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COPPER OBJECTS AND QUESTIONS OF „SOFIEVKA METALLURGY”

Copper finds in cemeteries are quite rare, which is typical for the neolithic period. But at the same time the grave goods presented here represent the wide set of types known at this period in Europe [Klochko 1994a:149-154].

Altogether, 202 copper artefacts were found. Of this number 150 were found in graves, i.e. in complexes [cf. Videiko, Archaeological. . . , in this volume].

In particular sites the proportion of copper items in graves was as follows: Chernin - 8.51% (8 graves containing copper), Krasny Khutor - 22.94% (39 graves), Sofievka - 9.59% (14 graves) and Zavalovka - 6.25% (1 grave).

1. TYPOLOGICAL DIFFERENTIATION

Two typological groups may be distinguished in this collection: I - tools/arms and II - ornaments. The share of artefacts that were assigned to the above groups (including hypothetically to group II those objects that have been poorly preserved - ca. 17 items) in specific cemeteries is given below:

Chernin	I - 0%	II - 100% (19 artefacts)
Krasny Khutor	I - 7.41% (6)	II - 92.59% (81)
Sofievka	I - 19.57% (18)	II - 80.43% (748)
Zavalovka	I - 0%	II - 100% (4)

1.1. TYPOLOGICAL GROUP I

In this group 9 units of classification may be distinguished: types and subtypes (Fig.1:1-9).

Awls (type IAw). Eleven awls were found in Sofievka (graves 14, 19, 71, 124 and from surface) and one in Krasny Khutor (grave 127). Their length ranges from 2cm to 7cm. Sofievka awls are tetrahedral in the cross-section (IAw1). The awl from Krasny Khutor is short and round in the cross-section (IAw2). (Fig.1:1-2).

Flat axes (type IAx). Two axes were found in Sofievka (grave 19 and on the surface), one of them broken. Axes were produced in casting forms, and are broad and thin in the cross-section (Fig.1:3).

Chisel (type IC). One chisel came from Sofievka (grave 2/1947). It is short, with a riveted blunt side (Fig.1:4).

Knives (type IK). Four knives were found in Sofievka (grave 19 and on the surface) and one (?) in Krasny Khutor (grave 103). They have leaf-like blades with a delta-like haft - more (IK2) or less (IK1) noticeable and are lenticular in the section (Fig.1:5-6)¹.

Daggers (type ID). Three daggers were found in Krasny Khutor (graves 127, 134, 167). They have triangular blades, and are connected with a haft by four (ID1) or two (ID2) rivets. One dagger had a bone rivet (Fig.1:7-8).

Arrowhead (type 1Ar). One (?) leaf-like flat arrowhead was found in Krasny Khutor (grave 145) (Fig.1:9).

1.2. TYPOLOGICAL GROUP II

In this group 7 units of classification may be distinguished: types and subtypes (Fig.1:10-17).

Bracelet (type IIBr). One bracelet was found in Krasny Khutor (grave 50). The bracelet had contracted terminals and was produced from a copper strip (Fig.1:10). A second bracelet, about which E.Chernykh has published [Chernykh 1966], is not connected with the cemeteries. It may be an accidental surface find from an unknown place.

Cylindrical — spiral beads (type IIBe). They were found in all cemeteries. They were produced from a broad rolled copper strip. There are two types of cylindrical beads: short (to 1 cm - IIBe1) and long (> 2 cm - IIBe2). Spiral beads (IIBe3) were

¹ Compare the criterion of distinguishing knives on the basis of morphological characteristics of the handle part with another criterion, namely the cross-section of the blade. The latter criterion was applied to the typological assessment of flint artefacts [see Budziszewski, Flint. . . , in this volume]. According to this criterion, the objects may be included in the „daggers” type (Editor’s comment).

