

**WEAPONS OF THE TRIBES  
OF THE NORTHERN PONTIC ZONE  
IN THE 16TH - 10TH CENTURIES B.C.**

*VIKTOR I. KLOCHKO*

**BALTIC-PONTIC STUDIES**

---

V O L U M E 1 • 1993

BALTIC-PONTIC STUDIES  
61-809 Poznań (Poland)  
Św. Marcin 78  
Tel. 536709 w. 147 Fax 536-536

EDITOR  
Aleksander Koško

EDITORIAL COMMITTEE  
Sophia S. Berezanskaya (Kiev), Aleksandra Cofta-Broniewska  
(Poznań), Lucyna Domańska (Łódź), Viktor I. Klochko (Kiev)

SECRETARY  
Marzena Szmyt

ADAM MICKIEWICZ UNIVERSITY  
EASTERN INSTITUTE  
INSTITUTE OF PREHISTORY  
Poznań 1993  
ISBN 83-86094-00-1

**WEAPONS OF THE TRIBES  
OF THE NORTHERN PONTIC ZONE  
IN THE 16TH - 10TH CENTURIES B.C.**

**Viktor I. Klochko**

translated from the Russian by  
V. A. Tikhomirov

BALTIC-PONTIC STUDIES

V O L U M E 1 • 1993

© Copyright by Viktor I. Klochko  
All rights reserved

Cover Design: Eugeniusz Skorwider

Printed in Poland

## Editor's Foreword

The first project of the mutual Polish-Ukrainian studies of the oldest history of the zone of the border of the Eastern and Western part of Europe was started in the 80's. An outline of a contract of co-operation between Adam Mickiewicz University and the Institute of Archaeology of the Ukrainian Academy of Sciences worked out at that time did not, however, receive an acceptance from the Ministry.

This conception could only be taken up again in 1991. One of the elements of a contract drafted at that time is a publication of a series devoted to the prehistorical culture of the communities of a given zone.

The Baltic-Pontic Studies are supposed to be a forum for discussions of the oldest — mainly "pre-ethnic" — history of settlement environments of the boundary of the basins of both seas that are mentioned in the title. Thus, one may observe that this project refers directly to the earlier initiative of Poznań scholars — a periodical *Slavia Antiqua*. It fills in a great gap in those publications that serve the promotion of archaeology in this part of Europe.

Each volume in this series will deal with one subject, giving monographs or collections of articles (commissioned) according to subjects. V.I. Klochko's monograph that starts the series deals with the North Pontic weapons in the second half of the second millennium B.C. It initiates a cycle of works on the early forms of relations between the two cultural environments in which we are interested, including in particular the beginnings of the organized exchange routes.

The support of this initiative to publish a series of works by Committee of Scientific Research marks the first stage of existence of the Baltic-Pontic Studies. We hope that as consecutive volumes appear the range of interests in the problems promoted by the series will extend as well as justification for the further development of the series.

Aleksander Kośko



## CONTENTS

Introduction . . . . .	1
I. Characteristics of sources . . . . .	3
II. Weapons of forest-steppe tribes . . . . .	8
1. Weapons of the Komarov-culture tribes . . . . .	8
2. Weapons of the Noua-culture tribes . . . . .	12
3. Weapons of the Hallstattian tribes in the basins of the Upper and Middle Dnieper . . . . .	14
4. Weapons of the Sosnitsa-culture tribes . . . . .	20
5. Weapons of the Byelogrudovo-culture tribes . . . . .	24
6. Weapons used in the Srubnaya-culture historical region	26
7. Weapons of the Bondarikha-culture tribes . . . . .	31
III. Weapons of steppe tribes . . . . .	34
1. Weapons of the Sabatinovka-culture tribes . . . . .	34
2. Weapons of the Byelozerka-culture tribes . . . . .	43
IV. The Age and Origin of the Armament Articles . . . . .	49
1. Weapons of the Sabatinovka- and Noua-culture tribes	51
2. Weapons used in the Srubnaya-culture historical region	58
3. Weapons of the Sosnitsa-culture tribes . . . . .	63
4. Weapons of the Komarov-culture tribes . . . . .	65
5. Weapons of tribes populating the Upper- and Middle- -Dnestr regions . . . . .	66
6. Weapons of the Byelogrudovo-culture tribes . . . . .	68
7. Weapons of the Bondarikha-culture tribes . . . . .	68
8. Weapons of the Byelozerka-culture tribes . . . . .	69
Conclusion . . . . .	71
References . . . . .	78
Abbreviations . . . . .	89
Figures . . . . .	91
Maps . . . . .	132



