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CONTENTS

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Marcin Burghardt[1]

CLASSIFICATION AND CHRONOLOGY OF THE COLLECTION OF ARROWHEADS FROM THE ASH-HILL FOUND IN THE HILLFORT OF THE SCYTHIAN CULTURAL CIRCLE IN CHOTYNIEC, SITE 1, JAROSŁAW DISTRICT

ABSTRACT

Burghardt M. 2020. Classification and chronology of the collection of arrowheads from the ash-hill found in the hillfort of the Scythian Cultural Circle in Chotyniec, site 1, Jarosław district. *Sprawozdania Archeologiczne* 72/2, 327-355.

The paper presents the results of a typo-chronological analysis of arrowheads from the ash-hill found in the hillfort of the Scythian cultural circle in Chotyniec, site 1, Jarosław province. During the 2016-2018 excavation campaigns, 38 such specimens were discovered. All arrowheads from Chotyniec could be linked to the Northern Black Sea region, where they have good analogies. Thanks to a detailed chronological analysis of the arrowheads, using the data from quiver sets from Scythian graves, it was possible to establish that they could be dated between the end (or maybe even the second half) of the 7th century to the middle of the 6th century B.C. Referring to chronological schemes of the Scythian cultural circle, the described collection of artefacts would be linked to the final phases of archaic Scythia (stage ESC-3), which are synchronous with the second half of the HaD1 and the HaD2 phase in the periodization of cultures of Central Europe.

Keywords: Scythian archaeology, Early Scythian Culture, Early Iron Age, Weapons, Periodization, Classification

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1. INTRODUCTION

Without a doubt, one of the most important archaeological discoveries of recent years is the settlement in Chotyniec (site 1) in the Jarosław district. Despite the site having been known for a long time, no systematic investigations were done until 2016. For this reason, the chronology of its development, use and collapse remained undetermined, although many archaeologists tried to place it in the early Middle Ages or even later (*e.g.*, Kunysz 1968, 46). The state of research changed in 2016-2018 when the first excavations of the site were carried out (Czopek *et al.* 2017; 2018, 54, 56, 199, 291-303). Despite the fact that the range of fieldwork did not cover a large area of the settlement (in 2016, four test pits were explored, including one through the embankment wall and the other three located in the northern part of the internal area, while in 2017-2018, an area of about 160 m^2 was explored), extremely interesting discoveries were made. The artifacts and immovable sources obtained during fieldwork allowed for the specification of their cultural affiliation, and enabled the site to be assigned to the complex of other open settlements in the vicinity, representing the forest-steppe variant of the Scythian cultural circle (Czopek *et al.* 2018, 165-167, 197-202, 204, 210). Thus, they significantly expanded the boundaries of the occurrence of this cultural phenomenon in a north-westerly direction.

The settlement is located on the border of the upland of the Tarnogrodzkie Plateau and the valley of the Wisznia and San Rivers (Fig. 1; see also Czopek *et al.* 2018, fig. 5.2-5.3). The site has an irregular ellipse with dimensions of 750 × 600 m, which gives an area of approximately 0.36 km^2 (Fig. 2). The entire hillfort area was surrounded by an embankment, preserved in the southeastern part, covered by trees. The width in this zone is about 30 m, and its height is 3-4 m. The test pits prepared in 2016 did not reveal the presence of any internal structures within it. The research conducted in the north-eastern part of the internal zone was more fruitful. The main subject of these studies was a small, but visible elevation covered with numerous fragments of pottery, animal bones and lumps of daub, occurring within the darkened part of the ground surface. Already, at the initial stage of research, it turned out that those relics are remains of an ash-hill (*zolnik*), which is typical ritual space for Eastern European (mainly forest-steppe) settlement sites from the Bronze Age and the early Iron Age. The object had a slightly oval shape with a diameter of about 17-18 m. Its base was a small, conical artificial mound made of yellow clay, which was built on previously leveled terrain. The upper layers consist of traces of burning, with numerous artifacts and post-consumer animal bones. These layers in many places were separated by "inclusions" of yellowish clay of varying thickness. No other artifacts were recorded within them. Based on observations of the stratigraphy, it can be assumed that the ash-hill was used during at least two phases, which should be associated with the described layers of burning, animal bones and various findings. Unfortunately, due to the occupation of a large part of the settlement by a farm in the second half of the 20th century, the upper layers of the ash-hill were only partly preserved.

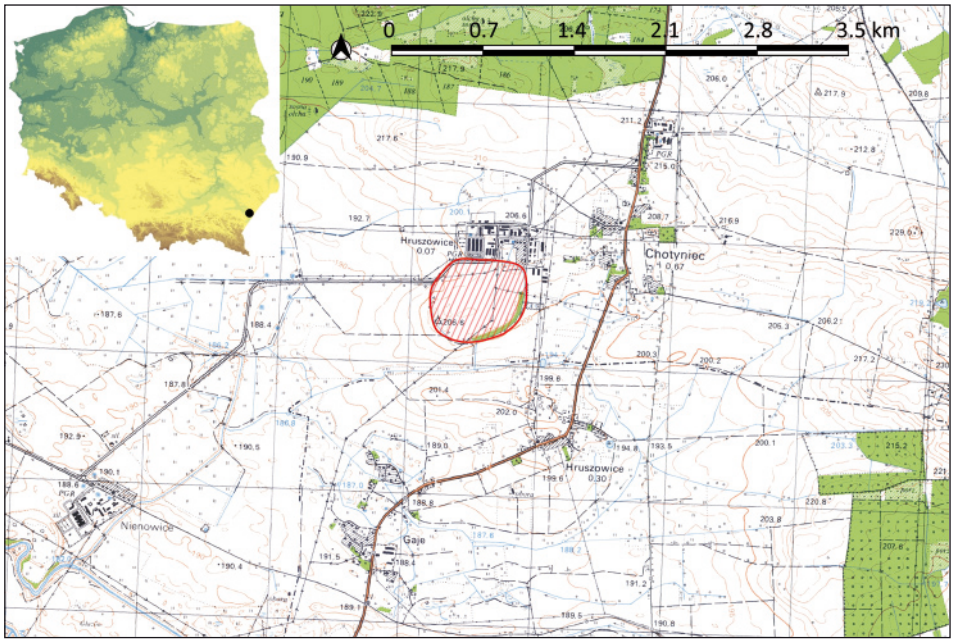

Fig. 1. Chotyniec, site 1, Jarosław district. Location of hillfort of the Scythian Cultural Circle

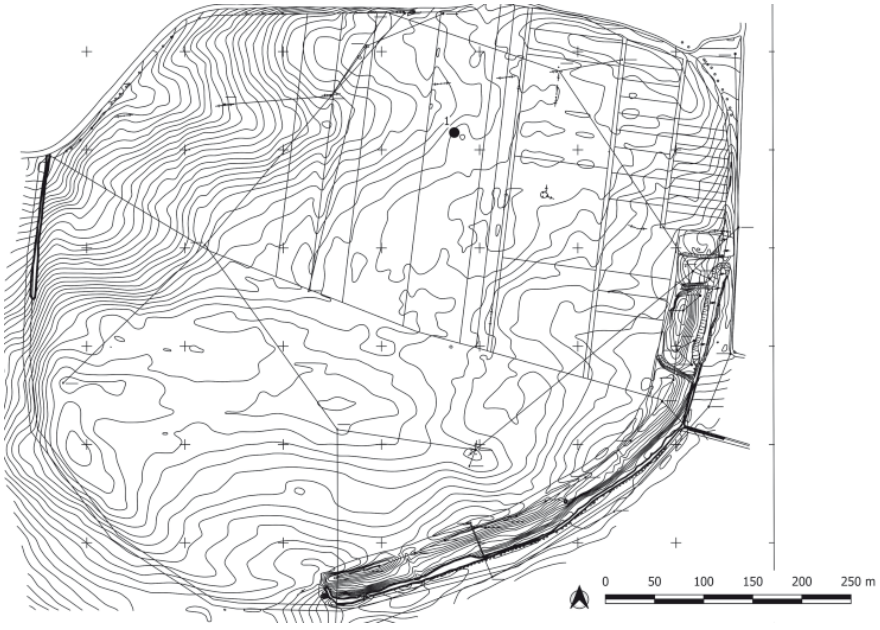

Fig. 2. Chotyniec, site 1, Jarosław district. Situational altitude plan of the hillfort: ash-hill (1)

During the research, which took place in 2017-2018, an extremely large amount of artifacts was found. In addition to animal bones, likely remains from various ceremonies that regularly took place here, an unusually large amount of pottery fragments, as well as numerous metal artifacts (mainly bronze and, to a lesser extent, iron; even some fragments made of gold) and bones were found. In total, more than 18,500 fragments of pottery

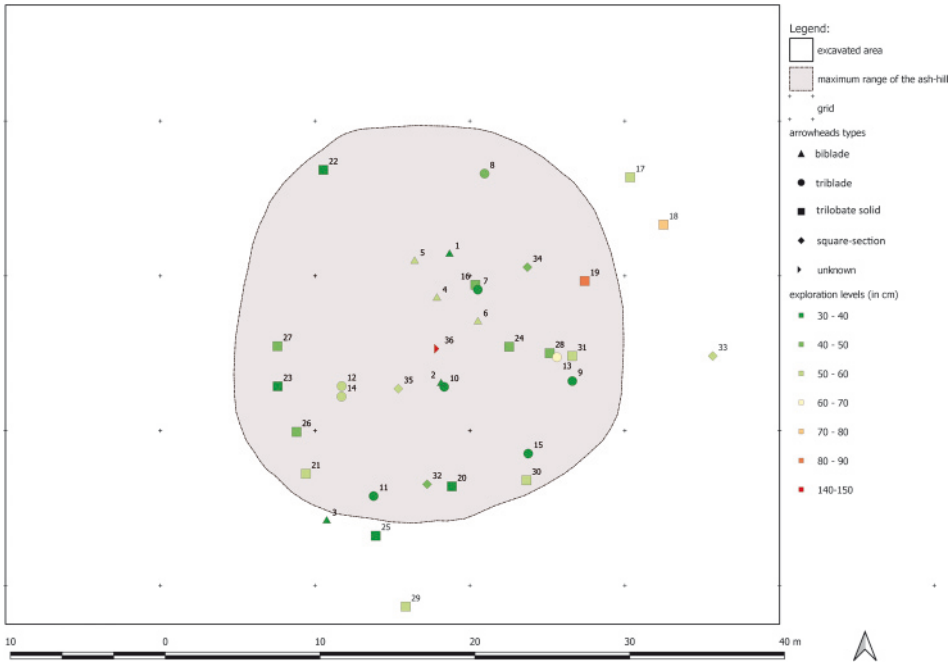

Fig. 3. Chotyniec, site 1, Jarosław district.
Distribution of arrowheads in ash-hill from Chotyniec with reference to the exploration levels

