have only one peripheral hole: from Utevk VI, Balanbash and Potapovka, and for them it was possible to simultaneously attach both the noseband and the cheekstrap to one hole⁸⁶. It should be noted that the cheekpieces from Utevk and Potapovka are rather late. It can be assumed that the noseband was not used in this case. However, experiments have shown that without it, the horse chews the cheekpiece very quickly, and it becomes unusable. Archaeological cheekpieces do not show such traces⁸⁷.

According to P.F. Kuznetsov, cheekpieces did not combine the function of rigid control and distribution of harness belts, since they could break, and this would make control impossible. They were only needed for stronger control of the horses. The harness belts were interconnected, and the cheekpiece was rigidly attached to the belts⁸⁸. However, we know cheekpieces without spikes, so this point of view is erroneous.

In my opinion, as well as in the opinion of A.N. Usachuk⁸⁹, the most logical way to attach cheekpieces and the evolution of harness was proposed by A.V. Epimahov and I.V. Chechushkov⁹⁰. The main element of the headstall, the cheekstrap, was attached to the plank. In the most archaic cheekpieces without a plank, with straight spikes and two or three holes, only the cheekstrap was attached to these holes, and the bit was passed through the central hole and attached to the rein. In later types, the noseband was attached directly to the spikes, which was the reason for the figured shape of the spikes in Sintashta cheekpieces. With the appearance of the plank, the cheekstrap was attached to it, for which one or two holes in the plank originally served. But this caused a lot of stress on the plank, it could break. Therefore, the next step is the appearance of a row of several holes, through which thin straps were passed, connected to a wider cheekstrap. Under loads, one of these straps could break, which was easy to repair, but the plank remained. The second solution to this problem was lengthening the plank and changing the method of attaching the cheekstrap to the cheekpiece: it was attached to the pins on the elongated plank. The appearance of a hole in another plane marks a change in the method of attaching the noseband: it was not attached to the spikes, but was passed through this hole. In

⁷⁸ KARO 1930, 113.

⁷⁹ CHECHUSHKOV/EPIMAHOV 2010, 201.

⁸⁰ NOVOZHENOV 2012, 240.

⁸¹ BROWNRIGG 2006, 165.

⁸² USACHUK 2013, 34.

⁸³ BOROFFKA 1998, 92.

⁸⁴ PRYAHIN/BESEDIN 1998, 29; EPIMAHOV/CHECHUSHKOV 2004, 41, 42.

⁸⁵ USACHUK, 2010; 2013, 145–152.

⁸⁶ PRYAHIN/BESEDIN 1998, 29–31.

⁸⁷ EPIMAHOV/CHECHUSHKOV 2004, 42.

⁸⁸ KUZNETSOV 2004, 37.

⁸⁹ USACHUK 2013, 152.

⁹⁰ EPIMAHOV/CHECHUSHKOV 2004, 41–43.

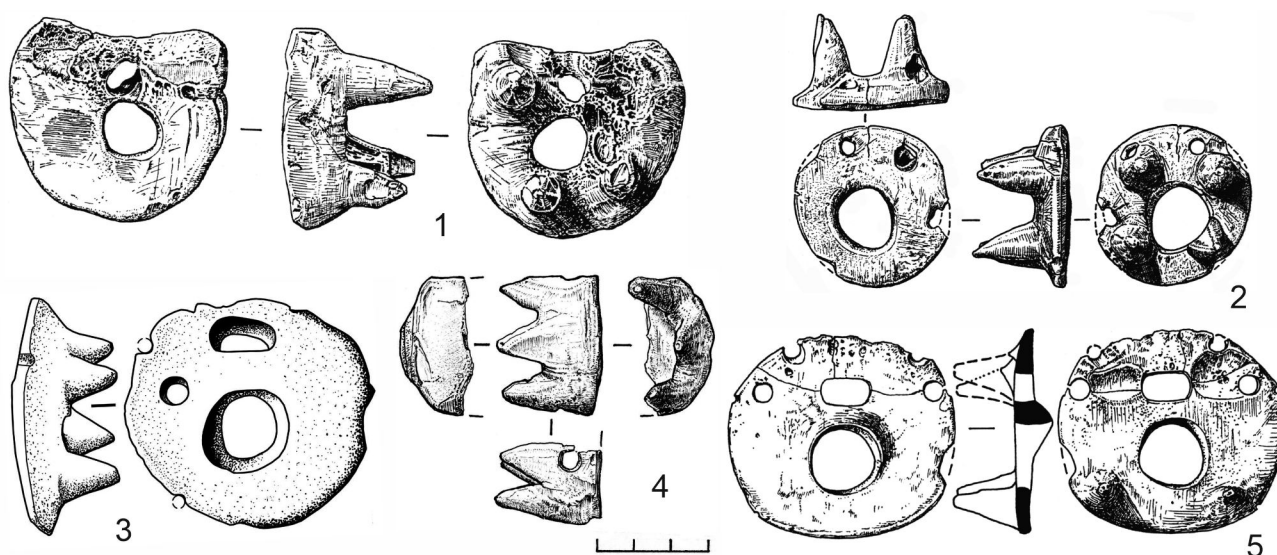


Fig. 4. “Archaic” cheekpieces from the epiphyses of cattle: 1 – Balanbash; 2 – Bashkiria; 3 – Trakhtemirov; 4 – Babich-1; 5 – Kamenka (after 1, 2, 5 – USACHUK, 2013; 3 – CHECHUSHKOV, 2013; 4 – BAKHSHIEV et alii, 2020).

this case, the noseband was easier to regulate. Accordingly, the figured shape of the spikes gradually disappeared. One of the spikes, farthest from the plank, also disappeared, since its role in influencing the horse is less, the main load falls on the spikes located near the plank⁹¹. Then all the spikes disappeared, and the cheekpieces have only one function – the distribution of belts.

4. TYPES OF CHEEKPIECES

4.1. Cheekpieces of steppe and forest-steppe Eurasia

4.1.1. Material and manufacturing process

The material for most disc-shaped cheekpieces was antler. It is more convenient, since a cheekpiece with monolithic spikes can be made from its thicker compact part. The optimal raw material was in the form of double plates, cut from the wide part of the elk antler. For cheekpieces with inserted spikes, it was possible to use only one antler plate or its thinner parts, but it was necessary to increase the plate because of the need for additional holes and the possible weakening of the cheekpiece. A small group of cheekpieces was made from the epiphysis of cattle bones (Balanbash, Kamenka, Sof'ino, Otrozhka, probably Trakhtemirov, Babich-1) (Fig. 4). The shape of these cheekpieces depended on the material, and the craftsman needed to avoid cutting into the cancellous bone. Moreover, in some instances, the location of the peripheral holes is irrelevant. For example, in the cheekpiece from Balanbash, a vascular channel of the bone was used for this. There are rare cheekpieces from mammoth ivory (Aydabul, Kazangulovo). Almost certainly everywhere disc-shaped cheekpieces were also made of

⁹¹ Use-wear analyses also show that these spikes were worked more (USACHUK 2013, 124).

wood, and there are finds of antler spikes and bushings for a wooden cheekpiece in Ureni in the Saratov Volga region (Fig. 5). It was easier to make such a cheekpiece, but it was less convenient. Grooved cheekpieces, on the other hand, were made of splintered bone, and many disc-shaped cheekpieces without spikes or with inserted spikes from a bone plate⁹². The rationale behind the transition to grooved cheekpieces is clear: simplification of production⁹³. Thus, the choice of material depended on the type of cheekpiece. On the other hand, a shortage of the necessary material or the desire for simplicity in production could lead to a type transformation.

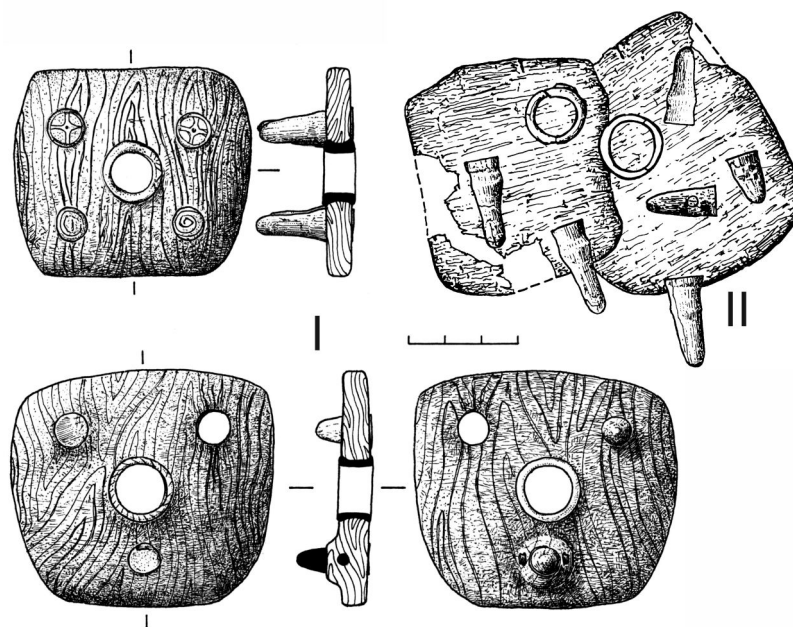


Fig. 5. Cheekpieces with a wooden shield and antler spikes and bushings from Ureni: I – reconstruction, II – location of parts in the excavation (after USACHUK/AFRIKANOV 2011).

⁹² CHECHUSHKOV/EPIMAHOV 2010, USACHUK/YUDIN/AFRIKANOV 2011; USACHUK 2013, 30–32, 106, 120, 125.

⁹³ BOCHKAREV/KUZNETSOV 2010, 322; CHECHUSHKOV/EPIMAHOV 2010, 201.

The manufacture of cheekpieces, especially disc-shaped with monolithic spikes, required many labor-intensive operations: softening raw materials (soaking in organic acids, heat treatment), cutting, planing, drilling, in some cases decorating, grinding with a fine abrasive, polishing, cutting out spikes. This work required professional craftsmen who, for sure, made the harness in general, and possibly the chariots. Most of the techniques were common in all regions, although there are some regional differences between the Don and the Urals. Volga specimens demonstrate a mixture of these two traditions⁹⁴.

4.1.2. Disc-shaped cheekpieces

The most thoughtful work on the cheekpieces of the Transurals and Kazakhstan is the article by I.V. Chechushkov and A.V. Epimahov⁹⁵. In it, statistical processing of the Sintashta, Petrovka and Alakul cheekpieces was carried out. The obvious advantage of this work in comparison with a similar later work by V.S. Bochkarev and P.F. Kuznetsov⁹⁶ is that there is an opportunity to check the conclusions, correlating the discussed signs with a specific complex, positive and negative connections between individual signs have been shown and the whole problem is discussed in the context of functional and socio-cultural changes caused by traditional, technological and spontaneous factors. The identification of two typological nuclei became fundamental: 1) Sintashta, 2) Petrovka and Alakul.

A group of Sintashta cheekpieces is made of antler; the plate is segmental, less often rectangular (Fig. 6). This depended on individual masters and has no chronological or typological significance. The center hole for bit is reinforced. The plank is often trapezoidal (Fig. 6/7,9,10,12). All Sintashta cheekpieces have four monolithic figured spikes. In addition to this classical version, there are "archaic" ones: without a plank, often with straight spikes and two or three peripheral holes (Fig. 6/1–4). This variant is close to the cheekpieces from Trakhtemirov and Balanbash, and it is assumed that it reflects a simple headstall, only with the cheekstrap. There are also deviations, as a cheekpiece from Kamenny Ambar-5 (mound 2, grave 8): it is ornamented, has three spikes, one of which is inserted, there is no reinforced central hole, and the holes on the plank are arranged in a row (Fig. 6/13). Parallels to this cheekpiece are known among the Pokrovsk-Abashevo cheekpieces in the west, and it is a clear borrowing of the tradition⁹⁷. In the same burial, a thin plate with two sharp spikes was found (Fig. 6/15). It also has western parallels in the form of two cheekpieces from Oarța de Sus in Romania⁹⁸.

The common difference of the Petrovka and Alakul cheekpieces from the Sintashta ones is the absence of a ridge around the bit hole. But their number is small, and the variability is higher. Some of the Petrovka cheekpieces are

close to the classical Sintashta ones. But cheekpieces made of bone with a segmental or round plate, a rectangular bit hole, a triangular plank, two⁹⁹ or three spikes, sometimes without spikes, are more typical (Fig. 7/1–3). The cheekpiece from the Ashchisu cemetery in Kazakhstan, discovered with horse burials, has a long plank, and a decorated segmental plate¹⁰⁰ (Fig. 7/7). The third variant is made of split bone (the so-called grooved cheekpieces) (Fig. 7/4).

Alakul cheekpieces are very rare (only 14), made mainly of bone, often have a round plate and ornament, as well as a hole in another plane (Fig. 7/5,6,8–12). There is no reinforced central hole, usually no spikes, or they are inserted. A cheekpiece from Zhaman-Kargala (mound 14, grave 2) in the steppe Urals, is similar to the Sintashta and Petrovka ones, but has a row of small holes on the plate (Fig. 7/6). There is also a small group of cheekpieces without spikes, with an elongated plank (in some instances with pins), a hole in another plane, and ornamentation (Fig. 7/8,9,11). For them exclusively ceremonial use is supposed¹⁰¹. An interesting decorated cheekpiece is found in the Ileksar I cemetery in Kazakhstan (Fig. 7/12), with a side protrusion in the form of a frame and a broken protruding plank¹⁰². A certain analogy to it are the Carpathian cheekpieces from Vatin and Tószeg.

V.S. Bochkarev and P.F. Kuznetsov carried out a statistical analysis of many disc-shaped cheekpieces from South-Eastern Europe to Central Kazakhstan and Central Asia. They took into account 224 examples, 202 of which are located between the Dnieper and the Southern Urals¹⁰³. In general, they confirmed the conclusions drawn from the Transural material by Chechushkov and Epimahov. Statistics on East European cheekpieces and comparison of different groups have become new.

The characteristics of the Pokrovsk group (SG – Pokrovsk-Abashevo) include inserted figured spikes, usually three, ornamentation, a trapezoidal plank, a hole in another plane, and the absence of the reinforced central hole (Fig. 8)¹⁰⁴. Another feature of these cheekpieces, which is probably not so clearly expressed statistically, has not been named: rows of small holes along the plank¹⁰⁵. The hole in another plane is more typical of the Don sites; to the east this feature is less common, but it is present on early Alakul cheekpieces of different types. This tendency clearly correlates with another: a decrease in the number of cheekpieces to the east with a row of small holes along the plank¹⁰⁶. On the cheekpiece from Staroyuryevo (Fig. 8/8), the hole in another plane is made in the form of a protruding frame, which has parallels in the Carpathians, in a cheekpiece from Brad. Some of these cheekpieces do not have this hole (Selezni-2), but the bumps from its broken plank have been preserved¹⁰⁷. One of

⁹⁴ USACHUK 2013, 105–113.

⁹⁵ CHECHUSHKOV/EPIMAHOV 2010. A striking work, without which it is impossible to understand the typology of cheekpieces and details of their construction, is the book by A.N. USACHUK (2013), which discusses the manufacture and use of these objects on the basis of use-wear studies.

⁹⁶ BOCHKAREV/KUZNETSOV 2013.

⁹⁷ CHECHUSHKOV/EPIMAHOV 2010, 201; BOCHKAREV/KUZNETSOV 2013, 63–66.

⁹⁸ BOROFFKA 1998, 92.

⁹⁹ Cheekpieces with two spikes are not very stable. Some specimens have an additional hole on the plate. Therefore, probably all cheekpieces had at least three spikes, one of which was inserted (USACHUK 2013, 129).

¹⁰⁰ USACHUK 2013, Fig. 113.

¹⁰¹ CHECHUSHKOV/EPIMAHOV 2010, 189.

¹⁰² USACHUK 2013, Fig. 93.

¹⁰³ BOCHKAREV/KUZNETSOV 2013.

¹⁰⁴ BOCHKAREV/KUZNETSOV 2013, 68.

¹⁰⁵ PRYAHIN/BESEDIN 1998.

¹⁰⁶ USACHUK 2013, 110, 111, 113.

¹⁰⁷ PRYAHIN/BESEDIN 1998, 26–28, Fig. 2.

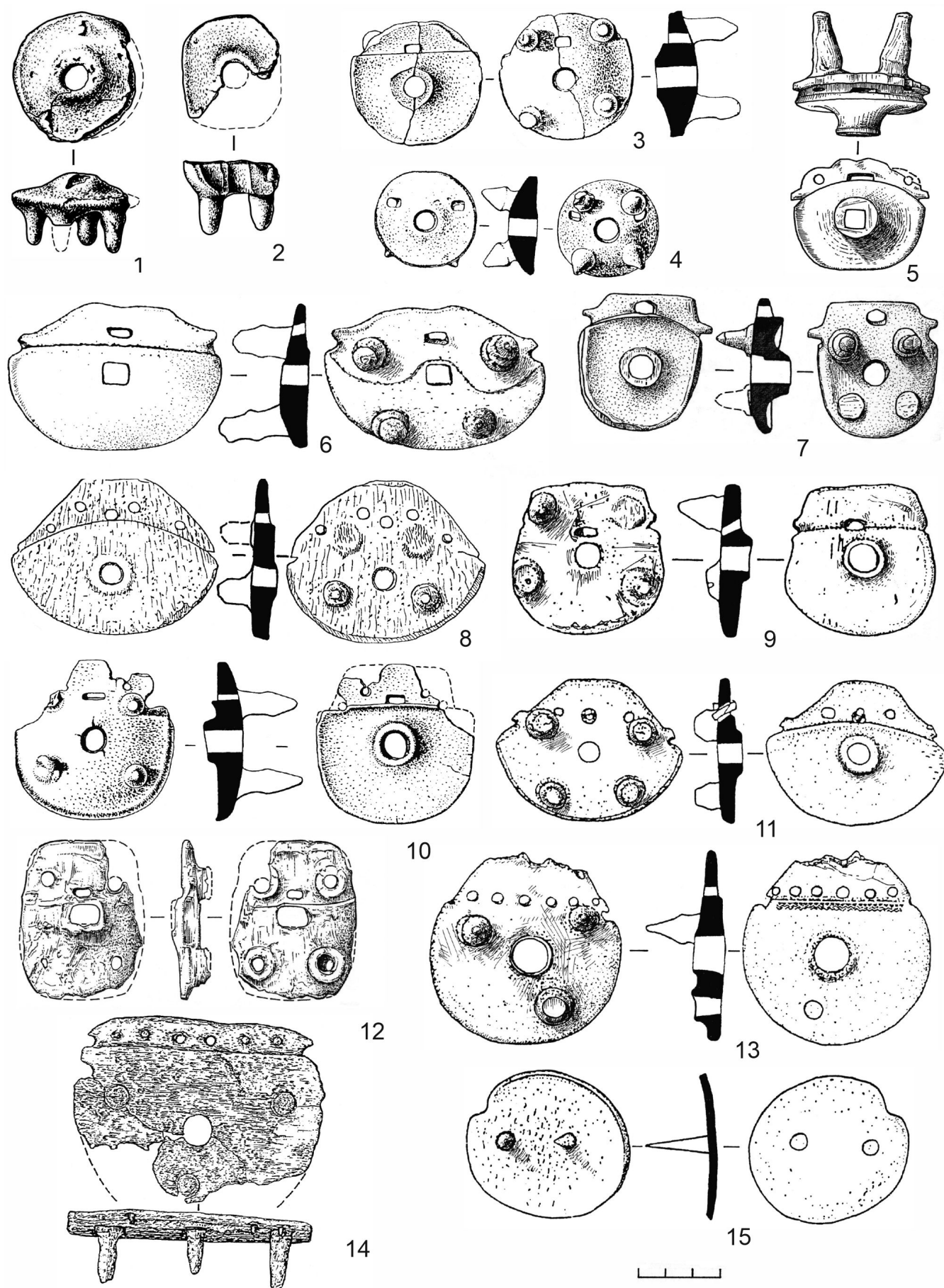


Fig. 6. Cheekpieces of Sintashta culture: 1, 2 – Sintashta, SM, G 5; 3, 10 – CM, G 11; 4 – G 39, – Bolshekaragansky, T 24, G 1; 6 – Kamenny Ambar, T 2, G 6; 7 – Solntse II, T 4, G 1; 8 – Sintashta, SM, G 30; 9 – Kamenny Ambar, T 2, G 5; 11, 13, 15 – Kamenny Ambar, T 2, G 8; 12 – Sintashta, SI, G 14; 14 – Bestamak, G 7. 1, 2 – after GENING et alii, 1992; 3–15 (after USACHUK, 2013).