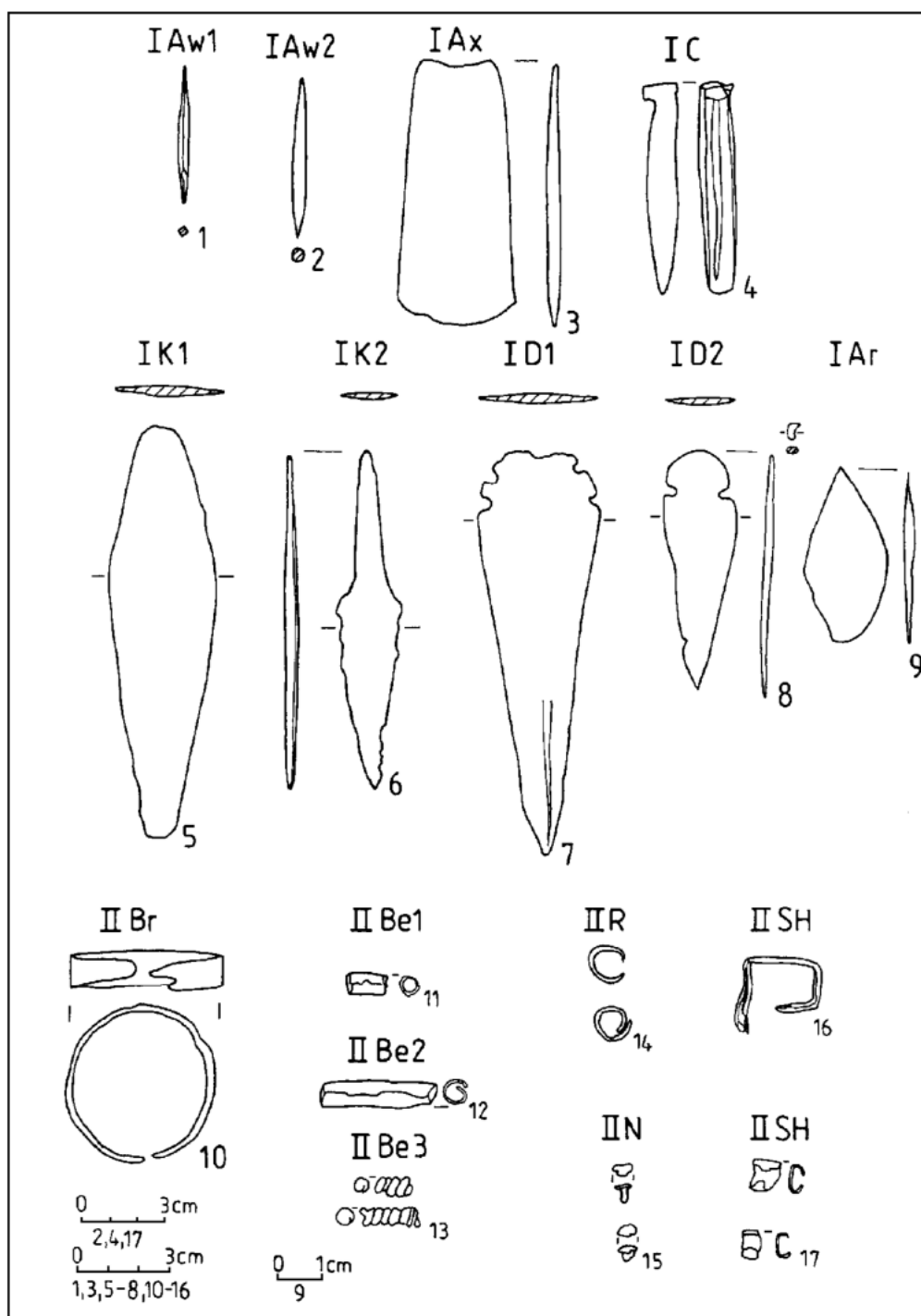


Fig. 1. Types of copper artefacts found in Sofievka type burial grounds.

found in Sofievka, Krasny Khutor and some in Chernin. They were produced from a narrow rolled copper strip (Fig.1:11-13).

Rings (type IIR). Eleven rings originated in Sofievka (graves 4, 84, 123 and on the surface). They were produced from round copper wire or copper wire tetrahedral in the cross-section (Fig.1:14).

Nails (type IIN). Two decorative small nails (h=4cm) were discovered in one grave at Sofievka (grave 8). They are tetrahedral in the cross-section, with amorphic riveted nail-heads (Fig.1:15).