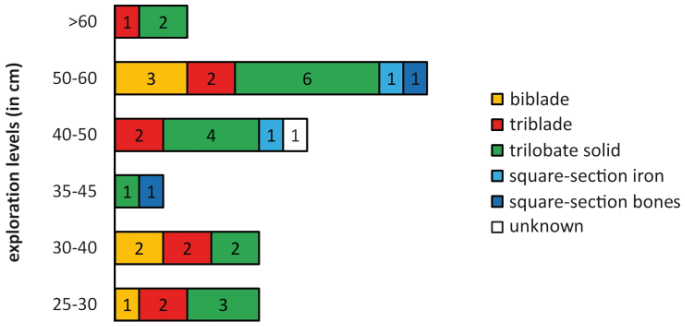

Fig. 4. Chotyniec, site 1, Jarosław district.
Number and form of arrowheads in relation to particular exploration levels

were recorded, among which, apart from the largest group of hand-made, local pottery, imported Greek amphorae (almost 200 fragments) as well as 148 bronze and 50 iron artifacts were particularly noteworthy. The collected sources are completed by single fragments of gold and bone items. Among the metal artifacts, the numerous arrowheads are particularly important for the analysis presented in this paper. Their presence was revealed within all exploratory layers (Figs 3 and 4). It should be noted that, as with the rest of the material (apart from artifacts from the arable layer), these objects occurred only within the layers of burning.

The presented paper is part of the research program *On the border between two worlds. Chotyniec agglomeration of the Scythian cultural circle – stage I: field research*, funded by the National Science Centre, No. 2017/27/B/HS3/01460. The main purpose of this article is to present the collection of arrowheads obtained during the excavations in the area of the ash-hill in 2016-2018. In addition, I would like to prepare an analysis of the collection in the present classification system. And finally, I will examine the chronology of the assemblage of arrowheads, as well as the ash-hill itself.

2. CLASSIFICATION OF ARROWHEADS

The presented collection consists of 38 arrowheads made from various materials, mainly bronze, as well as from iron and bone specific form of 37 of whose could be determined. According to commonly accepted classification systems of such arrowheads (*e.g.*, Meliukova 1964, 16-29, fig. 1; Petrenko 1967, 44-48; Ochir-Goriaeva 1996, 42-50; Hellmuth 2006, 193, Abb. 2), four main groups (sections) can be distinguished based on the cross-section of the arrowhead's body: the first one includes biblade specimens, the second group includes triblade specimens, the third group is made up of trilobate solid arrowheads, and the fourth is composed of square-section ones. While artifacts from Chotyniec belonging to classes I-III were made from bronze, group IV covers rare iron and bone specimens. The frequency of those main categories of arrowheads is presented in the chart in Fig. 5.

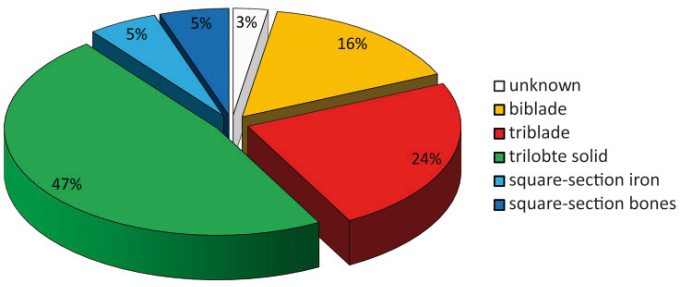

Fig. 5. Chotyniec, site 1, Jarosław district. Frequency of types (groups) of arrowheads

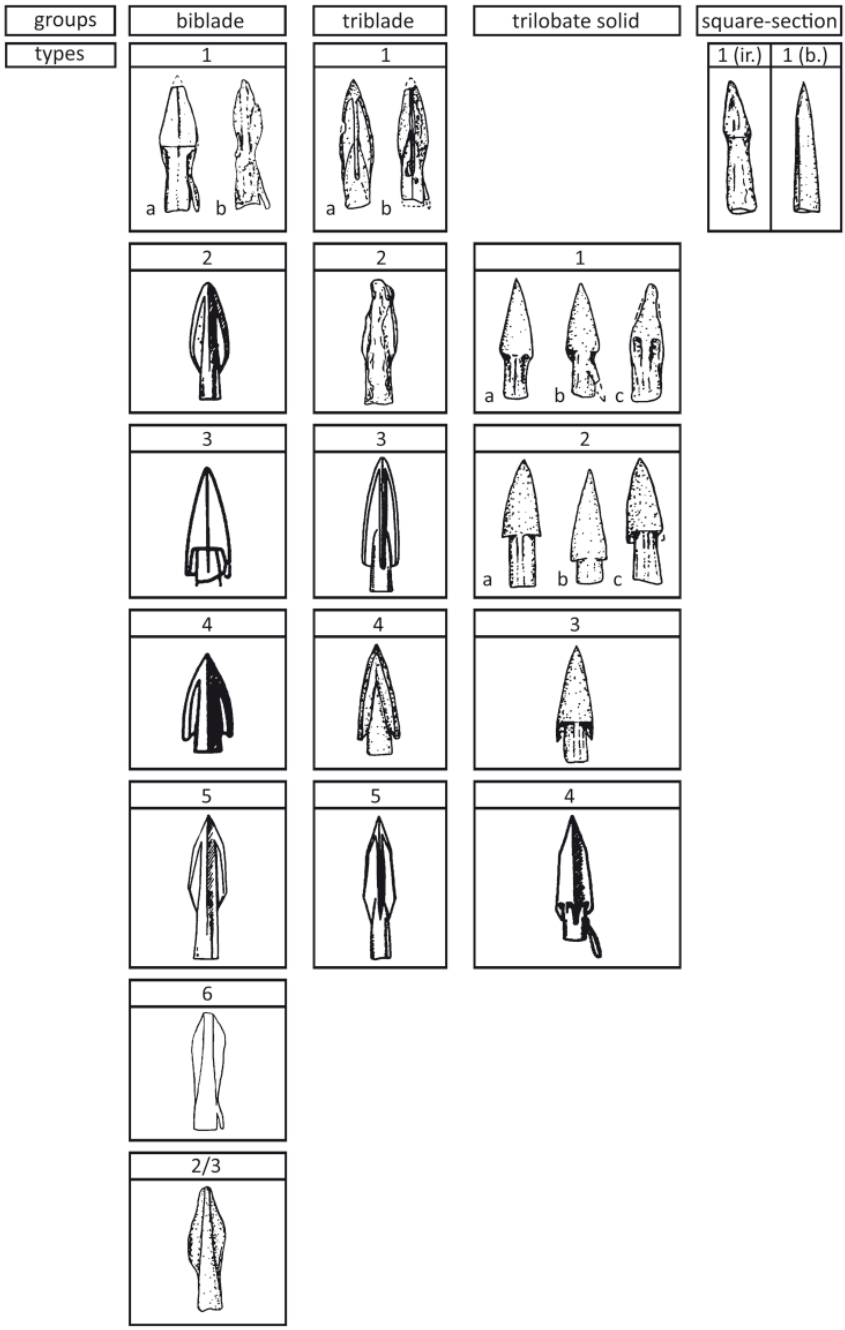

Fig. 6. Chotyniec, site 1, Jarosław district. Typological differentiation of arrowheads found in the ash-hill from Chotyniec (description in text)

The second feature of arrowheads used in their classification is the shape of the blade (leaf). In the collection from Chotyniec, the following varieties can be distinguished:

• a laurel-shaped blade, with the largest width more or less in the middle of its length;

• a leaf-shaped blade, with the maximum width in the lower part;

• a triangular blade, with more or less curved edges;

• a different shape of blade, with at least one of the edges extended to form a barb. In the case of triblade and trilobate solid types, all edges are extended, and the outline of the blade itself takes the form of a triangle with more or less arched edges. Barbed biblade arrowheads, which are absent in the analyzed collection, could have either two barbs, formed in a similar way as in triblade and trilobite species (*e.g.*, Smirnova 1993, fig. 8: 6), or they can have a blade of oval or rhomboid-oval form with only one prolonged edge (type 4 of group I according to Meliukova – 1964, fig. 1);

• a rhomboid-shaped the blade.