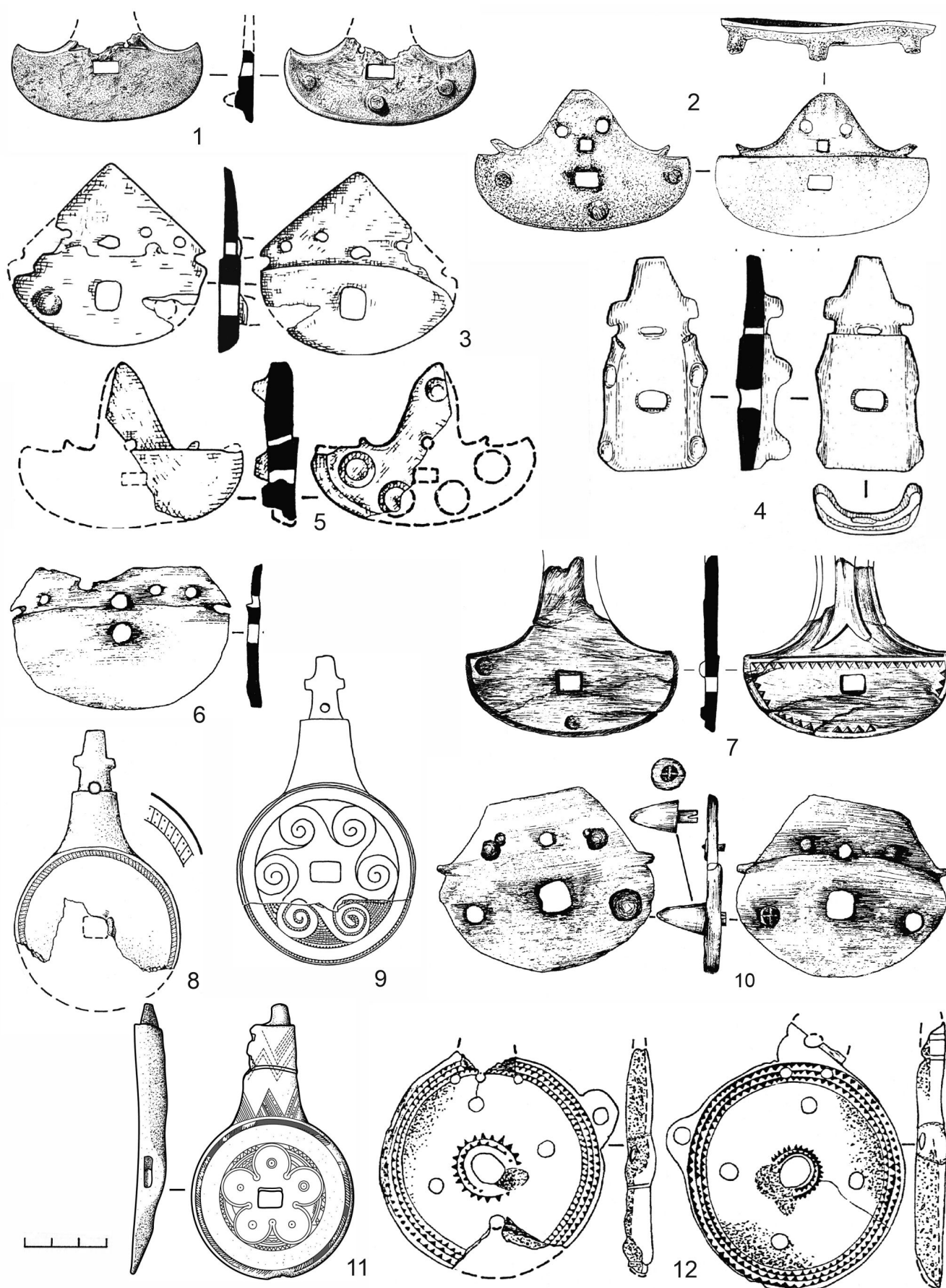


Fig. 7. Cheekpieces of Petrovka (1–4, 7) and Alakul (5,6,8–12) cultures: 1 – Kulevchi III; 2 – Krivoe Ozero, T 1, G 1; 3 – Berlik II, T 10, G 1; 4 – Aksaiman, T 2, G 1; 5, 11 – Novonikolskoye II; 7 – Ashchisu, T 1; 6, 10 – Zhaman-Kargala I, T 14, G 2; 7 8 – Alakul, T 13, G 2; 9 – Shibaevo; 12 – Ilekshar I, T 6, G 3 (after USACHUK 2013; 11 – after CHECHUSHKOV 2013).

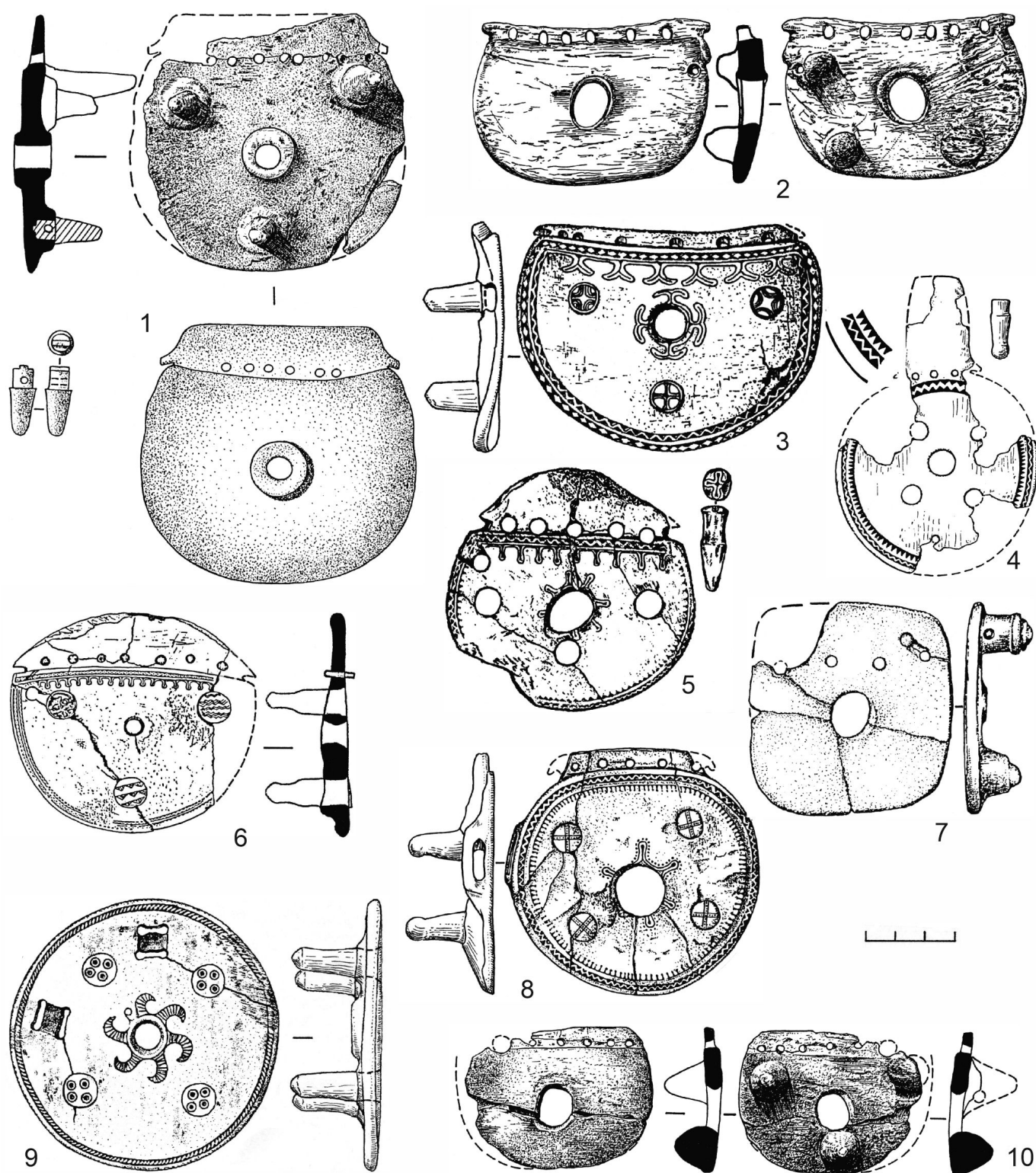


Fig. 8. Pokrovsk-Abashevo cheekpieces on the Don: 1 – Kondrashevka, T1, G 1; 2 – Otrozhka; 3 – Pichaevo, p. 1; 4 – Borodaevka II, T 21, G 1; 5 – Selezni 1, T 1., G 1; 6 – Uvarovo, T 11, G 2; 7 – Filatovka; 8 – Staroyuryevo, T 2, G 2; 9 – Selezni 2, T 1, G 3; 10 – Boguslav (Ukraine) (after USACHUK 2013).

the cheekpieces from the Filatovka kurgan has a rectangular plank and figured monolithic spikes, which makes it similar to the Sintashta cheekpieces (Fig. 8/7). A certain parallel to them is a cheekpiece from the Srubnaja settlement of Boguslav on the Dnieper (Fig. 8/10), with a narrow plank, a row of small holes, and with three monolithic spikes.

Potapovka cheekpieces are very heterogeneous

(Fig. 9/1–4). Some of them are identical to the Sintashta ones; some are close to the Petrovka, Pokrovsk-Abashevo (“Pokrovsk” in the original text) or Alakul cheekpieces. Therefore, these cheekpieces “indicate an intermediate position of the Potapovka group, between the early Srubnaja and Sintashta cultural stereotypes”¹⁰⁸. This conclusion is

¹⁰⁸ BOCHKAREV/KUZNETSOV 2013, 70.

quite consistent with the earlier one that the Potapovka cheekpieces reflect the fusion of two traditions: the Don Abashevo and the Transural¹⁰⁹. The presence of cheekpieces of the “archaic” Sintashta and Staroyuryevo types in one complex (Potapovka 5/8) is indicative. In my opinion, this reflects the formation of Potapovka cheekpieces at a relatively late time on the basis of the Sintashta-Petrovka tradition, but simultaneously with the appearance from the west of the tradition of cheekpieces of the Staroyuryevo type. This also means that the so-called “archaic” cheekpieces existed in the Sintashta culture always.

On this basis, schemes of evolution of disc-shaped cheekpieces were created. Classic Sintashta cheekpieces are a rather monolithic type, which was probably developed for a long time, and it was not a simplified version of the Abashevo cheekpieces. But it is unclear where this type had been created. This is followed by the transformation into Petrovka cheekpieces, which are partly identical to the Sintashta ones, but at later stages the material was changed: antler was replaced by bone. Then, there was the transformation into the Alakul cheekpieces, which have an elongated plank and a hole in another plane. It is assumed that it could have been borrowed from the Srubnaja people, who, in turn, borrowed them from Abashevo. The decrease in the number, and then the disappearance of spikes, was caused by the disappearance of the need to exert greater pressure on the horse. It is assumed that this confirms the line of cultural genesis “Sintashta – Petrovka – Alakul”¹¹⁰. The main point here is that they are a continuation of the Sintashta line of development.

V.S. Bochkarev and P.F. Kuznetsov also consider Sintashta cheekpieces to be the earliest, and admit that their “archaic” type goes back to cheekpieces from the epiphyses of cattle, a sample of which is the cheekpiece from Balanbash¹¹¹. But the earlier date of these “archaic” cheekpieces in comparison to the Sintashta ones is doubtful. The date of the cheekpiece from Trakhtemirov is unclear, the cheekpiece from Kamenka probably belongs to the late Catacomb period, and the cheekpiece from Balanbash is associated with the Ural Abashevo culture. But it is necessary to pay attention to the find of a fragment of similar cheekpiece from the Babich-1 settlement of the Srubnaja culture in Bashkiria (i.e. after Sintashta), also made from the epiphysis of a cattle bone¹¹², as well as all cheekpieces of this group (Fig. 4). Their shape was caused by the material. There are different description of the number of spikes, but use-wear analyses show that originally they had four spikes¹¹³. Therefore, we may assume the long existence of this group of “archaic” cheekpieces. This does not indicate their early chronological position, but only a certain “barbarization” caused by another material. V.S. Bochkarev and P.F. Kuznetsov synchronized the Sintashta cheekpieces with the Potapovka and early Pokrovsk ones (SG – Pokrovsk-Abashevo) and the first stage of their periodization of Eastern Europe. We discussed above that Sintashta preceded the Potapovka and the Don-Volga Abashevo, and the Potapovka

cheekpieces demonstrate a relatively late mixing of the Ural Sintashta and Don Abashevo traditions. Therefore, the fundamental question is the origins of cheekpieces of the Pokrovsk-Abashevo complexes.

In my opinion, the evolution of the Sintashta-Petrovka cheekpieces in the Transurals is quite logical. But the post-Sintashta transformations in Eastern Europe are not obvious. The presence of Sintashta cheekpieces in the Potapovka complex indicates an eastern impulse. But the main innovations in the Pokrovsk-Abashevo cheekpieces are well known: inserted figured spikes, the absence of thickening around the central hole, a hole in another plane, and rich ornamentation. An important feature is the presence of a narrow long plank with a row of small holes¹¹⁴. These are obviously interconnected features, which suggests that cheekpieces with a plank and a row of small holes, as well as inserted spikes, appeared together with ornaments of the Carpatho-Mycenaean type. This connection is also emphasized by the existence of four main patterns of arrangement of individual ornamental motifs, and all of them are adapted specifically for this construction of cheekpieces with a long narrow plank. Ornamentation on grooved cheekpieces is already secondary, being an adaptation of the compositional schemes developed to decorate disc-shaped cheekpieces¹¹⁵. There is also a relationship of these features with cheekpieces without spikes. The graph of positive relationships of signs for the Urals and Kazakhstan shows that the ornamentation of cheekpieces is associated with a round plate, a hole in another plane, the absence of spikes and making of bone, and through these signs with an elongated plank¹¹⁶. Therefore, the roots of this phenomenon were located where there is an earlier presence of these signs on cheekpieces. At the same time, some of these features can be combined with features of eastern origins. An example are cheekpieces from Kleshchevka (Fig. 9/7) and Suvorovo, which have a plank with a row of holes, ornamentation along the edge, as well as monolithic figured spikes and thickening around the central hole, typical for Sintashta cheekpieces¹¹⁷. This shows the mixing in the Volga region of two traditions: Sintashta and Pokrovsk-Abashevo.

There is an opinion that cheekpieces with inserted spikes cannot be considered as later, since such spikes can be present on cheekpieces with monolithic spikes, and cheekpieces of both types are found in the same complexes¹¹⁸. This is indeed the case, for example in Kamenny Ambar-5 8/2, a cheekpiece close to the Don Staroyuryevo cheekpieces, was found in the same complex with the classical Sintashta examples¹¹⁹. Therefore, cheekpieces cannot be used in detailed periodizations, but the coexistence of different types does not mean that they appeared simultaneously, and this reflects some tendencies¹²⁰. There are statements that inserted spikes were already present in the Sintashta culture, and in this case we may assume the origin of the Staroyuryevo type from the

¹⁰⁹ USACHUK 1999; TKACHYOV 2004, 27; PENNER, 2004, 88.

¹¹⁰ CHECHUSHKOV/EPIMAHOV 2010, 202, 203.

¹¹¹ BOCHKAREV/KUZNETSOV 2019a, 161.

¹¹² BASHSHIEV/USACHUK/VERBOVSKIY 2020.

¹¹³ USACHUK 2013, 30, 31, 106, 125.

¹¹⁴ PRYAHIN/BESEDIN 1992, 57; PRYAHIN/BESEDIN 1998; BOCHKAREV/KUZNETSOV 2019a, 162.

¹¹⁵ CHERLENOK 2010; 2019.

¹¹⁶ CHECHUSHKOV/EPIMAHOV 2010, 210, Fig. 5.

¹¹⁷ USACHUK 2013, Fig. 33, 42.

¹¹⁸ PRYAHIN/BESEDIN 1992, 58; PRYAHIN/BESEDIN 1998, 29.

¹¹⁹ CHECHUSHKOV/EPIMAHOV 2010, 201, 202.

¹²⁰ TKACHYOV 2004, 26.