Shackle-holders (type IISH). Two shackle-holders were found in Sofievka (grave 30 and on the surface) and two in Chernin (grave 43). One holder from Sofievka was made from a wire tetrahedral in the cross-section wire (Fig.1:16). It may be a decoration of a haft of an axe-hammer. Small shackles from Chernin may be used for decoration of a skin strip (Fig.1:17).

2. THE CULTURAL IDENTIFICATION

Awls. Such types of awls (IAw1 - IAw2) were widely spread throughout the Balkan-Carpathian region in the Copper Age. A given kind of artefact is hardly identifiable from the cultural point of view. There is a great variety which combine a number of cultures and groups throughout the above-mentioned circle.

Flat copper axes. Axes belong to the Altheim type, connected with the Carpathian region (Altheim-Vučedol-Mondzee-Kreis). Casting moulds for such axes were found in Vučedol [Novotná 1970:18-19].

Chisel. The form of the chisel is similar to chisels from Dabas (which were connected by P. Patay with the Bodrogkeresztúr culture) and grave 1 of the Rashkovec cemetery in Slovakia [Chernykh 1978:103-105].

Knives. This is the oldest type of the copper knives in Europe which have flint prototypes. Similar knives (IK1) are known in cemeteries of the Bodrogkeresztúr culture - Pushtaystvanhasa [Müller-Karpe 1974:Taf.754] and the Lažňany group - Šebastovice and Barca [Šiška 1972:140-143, Abb.35,1,4]. According to S. Šiška, such knives are typical for Bodrogkeresztúr culture.

Daggers. Usually the copper daggers from Krasny Khutor are compared with the daggers from Usatovo mounds [Zbenovich 1966; 1975]. The latter have Mediterranean prototypes. Metallographic- and spectro-analyses of the „large” Usatovo daggers show that they are similar to daggers from the Anatolia, which have been dated back to the first part of the third millennium BC. Daggers from the Usatovo mounds may have been imported from Anatolia [Ryndina, Konkova 1982]. All other daggers - from Usatovo and Krasny Khutor - are of local production, carried out according to Mediterranean prototypes. In the third millennium BC those types of