Based on these criteria, as well as on the classification of A. I. Meliukova (1964, 16-29, fig. 1) and A. Hellmuths (2006, 193, Abb. 2), several types were identified in each group. However, not all of them are represented in the analyzed set (Fig. 6). Nonetheless, they were included in the presented classification due to their presence in quiver sets with analogous arrowheads, similar to the findings form Chotyniec. In this way, among the first three groups of arrowheads different types were distinguished:

Group I – six types: 1 – with laurel-shaped blade; 2 – with a leaf-shaped blade; 3 – with a triangular blade and profile with slightly arched edges; 4 – with a triangular blade and two barbs, or an oval or rhomb-oval blade and only one barb; 5 – with a polygonal, most often hexagonal-shaped blade; 6 – with a blade of rhomboid form that can be symmetrical or asymmetrical. Among the assemblage from Chotyniec, only types 1 and 6 were identified Additionally, the transitional type 2/3 was identified based on the presence of an atypical, asymmetric outline of the blade – one side in a laureate form, while the second one was leaf-shaped. Forms representing belonging to types 2-4 are known from a grave from kurhan No. 2 found in Perebikivtsy (Smirnova 1993, fig. 8: 1, 2, 6; 9: 1) from the range of the West Podolian group of the Early Scythian Culture (ESC), and from the burial mound excavated by D. G. Shults near the stanitsa of Kelermes (Galanina 1995, fig. 3: 29-31) in the North Caucasus. In A. I. Meliukova's classification, these arrowheads were classified in the following types: I/3, I/6, and I/4. The fifth type is represented by arrowheads from Perebikivtsy, burial mound No. 2 (Smirnova 1993, fig. 8: 3-5, 9: 1);

Group II – five types were distinguished, according to the blade shape in an analogous way to the first group. In the collection from Chotyniec, findings of types 1, 2 and 4 are represented. Arrowheads of types 3 and 5 are known from mound No. 2 in Perebikivtsy (Smirnova 1993, fig. 8: 7, 8, 11, 12, 17; 9: 2-5, 10, 11);

Group III – four types: 1 – with laurel-shaped blade; 2 – with a triangular blade and more or less curved edges; 3 – with a triangular blade with barbs; 4 – with a polygonal (hexagonal) blade. Among the collection from Chotyniec, the first three types are represented.

Arrowheads of type 4 are known, along with others from the aforementioned group in Perebikivtsy, mound No. 2 (Smirnova 1993, fig. 9: 6).

Additionally, in the existing classification systems, apart from the shape of the blade, the form of the socket – either projecting or interior – is also taken into account. In the analyzed collection, all specimens made of bronze have a separate sockets of different lengths. Secondary morphological features are also important elements in the classification of Scythian arrowheads. These include the presence of a spur, the form of the blade and its transition into the socket, and the shape of the barbs in the case of triangular specimens.

Group I – Biblade arrowheads

Type 1 (I-1). Biblade arrowheads with a blade in the shape of a laurel leaf. They are divided into two variants:

• variant a (I-1-a – group-type-variant). Biblade arrowhead with a laurel-shaped blade with a flat lower part, and an upper part of a rhomboid form. The socket is clearly separated and has a rhomboid cross-section and a spur. Dimensions: length – 32 mm, the largest width of the blade – 10 mm, the diameter of the socket inlet – 7 mm, the diameter of the socket at the base of the blade – 5 mm. Weight: 3.1 g (Fig. 7: 1);

• variant b (I-1-b). Biblade arrowhead with a laurel-shaped (?) blade the socket is clearly separated and passes into the midrib and spur. Dimensions: length – 36 mm, the largest width of the blade – 8 mm, the diameter of the socket inlet – 7 mm, the diameter of the socket at the base of the blade – 6 mm. Weight: 2.9 g (Fig. 2: 1; 7: 2).

Type 6 (I-6). Biblade arrowhead with a massive, asymmetrical, rhomboidal blade, with the largest width in its upper part. The socket is separated, short, passing into the midrib, with a spur. The presented type is unfinished – in the top part of the blade, remains of gating systems is recorded. Dimensions: length – 36 mm, the largest width of the blade – 10 mm, the diameter of the socket inlet – 7 mm, the diameter of the socket at the base of the blade – 7 mm. Weight: 3.7 g (Fig. 2: 6; 7: 3).

Type 2/3 (I-2/3). Biblade arrowhead with an asymmetrical blade. One side of the blade is in the shape of a laurel leaf, while the second one is slightly less curved. The socket is clearly separated, passing into a midrib, without a spur. Dimensions: length – 39 mm, the largest width of the blade – 12 mm, the diameter of the socket inlet – 8 mm, the diameter of the socket at the base of the blade – 7 mm. Weight: 3.2 g (Fig. 2: 5; 7: 4).

In addition to the above-described classification, the analyzed collection also contained a fragment of another biblade arrowhead (Fig. 2: 4). Unfortunately, due to the poor condition (only a part of the blade preserved) a detailed description of its form is impossible.

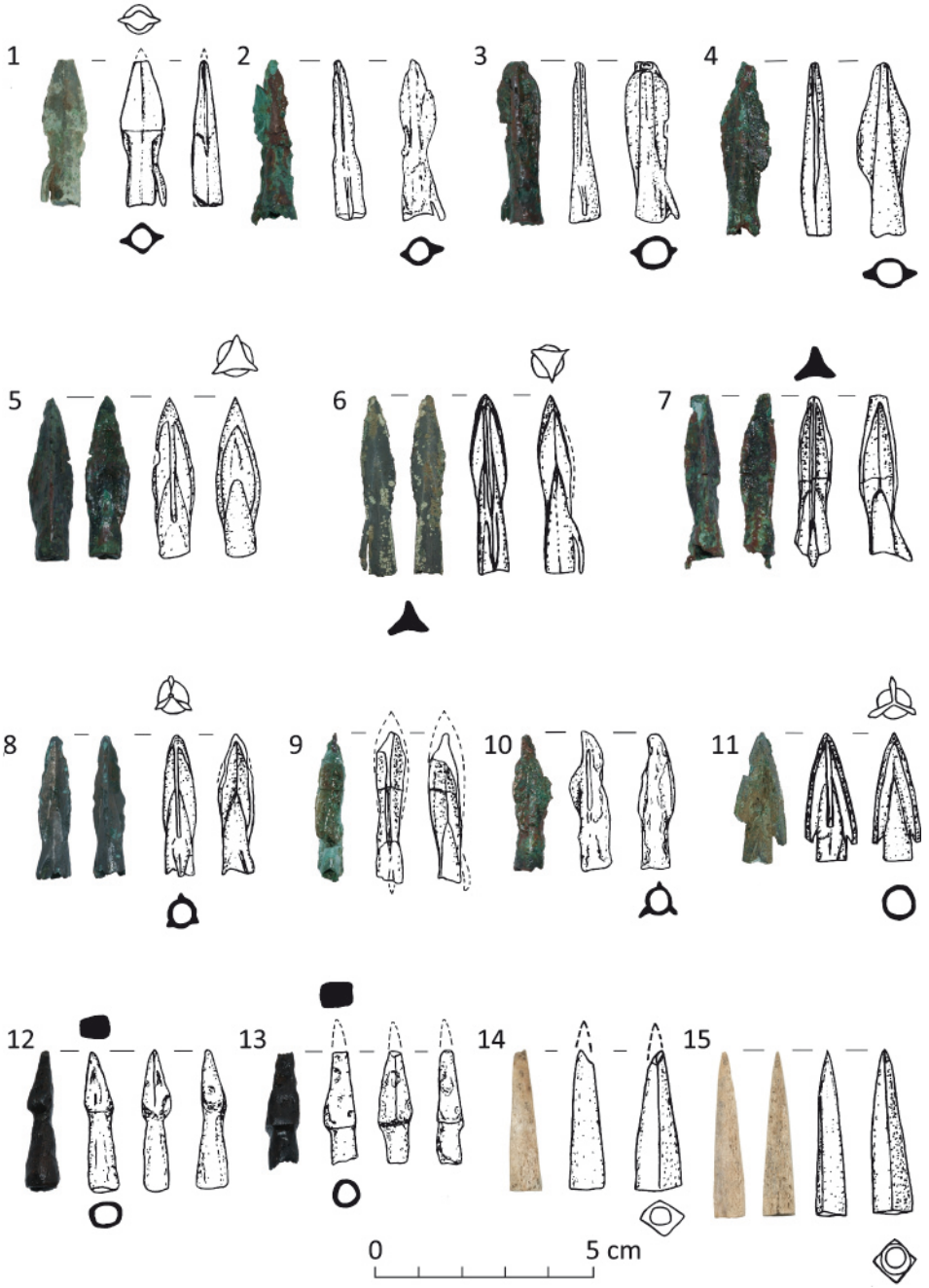

Fig. 7. Chotyniec, site 1, Jarosław district.
Biblade, triblade, and square-section arrowheads

Group II – triblade arrowheads

Type 1 (II-1). Triblade arrowhead with a laurel-shaped blade. Due to the presence or of a spur, two variants were distinguished:

• variant a (II-1-a). A triblade arrowhead with a laurel-shaped, visible short socket without a spur. Dimensions: length – 36 mm, the largest width of the blade – 10 mm, the diameter of the socket inlet – 7 mm, the diameter of the socket at the base of the blade – 7 mm. Weight: 3.7 g (Fig. 2: 14; 7: 5);

• variant b (II-1-b). Five triblade arrowheads with laurel-shaped blades, separated socket and spurs of various length. Dimensions: length – 32-39 mm, the largest width of the blade – 7-8 mm, the diameter of the socket inlet – 6-7 mm, the diameter of the socket at the base of the blade – 5.5-6 mm. Weight: 2.7-3.3 g (Fig. 2: 8, 11; 7: 6-9; Czopek *et al.* 2017, fig. 13).