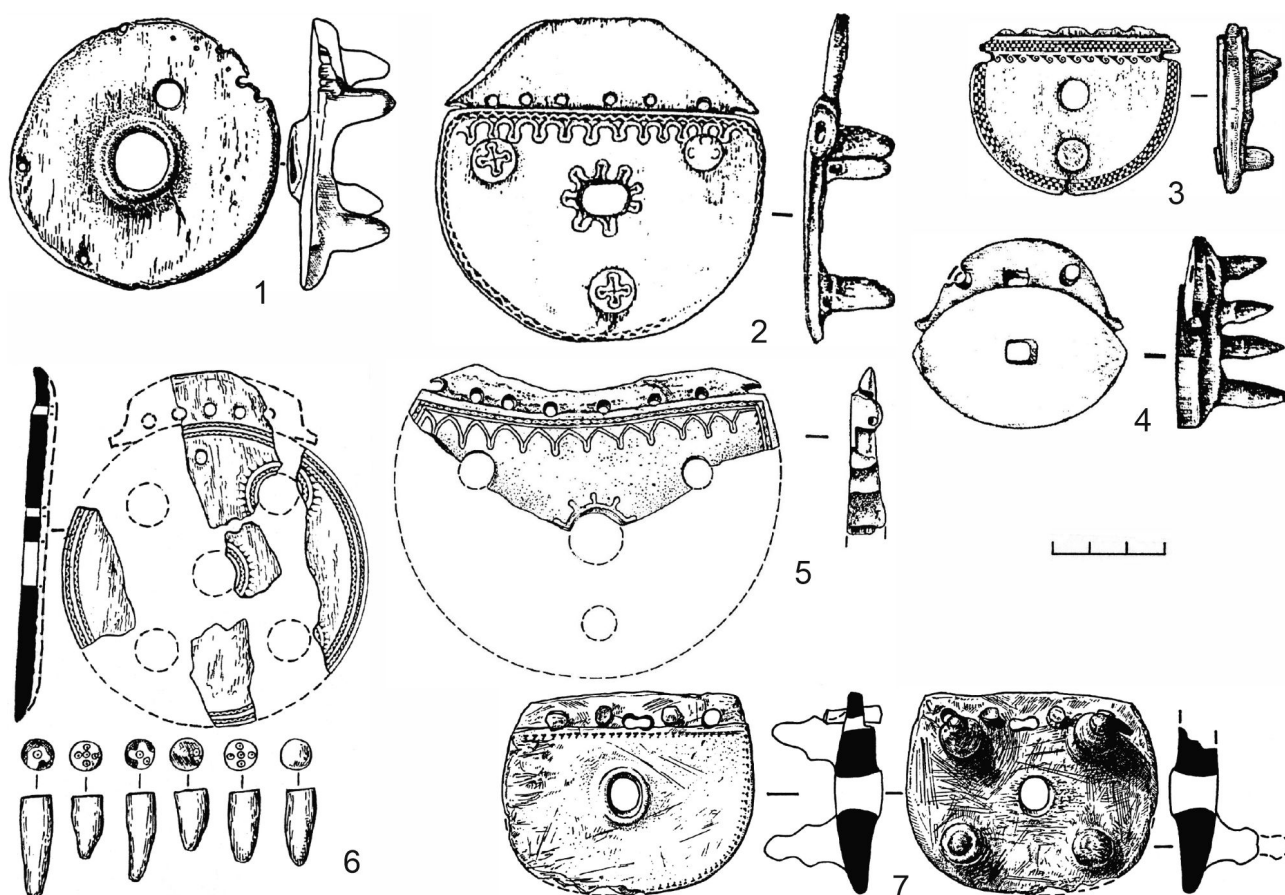


Fig. 9. Cheekpieces of the Volga region (1–4 – Potapovka; 5–7 – Pokrovsk-Abashevo types): 1, 2 – Potapovka, T 5, G 8; 3 – Utevka, T 6, G 5; 4 – Utevka, T 6, G 4; 5 – Krasnoselka, G 1; 6 – Staritskoe; 7 – Kleshchevka; (after USACHUK 2013).

classical Sintashta cheekpieces¹²¹, especially since they have planks and figured spikes. But we are talking about single objects, which cannot be considered as a stable tradition. In general, the inserted spikes mark the post-Sintashta period¹²². We said above that the presence of such a cheekpiece in the Kamenny Ambar cemetery is a sign of western influences. A complex from grave 7 of the Sintashta cemetery of Bestamak in Kazakhstan is indicative. In it a cheekpiece with a triangular plank and an oval plate, and holes for inserted spikes was found. This cheekpiece is close to Petrovka ones. The second cheekpiece of the Staroyuryevo type has three inserted spikes, and a narrow plank with a row of holes (Fig. 6/14). The vessels of this burial belong to Sintashta culture¹²³. This indicates that the penetration of the Staroyuryevo tradition to the east occurred in the period of destruction of the Sintashta system, and the Petrovka and Sintashta traditions coexisted. But it is necessary to understand the roots of the Staroyuryevo tradition, since its connection with the Carpatho-Mycenaean ornaments excludes a possibility of its origin in the Transurals.

The further evolution of the later Pokrovsk cheekpieces in Eastern Europe is close to the evolution of Petrovka ones: wedge-shaped spikes, and an elongated or triangular plank. Later, in the Srubnaja culture, there are features characteristic of the Alakul cheekpieces: an elongated plank and disappearance of spikes. This can be caused by both local development and interaction with eastern traditions.

This evolution cannot be considered in isolation from other types of cheekpieces.

4.1.3. Cheekpieces with features of disc-shaped and rod-shaped ones

In Eastern Europe, a group of cheekpieces has been identified in the Srubnaja culture, combining the features of disc-shaped and rod-shaped cheekpieces. In the Transurals, cheekpieces from Alakul, Shibaev or Novonikolskoye are close to them (Fig. 7/8,9,11). As a rule, they are decorated with ornaments in the Carpatho-Mycenaean style¹²⁴. Probably, this tradition arose in the Carpathians, where there were both disc-shaped and rod-shaped cheekpieces, with which it is difficult to disagree, but the Carpathian cheekpieces are dated basing on eastern analogs of the Late Pokrovsk, Petrovka and Srubnaja-Alakul times¹²⁵, and their more accurate chronological position is discussed below. Taking into account the fact that the Alakul culture started early, theoretically these cheekpieces can be dated to the Sintashta period. However, in Northern Kazakhstan, where the settlement of Novonikolskoye is located, at that time there was area of the Petrovka culture and there is Petrovka layer on this settlement. Therefore, these cheekpieces belong to the post-Sintashta horizon, when the Alakul tradition suppressed the Petrovka tradition in the steppe.

4.1.4. Grooved cheekpieces

¹²¹ TKACHYOV 2004, 27.

¹²² CHECHUSHKOV/EPIMAHOV 2010, 201.

¹²³ KALIEVA/LOGVIN 2009, Fig. 10, 12.

¹²⁴ BOCHKAREV/KUZNETSOV 2019b.

¹²⁵ BOCHKAREV/KUZNETSOV 2013, 72.

Grooved cheekpieces are a specific type (Fig. 10). Previously, they were described as a separate group, but G.B. Zdanovich showed that this is a kind of plate cheekpieces¹²⁶. They are made of a split tubular bone, with spikes carved on the edges, a hole in the center, one or more holes at the end; many samples have lateral holes. There are several their typologies, sometimes with a fractional division into subtypes, based on the shape of the plank, the presence of various holes, spikes and their location¹²⁷. Due to their small number (52), sometimes single cheekpieces fall into subtypes, and an impression of individuality and randomness of some types is created. As a result, the holes on the plank and its shape were recognized as signs not significant for determining the chronological position, in contrast to the spikes. The earliest are cheekpieces with spikes cut at some distance from each other, which is quite logical, since these cheekpieces copy disc-shaped cheekpieces. The later are cheekpieces, in which the spikes are located tightly to each other, and the latest do not have spikes¹²⁸.

In the eastern part of the area, Petrovka cheekpieces of the Aksaiman type (Northern Kazakhstan) and Obilkin Lug (steppe Urals) are attributed to the early group (Fig. 10/1,4). Interestingly, some of these cheekpieces have a plank with pins, which is a relatively late feature. They were replaced by cheekpieces of the Chelkar (with tightly cut spikes) (Fig. 10/3,7), Khripunovskiy and Tokskoe (without spikes) types of the Alakul period (Fig. 10/2). Since the cheekpieces from the Fyodorovka culture burial of the Maitan cemetery in Central Kazakhstan belong to the Chelkar type, V.S. Bochkarev and P.F. Kuznetsov expressed doubt about the attributing this cheekpiece to the Fyodorovka culture, because it contradicts the proposed chronology of this typological transformation¹²⁹. In fact, the Fyodorovka culture appeared much earlier, immediately after the Sintashta culture¹³⁰. The materials of mound 14 from Obilkin Lug are also not unambiguous. The author of the excavations identified it as Sintashta¹³¹. In fact, the pottery of this burial does not contain Petrovka features, but it is not Sintashta either. It is the Alakul pottery of the post-Sintashta time, when the Alakul culture formed in the steppe Urals. Therefore, these cheekpieces can really be considered as early, characteristic of the Petrovka and early Alakul complexes.

In Eastern Europe, cheekpieces of the Novoklyuchevka type of the Pokrovsk period (with spikes set at a distance from each other) are recognized as the earliest ones (Fig. 10/8). It is interesting that some of them (Krasny I) have a row of small holes on the plank, a side hole in a small frame, and Carpatho-Mycenaean ornamentation, thus repeating many details of the Staroyuryevo cheekpieces, and they are present together with disc-shaped cheekpieces. It is significant that other cheekpieces of the early group (Zolotaya Gora I, Vesely and Obilkin Lug) also have a hole in another plane in the form of a protruding loop, which also

served as an additional spike (Fig. 10/4–6,8). The remaining types, Komarovo (with densely set spikes) and Usatovo (without spikes), are occasionally found in the Pokrovsk complexes, but are more characteristic of the Srubnaja and Alakul cultures¹³². Therefore, it is possible to speak strictly about an early position only for the Novoklyuchevka type. The other two coexisted.

Researchers are unanimous on the genesis of grooved cheekpieces. They formed on the basis of disc-shaped cheekpieces with spikes, as suggested by E.E. Kuz'mina¹³³, and the main motive for this was to simplify and reduce the cost of production. Some discrepancies are present only in the ideas about their use: they were most likely used in chariot harness¹³⁴, but their additional use for riding is allowed¹³⁵. In the Krasny I cemetery, a pair of grooved cheekpieces lay with a pair of disc-shaped ones, and there was a burial of a pair of horses nearby¹³⁶. In grave 1 of mound 2 of the Aksaiman cemetery, four grooved cheekpieces and remains of two horses were found¹³⁷. All this clearly reflects the harness for a pair of horses in a chariot or cart. All the methods of making grooved cheekpieces repeat the methods of making disc-shaped cheekpieces, and the traces of use on them are the same as on disc-shaped ones, both with and without spikes. Therefore, this is a continuation of the old tradition, all of them could be used in chariots, although the disc-shaped cheekpieces are more convenient for this¹³⁸. The use of these cheekpieces for riding is possible but not documented anywhere.

Based on all that has been said, the proposed chronology of grooved cheekpieces can be considered as a trend, but it is valid only for cheekpieces with spikes set at a distance from each other. It is significant that cheekpieces from the Petrovka cemetery of Aksaiman in Northern Kazakhstan have pins on an elongated plank, as in some Alakul cheekpieces, and many Eastern European cheekpieces have side holes, a row of small holes on the plank and ornamentation. Moreover, it is typical for the earliest group. All these features bring them closer to the post-Sintashta disc-shaped cheekpieces, when, under the influence of western impulses, such features as an elongated plank with pins, a hole in another plane, and ornamentation appeared. These cheekpieces originally coexisted with disc-shaped ones. Therefore, this simplification may reflect their use in some cases for harnessing horses not to chariots, but to cars with two wheels. They appeared immediately after the end of Sintashta culture. But it is impossible to reliably determine the area of their appearance, since they everywhere reflect the features of local disc-shaped cheekpieces. Probably, one can agree with the opinion about the earlier appearance of these cheekpieces in the east, in the Petrovka culture. In this case, the spread of this tradition to the west reflects, apparently, the same eastern connections, which are manifested in the appearance in the west of disc-shaped cheekpieces with an

¹²⁶ ZDANOVICH 1985.

¹²⁷ HÜTTEL 1981; BOCHKAREV/KUZNETSOV 2010.

¹²⁸ BOCHKAREV/KUZNETSOV 2010.

¹²⁹ BOCHKAREV/KUZNETSOV 2010, 318–321.

¹³⁰ GRIGORIEV 2021a.

¹³¹ DENISOV 2001, 41, Fig. 2/28–31.

¹³² BOCHKAREV/KUZNETSOV 2010, 318–321.

¹³³ KUZ'MINA 1980, 16.

¹³⁴ BOCHKAREV/KUZNETSOV 2010, 311.

¹³⁵ CHECHUSHKOV/EPIMAHOV 2010, 201.

¹³⁶ BOCHKAREV/KUZNETSOV 2010, 319.

¹³⁷ ZDANOVICH 1988, 78.

¹³⁸ USACHUK 2013, 113, 121, 132, 133.

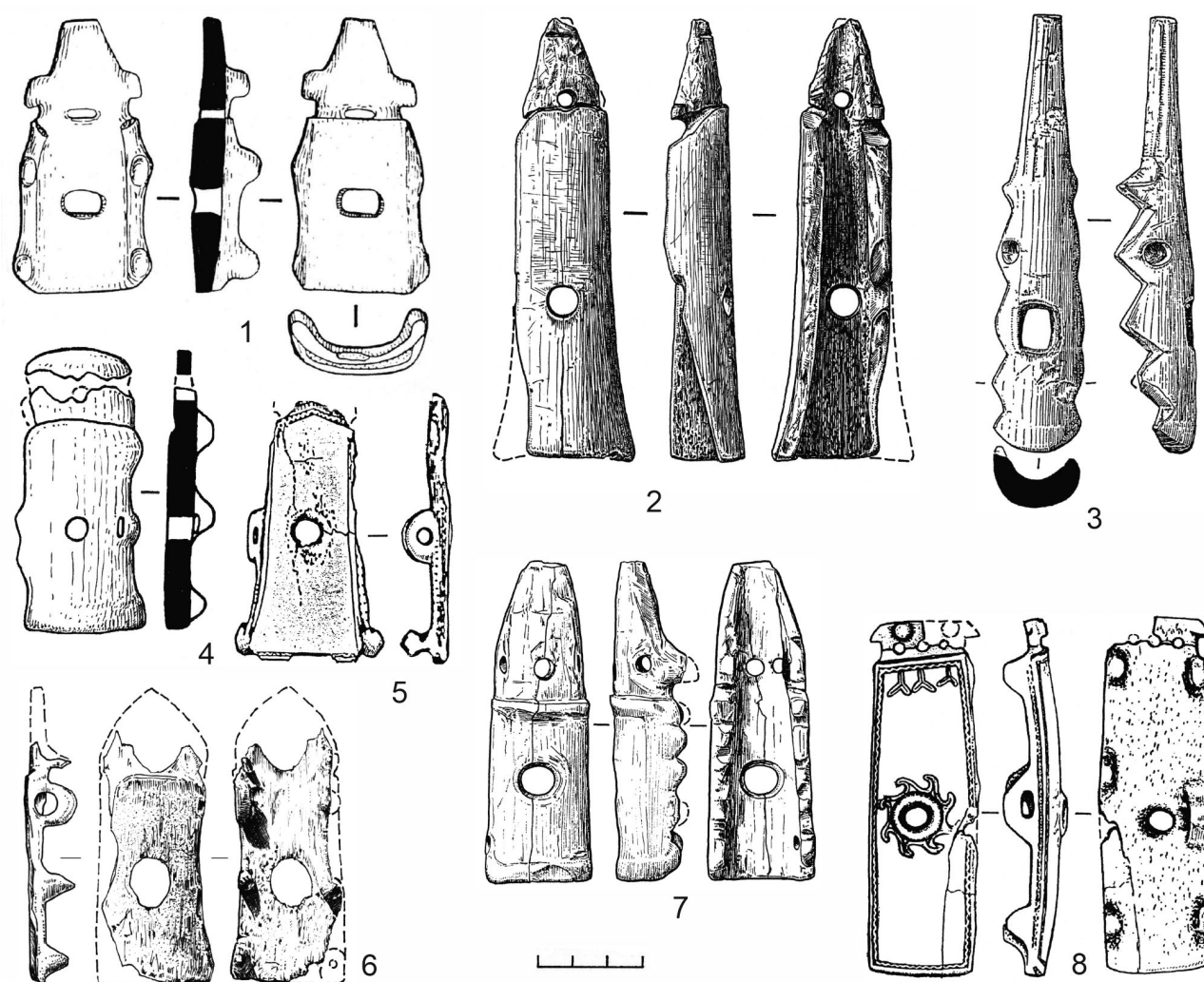


Fig. 10. Grooved cheekpieces: 1 – Aksaiman, T 2, G 1; 2 – Tokskoe; 3 – Chelkar; 4, 6 – Obilkin Lug, T 14, G 1; 5 – Zolotaya Gora, T 1, G 1; 7 – Guselka III; 8 – Krasny I, T 1, G 2 (after USACHUK, 2013).

elongated or triangular plank and simple spikes. In terms of time, these phenomena are close to the end of Sintashta culture.

4.2. Cheekpieces of the Balkan-Carpathian region

4.2.1. Carpatho-Danubian disc-shaped cheekpieces

It is generally believed that in the Carpatho-Danubian Basin, disc-shaped cheekpieces appeared later than in the steppe, and they came from the east¹³⁹. These are rare finds (Fig. 11), and their chronology should be clarified: two disc-shaped cheekpieces are found on the Brad settlement in the Monteoru Ic2-Ia layer (Fig. 12/7,9), but their date is not well defined; one is found in the Cirlomanesti settlement of the Monteoru culture (Fig. 12/5); the fourth was found in the defensive ditch A of the Oarța de Sus settlement of the Wietenberg culture (Fig. 12/6), the ditch contained materials of different stages of this culture; three cheekpieces come from the settlement of Sărata Monteoru (Fig. 12/1,2): two are from the old excavations and only on the basis of ornamentation they are attributed to stage Ic2, and the third from layer Ic3; the date of the cheekpiece from Ulmeni

(fig. 12/3) is unclear¹⁴⁰. Thus, the disc-shaped cheekpieces in this region have a wide date within the existence of the Monteoru and Wietenberg cultures (i.e., throughout the entire MBA), but some belong to layers Monteoru Ic3 and Ic2. A group of cheekpieces of the MBA period was found in Hungary: Tószeg and Tiszafüred, and in the adjacent regions of Serbia: Vatin¹⁴¹.