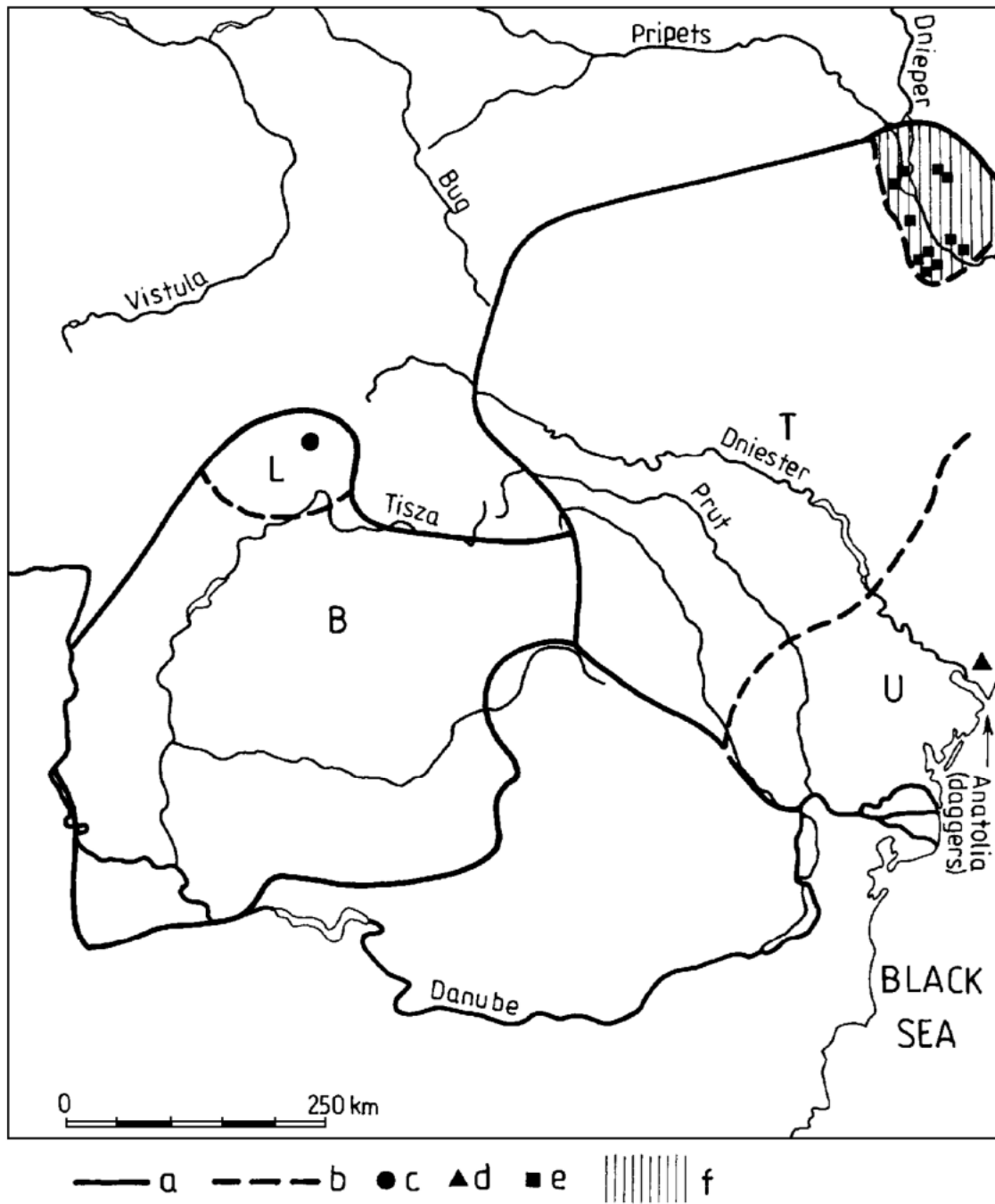


Fig. 2. Genetic background of Sofievka copper metallurgy - spatial dimension of technological inspirations. a - extent of cultures (B - Bodrogkeresztúr, T - Tripolye); b - extent of groups (L - Lažňany, U - Usatovo); c - Lažňany; d - Usatovo; e - representative sites of the Sofievka type; f - extent of the Sofievka type.

daggers were spread throughout Europe instead of the haft types [Goldman 1981].

Bracelet. This is very similar to examples from the Sebastovice cemetery of the Lažňany group [Šiška 1972:140] and the Branč cemetery of the Ludanice group [Lichardus, Vladoar 1964]) in Slovakia.

Beads. The cylindrical beads (IIBe1-2) are of the widely spread type of decorations in the Copper and Early Bronze Age in Europe [IIBe2 - see Koško, Klochko 1991:130-133]. Spiral beads (IIBe3) are typical for the Balkans and the Carpathian Basin and unknown in the present Tripolye monuments.

Rings. These were a widely spread type of copper decoration in the Copper and Bronze Age.

Nails. Similar bronze nails are known from the mound graves of the Early Bronze Age in Ukraine, where they were used for decoration of the hafts of stone battle axes-hammers.

Shackles-holders. Similar holders were found in the Tripolye cemetery of Vykhvatintsy, contemporary with the Sofievka type and the Early Bronze Age mounds in southern Ukraine.

To sum up the presentation of cultural identification, one should point to the main relations of the complex of artefacts studied with the stylistic traditions of the Balkan-Carpathian metallurgical centres, among them mainly of the Bodrogkeresztúr culture (together with the Lažňany group). Much more modern is the share of the indirect prototypes from the area of Anatolia (Fig.2).

3. TECHNOLOGY

Spectroanalytical investigations of copper were carried out by E. Chernykh [Chernykh 1966]. Results show us that most of the copper objects were produced from pure copper, except for one bead from Krasny Khutor, produced from As-bronze (Table 2). Whole group of metals is homogeneous, which suggests that all objects were produced in one center, using copper from one deposit. According to E.Chernykh, it was a deposit from an „unidentified region in the Balkan-Carpathian zone” [Chernykh 1970:26].