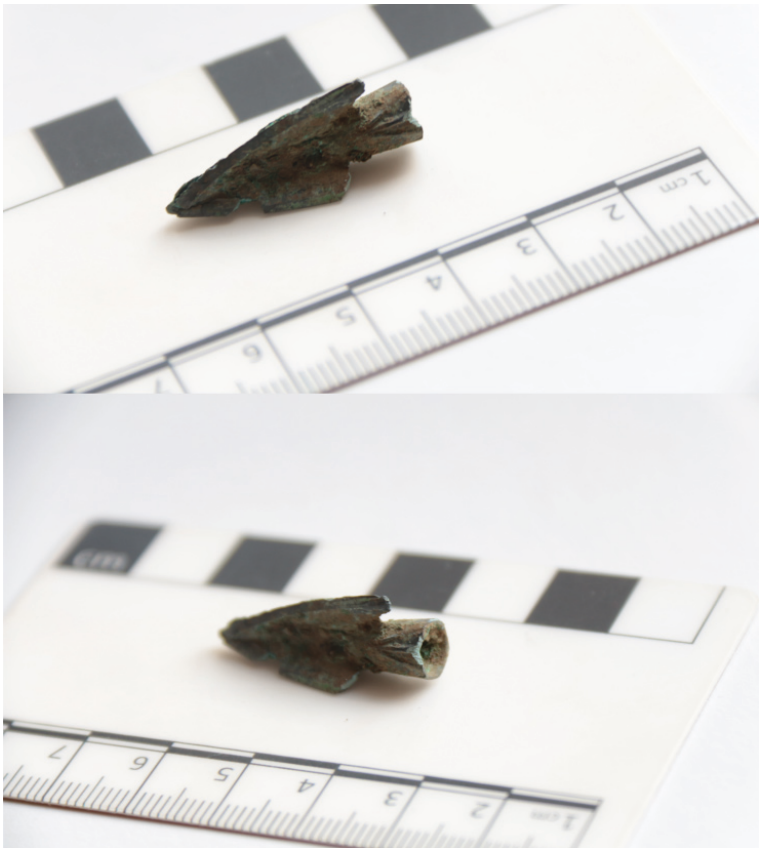

Fig. 8. Chotyniec, site 1, Jarosław district. Detail of the type II-2 arrowhead type

Type 2 (II-2). A triblade arrowhead with a partially preserved leaf-shaped blade (?), a separate socket, and no spur. Dimensions: length – 32 mm, the largest width of the blade – 10 (?) mm, the diameter of the socket inlet – 8 mm, the diameter of the socket at the base of the blade – 7 mm. Weight: 3.1 g (Fig. 2: 12; 7: 10).

Type 4 (II-4). A triblade arrowhead with a massive triangular blade, arched edges and diagonally-cut barbs. The socket is separated and has no spur. On the socket, engravings are present in the form of an inverted letter "V" with a bar (Fig. 8). The "V" is directed with its arms towards the inlet of the socket. Dimensions: length – 28 mm, the largest width of the blade – 12 mm, the diameter of the socket inlet – 7 mm, the diameter of the socket at the base of the blade – 6 mm. Weight: 1.9 g (Fig. 2: 7; 7: 11).

Group III – trilobate solid arrowheads

Type 1 (III-1). Trilobate solid arrowheads with narrow leaf-shaped blades and separate sockets. Due to the manner in which the blade transitions into the socket and also due to the presence of the burr, this type is divided into three variants:

• variant a (III-1-a). Two trilobate solid arrowheads with narrow leaf-shaped blades. The lower parts of the blades are beveled, overlapping a separate socket without a spur. Dimensions: length – 29-30 mm, the largest width of the blade – 8 mm, the diameter of the socket inlet – 7 mm, the diameter of the socket at the base of the blade – 6 mm. Weight: 2.7-3 g (Fig. 2: 14; 9: 1, 2). It is possible that a similar arrowhead was found in a water drain. On the other hand, the state of preservation of its socket makes the presence of a spur uncertain. In comparison with the aforementioned examples, the blade is also more massive;

• variant b (III-1-b). Three trilobate solid arrowheads with narrow leaf-shaped blades. The lower parts of the blades are beveled to the separated socket with a spur. Dimensions: length – 27-29 mm, the largest width of the blade – 8-9 mm, the diameter of the socket inlet – 6-7 mm, the diameter of the socket at the base of the blade – 6 mm. Weight: 2.8-4 g (Fig. 2: 19, 26, 9: 3-5);

• variant c (III-1-c). Trilobate solid arrowhead with narrow leaf-shaped blades and engravings near the edges, extracted socket, without spur. Dimensions: length – 28 mm, the largest width of the blade – 9 mm, the diameter of the socket inlet – 7 mm, the diameter of the socket at the base of the blade – 7 mm. Weight: 3 g (Fig. 2: 16; 9: 6).

Type 2 (III-2) is represented by trilobate solid arrowheads with triangular blades, more or less curved edges and separated sockets. Due to the manner in which the blades transition into the socket, it is divided into three variants:

• variant a (III-2-a). Two trilobate solid arrowheads with a triangular, arched blade, straight-cut edges and a clear transition to the socket. The sockets are separated and have various lengths. There are no spurs. In one of the examples, the upper part of the blade was not preserved (cut?). Dimensions: length – 18-35 mm, the largest width of the blade –

9-10 mm, the diameter of the socket inlet – 7 mm, the diameter of the socket at the base of the blade – 6-7 mm. Weight: 2.8-3.7 g (Fig. 2: 18; 27; 9: 7-8);

• variant b (III-2-b). Trilobate solid arrowhead with a triangular blade, straight-cut edges and a short, separated socket. The transition of the blade into the socket is smooth. Dimensions: length – 31 mm, the largest width of the blade – 10 mm, the diameter of the socket inlet – 7,5 mm, the diameter of the socket at the base of the blade – 7 mm. Weight: 3.5 g (Fig. 2: 30; 9: 9);

• variant c (III-2-c). Two trilobate solid arrowheads with a triangular, arched blade. Edges are cut straight and covered with engravings, which frame the separated socket. Dimensions: length – 31-32 mm, the largest width of the blade – 9 mm, the diameter of the socket inlet – 7 mm, the diameter of the socket at the base of the blade – 6-7 mm. Weight: 3.2-4 g (Fig. 2: 17; 9: 10-11).

Type 3 (III-3). Three trilobate solid arrowheads with a triangular, arched blade and extended edges, ending diagonally in the form of barbs. In the lower part, some engravings partially frame the separated socket. One arrowhead has a bent tip (due to impact with a hard object). Dimensions: length – 30-33 mm, the largest width of the blade – 11 mm, the diameter of the socket inlet – 7 mm, the diameter of the socket at the base of the blade – 6.5 mm. Weight: 4-4.8 g (Fig. 2: 24, 28, 29; 9: 12-14). In two cases, small holes are present on the "barbs". This may suggest that they were casted in the same molding form. In this context, the differences visible between them, manifested in the different lengths of the socket, could have arisen as a result of their further elaboration (cutting the socket?).

Finally, in the collection of bronze trilobate solid arrowheads, we can note three partially preserved arrowheads (including one with socket). Unfortunately, we are unable to define their original form.

Group IV – square-section arrowhead

Arrowhead made of iron. Type 1. Two square-section arrowheads made of iron with a separate sockets of different lengths. Dimensions: length – 25-31 mm, the largest width of the blade – 6-7 mm, the diameter of the socket inlet – 7 mm, the diameter of the socket at the base of the blade – 5 mm. Weight: 2-2.6 g (Fig. 2: 32, 33; 7: 12, 13).

Arrowhead made of bone. Type 1. Two square-section arrowheads made of bone. In one case the tip of the blade is not preserved. The dimensions are about: length: 30-36 mm; width – 7 mm, the inner diameter of blade base – 4 mm. Weight: 1.1-1.3 g (Fig. 2: 34, 35; 7: 14, 15).