The features of these cheekpieces are noteworthy. The cheekpiece from Ulmeni (Fig. 12/3) has a simple round plate decorated with a zigzag along the edge, one central and two small peripheral holes, and four simple monolithic spikes. Thus, it is typologically close to archaic Sintashta cheekpieces.

Two cheekpieces from Sărata Monteoru Ic2-Ia have a simple round plate, a large round central hole, two additional peripheral holes, and four simple monolithic spikes (Fig. 12/2). They differ from the archaic version of Sintashta cheekpieces only in the absence of a thickening around the central hole and in the presence of the ornament of rows of small triangles along the periphery of the plate.

The earliest cheekpiece from Sărata Monteoru Ic3 has a segmental plate with three monolithic spikes, a narrow

¹³⁹ BOROFFKA 1998, 114; BOCHKAREV/KUZNETSOV 2019a, 162.

¹⁴⁰ BOROFFKA 1998, 89–94.

¹⁴¹ PENNER 1998, 67.

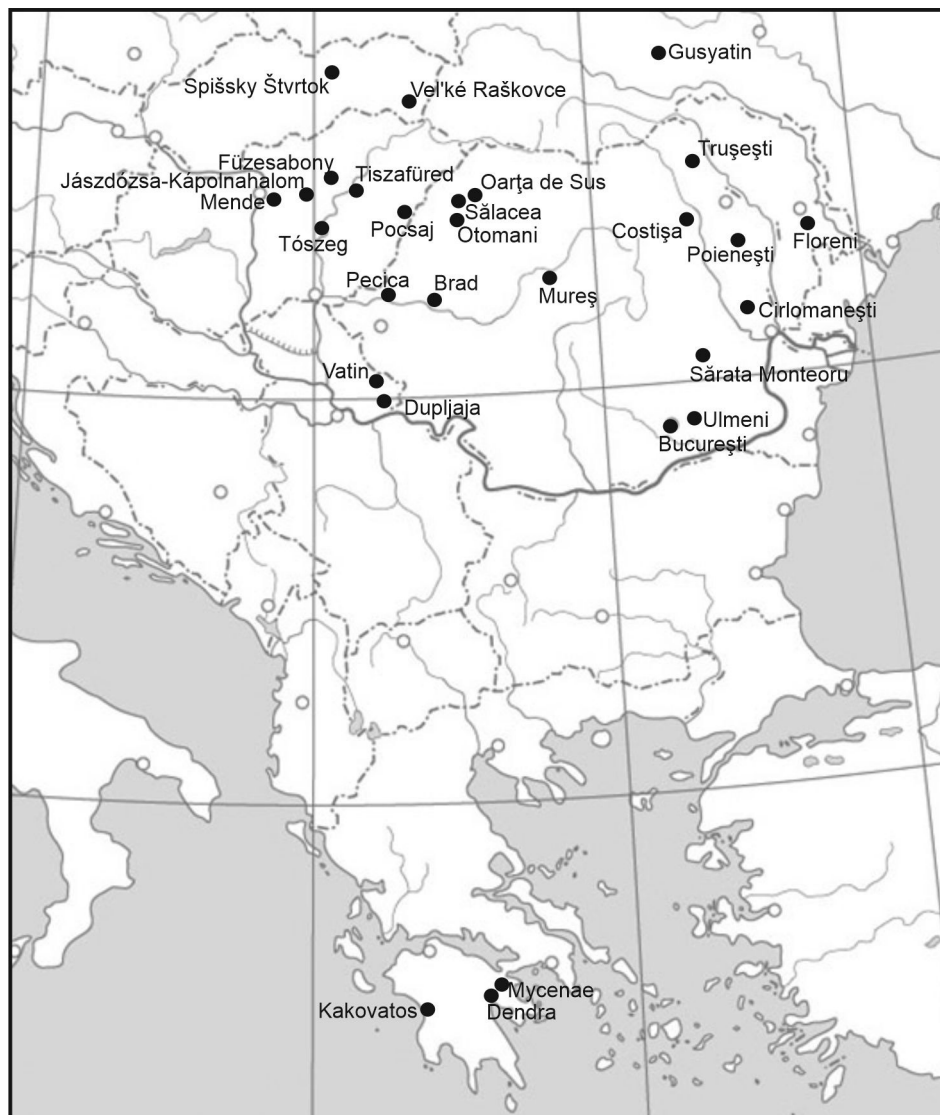


Fig. 11. Sites of the Balkan-Carpathian region mentioned in the text.

long plank, a large central hole; along the plank there is a row of small holes (Fig. 12/1). The cheekpiece was broken and repaired: additional holes were made in the center. There is decoration along the plank. Thus, we see the appearance of the scheme that would later be typical for cheekpieces of the Staroyuryevo type on the Don.

The cheekpiece from Cirlomanesti (Fig. 12/5) has a segmental plate with a central hole and three simple monolithic spikes (one has not survived). The plank is absent, but there is a row of small holes along its straight edge. A wave-like ornament is applied to the disc along these holes. In this case, we also see the emergence of the tradition of the Staroyuryevo scheme.

One cheekpiece of the Brad settlement has a round plate, four small monolithic spikes along the edge of the round plate, and two protruding perforated frames (Fig. 12/7). In fact, this is the design of a hole in another plane, as is the case on some Pokrovsk-Abashevo and Alakul cheekpieces. Moreover, these frames, as in the case of cheekpieces in the east, also performed the function of additional spikes.

The second cheekpiece from the Brad settlement has a round plate without spikes, a thickening around the central

hole, and three small peripheral holes (Fig. 12/9). It has a small ledge with two additional small holes. This cheekpiece is close to two cheekpieces from Hungary: from Tószeg and Tiszafüred, and the cheekpiece from Tószeg has a circular ornament, and it has no holes on the small plank (Fig. 12/4). Therefore, this is a close analogue to the Mycenaean cheekpieces.

A small group of cheekpieces (type 1, variant 4¹⁴²) is represented by simple objects with a round plate without spikes, with a large central hole and two or more holes on the periphery (Vatin, Mende, Spišský Štvrtok). The cheekpiece from Vatin is decorated. It has a hole in another plane in the form of frame and a long triangular plank, which has parallels in the Alakul cheekpieces (Fig. 12/15). Two decorated cheekpieces from Tószeg, in addition to a round plate with a large hole, have an elongated plank with pins (Fig. 12/13,14), which also has analogies in the Alakul culture.

Finally, two cheekpieces (Fig. 12/6) from the Oarţa de Sus settlement have a trapezoidal plate with a large central hole, two long oval holes at two corners of the wider part, and four holes on the plate, one of which retains a small sharp spike. This is probably the

only case of inserted spikes in the Carpathian cheekpieces. An analogy of this cheekpiece is one of the cheekpieces from Kamenny Ambar.

Thus, because of the small number of these cheekpieces, they do not form distinct groups. But they contain features of two different eastern traditions. There are close analogs to the Sintashta cheekpieces of the "archaic" group (simple monolithic spikes on a round plate without a plank), and there are features that appeared on the Pokrovsk-Abashevo cheekpieces: three spikes, inserted spikes, a row of small holes along the edge, in one case on a long decorated plank, a hole in another plane. The similarity of cheekpieces with a plank in the Carpathians and on the Don was pointed out by E.E. Kuz'mina¹⁴³, therefore, the issue of chronology is fundamental. It is important in this case that the features of the "archaic" Sintashta cheekpieces and many of the later Staroyuryevo cheekpieces were synchronous in the Carpathians with the Sintashta culture and preceded the Pokrovsk-Abashevo and Potapovka cheekpieces. Cheekpieces with an elongated plank and pins are also dated in this

¹⁴² after PENNER, 1998, Abb. 8.

¹⁴³ KUZ'MINA 1980, 9.

region earlier than in the Alakul culture. Some features of the Carpatho-Danubian cheekpieces have parallels in the Mycenaean ones: a small projection on the edge, one central and two or three lateral holes, three monolithic spikes.

There is also a small group of specific Y-shaped antler cheekpieces in the Carpatho-Danubian basin (Jászdózsakápolnahalom, Tószeg and Tiszafüred), Poland (Miechow) and Anatolia (Alaca Hüyük)¹⁴⁴. They have no analogues in the east.

4.2.2. Carpatho-Danubian rod-shaped cheekpieces

The rod-shaped cheekpieces of the Carpathians reflect another type of harness, but they could well have been used for harnessing chariots. A burial near Gusyatin in the Ternopil region of Ukraine is significant, where three rod-shaped cheekpieces with pins and Carpatho-Mycenaean ornaments were found in a large grave with a pair of horse, from which a conclusion is drawn that this type of cheekpiece was used for chariot harness¹⁴⁵. Rod-shaped cheekpieces are present in some Egyptian and Assyrian chariot depictions¹⁴⁶. In the Carpatho-Danubian region, this type of cheekpieces appeared in the late 3rd – early 2nd millennium BC simultaneously with the disc-shaped cheekpieces in the steppe, then spread to the east and gradually replaced disc-shaped cheekpieces¹⁴⁷. Most of the rod-shaped cheekpieces in the Carpathians belong to the late Noua culture. But there are also early examples. First of all, it is a decorated cheekpiece from Sărata Monteoru Ic3 (Fig. 12/16). It is noteworthy that a disc-shaped cheekpiece was also found in the same layer. On the same site, in grave 35 of cemetery II (layer Ia), two identical cheekpieces with a Carpatho-Mycenaean wave ornament were found. Finally, two cheekpieces (one with pins) have been found in the Pecica settlement (Fig. 12/10,12), probably in the layer of Mureş culture¹⁴⁸. Therefore, rod-shaped cheekpieces did indeed appear at the same time as the disc-shaped cheekpieces, and both types coexisted in Monteoru.

V.S. Bochkarev and P.F. Kuznetsov agree with the opinion of N. Boroffka (going back further to H.-G. Hüttel)¹⁴⁹ that the disc-shaped cheekpieces of the Eurasian steppes appeared simultaneously with the rod-shaped cheekpieces of the Carpathian Basin in the late 3rd – early 2nd millennium BC. After the penetration of the tradition of disc-shaped cheekpieces from the east into the Carpathians, a new type of cheekpieces appeared there, combining a plate with an elongated plank, often having pins at the ends, which initially appeared on the rod-shaped specimens. And these cheekpieces appeared in the Eurasian steppe¹⁵⁰. But there could be no penetration into the Carpathians, the disc-shaped cheekpieces already existed there. There is also an opinion that the appearance of chariots, rod-shaped cheekpieces and horse burials was stimulated by impulses from the Volga-Ural region¹⁵¹, but there were no such cheekpieces in the east in this period.

¹⁴⁴ PRZYBYŁA 2020, 117, 121.

¹⁴⁵ BOCHKAREV/KUZNETSOV 2019b, 51, 72.

¹⁴⁶ LITTAUER/CROUWEL, 1979, 86; NOVOZHENOV 2012, 240.

¹⁴⁷ BOCHKAREV/KUZNETSOV 2010, 292, 293; 2019, 50–52; 2019a, 11.

¹⁴⁸ BOROFFKA 1998, 92, 93.

¹⁴⁹ HÜTTEL 1981; BOROFFKA 1998.

¹⁵⁰ BOCHKAREV/KUZNETSOV 2019.

¹⁵¹ PRZYBYŁA 2020, 131.

Since the type of cheekpiece depends on the type of harness, and the latter depends on the specific tradition of using horses, the spread of new types must have their bearers. This is a rather complicated process, and it is very likely that this new type of disc-shaped cheekpieces with an elongated plank and pins, some rod-shaped cheekpieces and Carpatho-Mycenaean ornaments spread eastward at a close time. If we turn to a specific context, then rod-shaped cheekpieces appeared in the last phase of the EBA of the Carpathians and existed in Hallstatt time. Cheekpieces of type Ib, as in the early Srubnaja cemetery of Lopatino, are present in the context of Věteřov and Maďarovce cultures, which allows them to be correlated with the A2b–c periods. But pins on some of them appeared almost immediately (type IVa). Some cheekpieces with pins are associated with the Noua culture (Calafindești, Coroteni, Floreni, Girbovăș, Poienești), and some come from an undefined context (Floreni). The cheekpiece from Pecica belongs to the Mureş culture, the cheekpiece from București to stages II – IV of the Tei culture, and the cheekpiece from Sălăcea belongs to stage II of the Otomani culture. Many cheekpieces of this type are decorated (Poienești, Floreni, Girbovăș, Sălăcea)¹⁵².

The Mureş culture existed for a long time from the end of the EBA to the Koszider horizon, but we do not know with what phase this cheekpiece is associated. The same situation is with the cheekpiece from București, since the Tei culture was synchronous with Otomani-Füzesabony and Monteoru. Accordingly, we have the same wide interval of possibilities between the 20th and 16th centuries BC. The cheekpiece from Sălăcea is, apparently, the earliest, since the II stage of Otomani culture was synchronous with the early phase of Wietenberg culture, the Hatvan II period and Monteoru Ic2-1, which in the AMS dates corresponds to the first quarter of the 2nd millennium BC¹⁵³. Therefore, if we assume that the appearance of the Lopatino cheekpiece of type Ib is associated with the same process of penetration to the east of disc-shaped cheekpieces with an elongated plank and pins, then this could have happened not earlier than phase A2b of Central Europe, but the upper boundary remains unclear.

The cheekpiece from Trușești (Fig. 12/8) has a disc-shaped plate and a rod-shaped plank with pins, but its date is unclear too¹⁵⁴. Two cheekpieces from Tószeg with a round plate and a central hole also have rod-shaped plank with pins. A feature of these cheekpieces is circular ornamentation. They belong the MBA, but it is difficult to determine the exact date. In principle, these specimens are close to the Alakul cheekpieces from Alakul, Shibaev, Novonikolskoye and Ilekshar.

Thus, in the Carpatho-Danubian basin from the beginning of the 2nd millennium BC, rod-shaped and disc-shaped cheekpieces with spikes appeared. It was synchronous with the Sintashta culture formation. From the beginning, some rod-shaped cheekpieces have pins, which indicates the existence of two different types of harness and the use of horses for different purposes. The appearance of a combination of disc-shaped and rod-shaped cheekpieces

¹⁵² BOROFFKA 1998, 89–93, 103, 104.

¹⁵³ GOGĂLTAN 2015, 54; BĂLAN/QUINN/HODGINS 2016, 79, 80, 87.

¹⁵⁴ BOROFFKA 1998, 94.

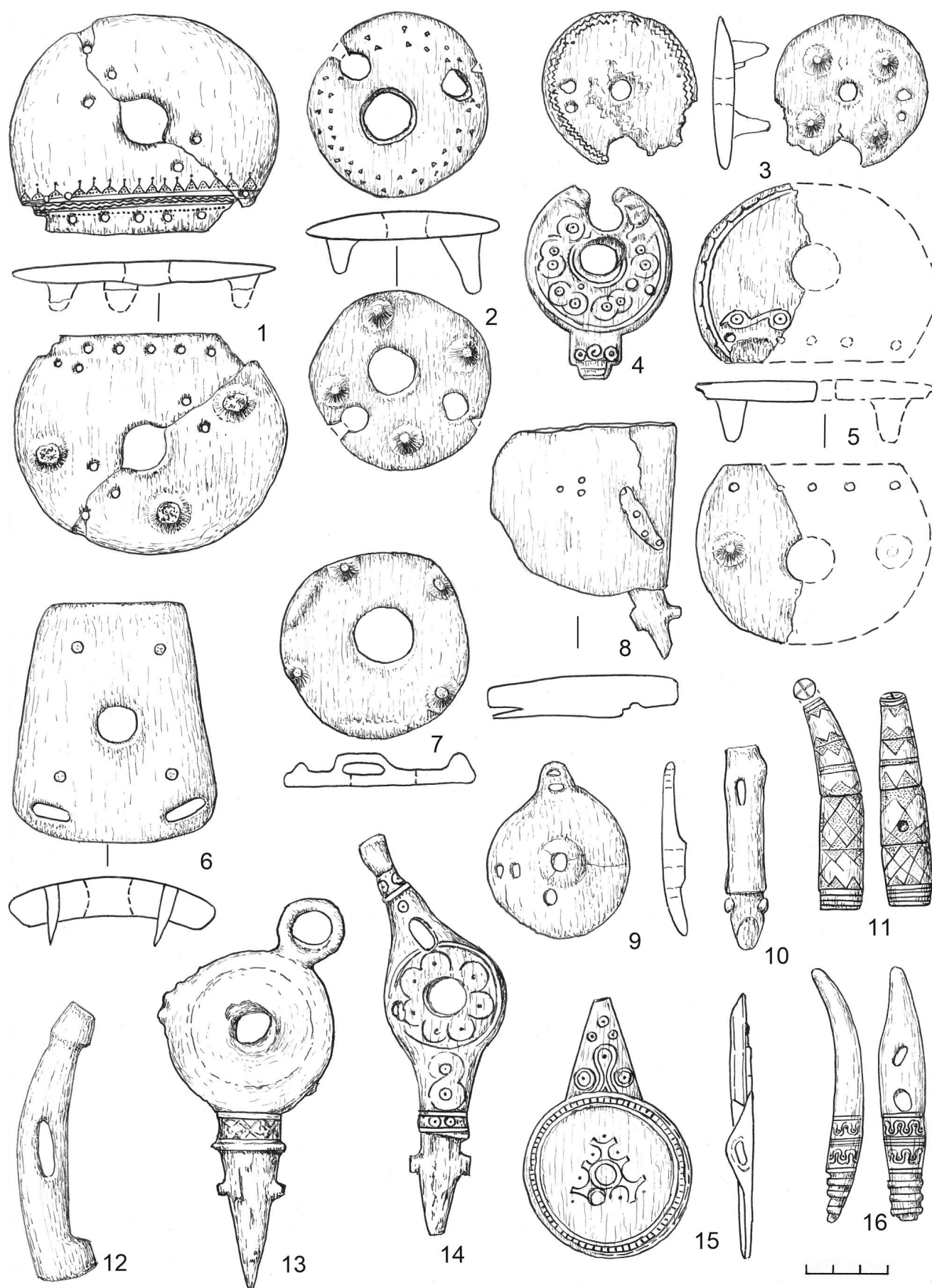


Fig. 12. Cheekpieces of the Carpatho-Danubian basin: 1, 2, 11, 16 – Sărata Monteoru; 3 – Ulmeni; 4, 13, 14 – Tószeg; 5 – Tószeg; 5 – Cirlomanesti; 6 – Oarța de Sus; 7, 9 – Brad; 8 – Trușești; 10, 12 – Pecica; 15 – Vatin (1–3, 5–12, 16 – after BOROFFKA 1998; 4, 13–15 – BOCHKAREV/KUZNETSOV 2013).