Today such an explanation is unsatisfactory. Balkan deposits have different micro-admixtures [Chernykh 1978]. This is why the homogeneous copper from the Sofievka type cemeteries cannot be connected with the Balkans. Among the types of copper objects there are different examples, connected with the Tripolye, Bodrogkeresztúr, Mediterranean and other traditions, but they all were produced from the same copper. According to specialists, the purity of the Sofievka copper can be explained by its origin from minerals, connected with the oxidised top layers of deposit. Usually such a situation represents the beginning of mining.

Table 1

List of copper artefacts from the Sofievka cemetery submitted to physico-chemical analyses of the composition of raw material. According to E.N. Chernykh

n. an.	object	cemetery	grave	year
368	awl	Sofievka	surface	
369	chisel	Sofievka	2	1947
370	flat axe	Sofievka	19	1948
371	flat axe	Sofievka	3	1948
374	knife	Sofievka	surface	1947
376	knife	Kr. Khutor		
377	bead	Kr. Khutor		
378	awl	Sofievka	19	1948
379	knife	Sofievka		1948
381	bead	Sofievka	surface	1947
382	bead	Kr. Khutor		
383	bead	Kr. Khutor		
384*	bracelet	Kr. Khutor	50	
387	bead	Kr. Khutor	surface ?	
394	knife	Sofievka ?		1948 ?

* Analysis n. 385, 386 — from bracelets, which are not connected with graves of Krasny Khutor. They are surface finds from unknown place.

Table 2

Spectroanalytical investigations of copper from Sofievka and Krasny Khutor cemeteries. After E. Chernykh 1966

n.an.	Cu	Sn	Pb	Zn	Bi	Ag	Sb	As	Fe	Ni	Co	Mn	Au	P
368	B	—	0,001	—	0,001	0,08	—	—	tr	—	—	—	—	—
369	B	—	0,001	—	0,001	0,04	—	—	0,001	0,002	—	—	—	—
370	B	—	—	—	—	0,01	—	—	tr	0,0012	—	—	—	—
371	B	<0,001	0,0016	—	—	0,013	—	—	<0,001	—	—	tr	—	—
374	B	?	0,001	—	—	0,055	—	—	0,001	—	—	0,001	—	—
376	B	—	—	—	0,001	0,027	—	—	tr	—	—	—	—	—
377	B	—	0,003	—	—	0,005	—	—	tr	0,0009	—	—	—	0,2
378	B	0,001	0,0017	—	—	0,015	—	—	tr	—	—	—	—	—
379	B	—	0,001	—	?	0,02	—	?	tr	0,001	—	—	—	—
381	B	—	0,001	—	?	0,08	—	—	0,001	—	—	tr	—	0,3
382	B	—	0,001	—	—	0,033	—	—	0,003	0,001	—	tr	—	>1
383	B	—	0,001	—	—	0,016	—	—	tr	—	—	—	—	—
384	B	0,0003	0,0014	—	?	0,0063	—	—	0,007	0,001	—	tr	—	<0,1
387	B	—	0,001	—	0,001	0,008	—	1,50	<0,001	0,002	—	—	—	0,1
394	B	?	0,003	—	0,003	0,01	0,01	1,90	0,0015	0,42	—	—	—	?

The source of the Sofievka copper can be located among deposits of the copper sandstones in the Skvira metalbearing region of the Ukrainian Crystalline Shield, which is not far from the cemeteries of the Sofievka type [Metallogenia 1974:488].

Metallographic investigations of copper objects from Sofievka and Krasny Khutor, carried out by N.Ryndina, show that all of the objects were produced using different copper-smithing technologies. Semi-finished flat axes, knives and daggers were produced in closed double-sided casting moulds [Ryndina 1971:138-139].

It seems that Sofievka shows us the products of a local center of metallurgy and metalworking. This center was connected with local deposits of copper (the Skvira region) and different technological traditions (local - Tripolye; Carpathian - Bodrogkeresztúr, Lažňany; Mediterranean - Anatolia), Fig.2.

Such amalgamation may only be the result of immediate contacts between the carriers of those three technological traditions [Klochko 1994a].

Translated by Inna Pidluska and Andrzej Pietrzak