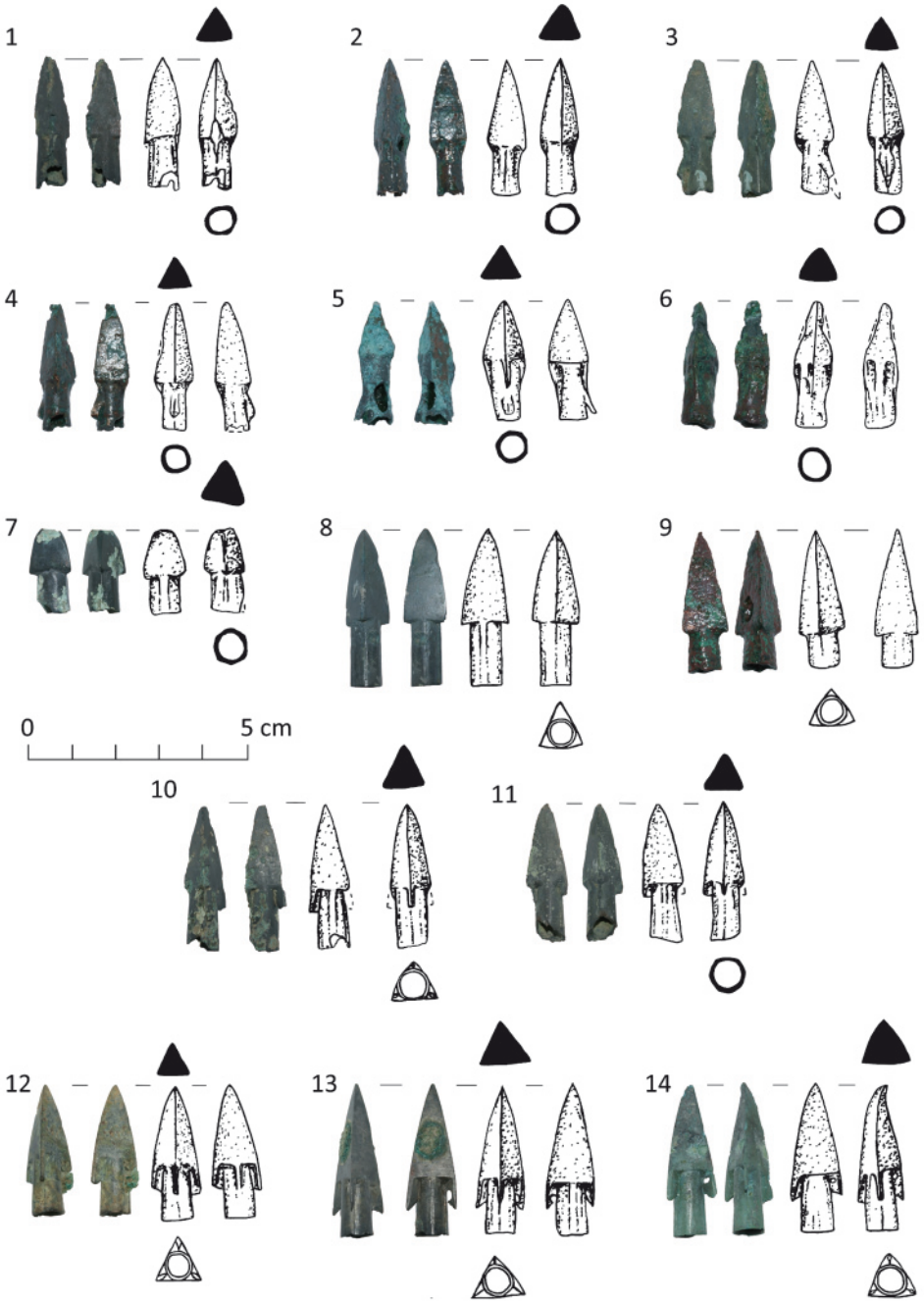

Fig. 9. Chotyniec, site 1, Jarosław district.
Trilobate solid arrowheads

3. THE COLLECTION FROM CHOTYNIEC IN THE CONTEXT OF THE CLASSIFICATION SYSTEM OF OTHER SCYTHIAN ARROWHEADS

Biblade arrowheads with laurel- and leaf-shaped blades, analogous to type I-1 among Chotyniec findings, are sometimes referred to as the so-called Kelermes type. In A. I. Meliukova's classification, they are included in the second type. Among arrowheads from Chotyniec, two of four variants of this type are represented. Arrowheads with a "bipartite" blade (I-1-a variant in the Chotyniec classification) are attributed to the third variant, while arrowheads with a laurel-leaf-shaped blade, with the midrib passing into the socket (I-1-b variant), belong to the second variant (Meliukova 1964, 18, fig. 1). An item with an asymmetric, leaf-shaped blade (type I-1/2) does not find an analogy in A. I. Meliukova's work. She includes examples with a leaf blade, with the largest width in the lower part, in the third type of the first group. Nevertheless, the lack of the spur suggests that the described artifacts are closer to the fourth variant (I/3/4 – group/type/variant) of this type. The absence of a spur is also characteristic for the first and fourth variants of the second type of arrowheads with a laurel-shaped blade. Moreover, the forms of the blades of arrowheads from Chotyniec suggest a closer relationship to the second type, but in the first group (I/2/1). The items of the I-1-b variant also find their equivalents in the classification of Scythian arrowheads from the hillfort in Smolenice-Molpír, prepared by A. Hellmuth (2006, 193, fig. 2). In this classification, the 1b variant of group IA is the most similar. Generally, the blades are in the shape of an almond (laurel), with a long socket, the length of which is about half of the entire arrowhead.

The second group of biblade arrowheads from Chotyniec is type I-6. According to A. I. Meliukova's (1964, 16, fig. 1) divisions, biblade arrowheads made of bronze, and with a rhomboid outline, were included in the first type of the first division. This type is divided into five variants based on the proportion of the blade, its symmetry or asymmetry, the length of the socket and finally the presence/absence of the spur. The asymmetric form of the blade is also one of the determinants of the arrowheads of the Zhabotin or Ehdzhe-Zhabotin type (Illinska 1973, 14, fig. 1; Polin 1987, 21-23; Daragan 2010, 565; 2015, 133). In comparison with the typical examples, the analyzed arrowhead differs slightly in the form of its blade, which is more curved, as well as in regard to its largest width, which is placed higher. This situation may be a consequence of the fact that the described item is unfinished. It is worth mentioning that the final shape of the arrowhead was determined by the technology of its preparation, especially the final stage associated with its sharpening. Each type of elaboration could significantly change the shape of the blade. This may lead to a considerable diversity of forms that can be associated with a particular type of arrowhead (in this case asymmetrically rhombic), even if they have been cast in the same molded form (see Daragan 2010, 565) Therefore, it is difficult to find more accurate analogies to the described artifact from Chotyniec. We can only try to point to arrowheads with some

similar features – among which are certain examples from burial mound No. 469 at Aksiutintsy upon Sula (excavations of N. E. Brandenburg); these were attributed by A. I. Meliukova (1964, plate 6: L, 1) to the third variant of this type. Similar examples also come from the vicinity of Izium upon Donets (Illinska 1973, fig. 2: 4, b, e, z).

Triblade arrowheads have been included in the second group by A. I. Meliukova. Examples analogous to those found in Chotyniec (types II-1, II-2 and II-4) can be attributed to the first three types. The first of them (type II/1) is characterized by a laurel-shaped blade, the second (type II/2) by a leaf blade with the largest width located in its lower part, while the third type (II/3) takes the form of a triangle (Meliukova 1964, 19, fig. 1). Among examples with a leaf-shaped blade, similar to the biblade arrowheads, some them are referred to the so-called Kelermes type. Nevertheless, three variants can be distinguished. The first two of them have a separate socket, with a spur (variant II/1/2) or without it (variant II/1/1), while the third variant (II/1/3) has no separated socket at all (Meliukova 1964, 19, fig. 1). In the analyzed collection, the first two variants of this type are found. They were included in variants II-1-b and II-1-a, respectively. In the classification of A. Hellmuth (2006, 193, fig. 2), these artifacts correspond to the arrowhead included in group IIA. These specimens, like most other types distinguished by this researcher, are divided into several variants differing in the ratio of the length of the socket to the length of the entire artifact, as well as by the presence of a spur on the socket.

The second type of triblade arrowheads present in the collection is classified as type II-2. This is in relation to the second type of the second division, according to A. I. Meliukova's classification (1964, 19, fig. 1), while in this group, only arrowheads of the second variant (II/2/2) do not have a spur.

The third form of triblade arrowheads that can be distinguished in the presented collection is a single type with a massive blade, curved edges and blades beveled at the bases (type II-4). In the literature, this kind of artifact is sometimes referred to as triangular-arched or triblade with a massive, arched point. Arrowheads of this variety, although they generally have blades cut at right angles to the socket, were included by A. I. Meliukova (1964, 19) in the first and second variants of the third type (II/3/1 and II/3/2). They differ also in the length of the socket. In this context, the presented artifacts can be referred to the second variety with a relatively short socket. In the classification of A. Hellmuth (2006, 193, fig. 2), the described arrowheads from Chotyniec can be associated with group IIG. A particularly interesting analogy for this kind of artifact comes from the Scythian culture settlement from the vicinity of Pozharnaya Balka in the Worskla River basin. It presents the same form as the analyzed arrowhead (Alekseev 2014, fig. 7; Daragan 2015, fig. 10: 32), but it is also covered by an engraving in the shape of a "bird's foot" on the socket (Alekseev 2014, 7). Apart from it, cuttings like this are sometimes interpreted as ornaments or "signatures" of craftsman – makers who mark their own products with their own designs (Daragan 2015, 128). However, these arrowheads have a different form of the blade, or the

engravings are placed elsewhere, sometimes as part of a more complex decoration (Alekseev 2014, fig. 3-4; Daragan 2015, fig. 2: 1).

In A. I. Meliukova's (1964, 19, fig. 1) system, **trilobate solid arrowheads** are represent the third group, consisting of ten types, two of whom were identified in Chotyniec. The first of them includes arrowheads with a leaf-shaped blade. In the Chotyniec classification, they are considered to be type III-1. This type is divided into four variants, while items from Chotyniec can be classified into three of them. The first variant (III/1/1) includes examples with a spur located on the socket. In the collection from Chotyniec, they represent variant III-1-b. The second one (III/1/2) is characterized by the lack of a spur and the presence of grooves on the edges. In the presented set, they are included in variant III-1-c. The third variant is analogous to arrowheads of variant III/1/3, which is distinguished by the absence of a spur on the socket. In the classification of Chotyniec artifacts, they are included in variant III-1-a.

Arrowheads of type III/2 with trilobate solid blades are analogous to types III-2 in the Chotyniec classification, as well as to III-3 in A. I. Meliukova's (1964, 19, 22, fig. 1) system, with the following four different varieties. The first one (variant III/2/1) represents examples with a triangular blade, straight-cut edges and a distinct socket. In the presented classification, they were included in variant III-2-a. Another variation considered by the mentioned author refers to the sixth variant, which includes items with a triangular and straight-cut blade, and without a clear difference between the body and socket. In the collection from Chotyniec, this type represents variant III-2-b. A. I. Meliukova also proposed two additional varieties of arrowheads with grooves in the lower parts of the blades. They frame the socket with small "wings". However, they differ in the way in which the "wings" are cut off – some are cut at right angles to the socket and belong to the eighth variant (III/2/8), while in the ninth variant (III/2/9) the "wings" are cut diagonally. Arrowheads from Chotyniec of analogous forms are grouped in the c variant of type III-2 and type III-3, respectively. Examples of variants III-2-a and III-2-b with straight-cut "wings" also find their equivalents in V. G. Petrenko's classification from the forest-steppe, right bank of Dnieperland, dating back between the 5th and 3rd centuries BC. He included trilobate solid arrowheads with triangular, arched blades and a separate socket in the second type of the third group. In this group, specimens with straight-cut edges are included in the first and fourth variants. In the first of them, the transition of the blade into the socket is clearly visible, in contrast to the second type (Petrenko 1967, 46-47, plate 34: 197, 211, 212).

Iron arrowheads with a square-shaped cross-section and separate sockets do not find analogies among the Scythian cultural circle. Generally, arrowheads of this type, known from the area inhabited by the Scythians, can be divided into three groups, which differ in the way of sticking to the spars, the shape of the blade and the technique of manufacture and elaboration. The first group can be characterized by flat arrowheads with a leaf-shaped blade and a tang, the second by arrowheads with separated, round sockets, while the third one includes the so-called "barbed" specimens (Shramko 2009, 384, fig. 2-6).