(disc-shaped cheekpieces with an elongated plank with pins) was later, but this was earlier than similar Alakul specimens. Likewise, in the early context, there are planks with a row of small holes, a hole in another plane, including in the form of a frame that also had the function of spikes, ornaments on cheekpieces. A possible analogy is the thin cheekpieces with sharp inserted spikes from Oarța de Sus and Kamenny Ambar. All these innovations appeared in the east at the same time – the final phase of Sintashta culture, the Pokrovsk-Abashevo, Petrovka and early Alakul complexes. Their joint appearance indicates some kind of impulse from the west during the A2b period of Central European chronology.

4.2.3. Mycenaean chariots and cheekpieces

The mechanism of the appearance of chariots in Mycenae is a long debated issue. The idea of their coming from steppe Eurasia is well established. The first list of parallels with the steppe was proposed by Penner, where she included chariots, cheekpieces, bows and arrows, spearheads with open socket and ornaments that, in her opinion, go back to Abashevo or Carpathian ornaments¹⁵⁵. In fact, most of the parallels she proposed are not accurate, in particular the bow and arrows. The spearheads with open socket were widespread at this time in the Near East. In any case, the Mycenaean spearheads with a narrow blade have the Eastern Mediterranean parallels, which Penner noted, although she believed that they came to Mycenae through the steppe¹⁵⁶. As a result, even researchers who consider people buried in the Shaft Graves as the local elite admitted that they had connections with the north, since broad relations were generally characteristic of Mycenae, and these graves contain many artifacts of foreign origins¹⁵⁷.

The most extensive list of parallels between Mycenae and the steppe was proposed by J. Makkay, who believed that the Mycenaean rulers were Iranians who invaded the Greek environment that already existed in the south of the Balkans, and they were quickly assimilated by the Greeks¹⁵⁸. Makkay gave an extensive list of parallels between the Shaft Graves and the steppe. But these parallels are either too early of the Kemi-Oba and Yamnaya periods of the steppe Late Eneolithic and EBA (contracted burials, vertical stones around the mounds, steles, mats, a vessel with ocher, ornaments from boar tusks), or too wide (several burials under the mound, sacrificial animals, bow and arrows, spearheads with the open socket; rings with spiral ends and copper diadems), or dubious (clay masks of Catacomb burials and golden masks of Mycenae, comparison of animal images with the steppe animal style that appeared in the steppe only in Scythian time, the use of drugs by the Greeks, as well as by the Scythians). The cheekpieces are the only relatively reliable parallel¹⁵⁹. Some parallels (for example, bone details of whips or sceptres with carved Carpatho-Mycenaean ornaments) were found in the steppe in the later Srubnaya complexes¹⁶⁰. They have broader parallels

and can be discussed only in the context of origins of this ornamental style. But this style is also indicated as a steppe parallel¹⁶¹. The idea that the earliest chariots are Sintashta ones is based on the use of radiocarbon dates for them, and historical dates for the Mycenaean complexes¹⁶². In reality, in the Mycenaean complexes there is nothing comparable to the steppe ones. Therefore, cheekpieces remain the only problem for the discussion.

Mycenaean cheekpieces are represented by 11 specimens and are very diverse. There is a point of view about the eastern origin of cheekpieces from the IV Shaft Grave of Circle A¹⁶³. According to the statistical analysis, some Mycenaean cheekpieces have been placed in the Sintashta, Petrovka, Alakul and Pokrovsk correlation fields, therefore, they are considered as borrowed from the steppe. The similarity with some Carpathian cheekpieces suggested that this borrowing was carried out through the Carpathians. It was a fusion of Eastern European, Carpatho-Danubian and local traditions¹⁶⁴. Unfortunately, there is no description of how we can make these comparisons.

The most comparable with the Eurasian cheekpieces are four cheekpieces from Grave IV of Circle A (Fig. 13/1–4), assigned by Penner to variant 1 of type 1, and the rest are attributed to variant 3 of type 1¹⁶⁵. This second group consists of ivory cheekpieces from tholos A at Kakovatos, the House of Shields at Mycenae (Fig. 13/5), and bronze cheekpieces: a pair from tomb 81 and one from tomb 15 (?) at Mycenae. The same group includes a terracotta cheekpiece found behind the western wall of the citadel of Mycenae, and a fragment of bone cheekpiece from Tomb 7 at Dendra. These cheekpieces have a round plate with two holes and four inserted spikes, and they do not have strong parallels in the east. Moreover, they all belong to the late time: LH II, III. This was a local development of the harness in Mycenaean Greece, which is not relevant to the problem under discussion, and the use of this group of cheekpieces in these statistics is perplexing, since it casts doubt on the reliability of the entire statistical procedure.

However, the number of these finds is so insignificant that we can avoid statistics. The cheekpieces of the Shaft Graves have a round plate without plank, one large round central hole, one oval, and one or two small peripheral holes. The front surface is decorated in the Carpatho-Mycenaean style, and on the reverse side there are three monolithic spikes of a simple triangular shape. Closest analogies to them are cheekpieces from Trakhtemirov, Kamenka, Balanbash and a group of “archaic” Sintashta cheekpieces. This has always been the basis for the hypothesis about the penetration of this tradition into Mycenae from the steppe. But in the east, all cheekpieces of this type have four spikes. The reduction in the number of spikes occurred on Petrovka cheekpieces and on Staroyuryevo cheekpieces with inserted spikes. Thus, these parallels are inaccurate. Even if we ignore this detail, there is a chronological problem, since the end of Sintashta noticeably predates the beginning of LH I. Moreover, “archaic” Sintashta cheekpieces are not a reliable parallel.

¹⁵⁵ PENNER 1998, 70, 178, 188–193, 210.

¹⁵⁶ PENNER 1998, 209, 210.

¹⁵⁷ HARDING 2005, 298.

¹⁵⁸ MAKKAY 2000, 14, 16, 60, 62.

¹⁵⁹ MAKKAY 2000, 18–47, 54.

¹⁶⁰ MAKKAY 2000, 48, 49.

¹⁶¹ MAKKAY 2000, 56.

¹⁶² MAKKAY 2000, 57.

¹⁶³ PENNER 1998, 41.

¹⁶⁴ BOCHKAREV/KUZNETSOV 2013, 72, 73; 2019a, c. 162.

¹⁶⁵ KARO 1930, 113; PENNER 1998, 41, 48–52, Taf. 1, 6, 7.

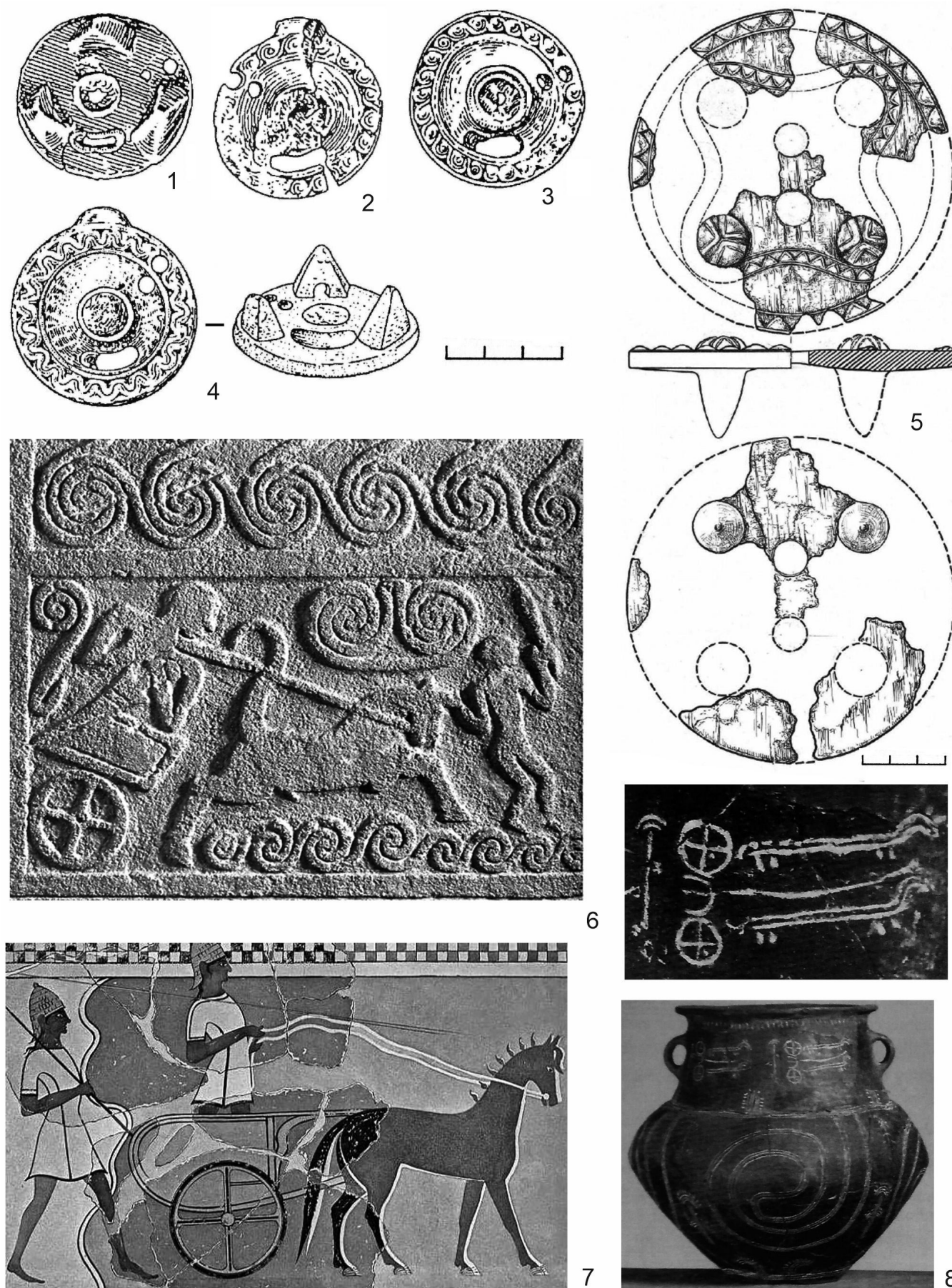


Fig. 13. Chariot complex of Mycenaean Greece: 1–4 – cheekpieces from the Shaft Grave IV of the Circle A at Mycenae; 5 – cheekpiece from the House of Shields at Mycenae; 6 – chariot on stele from Circle A; 7 – Mycenaean chariot on the fresco in Tiryns; 8 – chariot on a vessel of the Otomani-Füzesabony culture in Vel'ké Raškovce (1–5 – after PENNER 1998; 6 – KARO 1930; 8 – BÁTORA 2018).

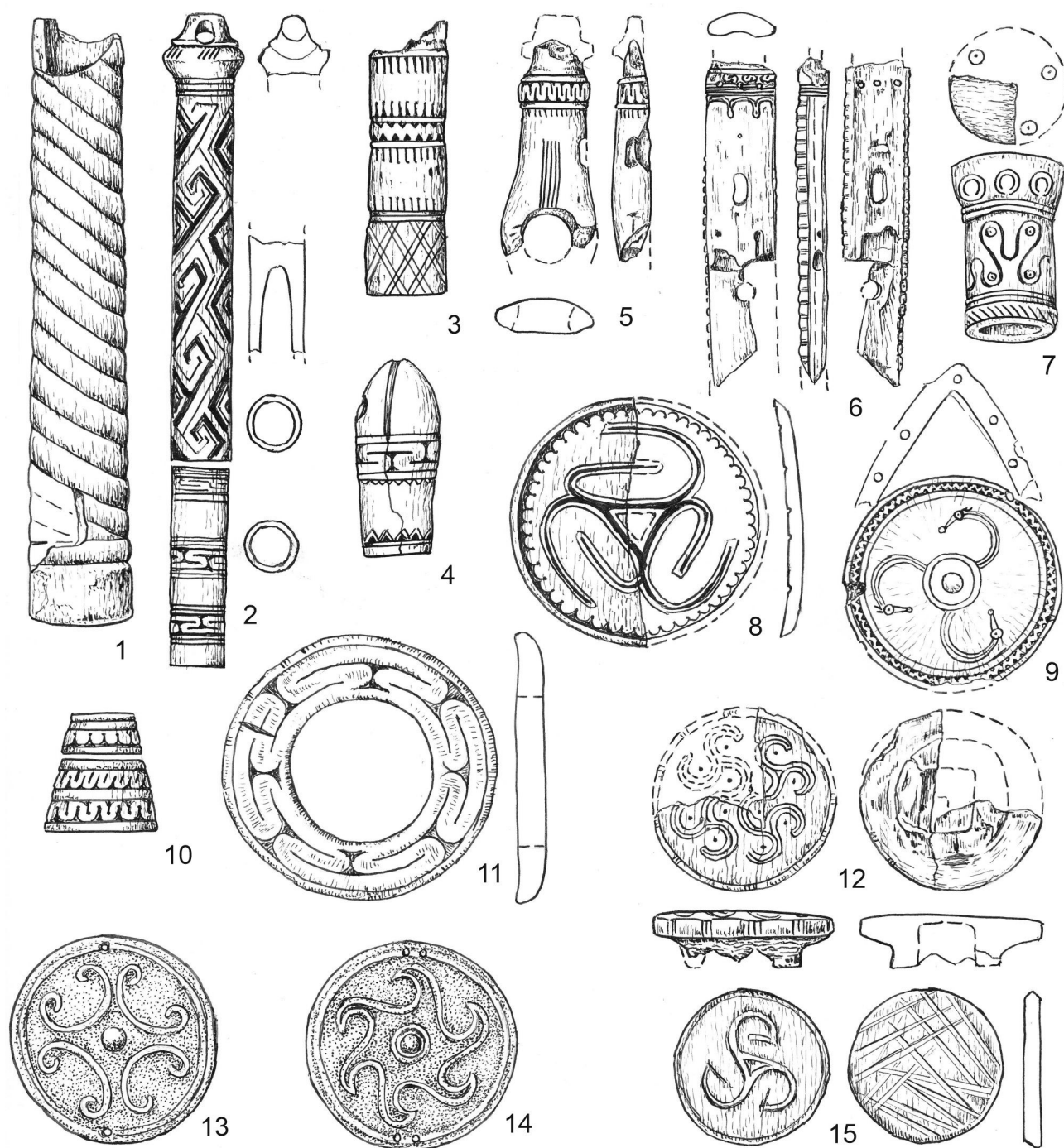


Fig. 14. Ornaments of the Carpatho-Mycenaean style on bone (1–12, 15) and metal (13, 14) objects in Srubnaja complexes of Eastern Europe: 1 – Vilna-Hrushevka; 2 – Krasnoselka; 3 – Radchenskoe; 4 – Privetnoe; 5, 6, 8, 12 – Kapitanovo-1; 7 – Petryaev; 9 – Nizhnyaya Krasavka III; 10 – Pasekovo; 11 – Illichivka-2; 13, 14 – Novie Yabalakly; 15 – Shipilivka (1, 3, 4, 7, 10, 13, 14 – after BESEDIN 1999; 5, 6 – BOCHKAREV/KUZNETSOV 2019; 2, 8, 9, 11, 12 – after OTROSHCHENKO 2017; 15 – after LITVINENKO et alii 2013).

They have four spikes, and this was not the leading type of Sintashta cheekpieces. If borrowing came from the east, more developed types would have been introduced into Mycenae, into an elite environment. There is another peculiarity: two Mycenaean cheekpieces have a small protrusion on the disc. There is a similar protrusion in the Carpathians on the cheekpiece from Tőszeg, and three simple monolithic spikes on the cheekpiece from Cirlomanesti.

There is another parallel between the Mycenaean chariot complex and the Carpatho-Danubian one. Early Anatolian carts from Kültepe have four-spoke wheels. Eight-

spoke wheels appear on Syrian seals from 1750 BC in the “Middle” Mesopotamian chronology¹⁶⁶, and up to 1600 BC they go together with four-spoke wheels¹⁶⁷. The wheels of Sintashta chariots had from 10 to 12 spokes¹⁶⁸. In the case of the penetration of this tradition from the steppe into Mycenae, where the wheels had four spokes (Fig. 13/6,7)¹⁶⁹,

¹⁶⁶ Further, all historical dates will be given in the “Middle” chronology of Mesopotamia.

¹⁶⁷ LITTAUER/CROUWEL 1979, 49–51; MOOREY 1986, 198, 201, 202, pls. 2, 5.

¹⁶⁸ CHECHUSHKOV/EPIMAHOV 2010, 191, 204.

¹⁶⁹ KARO 1930, Abb. 12; RECHT 2018, Fig. 16, 17, 19, 21, 24, 25.

how can we explain the degradation of this technology after penetration into a more developed region? Therefore, it is more logical to think about the penetration of chariots into Mycenae from Western Asia¹⁷⁰, where there were wheels with four and eight spokes. But it does not follow from this that this happened in the period immediately preceding the Shaft Graves. Chariots could have come to Mycenae from the Carpathians. In the Carpatho-Danubian region, the wheels also had four spokes. Chariots drawn by a pair of horses with such wheels are depicted on the vessel of the Susiu de Sus culture from Vel'ké Raškovce (Fig. 13/8) and there are wheel models of the Maďarovce and Otomani-Füzesabony cultures, reflecting perhaps four spokes¹⁷¹. At the Pocsaj settlement of the Gyulavarsánd culture, a model of a four-wheeled cart with four-spoke wheels was found. There are also four spokes in two chariot models from Dupljaja, a site belonging to the Žuto Brdo–Dubovac group, also dated to the MBA¹⁷². In addition to four spokes, the common feature of these models is the axle arranged in the middle of the body¹⁷³. This is an archaic sign common to the Carpathians, Mycenae and Sintashta. It is very important that in the Carpathians, some cheekpieces are decorated with Carpatho-Mycenaean ornament, moreover, cheekpieces typologically close to the Mycenaean ones (Tószeg). The problem of these ornaments is closely related to the problem of chariots.