Apart from them, there are also a few finds from Scythian quiver sets with shapes that bear similarities to bone arrowheads with square-shaped cross-sections, but in this case without sockets. Iron arrowheads with a separate socket and a square-shaped cross-section are also not known from the range of other nomadic groups from the Early Iron Age (*e.g.*, Ochir-Goriaeva 1996, 49-50, fig. 6). However, for the described artifacts, analogies can be found outside the zone occupied by the Scythians. Some were recorded in the context of the Lusatian culture in Wicina (Michalak 2013, 51, 81, fig. 65: 12), which was destroyed by "assailants using Scythian-like weapons" (Chochorowski 2014, 32, fig. 19). Visible differences between the finds from Chotyniec and Wicina (*e.g.*, the length of the socket and a slightly different cross-section), though still close to square-shaped should be explained by technical issues, including – first of all – difficulties in obtaining identical arrowheads by different blacksmiths, especially if they are of small size.

Bone arrowheads with a square-shaped cross-section were classified by A. I. Meliukova (1964, 19, fig. 1) in group IV. Apart from them, this group also included items with a circular cross-section, which were absent in the collection from Chotyniec. In A. Hellmuth's (2006, 193, fig. 2) classification, the Chotyniec arrowheads can be included in the KN variant with a square-shaped cross-section.

4. CHRONOLOGY OF CHOTYNIEC ARROWHEADS

For determining the chronology of the arrowheads from the ash-hill in Chotyniec, we need to focus on establishing a general chronological framework. For this purpose, the dating of individual types of artifacts was made. Undoubtedly, biblade arrowheads with asymmetric, rhomboidal blades of type I-6 can be considered as the oldest. A. I. Meliukova (1964, 18) points out the connections of this type with the pre-Scythian period (8th-7th centuries BC). She connects only a few findings of this type with the first chronological group, and dated them between the end of the 7th – the beginning of the 6th century BC. A similar chronological frame for arrowheads with a rhomboidal head was prepared by V. A. Illinska. In addition, she divided this kind of item into two types: the Zhabotin type represents arrowheads with a long, separated socket, and is dated between the second half of the 7th century to the turn of the 7th/6th centuries BC, while slightly older finds (the beginning and the first half of the 7th century) are associated with arrowheads of the Endzhe type, characterized by a more massive form and a blade with a length almost equal to the entire artifact's length (Illinska 1973, 15, 17). S. V. Polin (1973, 31) quite often suggested difficulties in the unambiguous separation of both types and proposed combining them under the common name of the Endzhe-Zhabotin type. The chronology of this form of arrowhead was mainly connected with the Novocerkassk group from the 8th and 7th centuries BC. However, Polin took into account the possibility of their use in a later period as well. In his opinion, the end of their use is finally in the middle of the 7th century BC, when they were

replaced by arrowheads with blades in the shape of a laurel leaf. L. K. Galanina (1983, 42; 1995, 50) suggests a longer duration of this kind of weapon. In her opinion, they could have even been used in the third quarter of the 7th century BC. A chronology between the 8th and the 7th centuries BC was also assigned by I. N. Medvedskaya (1992, 87). Based on the findings of earlier researchers, including G. Kossak (1987, 24-86), she considered the use of this type of arrowhead as a determinant of the first stage of the Scythian culture (so-called ESC-1), related to the end of the 8th century and the early 7th century BC. The dates of finds from the West Podolian ESC group, in which some rhomboidal arrowheads were found (see the list of finds of this type of arrowhead in Burghardt 2015, table 1), cover the entire 7th century BC (Bandrivskyy 2010, table 1; Kowalski-Biłokryłyy 2012, 183-186, table 33-35).

Biblade and triblade arrowheads with a leaf-shaped blade of the Kelermes type, which can be combined with I-1 (variant b) and II-1 from Chotyniec, are younger then the Endzhe-Zhabotin type. A. I. Meliukova (1964, 18) considers them as the most common form of the quiver sets of the first chronological group. A similar dating for this type of arrowhead was described by S. V. Polin and N. I. Medvedskaya. According to this first researcher, the Kelermes type appeared around the middle of the 7th century BC, replacing the Endzhe-Zhabotin type, and was present until the first quarter of the 6th century BC (Polin 1987, 23, 31). In turn, I. N. Medvedskaya (1992, 87) treats this type as one of the determinants of the second and third stages of the ESC (respectively, the first half and third quarter of the 7th century BC, and the fourth quarter of the 7th and the beginning of the 6th century BC). The first chronological group is also connected to the triblade second type of arrowheads of A. I. Meliukova's classification, which is generally found in sets with biblade and triblade examples (see Meliukova 1964, table 1; plate 6).

Based on the findings of A. I. Meliukova (1964, 19), an arrowhead with a massive triangular blade with arched edges, and beveled at the base (type II-4), should be considered as the youngest among all triblade arrowheads from Chotyniec. In her opinion, some of the triblade varieties with triangular blades (II/3/1-3 and 6 variants) appeared and spread only in the beginning of the 6th century BC. On the other hand, they are not known from finds from the end of the 7th century BC. I. N. Medvedskaya has the opposite opinion. She assumes that these types of arrowhead appeared already at the end of the second stage of the ESC, and became dominant in the later stage, *i.e.*, in the second half of the 7th and the beginning of the 6th century (Medvedskaya 1992, 94-95). Also, M. N. Daragan suggests a similar chronology. According to her, they appear a bit earlier, in the first half of the 7th century, when it comes to a fundamental change of quiver sets, resulting due to the optimization of this type of weaponry. In effect, we can observe a gradual spread of triblade arrowheads of the described type, followed later by trilobate solid examples (Daragan 2010, 584-585, 586). In addition to the quiver sets from the ESK (or the first chronological group according to A. I. Meliukova), sometimes they are also found in younger burial complexes related to the second chronological group, which is dated between the second half of the 6th century and

the first half of the 5th century BC (Meliukova 1964, 21, table 2), or the beginning of the 6th – the beginning of the 5th century BC (Polin 1987, 31-32).

To the first chronological group we could attribute also a few trilobate solid arrowheads with leaf-shaped and triangular (or arched) blades of types III/1 and III/2, according to A. I. Meliukova's classification. This observation concerns only some of their varieties. In the analyzed collection from Chotyniec, these forms include the arrowheads of all three variants of type III-1 and some examples of the III-2-a variant. Trilobate solid arrowheads are more often found in the quiver sets of the second chronological group. In addition to varieties known from earlier assemblages, a number of new specimens appeared. Similar forms to artifacts found in Chotyniec were included in III/2/6 (III-2-b variants of the Chotyniec series) and III/2/8 (III-2-c) variants and III/2/9 (III-3) type by A. I. Meliukova (1964, 19-23). However, they are not frequent (Meliukova 1964, table II). On the other hand, it should be noted that analogous arrowheads were also found in the quiver sets in some burials of the West Podolian ESC group (Doliniany, k. 2; Kruglik, k. 1; Perebikivtsy, k. 2, sets of quivers No. 1 – Smirnova 1993, fig. 2: 12-14; 5: 1-2; 8: 20-22) related to the third quarter of the 7th century BC or slightly wider to the fourth quarter (end) of the 7th – the beginning (or the entire first half) of the 6th century BC (Smirnova 1993, 111, 112, 116; Kowalski-Biłokryłyy 2012, 184, 186, table 33). Thus, their chronological frames overlap with the dating of most other types of arrowheads, with the exception of the "archaic" Endzhe-Zhabotin type.

To summarize the above observations, it can be concluded that the collection of arrowheads from the ash-hill recorded in Chotyniec should be linked to the first chronological group. Thus, it should be synchronized with the Early Scythian Period, traditionally dated within the entire 7th and the first half of the 6th century BC. At the same time, some elements appeared that are considered as more characteristic for the second chronological group by A. I. Meliukova. She underlined the better quality of trilobate solid and triblade arrowheads over biblade ones, as well as the presence of new forms among them. However, these impressions are an effect of the limitations of the database (see Daragan 2016, 62; 2017, 85-86) that was available to A. I. Meliukova during her research. Turning now to newer remarks, the quiver sets of the Kelermes type, with biblade triblade arrowheads (including those typical for this stage, similar to type II-4) and also trilobate solid ones, appeared already in the first half (2nd quarter) of the 7th century BC (Medvedskaya 1992, 87-88; Smirnova 1993, 105-106; Galanina 1995, 50; Daragan 2010, 584-585, 586). The spread of triblade and trilobate solid arrowheads went further in the next period, in the second half of the 7th century BC, when they became the dominant form. On the other hand, biblade examples lose their popularity (Daragan 2010, 600), and even some "archaic" arrowheads were almost out of use. Their presence in this period is treated as a kind of anachronism (arrowheads of the Endzhe-Zhabotin type). In addition, one should point out the existence of a certain regionalism in the distribution of individual forms of arrowheads (Smirnova 1993, 105-106). It manifests itself in a different proportion of trilobate

solid specimens in a set. They are especially frequent in the West Podolian ESC group, where they are components of many quiver sets (Burghardt 2015, 146-147, fig. 4). As shown above, some forms (mainly trilobate solid ones same as III-2-b, III-2-c and III-4 variants of the Chotyniec series) appeared in the same grave inventories. According to A. I. Meliukova, they could be dated between the second half of the 6th century and the first half of the 5th century BC. However, they should be attributed rather to the period between the second half (probably the end) of the 7th to the beginning (or the entire first half) of the 6th century BC. In light of these findings, it can be concluded that the connection of this collection of arrowheads with the early Scythian period is irrefutable. Moreover, the dominance of triblade and trilobate solid specimens over biblade forms, in the presence of only a few "archaic" forms (arrowheads of type I-6/Endzhe-Zhabotin), suggests that the beginning of the Chotyniec collection should not be older than the middle of the 7th century BC.

The lack of triblade arrowheads of "basic" type with straight-cut leaves equal to the base of the non-separate socket (Meliukova 1964, fig. 1 – types II/5, II/6 and II/9; Daragan 2017, 53) seems to be crucial for determining the upper chronological framework of the Chotyniec collection. This observation is important because artifacts of this type are a mandatory element of quiver sets of the second chronological group synchronized with the Middle Scythian period (Meliukova 1964, 19-22, table II; Daragan 2017, 53, 82-89, 101). Its beginning is traditionally established to the middle (the second and third quarters) of the 6th century BC (Alekseev 2003, 156). Thus, the analyzed assemblage should not be younger than the middle of the 6th century BC.

Concluding this part of the considerations on the general chronological frames of arrowheads from Chotyniec, it should be noted that limiting their dating only to the early stage is also based on the other features of the collection. The first one is the weight of the artifacts. According to M. N. Daragan (2015, 158-160, 164) there is a strong correlation between the shape of the arrowhead, and thus its chronology and weight. First of all, we should point out the results of her analyses of the weight of trilobate solid and triblade specimens from the early and middle Scythian period. According to them, the scope of this parameter for arrowheads from the 7th century BC ranges from 1.5 to 5 g, while the artifacts weighing 3-4 g are the most popular. On the other hand, the weight of the arrowheads between the 6th and the first half of the 5th century BC does not exceed a value of 2-3 g (M. N. Daragan 2016, 159). The weight of triblade and trilobate solid arrowheads from Chotyniec is about 3-4 g (limit values of 1.3 and 6.1 g), which represents a typical range for the early Scythian period. Another element connecting the analyzed assemblage with the early Scythian period is the engraving in the shape of a "bird's leg", discovered on an arrowhead of type II-4. Taking into account the other findings, this type of ornamentation appeared only on artifacts from the early Scythian period and the first half of the 7th century BC (Shramko 2006, 41; Alekseev 2014, 7). The location of the ornamentation on the arrowhead from Chotyniec resembles the younger group of those artifacts. It is worth

mentioning, that both of this type arrowheads from the forest-steppe left-bank of Dnieperland were found not in graves, but in settlement sites (Pozharnaya Balka, the western fortifications of the Belskoe hillfort). In addition, the arrowhead from Belskoe was found in an ash-hill (feature No. 5), thus in the same context as in Chotyniec. The chronology of both artifacts is close to the beginning of the second quarter to the third quarter of the 7th century BC (Shramko 2006, 41-42; Daragan 2010, fig. V.49), with younger and more precise dates (the mid-third quarter of the 7th century BC) for Pozharnaya Balka, which represents the same type of arrowhead as the find from Chotyniec. Thus, arrowheads of type I-6 can be considered as determinants of the oldest stage of formation of the analyzed collection.

The second issue in the dating of arrowheads collected in the ash-hill in Chotyniec is an attempt to verify the degree of homogeneity of the analyzed assemblage. The stratigraphic observations of the layers forming the pit indicate at least two stages of its duration. The "younger" phase is not fully recognized due to the significant destruction of its upper parts. Thus, it cannot be certain that arrowheads refer to different chronological periods. At the same time, there are no other artifacts among them that can be clearly associated with other, younger chronological groups than the first one. Moreover, we can also observe the lack of "younger" findings near or in the vicinity of the ash-hill. For this reason, we assume that assigning chronological frames younger then the early-Scythian period is unjustified. Some important remarks can be made due to the observation of ash-hills from the forest area of Dnieperland. In the case of some of them that are confirmed to be multiphased, we can observe that mostly arrowheads and other artifacts are divided in horizons that could be easily dated (*e.g.*, Shramko 2006; Daragan 2010, fig. V: 49).

Another issue is the selection of sources for chronological analysis. In these terms, quiver sets placed in graves are the most relevant. However, this group of sources cannot be directly combined with settlement findings, including the collection from Chotyniec. Sets of arrowheads placed in the grave were consciously assembled (a separate issue is the reasons of selection of these kind of artifacts together – *e.g.*, Chochorowski 2014, 36-37; Daragan 2016, 72-73), while the arrowheads found in residual contexts are usually accidental. Their composition may be a result of various factors, the simplest being that they were lost by the owners. On the other hand, it should be noted that the above-mentioned observations of some of the ash-hills from areas located further east of Chotyniec indicate a clear chronological horizons of artifacts, including numerous arrowheads. They can be combined with specific stages of their use. Moreover, it must also be pointed out that the sets could be not purely accidental. The abundance of arrowheads among post-consumer animal bones suggests their use for killing animals, whose meat was eaten during various types of ritual feasts made in the area of the ash-hills. Another possibility that should be taken into account is their loss by the owners during various religious activities related to the use of this type of object. Finally, it cannot be ruled out that they are deliberately deposited in such locations (as votive/ritual gifts?). However, this hypothesis is difficult to

Table 1. Selected assemblages of grave goods with quiver sets similar to arrowheads found in the ash-hill from Chotyniec

Complex (Region)	Number	Material			Groups I			Groups II				Groups III				Chronology (in century BC)	Notice
		br	i	b	1	6*	other	1	2	4	other	1	2	3	other		
Aksiutintsy, barrow No. 467 (Sulaland)	5	+	-	-	1 (b)	-	1	2 (a,b)	-	-	-	1 (b)	-	-	-	1st half 7 (Medvedskaya 1992)	-
Aksiutintsy, barrow No. 469 (Sulaland)	11	+	-	-	-	1	-	6 (a,b)	-	-	3	1 (b)	-	-	-	1st half 7 (Medvedskaya 1992)	-
Lenkovtsy (West Podolian group ESC)	28	+	-	-	7 (b)	5*	-	3 (a,b)	3	4	4	2 (a)	-	-	-	1st half 7 (Kowalski-Biłokryłyy 2012)	-
Likhachevka (Vorsklaland)	55	+	-	-	21 (b,-)	-	2	5 (b)	3 (+)	8	7	1 (a)	-	-	8	1st half – half 7 (Daragan 2010)	-
Kelermes, barrow No. 24 (North Caucasus)	76	35	-	1 (c)	25 (b,-)	12*	+	18 (a,b)	-	-	2	13 (a-c)	-	-	5	half – 3rd ćw. 7 (Galanina 1995)	-
Malaya Ofirna (Forest-Steppe Right-Bank of the Dnieperland)	110	+	-	-	15 (b)	-	2	4 (a,b)	-	55	26	2 (a,b)	-	-	6	half – 2nd half 7 (Daragan 2010) or the end 7 (Kovpanenko *et al.* 1989)	-
Ostiniazhka, barrow No. 474 (Forest-Steppe Right-Bank of the Dnieperland)	12	9	2	1	2 (b)	1*	-	4 (b)	2	-	-	-	-	-	-	2nd half 7 (Kovpanenko *et al.* 1989)	-
Aksiutintsy, Starshaya Mogila (Sulaland)	177	138	31	8 (c, sq)	12 (a,b)	-	83	15 (a,b)	-	4	20	-	1 (a)	-	-	2nd half 7 (Daragan 2010) or 4th quarter of 7 – the beginning 6 (Grechko 2013)	-
Repiahtovaya Mogila, burial No. 1 (Forest-Steppe Right-Bank of the Dnieperland)	97	88	5	4 (c)	+ (b,-)	-	+	+ (a,b)	-	+	+	+ (a,b)	+ (a)	-	-	3rd/4th quarter of 7 (Grechko 2013) or the end 7 – the beginning 6 (Kovpanenko *et al.* 1989)	-

Repnahtovaya Mogila, burial No. 2, set of quivers No. 2 (Forest-Steppe Right-Bank of the Dnieperland)	124	+	-	-	11 (b)	-	-	34 (a,b)	-	-	60	-	-	19	-	no later than the end 7 (Daragan 2010), 2nd quarter of 7 – 1st quarter of 6 (Grechko 2013) or 1st half 6 (Kopylov and Rusakov 2014)	set of quivers coexisting with the Greek amphorae
Kruglik (West Podolian group ESC)	19	16	1	2 (sq)	-	1*	2	4 (a,b)	2 (+)	2	-	-	4 (a,c)	-	2	4th quarter of 7 or the end 7 – the beginning 6 (Kowalski-Biłokryłyy 2012)	-
Berestnnagi, barrow No. 82 (Forest-Steppe Right-Bank of the Dnieperland)	13	+	-	-	1 (b)	1*	1	7 (b)	-	-	-	3 (a,b)	-	-	-	the end 7 – the beginning 6 (Kovpanenko *et al.* 1989)	-
Kharpy, barrow No. 25 (lower Don)	86	+	+	+ (c, sq)	+ (b)	-	+	+ (a,b)	+ (+)	+	+	+ (c)	+ (c)	-	+	the end 7 – 1st half 6 (Kopylov and Rusakov 2014)	set of quivers coexisting with the Greek amphorae
Doliniay, barrow No. 2 (West Podolian group ESC)	13	11	1	1 (sq)	-	-	2*	5 (a,b)	1 (+)	1		-	1 (c)	-	-	1st quarter of 6 (Kowalski-Biłokryłyy 2012)	* bronze specimen of archaic form
Perebikivtsy, barrow No. 2, set of quivers No. 1 (West Podolian group ESC)	133	+	-	-	-	-	5	-	18 (+,-)	2	28	4 (a)	51 (b)	+	-	1st quarter of 6 (Kowalski-Biłokryłyy 2012) or 1st/2nd quarter of 6 (Grechko 2013)	19 copies combined groups II and III
Novoaleksandrovka, barrow No. 7, burial No. 8 (lower Don)	72	+	-	-	13 (a,b)	4*	29	-	-	7	19	-	-	-	-	1st half 6 (Kopylov and Rusakov 2014)	set of quivers coexisting with the Greek amphorae

Description: types are recorded in Fig. 6. Where possible, information included in brackets presents variants distinguished within individual types. A plus (+) indicates a spur on the socket, while a minus (-) indicates its absence. Abbreviations: b – bone, br – bronze, c – circular cross-section (bone arrowheads), i – iron, sq – square-section cross-section (bone arrowheads); Group I, type 6 – an asterisk (*) indicates arrowheads of Endzhe-Zhabotin type, but different then arrowhead from Chotyniec. Sources: Doliniay, barrow No. 2; Kruglik, barrow No. 1; Lenkovtsy, barrow No. 1; Perebikivtsy, barrow No. 2 – Smirnova 1993; Kelermes, barrow No. 24 – Galanina 1995; Kharpy – Kopylov and Rusakov 2014, Daragan 2016; Likhachevka – Daragan 2010; Malaya Ofirna; Repiahtovaya Mogila, burials No. 1 and 2 – Daragan 2015; Novoaleksandrovka, barrow No. 7, burial No. 8 – Koreniako and Lukiashko 1982; other – Meliukova 1964

prove. Thus, it can be assumed with a high degree of probability that the sets of arrowheads found in the ash-hills may have a uniform chronological position, although seemingly accidental.