5. CARPATHO-MYCENAEAN ORNAMENTS

Historiography on the Carpatho-Mycenaean ornaments in Eastern Europe (Fig. 14) is given in some articles¹⁷⁴. The most detailed work on this topic was carried out by V.I. Besedin, who divided these ornaments into two chronological groups: 1) on cheekpieces of the Pokrovsk-Abashevo culture, and 2) on details of whips and rods of the early Srubnaja and Srubnaja culture. The style of these ornaments is different. For ornaments on cheekpieces, the parallels with Mycenae are not so obvious, but there are parallels with the Carpathians. For Srubnaja objects, both groups of parallels are applicable, and for this time we may speak of impulses from the west. In the case of ornamentation on cheekpieces, despite the similarity with Carpathian ornaments, this was not allowed, since the idea of the eastern origin of cheekpieces was at the heart of it. Therefore, a completely reasonable idea was expressed that ornaments cannot spread without a bearer, i.e., without other things. As a result, it was concluded that the Srubnaja ornaments can be explained by the Balkan-Carpathian impulses, and the ornaments on the Don and Volga cheekpieces could have formed in the Abashevo culture¹⁷⁵.

But the Carpatho-Mycenaean ornaments appeared in the Carpathians on cheekpieces of a rather early phase, long before the Mycenaean Shaft Grave period. Spiral and wave ornaments are present on ceramics of many MBA cultures of the Carpatho-Danubian region, and stylistically they are not associated with the Mycenaean tradition. They are present

in the Wietenberg culture from the very beginning, and in the Monteoru culture from phase 2, which also preceded the Shaft Grave period, and, moreover, mainly on ritual vessels. The presence of this ware in a ritual context, together with wheel and cart models imitating the heads of draft animals, made it possible to hypothesize that they reflect the idea of movement, and the transition from Z-shaped ornaments to S-shaped ones created more dynamic compositions reflecting movement. Ultimately, this phenomenon is associated with the use of horses and chariots, if we proceed from the general context and the absence of horns in the images of draft animals in this model¹⁷⁶.

Bone objects with Carpatho-Mycenaean ornaments are also widely represented in the Carpathians. Many of them were found out of strict context or belong to the Mycenaean period, but there are also pre-Mycenaean finds. Above, we have already mentioned rod-shaped cheekpieces with ornaments of this type in the early Monteoru culture. An important find is two bone cylinders from the Costișa settlement, where a layer of the Costișa culture is overlaid by layers with Monteoru Ic2-Ic1 ceramics, which may be partly included in the final part of the early Ic3 package. Accordingly, the layer with the Costișa culture pottery is synchronized with the early Monteoru phase. One of the cylinders is decorated with a wave ornament, a small zigzag of triangles and circles; the second is not decorated. The ornamented specimen lay under the Monteoru layer together with the Costișa ceramics. Analysis of the undecorated sample gave the date 1745–1680 BC (67.4%). A horse bone from the overlying Monteoru layer is dated to 1695–1635 BC¹⁷⁷. But above, we discussed that in radiocarbon dates, the early phase of the Monteoru culture and the Costișa culture are dated around 2200–1800 BC. In any case, these are early dates preceding Mycenae, Don-Volga Abashevo and Potapovka. Since in Anatolia and Syria the earliest such objects were found in grave 39/97 in layer VI of Alalakh (not earlier than the 17th century BC) and in layer Ib on Kültepe with the date 1800–1728 BC¹⁷⁸, it is concluded that in the Carpathians they appeared at the same time as in Anatolia¹⁷⁹. However, it should be understood that the Carpathian date is an interval of probability of radiocarbon dates, and the Anatolian date is the real time of the existence of layer Ib. Radiocarbon dates are usually older than historical ones. Since these cylinders are found in the context of the early phase of the discussed Carpathian cultures, and they date from the 20th century BC in radiocarbon chronology, we may assume that earlier finds will be made. Indicative, for example, is the presence of spiral motifs on ceramics of the early phase of the Wietenberg culture¹⁸⁰. But today the dates from Kültepe are earlier.

When discussing the difference between the dates of the steppe and Near Eastern chariots, I assumed the synchronization of the beginning of Sintashta with this

¹⁷⁰ DREWS 2017, 141, 146, 161, 166, 219, 220, 229.

¹⁷¹ BÁTORA 2018, 151–153, Fig. 113, 114.

¹⁷² BONDÁR 2012, 62, 63, 86.

¹⁷³ BOROFFKA 2004, 350.

¹⁷⁴ BESEDIN 1999; OTROSHHENKO 2017.

¹⁷⁵ BESEDIN 1999, 54–57.

¹⁷⁶ DIETRICH/DIETRICH 2011, 67, 76–82.

¹⁷⁷ POPESCU/BĂJENARU 2015, 35, 36.

¹⁷⁸ Below we will discuss that this layer is dated since 1835–1832 BC, and possibly earlier.

¹⁷⁹ POPESCU/BĂJENARU, 2015, 36.

¹⁸⁰ BĂLAN/QUINN/HODGINS 2016, 7, Pl. II.

layer of Kültepe, with the beginning of the A1c phase of Central Europe and with the appearance of fortified settlements in the Hatvan culture¹⁸¹. Thus, the appearance of the first cheekpieces in steppe Eurasia coincides with their appearance in the Carpathians, where it was possibly accompanied by ornaments of the Carpatho-Mycenaean style, whose peculiar manifestations are also present in the ceramic complex. It is noteworthy that fortified settlements appeared simultaneously in all these areas. And we have no grounds for an idea about the spread of these phenomena from the steppe.

Not all objects decorated with this ornament reflect the impulses of this time. This is most obvious for the bone objects of the Begazi-Dandibay culture from the settlements of Kent and Myrzhik in Central Kazakhstan¹⁸². It is not well dated, but is generally synchronous with the Sargari and Karasuk cultures, which are dated since 1400 BC¹⁸³. The wave ornament on the bone cylinder from Petryaev in Bashkiria is more comparable to the ornaments from Tell Achana (Alalakh) in Syria than from the Carpathian Basin or the Aegean¹⁸⁴. The historical conditions for the appearance of such a similarity are not clear, since this cylinder was found in the Srubnaja grave¹⁸⁵. Therefore, most likely, this reflects relations with the Balkan-Carpathian region.

The most detailed discussion of problems of the Carpatho-Mycenaean ornamental style has been published in several works by W. David. Without going into the details of this topic, I would like to briefly summarize some of the conclusions of his works. There are four main regions of these ornaments distribution: Mycenaean Greece, the Carpathian Basin, Eastern Europe and the Syro-Anatolian region (Fig. 15)¹⁸⁶. They have some stylistic differences due to the difference in the archaeological context and bearers. The origins of this style are not clear, and David avoided making clear judgments on this topic (with the exception of the unambiguous conclusion that it was not formed in Eastern Europe and the Carpathians), but he emphasizes the unconditional relationship between the regions where this style is presented, and admits that in the Carpathians it appeared from Anatolia, bypassing Mycenae, and direct

connections between Anatolia and the Carpathians through the Northern Black Sea region are possible. Therefore, the terminology used (“Mycenaean” and “Carpatho-Mycenaean”) is incorrect. It is more correct to call these ornaments “Carpatho-Eastern-Mediterranean”. Their appearance in Eastern Europe can be explained by connections with any of these three regions. It was assumed that the Central European phases A2b – B1 are synchronous with LH I, II in Greece and layer Ib at Kültepe in Anatolia¹⁸⁷. Above, we discussed the earlier presence of similar ornaments in the Carpathians within the periods A1c – A2a, and this is before the time of the Shaft Graves. It is also obvious that the ornaments in the Carpatho-Danubian region do not reflect any single process, and already in the Mycenaean time there were numerous relations that stimulated the development of similar features in this ornamental tradition. There are possibilities for synchronizing the beginning of the Sintashta culture with the Central European A1c phase, as well as with the Kültepe Ib layer¹⁸⁸. The difference between Anatolian and European dates is caused only by the use of different chronological systems. In general, these are similar phenomena, which does not allow us to speak of chronological priorities yet. But in Anatolia, this style has deeper roots, as it is presented on the EBA metal ware in Alaca Hüyük, Horoztepe, and Troy II¹⁸⁹. On the metal weapons of the Carpatho-Danubian basin, these ornaments appeared somewhat later, from the A2c period, in the form of the so-called Hajdúsámson-Apa style¹⁹⁰. Therefore, the start of LH I is probably dated within this phase.

All that has been said forces us to provide various options. In the east, most of these finds are associated with impulses marking the end of the Sintashta culture, which does not provide grounds for early dating of the Don-Volga Abashevo and Potapovka. These ornaments are closely related to the spread of cheekpieces with inserted spikes and a narrow plank with a row of thin holes (the so-called “Staroyuryevo” type, characteristic of the Don-Volga Abashevo and Potapovka)¹⁹¹. Cheekpieces with the row of small holes along the edge with Carpatho-Mycenaean ornaments were found in the settlement of Sărata Monteoru in the early layer Ic3 (this cheekpiece already has a plank) and Ulmeni, whose date is unclear¹⁹². This is noticeable earlier than the Don-Volga Abashevo and Potapovka complexes and the Mycenaean Shaft Graves. Therefore, this solves the problem indicated by V.I. Besedin: Carpathian ornaments, spreading to the east, had their bearers in the form of cheekpieces.

Earlier I wrote that these ornaments appeared in the east about the beginning of the A2c phase¹⁹³, but their early presence in the Carpathian Basin allows earlier dates to be supposed within the A2b period, when these ornaments became widespread. The presence in the Lopatino cemetery on the Volga of a rod-shaped cheekpiece with analogs in

¹⁸¹ GRIGORIEV 2019; GRIGORIEV 2020a, 74.

¹⁸² VARFOLOMEEV/LOMAN/EVDOKIMOV 2017.

¹⁸³ MOLODIN/EPIMAHOV/MARCHENKO, 2014, 144. In Europe, these ornaments existed within the Reinecke's phases A2 and B and were not present in phase C (DAVID 2002, 261), the transition to which is dated around 1500–1434 BC (BRUNNER/VON FELTEN/HINZ/HAFNER 2020, Fig. 7). One of these objects is, possibly, a cheekpiece, whose undated decorated analogue is known in Ukraine (Nikolaevka - Novy Sad) and an unfinished object in Romania, in Truşeşti, in the Noua II layer (PANKOVSKIJ 2004). The latter suggests a date after 1500 BC. Perhaps this is an important chronological marker, since we have the fact of an impulse from the west, which, along with others, led to the formation of Commonality of Cordoned Ware Cultures in vast areas from the Carpathians to Altai and Central Asia, identified by E.N. CHERNYH (1983).

¹⁸⁴ DAVID 2001, 56.

¹⁸⁵ MOROZOV/NIGMATULLIN 1998, 8, Fig. 5.

¹⁸⁶ In addition, Carpatho-Mycenaean ornaments, because of relations with the Carpathians, appeared in Poland (PRZYBYŁA 2020, 103) and Northern Europe. The initial penetration is dated to the NBA IA period (1700–1600 BC), which corresponds to the A2b period in Central Europe. But it broadly present in the later complexes of the NBA IB (1600–1500 BC). Probably the NBA IA / NBA IB transition corresponds to the start of the Koszider period and phase A2c. It is noteworthy that the spread of these ornaments was accompanied, judging by finds of rod-shaped cheekpieces, with the spread of chariots (VANDKILDE 2014).

¹⁸⁷ DAVID 2001, 66, 68, 69, 73, 74; 2007, 415.

¹⁸⁸ GRIGORIEV 2019; 2020a.

¹⁸⁹ AVILOVA 2008, Fig. 16, I.

¹⁹⁰ DAVID 2006, 225.

¹⁹¹ PRYAHIN/BESEDIN 1992, 57.

¹⁹² BOROFFKA 1998, 93, Abb. 8.4.5.

¹⁹³ GRIGORIEV 2019.



Fig. 15. Ornaments of the Carpatho-Mycenaean style on bone objects in Syro-Anatolia (1-7), the Carpathians (8-15) and Greece (16-20): 1, 3 – Boğazköy; 2, 4, 5 – Kültepe; 6 – Tel Achana (Alalakh), 7 – Beyjesultan; 8 – Costișa; 9, 11 – Tiszafüred; 10, 14, 15 – Vatin; 12 – Pecica; 13 – Derşida; 16 – Mycenae, III; 17, 18, 20 – Mycenae, Acropolis; 19 – Mycenae IV (after DAVID 2001; 8 – after POPESCU/BĂJENARU 2015).

the A2b period does not contradict this, but also does not confirm, since this type existed longer. At the turn of the A2a/A2b periods, the Seima-Turbino tradition of making socketed spearheads penetrated into Central Europe¹⁹⁴. Since that time, in the Carpathian cultures, Mycenaean ornaments on bone objects have become widespread. However, it is not yet possible to clarify the date of this impulse to the east within A2b.

In Ukraine, the Carpatho-Mycenaean ornaments are present in complexes of the Pokrovsk culture and the first period of the Berezhnovka-Mayevka Srubnaja culture. They correspond to the Balkan objects of the periods LH I and LH IIA¹⁹⁵, as I.V. Besedin discussed previously. Accordingly, we may synchronize this time with LH I.

6. DISCUSSION

6.1. Cultural transformations in steppe Eurasia and the evolution of cheekpieces

The data presented in this article significantly change the interpretation of origins and spread of chariots in Eurasia. In the early 2nd millennium BC cultural transformations took place, as a result of which the Sintashta culture appeared in the Urals. This culture has many Near Eastern and Caucasian components, as well as some Eastern European admixtures, which made it possible to conclude that it was formed as a result of migration from the Near East¹⁹⁶. This is the earliest appearance of chariot complex and cheekpieces in steppe Eurasia. In the culture, there are disc-shaped cheekpieces with monolithic spikes of two types: "archaic", without plank, and with the plank. There is no reason to believe that the term "archaic" is correct and we can distinguish these types chronologically. This type penetrated westward (Potapovka type) at a very late stage; therefore, it existed throughout the Sintashta culture. Moreover, the cheekpieces made on the epiphysis of cattle, considered as prototypes for these cheekpieces, also do not give grounds for asserting their early chronological position. The date of some of them is unclear, and the late Catacomb cheekpiece from Kamenka and the cheekpiece from Balanbash may be quite synchronous with Sintashta. A cheekpiece of this type from Babich-1 belongs to a later period. Accordingly, the shape of these cheekpieces does not indicate archaism, it was caused by the chosen material.

To the east, the Petrovka culture was soon formed, in which the development of cheekpieces of the Sintashta type with a plank took place, and then grooved cheekpieces appeared, but if the former could have arisen in the Sintashta period, the latter belong to the post-Sintashta time.

Almost simultaneously with Sintashta, transformations took place in the Carpatho-Danubian basin, where the Monteoru, Wietenberg and Otomani-Füzesabony cultures arose (probably at the end of the A1b period). It is very possible that the spread of these cultures caused migration of some local tribes to the east and led

to the formation of the Babino, Middle Volga Abashevo, Volsk-Lbische and Voronezh (?) Cultures. Disc- and rod-shaped cheekpieces are present in the Carpathian cultures from the early stages. The number of these finds is much less than in the east, and they are highly variable. There are cheekpieces with monolithic spikes and without plank, but there are other forms: cheekpieces with a row of small holes on a narrow plank, with a hole in another plane, with inserted spikes, as well as disc-shaped cheekpieces with elongated plank and pins. In the same period, ornaments of the Carpatho-Mycenaean type appeared in this region. After the appearance in this zone of metal objects of the Seima-Turbino tradition at the beginning of the A2b period, these ornaments were widely distributed and soon, within the same period, a reverse impulse followed, which brought a number of these innovations in the construction of cheekpieces to the east. At the same time, the Sintashta culture ceased to exist, and part of the Sintashta and Ural Abashevo groups shifted to the west. As a result of these processes, we see in Eastern Europe the penetration of the Carpatho-Danubian traditions in the form of Pokrovsk-Abashevo cheekpieces of the Staroyuryevo type (with a plank and a row of small holes, a hole in another plane, inserted spikes and Carpatho-Mycenaean ornaments), as well as the penetration of the Sintashta tradition cheekpieces with a plank. These traditions met in the Volga region, where they are present together in the Potapovka complexes.

The penetration of the western tradition to the east is episodically recorded up to the Transurals and Kazakhstan, where in the Sintashta complexes two cheekpieces are known, comparable to the Pokrovsk-Abashevo ones, as well as a cheekpiece on a thin plate with sharp spikes from the Kamenny Ambar cemetery with analogies in Romania. This western influence is associated with the appearance of an elongated plank with pins in the early grooved cheekpieces of the Aksaiman type, as well as small holes in the plank and ornaments in cheekpieces of the Novoklyuchevka type. This impulse is also associated with the peculiarities of the Alakul cheekpieces with an elongated plank, pins and circular ornament. This complex of features is a chronological marker.

6.2. The origin of chariots and the evolution of cheekpieces

It is difficult to say how widespread chariots were in the Balkan-Carpathian region, where there are few cheekpieces, in comparison with forest-steppe and steppe Eurasia. It is assumed that in the steppe and the Near East, chariots were used in the military sphere, but not in Europe¹⁹⁷. But in the Carpathians, the most cheekpieces were found in settlements, and in the steppe in burials, the finds in settlements are rare. Therefore, this quantitative difference may be caused by the lack of tradition to reflect the chariot complex in the funeral rite. If we compare the number of finds in the settlements, then the Carpatho-Danubian region will already have the prevalence. It should also not be forgotten that the Carpathian basin is incomparably smaller

¹⁹⁴ GRIGORIEV 2018b.

¹⁹⁵ BROVENDER 2008, 201; LITVINENKO/SANZHAROV/USACHUK 2013.

¹⁹⁶ GRIGORIEV 2002.

¹⁹⁷ BOROFFKA 1998, 117.

than the Eurasian steppe and forest-steppe. Therefore, this is an unanswered question.

Within the framework of our problem, the most important question is the following: if chariots arose simultaneously in the Carpathians and in the Urals, then where did it come from to these regions? The earliest chariots appeared in the Near East¹⁹⁸. Against the background of many Syro-Anatolian parallels in the Sintashta culture, this hypothesis is the most probable. However, we do not know the early cheekpieces there, although the chariots are well known. Indirectly in favor of such a connection may be used the fact that the Carpatho-Mycenaean ornaments appeared almost contemporary in the Carpathians and Anatolia, during the Kültepe Ib period, but in Anatolia they had prototypes in the EBA. Probably, after their final formation, they quickly spread to the Carpathians. The generally accepted connection of these ornaments with chariots is indicative. Additional, but also indirect, evidence on the distribution of cheekpieces from the Near East are cheekpieces from Zardča Chalifa (Fig. 16) and some later complexes of Sazagan and Dzsharkutan in Central Asia, which are similar to “archaic” Sintashta cheekpieces, and therefore are considered as a sign of Sintashta penetration to the south. But these cheekpieces were found together with bronze bits with undoubted Western Asian parallels. The following explanation is suggested for this paradox: the cheekpieces were borrowed from the north, and the bits from the Near East¹⁹⁹. But it is a single harness complex, and it is more logical to assume its joint appearance. In addition, these are typical BMAC burials, which lack ceramics comparable to the Sintashta or Andronovo ones, so these cheekpieces demonstrate the use of chariots by the local elite, and not the penetration of the Sintashta people from the north²⁰⁰. V.I. Sarianidi showed the roots of this complex in the Syro-Anatolian region. This happened at the same time when the Sintashta culture formed²⁰¹. Therefore, a further search for the roots of the Ural and Carpathian chariots should be carried out in the Near East. It is possible that prototypes of the disc-shaped cheekpieces will be found in Anatolia, but it is possible that

at that time they were rare, and cheekpieces were made of wood.