In some way, arrowheads found in subsequent layers may reflect the developmental trends of this category of military items. Of course, this does not mean that the arrowheads found in settlement contexts can be easily compared with quiver sets found in graves. It is more reasonable to describe them in relation to each other in terms of the convergence of their forms (their specific types and variants), while in the case of grave goods, their larger series related to specific time horizons should be taken into account.

In the analysis of 17 burials, we can identify at least four varieties of arrowheads analogous to the finds from Chotyniec (in the case of the Endzhe-Zhabotin type, the presence of this form was enough). Four chronological groups can also be further divided (Table 1). The first division is formed by artifacts that are dated to the first half of the 7th century BC, the second one comes from the second half of same century, the third represents graves that can be generally dated between the second half (end) of the 7th century and the beginning (1st half) of the 6th century BC, while the fourth one refers to the first half of the 6th century BC. They are also different sets of arrows placed in quivers and treated as grave goods. The first two (from the first and second half of the 7th century BC), does not contain I-1-variants of biblade arrowheads or III-2 and III-3 types of trilobate solid arrowheads. In comparison with the arrow sets typical of burials from the second half (end) of the 7th and the first half of the 6th century BC, the Endzhe-Zhabotin type was represented by different varieties. On the other hand, in quivers from the first half of the 6th century BC, the presence of III-1-a and III-2-a variants was not noted; however, examples of this form are known from other sites with the same chronology (*e.g.*, burial No. 22 in the Diunnyj necropolis on the lower Don – Kopylov and Rusakov 2014, fig. 2: 5).

Summing up, it can be concluded that the collection of arrowheads from Chotyniec, found in two different (utility?) levels of the ash-hill, can be considered as a homogeneous assemblage. This possibility is mainly indicated by their convergence with quiver sets placed in burial complexes from the end (or the entire 2nd half) of the 7th and the first half (or at least its beginning) of the 6th century BC. The presence of all forms of bone and bronze arrowheads analogous to those found in Chotyniec was noted in this period. The only exceptions are specimens made of iron. For them, an analogy in the Scythian world cannot be found.

An additional argument in favor of such dating of the analyzed collection are fragments of imported Greek amphorae from the same layers. Found in the central part of the ash-hill fragments of an amphora from Klazomenai can be dated between the 7th century and the first decades of the 6th century BC (Sezgin 2004, 173-175). Their presence is worth noticing because pottery of this type was used for wine transport – a drink related to the ritual sphere. Undoubtedly, the presence of this kind of pottery should be explained in this way. Moreover, amphorae were deposited shortly after transferring to their final destina-

tions. Thanks to that, it is possible to prepare an accurate and precise chronological analysis. No less important is the fact that amphorae from this production center (with slightly later dating), as well as from other contemporary workshops also located in Ionia (*e.g.*, Miletus), are frequent components of the grave goods of the burial complexes from the end of the 7th – the first half (the end of the 2nd quarter) of the 6th century BC (Kopylov and Rusakov 2014, 175-177; Daragan 2016, 71). Amphorae of this type were found with quiver sets similar to those in the assemblage of Chotyniec arrowheads.

In summary, the collection of arrowheads discovered during the excavations in the ash-hill in Chotyniec seems to be homogeneous, and its dating should be limited most probably between the second half of the 7th century and the first half of the 6th century BC, or more precisely, at the end of the 7th century BC. On the other hand, it should be noted, that convergences and relations in assemblages of artifacts (arrowheads and amphora) from Chotyniec and other early-Scythian burials from the end of this period (end of the 7th – the first half of the 6th century BC), which form the basis of such dating, do not exclude the possibility of its earlier chronology within the 7th century BC (at least its 2nd half). This may be partly suggested by the spatial distribution of arrowheads. So far we can treat biblade arrowheads, especially types I-6 and II-4 with the "bird's leg" ornamentation on the socket, as the oldest, while types III-2 and III-3 seemed to be the youngest ones. The analysis of their distribution in relation to the borders of the ash-hill (Fig. 3) showed that the first, older group, was found predominantly in its central part, while the potentially "younger" artifacts were found on its outskirts or even beyond its borders. There are two ways of interpreting this situation. For one thing, the collection is not homogeneous and is associated with various stages of the functioning of the ash-hill, although not beyond the early-Scythian period. In this context, the older phase should be referred to at least the middle of the 7th century BC. In this time, triblade arrowheads (including type II-4, considered as typical for this period) and trilobate solid ones appeared, and the Endzhe-Zhabotin type disappeared. The younger stage should be dated between the end of the 7th (its 4th quarter?) century and the first half of the 6th century BC, when trilobate solid arrowheads of types III-2 and III-3 were in use, and Greek amphorae were deposited in Scythian burials. The second explanation is that the situation is the result of post-depositional processes. It should be noted that the ash-hill itself has the form of a small mound, with slopes covered with archaeological material, including arrowheads or traces of burning. Thus, it can be assumed that the spatial distribution of the mentioned findings may be the result of the "sliding" of these layers. In addition, it should be noted that the above-described amphorae fragments came from the same layers where the presence of the potentially oldest arrowhead of type I-6 was marked. Although they were discovered at slightly different depths (the arrowhead was slightly lower than the amphora), it should be noted that both these categories of artifacts often coexist, as in the mentioned grave goods (see Table 1). However, this issue requires careful analysis of all the layers, not only in terms of the relations between them and other layers, but also in terms of the presence of different artifacts,

which can be treated as kinds of chronological "markers" (other metal findings, handmade pottery, imported wheel made pottery, *etc.*). Only on the basis of these kinds of observations, in conjunction with the results of radiocarbon dating, will precise interpretation be possible.

5. FINAL REMARKS

Analysis of arrowheads found in the ash-hill in Chotyniec, site 1, conducted in terms of their morphological diversity and chronology allowed for their assignment within the early-Scythian period. This coincides with the dating of other categories of artifacts (amphorae). At the same time, detailed analysis of the chronology of the whole collection, supported by observations of quiver sets placed in graves, allowed for the chronological framework to be narrowed to between the second half (end) of the 7th century and the first half of the 6th century BC. In chronological systems related to the Scythian cultural circle, the collection can be referred the final stages of the development of archaic Scythia (ESC-3 phase, according to N. Medvedskaya), which can be synchronized with the HaD1 (half of it) – HaD2 phases, according to M. Traschel (2004). At the same time, it cannot be precluded that the chronology of findings could be switched to the middle of the 7th century BC.

The presented results allow us to look again at some issues related to the occurrence of Scythian arrowheads in present-day Poland. Apart from the artifacts from the early-Scythian period found in the hillfort in Chotyniec and functionally-related settlements (Czopek *et al.* 2018, 197-198, 270, fig. 20: 4), as well as finds from settlements and funerary contexts associated with population groups other than "Scythian" ones (Czopek *et al.* 2015, 193-196, 197, 208-213, table 1, 3-4; 2018, 277, 308), finds of arrowheads from Przemyśl are particularly interesting (Czopek *et al.* 2015, table 1, No 29). Their location at a relatively short distance from the Chotyniec agglomeration may indicate their possible link to the activity of its residents. It cannot be ruled out that stray finds of arrowheads from the first chronological group of A. I. Meliukova's classification in the basins of the Tanew and Wieprz Rivers (Chełm, Dorohusk, Róża, Stary Machów, Wieprzec, Wolica Śniatycka – see Czopek *et al.* 2015, table 1, No. 5, 7, 30, 31, 38-39, 41) could be interpreted in the same way. It is worth mentioning that the environmental conditions of this part of the Lublin region show strong links with the forest area, and thus it was the most attractive zone for the population of the Scythian cultural circle.

On the other hand, S. Czopek and K. Trybała-Zawiślak (2019) pointed out other possible activities of the population associated with this center. During the interpretation of the significance of the settlement in Chotyniec (and its entire agglomeration), they suggested the possibility of the participation of warriors (or some of them) in invasions in Central Europe, which occurred between the turn of 7th/6th centuries and the fourth quarter of the 6th century BC (Chochorowski 2014, 32-43). In their opinion, this may be justified

due to the location of the Chotyniec agglomeration in the border zone from which the warriors taking part in these invasions (the West Podolian ESC group – see Chochorowski 2014, 43) were most likely recruited. The results of the formal analysis of the Chotyniec arrowheads also confirm this thesis. Particularly important here are iron specimens with square-section blades and separate sockets. As has been shown above, such artifacts are known only from the discussed site and from the layers of destruction in Wicina. Moreover, additional convergences in the sets of arrowheads from both sites can be noted. Besides biblade and triblade examples of the Kelermes type, these include artifacts referring to the few arrowheads of type III-2 from Chotyniec (Michalak 2013, fig. 65: 7). Of course, taking into account a whole range of objections appearing in the comparison of arrowheads from various contexts (from the eash-hill and the demolished defensive settlement; Chochorowski 2014, 37), the convergence of some forms cannot be considered as an argument that clearly supports the above hypothesis. It should rather be treated as another premise indicating the possibility of the participation of warriors from Chotyniec in invasions in Central Europe. Undoubtedly, this issue requires further research, including an analysis of the origin of the material from which the arrowheads from both sites were made.

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