6.3. Origins of the Greeks and Thracians

The Carpatho-Mycenaean ornamental style was introduced to the steppe from the Carpathians, but there it appeared earlier than in Mycenae. Therefore, hypothetically, we can return to the idea of the arrival of the Mycenaeans from the steppe. This is closely related to the problem of origins of the Greeks, since the presence of the Greeks in the south of the Balkans is reliably recorded only by the texts of Linear B of the Mycenaean period. A rich literature is devoted to this problem. The presence of a pre-Greek substrate is well documented by toponyms with the suffixes *-ss-*, *-nth-* and *-nd-*, common to Greece and Southwestern Anatolia, therefore it is assumed that this substrate was Luwian, and the Minoan language belonged to the same Anatolian group of Indo-European languages²⁰². But when the population change occurred in mainland Greece remains unclear. This largely depends on the ideas about the Indo-European origins, and since the ideas of the steppe origins dominated, many authors were forced to take this into account. The theme of chariots and cheekpieces played an important role in this. However, the appearance of chariots or horses is not at all equivalent to the appearance of the Greeks. There are different points of view on this problem.

The earliest scenarios suggest the coming of the Greeks at the transition to the Neolithic (according to C. Renfrew's theory about the Neolithic Indo-Europeanization of Europe)²⁰³ or ca. 3200 BC at the transition from the Late Neolithic to the Early Helladic, demonstrated by depopulation and a significant change in culture. This fits into the hypothesis of the steppe origins and is associated with the Yamnaya migrations to Europe²⁰⁴. It is rather difficult to discuss this, since there are no features of the Yamnaya culture in Greece. Robert Drews suggests the latest coming of the Greeks, ca. 1600 BC, by sea from the South Caucasus, because there are parallels with this region in ornamental styles, spearheads and rapiers. The steppes of Eurasia are seen as the primary homeland from where the Greeks penetrated to the south, forming the Trialeti culture²⁰⁵. These parallels are partly (but not all) true, although Trialeti was not formed under the influence of migrations from the north, it was a southern phenomenon.

The most common hypothesis is that the coming of the Greeks is associated with the spread of Minyan ware during the EH III period, around 2200–2000 BC²⁰⁶, also this ware spread rather at the transition to the MH around 2000/1900 BC²⁰⁷. Some authors suggest the origins in the Balkans²⁰⁸. Chronologically, this, in general, coincides with the transformations in the Carpatho-Danubian basin at the transition to the MBA, and some ceramic forms, for example, *kantharos*, are common. But these traditions have no prototypes in the Balkans. J. Mellaart believed

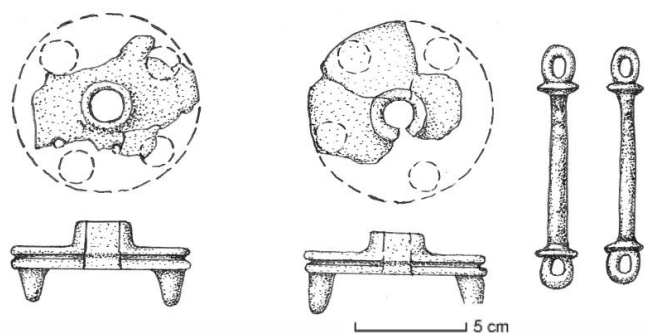


Fig. 16. Bone cheekpieces and metal bits from Zardča Chalifa (after TEUFER 2012).

¹⁹⁸ GRIGORIEV 2020a.

¹⁹⁹ TEUFER 2012, 276, 278, 279, 282, 285, 287.

²⁰⁰ BURMEISTER/RAULWING 2012, 105.

²⁰¹ SARIANIDI 1998, 136–141, 156, 157.

²⁰² PALMER 1958.

²⁰³ BINTLIFF 2012, 166.

²⁰⁴ COLEMAN 2000.

²⁰⁵ DREWS 2017, 21, 205, 217–220.

²⁰⁶ CASKEY 1971, 776, 778, 785–790.

²⁰⁷ BINTLIFF 2012, 164.

²⁰⁸ CROSSLAND 1971, 846–850.

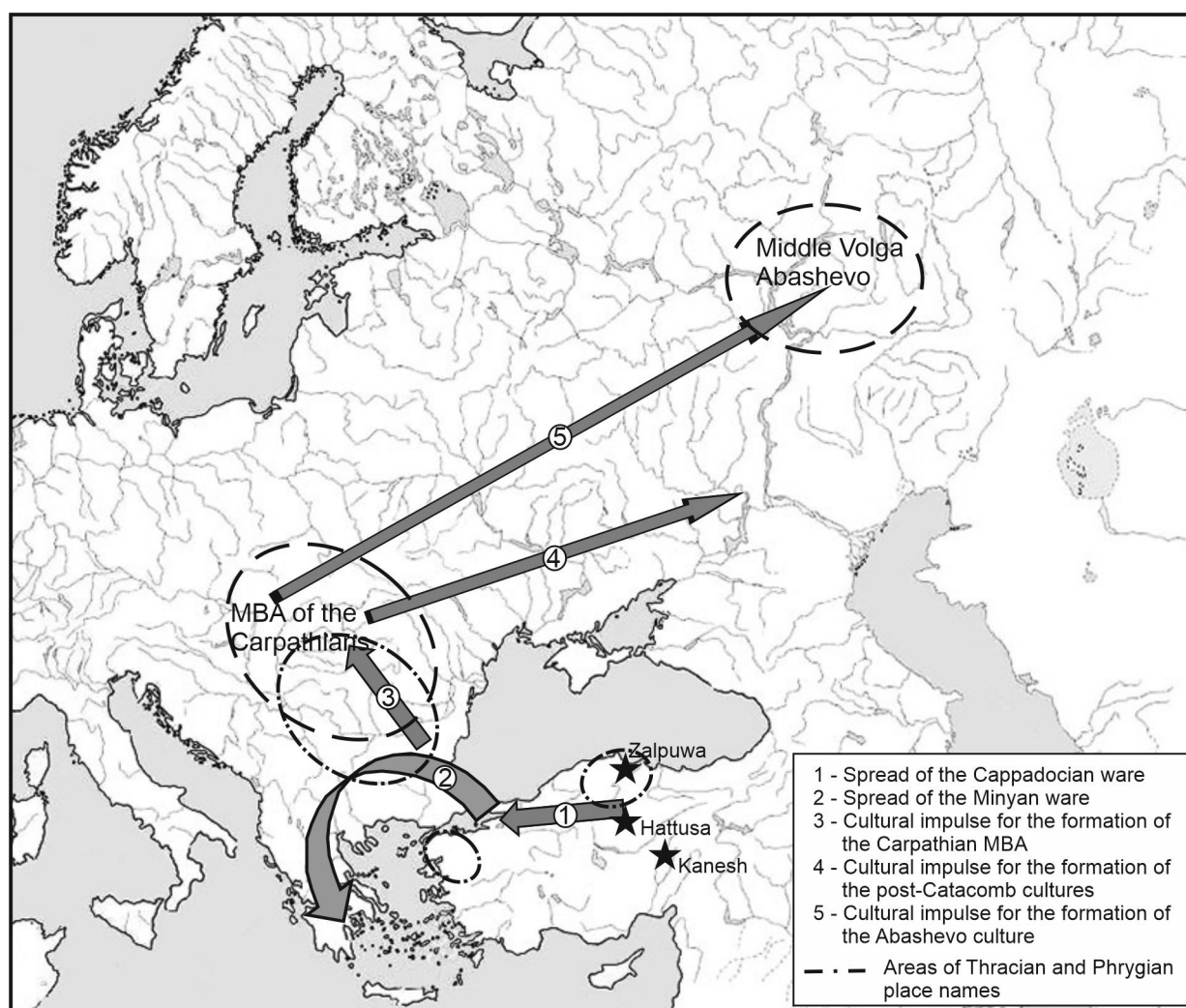


Fig. 17. Thracian and Phrygian place names, the migrations of Greeks, Thracians and Phrygians, the formation of the Carpatho-Danubian MBA and post-Catacomb cultures of Eastern Europe.

that the origins of this ware, and, accordingly, the Greeks, were in Northwestern Anatolia, near the Sea of Marmara, and its appearance in the Balkans was preceded by the movement of people with Cappadocian ware from Eastern to Central Anatolia (Fig. 17)²⁰⁹. Therefore, the primary origins could really be in Anatolia. This is also indicated by the paleogenetic studies. Three-quarters of the ancestors of the Mycenaeans and Minoans go back to the Neolithic farmers of Anatolia and the Aegean, and the rest are represented by closely related groups of the Caucasian hunter-gatherers and Iranian farmers. The latter admixture is also typical for the steppe, but the analysis of Y chromosomes shows a direct connection with Eastern Anatolia, without the participation of the steppe component. At the same time, the Mycenaeans demonstrate a significant difference from the Minoans: 4–16% of the admixture of hunters and gatherers of Eastern Europe and Siberia²¹⁰. In this case, this may indicate the Carpathian basin, since at the beginning of the A2b phase, the tradition of the Seima-Turbino metalworking spread there, whose roots were located in Siberia.

Probably, somewhere in this direction we should look for a solution to the problem. There are no grounds

for discussing the migration of Greeks from the steppe for several reasons: 1) there are no real analogies with the steppe in the Peloponnese; 2) chariots and cheekpieces of the Shaft Grave period are comparable to those of the Carpatho-Danubian region; 3) composition of ornamental motifs in the Carpathians and Greece is quite comparable, while the Eastern European one looks depleted against this background. If we return to the previous argument about the spread of rapiers, they are typical for three regions: Transcaucasia, Greece and the Carpathian basin, and the last two regions were closely related in the Mycenaean time, including a common ornamental style²¹¹. This was not necessarily a massive migration, in any case, there are no Carpathian features in complexes of the end of MH III period. The Shaft Graves culture was based on the local development of the Middle Helladic period, only Minoan influences are visible²¹². Therefore, it could be the arrival of a small elite group. It is significant that in the Near East and the Carpathians, objects in the Carpatho-Mycenaean style are presented in settlements, and in the Peloponnese, exclusively in a prestigious context²¹³. And the question remains: were

²⁰⁹ MELLAART 1971, 681–698.

²¹⁰ LAZARIDIS *et alii* 2017, 214–216.

²¹¹ LICHARDUS/VLADAR 1996, 26, 37, 38; GRIGORIEV 2002, 392–396.

²¹² BINTLIFF 2012, 167–177.

²¹³ DAVID 2007, 412.

the newcomers Greeks? In Romania and Bulgaria, against the background of many Thracian river-names, Greek ones are absent²¹⁴. The study of the legendary genealogy of Greece shows that the unifying concept of “Hellenes” does not mean that all these tribes go back to the mythical ancestor of Hellen. Many originated from the Pelasgians, and marriage was often an institution that contributed to ethnic change. But one feature is noted that was characteristic of the early Greeks and Hittites: the ancestral succession and the transfer of royal power were carried out along the female line. The king was a military leader, and his wife was a priestess. This has numerous echoes in both real and mythical Greek history²¹⁵. Therefore, we may assume that the rulers buried in the Shaft Graves came from the Carpathians, but this did not require a military invasion and the coming of many people. One small clan with a lucky groom was enough. This hypothesis is relevant not only for the early Mycenaean, but for the entire Mycenaean period, since Thracian and Phrygian names are found in the Mycenaean and Theban royal genealogies, Thracian names of mythical heroes are known. In some places (Delphi, Euboea), one can even admit the presence of Thracian clans or tribes. More tangible is the presence of the Phrygians, who are often regarded as the earlier population of Greece, the Pelasgians. It is visible in many Phrygian place names, the name of the Peloponnese, in the more ancient name of Attica “Mopsopia”. Some of the Phrygians gained royal power through marriage: Danaos at Mycenae and Kadmos at Thebes, Teutamios at Larissa in Thessaly, and possibly even Crete. Many Greek cults were of Phrygian origin: Demeter and the mountain goddess Cybele²¹⁶. Such relations could provide further intensive contacts between Greece and the Carpathians during the Mycenaean period.

Particularly interesting for our topic is that Fred Woudhuizen identified Phrygian and Thracian toponymic strata and corresponding names in the region around Sinop, on the Black Sea coast of Anatolia. This preceded the later penetration of these peoples into Anatolia within the movement of the Sea Peoples ca. 1200 BC, when the Phrygian Kingdom formed with its capital at Gordion in the west of Asia Minor. During the Old Hittite period, this area around Sinop was occupied by speakers of Palaic, the third group of Anatolian Indo-European languages. But by the 16th century BC it was a dead language. Woudhuizen believes that these facts reflect the earlier coming of the Thracians and Phrygians from the Balkans²¹⁷. But in this case, the question arises: where did the Greeks come from? The connection of the Mycenaean Shaft Grave with the Carpathians suggests

this area, where Greek place names are absent, but there are Thracian ones. On the other hand, the earlier appearance of chariots and the corresponding ornamental style in Anatolia allows us to search for their origins there.

Previously, knowledge about the Indo-European presence in the Near East was limited by indisputable evidence of the speakers of Anatolian Indo-European languages (Hittite, Luwian, Palaic) and Mitannian Aryan (not to mention later evidences on Armenians and Iranian-speaking Kurds). Analysis by L.A. Gindin of Homer's *Iliad* showed that Thracians and Luwians lived in Troas²¹⁸. It was also possible to identify the Gutians and Tukri of the Mesopotamian sources with the Tocharians and localize them in the areas of Lesser Zab²¹⁹.

It is especially important to identify and summarize data on the Indo-European presence in Anatolia, Syria and the Levant. There are place- and river-names, and some names in Hittite, Assyrian and Old Babylonian sources, which can be designated as Old Indo-European. It is assumed that they preceded the spread of Anatolian Indo-European and are dated to the EBA, within the 3rd millennium BC²²⁰. But these events are interpreted from the position of the steppe origins of the Indo-Europeans²²¹. It is assumed that ca. 2300 BC at the transition from the EBA II to the EBA III, the Pelasgians (Thracians and Phrygians) penetrated the Balkans from the Northern Black Sea region, which is reflected in the appearance of burials with stone rings and steles in the Balkans, as well as in the spread of catacombs across the Mediterranean. Some of these groups penetrated into Anatolia, although the main stream were the Luwians. On the other hand, at the same time the Hittites came through the Caucasus, which is reflected in the similarity of the royal tombs of Alaca Hüyük with the Maikop tombs in the North Caucasus and the Kura-Araxian culture in Transcaucasia. In this case, the basis for this conclusion

²¹⁸ GINDIN 1991, 29, 38.

²¹⁹ HENNING 1978; GAMKRELIDZE/IVANOV 1989, 15, 16.

²²⁰ WOULDHUIZEN 2018, 51, 55–58, 63, 64, 68–70, 87–90.

²²¹ It should be noted that F. Woudhuizen believes that it is not evidence of the Indo-European origins in Anatolia, since there are no place names of the Proto-Indo-European type (WLOUDHUIZEN 2018, 94). However, they shouldn't be there. Asia Minor was the homeland of the Proto-North Caucasian peoples, and the Indo-European homeland was located to the east, on the Armenian plateau. This is confirmed by the fact that during the Neolithization of Europe, the population of Asia Minor penetrated there. The European hydronyms that KRAHE (1964) identified as Proto-Indo-European are in fact close to the Basque language, but these hydronyms were transformed by the early Indo-Europeans (VENNEMANN 1994, 263, 264). There is also an opinion that the population of Neolithic Europe spoke a language of the Hatto-Sumerian family (SCHRIJVER 2018, 360, 361). But Hatti belongs to the North Caucasian languages, which are related to Basque and belong to the Dene-Caucasian language family (BENGTSON 2004). The separation of the Proto-North Caucasian languages occurred around the late 6th – early 5th millennia BC (STAROSTIN 1988, 154), shortly after the beginning of the Neolithic complex in Europe. Since some of the identified early Indo-European river-names in Anatolia are similar to those identified in Europe by Krahe (WLOUDHUIZEN 2018, 51), in this case some of them may be of the same type, but transformed by the early Indo-Europeans, who spread to some areas of Asia Minor before the coming of the Hittites and Palaians there. This process of the spread of the early Indo-Europeans to Asia Minor is well demonstrated by paleogenetic studies. Initially, the population of this region differed from the related populations of the Caucasus and Western Iran, but since the Eneolithic these groups have been actively mixing (WANG *et alii* 2019, 3, 5–7).

²¹⁴ PALIGA 2018.

²¹⁵ FINKELBERG 2005, 33–37, 65–108. As a child, when reading Homer, I was always surprised by strange logical inconsistencies: 1) Why does Telemachus calmly look at the fact that, in the absence of his father Odysseus, the suitors are besieging his mother, and the royal power is leaving his hands? 2) Why does Odysseus's father Laertes take this for granted and why is he not a king? This is probably caused by the fact that inheritance could be realized along the female line, and only Penelope's husband or her daughter's husband could become king. If we turn to the *Iliad*, we learn that Menelaus became the Spartan king because he married beautiful Helen, the daughter of the former queen. In this case, the romantic story of her abduction by Paris and the campaign of the Greeks near Troy takes on completely different meanings.

²¹⁶ WOULDHUIZEN 2018, 30, 34–40.

²¹⁷ WOULDHUIZEN 2018, 44–46.

is the article by N. Tschora²²². However, these conclusions do not have a real archaeological basis²²³. The Hittites did penetrate into Central Anatolia from the east, but later, and the general scenario of their origin was more complicated, with an earlier penetration into the Balkans and two successive migrations to Anatolia in the EBA, which led to the formation of the Kura-Araxian in the Caucasus and Khirbet Kerak complexes in the Levant²²⁴.

Therefore, the following scenario is most likely. The penetration of the Greeks, Thracians and Pelasgians into the Balkans from Anatolia took place in the period 2300–2000 BC in radiocarbon dates, possibly by different streams, which corresponds to the EBA III and the beginning of the MBA period. More recent was the penetration of the Thracians at the beginning of the Carpathian MBA, and the formation of new cultures in this region marks their arrival. Perhaps the Greeks came along with them, which gave rise to the MH period in Greece. But these options should be studied in more detail on the Balkan materials.

6.4. Chariot Cultures of Eurasia and the Historical Chronology of the Near East

The conclusions about the mechanisms of spread of cheekpieces and Carpatho-Mycenaean ornaments allow us to continue the long journey towards creating a historical chronology of steppe Eurasia. It has already been suggested that the beginning of Sintashta or “chariot cultures”, according to some Anatolian, Syrian and Mesopotamian parallels, can be dated within the 19th–18th centuries BC, and,

²²² TSCHORA 2004.

²²³ WOU DHUIZEN 2018, 47, 48, 55. The idea of Northern Pontic influences in the Balkans on the basis of these burials with stone rings and steles is quite popular, but such burials in the Black Sea region are unknown at this and previous time. The “catacombs” include both real catacombs and Mediterranean rock tombs. Real parallels to the steppe catacombs are only burials in Jericho, where there is a corresponding burial rite (skeletons contracted on their side, facing the entrance shaft) and ceramic burners. But this also has strict analogies in the group of burials of the Okunev culture in the Uybat cemetery in Siberia, and earlier roots in the southeastern Caspian. Moreover, the Catacomb culture demonstrates many Middle Eastern and Caucasian parallels (GRIGORIEV 2002, 189, 344, 382–384). Tschora (2004) does not really discuss the chronologically more realistic parallels with the Kura-Araxian culture. The complexes of Trialeti in the Transcaucasia, Srubnaja and Koban cultures in the Northern Pontic region and the Maikop culture in the Northern Caucasus are cited as parallels. But the Koban culture belongs to the Early Iron Age, and the Srubnaja culture to the LBA, which, against the background of the absence of actually shown analogies, does not allow them to be used. The Trialeti culture is dated to the later time, MBA, it was of southern origin, and was not associated with migrations from the steppe. Maikop preceded the appearance of the tombs of Alaca Hüyük for many centuries, it really demonstrates some general typological similarities (detailed specific analogies are not given), but this similarity was caused by the Near Eastern origin of the Maikop culture. Therefore, all evidences of the identification of this movement with the Hittites in this article is based on belief in the steppe origins of the Indo-Europeans. Moreover, the Maikop culture is used by the supporters of the steppe hypothesis for exactly the opposite: basing on this culture they try to explain the linguistic contacts of the Proto-Indo-Europeans with the Semites (SAFRONOV 1989, 235, 243–256) or the North Caucasians (ANTHONY 2019, 179, 182). The problem is also that the proposed scenario uses incompatible systems of historical and radiocarbon dates. So, to substantiate the movement of the Hittites from the east of Anatolia to the west, the activity of the Akkadian kings Naram-Sin and Sargon I in the bend of Halys in the 24th century BC is proposed, which predates the appearance of the Alaca Hüyük tombs (WOU DHUIZEN 2018, 49). The penetration into Anatolia of two related groups, Hittites and Luwians, from opposite directions is also doubtful.

²²⁴ GRIGORIEV 2002, 355, 356, 363.

in my opinion, more parallels are found in the 18th century BC, and a possible impetus for this event was the invasion of the Kassites into the Khabur basin ca. 1740 BC²²⁵. In principle, we discussed above that in the Syro-Anatolian region, the transition to wheels with eight spokes instead of four occurred ca. 1750 BC, although it is very approximate.

It was assumed that the distribution of Carpatho-Mycenaean ornaments in Eastern Europe is dated to the A2c period, therefore, at this time the Sintashta culture no longer existed, this is the date of the Potapovka and Pokrovsk-Abashevo complexes with chariots²²⁶. However, there were two stages in the penetration of these ornaments to the east. To this A2c period, synchronous to the Hajdúsámson-Apa horizon and LH I, the Early Srubnaja culture and the Borodino hoard belong. It is possible that the part of A2b is also synchronous with the beginning of the LH I²²⁷, although in my opinion this is due to the fact that the stereotypes characteristic of the Mycenaean Graves of Circle A originated in the Carpathians. Earlier, the start of the LH I was dated to ca. 1550 BC²²⁸, but now the generally accepted date is 1600 BC²²⁹. The use of Bayesian statistics for AMS dates of complexes reliably associated with the Reinecke's phases in Switzerland and southern Germany allowed the BzA/BzB transition to be dated within 1615–1530 BC²³⁰. This procedure is not as strict as dendrochronology, and may partly reflect the tendency of older dates, characteristic of the radiocarbon method. However, the beginning of the A2c phase can be dated to ca. 1600 BC, which is quite consistent with the date for the beginning of LH I. This is consistent with the date of the Santorini eruption. It is the subject of a long debate, but Mycenaean ceramics of the LH I period, imitating the local LM IA ceramics, were found in the layer of the Akrotiti settlement on Thera, buried under the volcanic layer²³¹. The most likely date for this eruption, based on Egyptian and Chinese written sources, as well as dendrochronology, is 1560 BC²³². All this makes the beginning of the early Srubnaja time ca. 1600 BC quite likely. The transition in Central Europe to the BzB phase could also be caused by this event in 1560 BC, since the several years of summer frost that followed the eruption, described by Chinese sources for the end of the Xia dynasty²³³, were critical for the agricultural societies of this region. However, we cannot be sure that the beginning of the LH I and phase A2c were absolutely synchronous, and that the date 1600 BC is the final date for the start of the Circle A at Mycenae.

It is difficult to determine the date of the first penetration of the Carpatho-Mycenaean ornaments to the east, and, accordingly, the date of the Don-Volga Abashevo, Potapovka and the final phase of Sintashta, since we do not know in what part within phase A2b this took place. At the very beginning of this phase, the population penetrated into the Carpatho-Danubian basin from the east, and we may

²²⁵ GRIGORIEV 2002, 137; MIMO HOD 2013, 263, 264.

²²⁶ GRIGORIEV 2018a.

²²⁷ DAVID 2002, 401; 2007, 415.

²²⁸ MARINATOS 1976, 66.

²²⁹ TARTARON 2008, 84.

²³⁰ BRUNNER/VON FELTEN/HINZ/HAFNER 2020, 20.

²³¹ MARTHARI 1993.

²³² Currently, my article on this topic is under review.

²³³ FOSTER/RITNER/FOSTER 1996, 9.

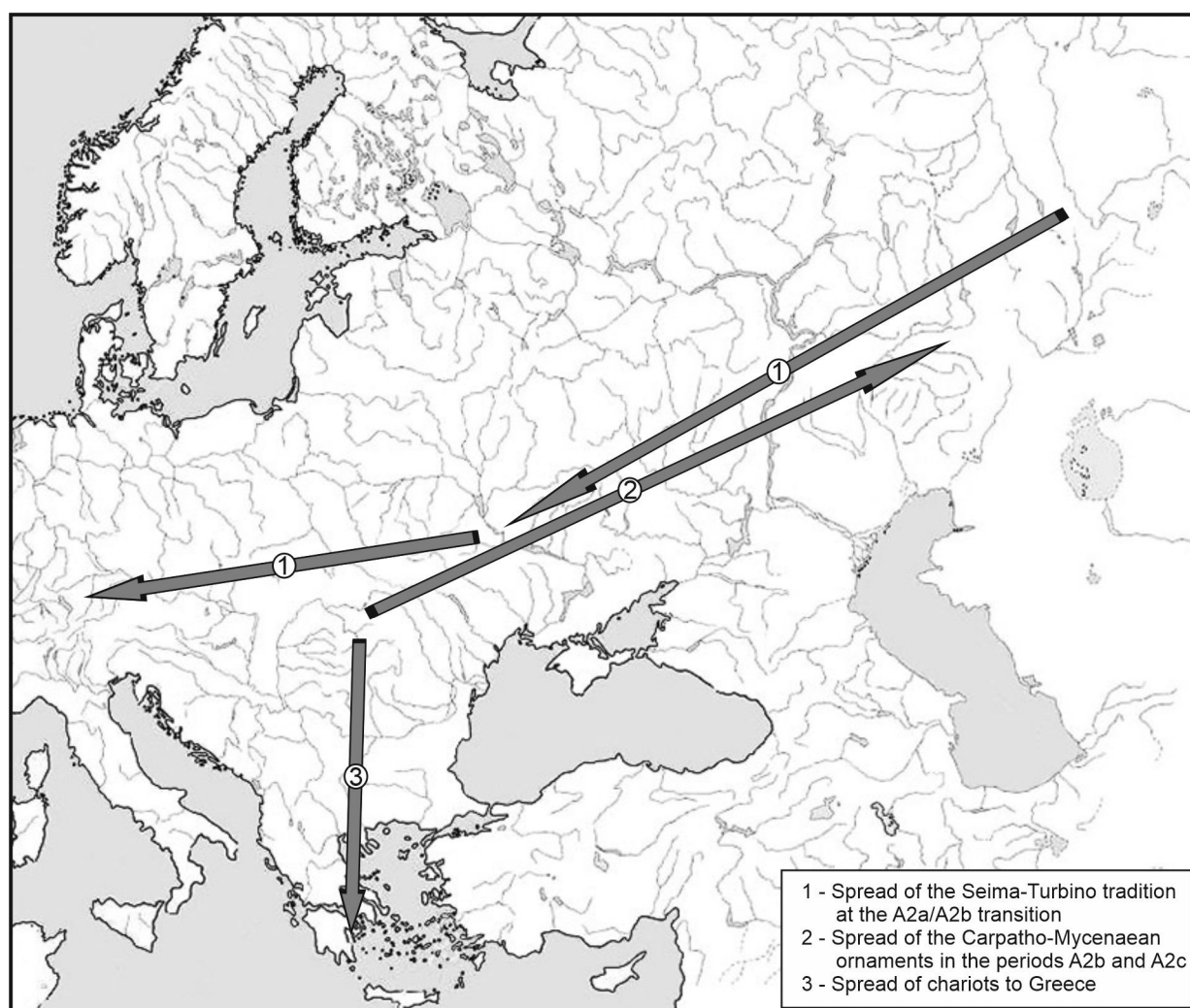


Fig. 18. Spread of the Seima-Turbino tradition to Europe, Carpatho-Mycenaean ornaments to Eastern Europe and the Urals, and chariots to Greece.

even assume that the return movement took place almost immediately. It did not include the Carpathian population, since only those elements of culture that are associated with chariot complex spread to the east: some specific features in cheekpieces and ornaments associated with them. Other local features have not been adapted, or we have not yet identified them. But we have no grounds for clear judgments on this topic.

But we have additional evidences for discussing the date of the chariot complex formation in the Carpathians at the beginning of the Central European phase A1c, within which the Babino and, probably, the Middle Volga Abashevo cultures formed. Since, according to our reconstruction, the impuls for this was made by cultural transformations in the Carpathian basin, stimulated by the population that came from Anatolia, we can try to rely on the Near Eastern chronology. Based on the fact that chariots with four spokes appeared in the Carpathians and Greece, a date earlier than 1750 BC is possible, but it is unreliable, since during 1750–1600 BC eight and four-spoke wheels coexisted. Another support for us may be the date of the presence of the identical ornamental style in layer Ib on Kültepe (Kanesh), which replaces layer II, associated with the *karum* of the Assyrian trading colony in the Lower City. Around 1835 BC the city

was burned and plundered by the king Uhna of Zalpuwa, allied with the Hattians of the Halys bend. Particularly indicative are excavations in the Upper Town, where the Varšama Palace (layer Ib) was built on the ruins of the Old Palace (layer II). The trees for this palace were cut in 1835–1832 or even in 1852–1843 BC, and in this case, many AMS analyzes and dendrochronology showed correspondence with the “Middle” chronology of Mesopotamia, which was reliably proved by the correlation with the eponymous lists of Kültepe. Varšama was a historical person who ruled ca. 1775–1750 BC. Accordingly, he lived in the palace built before him. Earlier kings of this period were Hurmeli and Inar, the Varšama’s father, who ruled ca. 1790–1775 BC²³⁴. Based on this, we can date the Anatolian impulse to the Carpathians within a very wide period of ca. 1850–1750 BC. But we do not yet have an opportunity to clarify the date based on the typology.

If we proceed from the fact of the presence of Thracian and Phrygian place names north of the Halys bend, in the Sinop region, we can turn to historical events that could destabilize the situation in this region. Around 1750 BC the Hittites from Kuššara appeared on the historical arena. At

²³⁴ BARJAMOVIC/HERTEL/LARSEN 2012, 29, 34, 40, Fig. 11, 13.

this time, the Hittite leader Pithana came to Kanesh and expelled Varšama from there. Pithana is succeeded by his son Annita, who rules until 1725 BC. Around 1730 BC he invaded the Halys bend, captured and destroyed Hattusa, but he also waged a series of battles, including at Zalpuwa, from where he returned to Kanesh the “god” previously stolen by Uhna, probably some sacred object²³⁵. The city of Zalpuwa was located to the north of the bend of Halys, on the Black Sea coast, and here Kaskians lived, which, on the basis of onomastics and toponymy, were identified with the Thracians and Phrygians²³⁶. But we do not know the date of Annita's battle at Zalpuwa, whether it coincides in time with his actions at Hattusa. Therefore, the date 1730 BC is likely, but it is not the only possible. Some other event of this turbulent time of the late part of the Anatolian EBA III, when the consolidation of small city-states took place everywhere²³⁷, could have led to the migration. It is possible that the movement of Cappadocian ware from the east, described by J. Mellaart, marks the migration of the Palaians who settled north and northwest of the Halys bend. They could displace the Thracians and Phrygians from the region before the Annita's actions in the north. This expands the possible interval for the impulse under discussion. Therefore, the formation of the MBA cultures of the Carpatho-Danubian basin could occur in the interval 1850–1730 BC. Accordingly, the formation of the Abashevo and post-Catacomb cultures took place at the same time, but with some delay. As a result, we get not too strict and too wide intervals. However, there is a possibility of gradually clarifying them when it becomes possible to link the Carpathian MBA cultures with the Alpine dendrochronology of the early A1c phase.

By applying Bayesian statistics to the AMS dates of the Central European complexes, the A1/A2 transition is dated between 1876–1820 BC²³⁸. Accordingly, the beginning of A1c should be earlier or in the early part of this interval, but we cannot exclude here the standard for this method older dates, which the applied procedures reduce, but do not completely eliminate. Unfortunately, it is not yet possible to determine the date of this transition using the dendrochronological method²³⁹. Moreover, it cannot be extremely accurate. On the example of the steppe and forest-steppe Eurasia of this time, we see the coexistence of traditions, which we previously estimated as different in time.

For Sintashta, the previous date remains relevant, but an earlier date is also possible. Around 1775 BC the kingdom of Mamma expanded to the south of Taurus, capturing Zalwar, Uršu and Haššum²⁴⁰. However, if eight-spoke wheels did not really appear before 1750 BC, this date is questionable. If the date 1740 BC is accepted, and with

the limitation of the upper boundary of Sintashta by some time before 1600 BC, we can get a very narrow interval for it. However, this is quite consistent with the impression of a relatively short existence, which is produced by the excavations of the Sintashta settlements.

7. CONCLUSIONS

The spread of chariots and cheekpieces in steppe Eurasia and the Carpathian basin was associated with instability in Anatolia, from which migrations followed to both regions within 1850–1730 BC. It is quite likely that tribes, speakers of the Thracian and Phrygian languages, migrated to the Carpathians from the Black Sea zone of Central Anatolia. In the same period, the migration of the Greeks took place, although it could be earlier, and in general this situation is not so clear and must be studied on the Balkan materials. This leads to the formation of the MBA cultures of the Carpatho-Danubian basin and corresponds to the beginning of the A1c phase of the Central European chronology. As a result, part of the local population is displaced from this region, which migrated to the east, leading to the formation of the Middle Volga Abashevo and post-Catacomb cultures, and antler and bone cheekpieces were spreading in the Carpathians and the Urals. In the Carpathians, the number of cheekpieces is small, but typologically they are very diverse. In the Transurals, the Sintashta culture formed with a bright chariot complex and a large series of disc-shaped cheekpieces with monolithic spikes. The development of this tradition led to the appearance of cheekpieces with a plank, and then grooved cheekpieces made of split bone.

In the period corresponding to the beginning of the Central European phase A2b, the population from the Transurals and Eastern Europe penetrated into the Carpatho-Danubian basin and further west, which brought the tradition of the Seima-Turbino metalworking (Fig. 18). During the same phase, a reverse impulse followed, accompanied by the distribution of innovations in the construction of cheekpieces: inserted spikes, planks with a row of thin holes, holes in another plane, Carpatho-Mycenaean ornaments, cheekpieces without spikes and cheekpieces with a long plank and pins. But at the same time, the Ural Abashevo and Sintashta people moved westward. All these processes lead to the formation of Potapovka type in the Volga region and the Don-Volga Abashevo culture. In the east, this corresponds to the late Petrovka sites, the movement of the early Alakul population to the steppe zone and the beginning of the formation of classical Alakul culture. This was probably stimulated by the Fyodorovka people who came from the east.

After some time, corresponding to the beginning of the European phase A2c and LH I in Greece (ca. 1600 BC), some elite groups (probably of Thracian origins) penetrated from the Carpathians to the south of the Balkan Peninsula and burials with cheekpieces appeared in the Shaft Graves of Circle A. It should not be assumed that they were responsible for the formation of the Mycenaean civilization, since the earlier tombs of Circle B (MH III) were the result of local development. The impulses of this time to the northeast

²³⁵ BARJAMOVIC/HERTEL/LARSEN 2012, 38, 40, 48, Fig. 13.

²³⁶ WOU DHUIZEN 2018, 44.

²³⁷ BARJAMOVIC/HERTEL/LARSEN 2012, 43.

²³⁸ BRUNNER/VON FELTEN/HINZ/HAFNER 2020, Fig. 7.

²³⁹ I am grateful to one of the authors of the cited article, Albert Hafner, for help and advice in this matter. The problem is that there is a reliable dendrochronological scale of this period for settlements in Switzerland, and there is a detailed typology of ceramics linked to this scale. However, metal finds at these settlements are rare, which does not allow reliably linking this dendrochronological scale with the Reinecke's phases identified on the basis of metal complex.

²⁴⁰ BARJAMOVIC/HERTEL/LARSEN 2012, 50.

coincided with the formation of early Srubnaja culture.

It cannot be ruled out that the formation of developed Srubnaja culture, as well as significant changes in Europe at the beginning of phase B1, coincided with the eruption of Santorini ca. 1560 BC.

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