## INTRODUCTION

A study of the economic structures and social stratifications of the Bronze-Age society is one of the urgent problems of the modern historical science. It should be noted at this point that no characteristics of historic processes of ancient times can be comprehensive, if the military sphere is ignored.

In its development, the military science, as other social phenomena, is determined in the final analysis by the economic conditions and by the mode of production of material values. The qualitative transformations in the military science are inherently related to changes in the economic life of a society, therefore studies on the military science can provide additional materials in the field of broad historical investigations.

One of the most important components of the military science is the armament — an aggregate of all means of warfare. In the archaeological sources, this phenomenon is primarily represented by weapons — implements for conducting battle, i.e. tools of attack or defence. Being intimately and directly associated with the production base, implementing the latest technological achievements, being an object of borrowing and exchange, and reflecting the methods of application in the design features, any weapon is an element of the material culture, which can give information on the level and degree of production development, on the character and direction of historic contacts and the social relations. Besides, analysis of weapons can give technic information on the secrets of ancient artisans.

In the context of this work, the armament is implied as an aggregation of all kinds and types of weapons specific for this or any other ancient society.

The late period of the Bronze Age is characterized by a relatively high level of civilization, by a vigorous growth of bronze casting and metal working, by an increasing social differentiation of the society and an increasing military activity of tribes.

The division of the Bronze Age into early, middle and late stages is comparatively conditional. The present definitions of these periods are mostly declarative and have no distinct characteristics of changes in the material cultures of ancient societies associated with the transition to this or any other stage in the Bronze-Age development. The formation of definitions covering the whole combination of new progressive phenomena in the development of economy and social relations of the ancient population and providing a division of the Bronze Age into periods should proceed from special studies on economy and social structures of ancient societies the necessity of which has become evident. We believe that the Bronze Age exhibits most clearly only the early and the late periods. In case of the late period, a clearly defined formulation of its specific character has become possible because of an investigation on ancient metallurgy which could reveal the most characteristic properties of the bronze-casting production of the period under discussion: a wide

spread of tin bronze and stone casting forms, an entire change of shapes of metal articles [Chernykh 1976, 1978]. In addition to this characteristics from the standpoint of history of armament, it may be stated that the late period of the Bronze Age is characterized by the appearance of developed and clearly defined groups of highly specialized metal implements of war that represent various stable sets of categories and types of long- and short-range weapons. According to the latest data, this period may be approximately dated to the middle- the second half of the 2 nd millenium B.C. The upper chronological limit of the given work is determined by the beginning of the Early Iron Age in the Ukraine. For the steppe tribes, it is referred to the 10th century B.C.; for the forest-steppe tribes, it is the 9th century B.C.

The urgency of this work is based, on the one hand, on the importance of weapons in the historical interpretation of the archaeological sources, and on the absence of special investigations on the weapons of Bronze-Age tribes in the territory of the Ukraine, on the other hand.

The territory under study includes the forest-steppe and steppe zones of the Ukraine and the regions occupied in the Late Bronze Age by such archaeological cultures as the Komarov, Noua, Sosnitsa, Byelozerka, Gava-Goligrady, Byelogradovo and Bondarikha cultures. The work does not include the territory of the Carpathian regions which, in the Late Bronze Age, were occupied by the Stanovo culture. This culture is related to such Danubian cultures as Otomani III, Berkesh and Kiyatitsa. The armament of the Stanovo culture includes articles of the Danubian type and should be studied together with weapons of the other Bronze-Age Danubian cultures.

In the course of preparation of this work, the author set himself the following tasks:

- 1 – classification of armament articles;
- 2 – characteristics of armament articles of the tribes referred to particular archaeological cultures;
- 3 – introduction of more precise definitions to the chronology of armament articles;
- 4 – elaboration of problems on the origin, the ways of improvement and places of production of weapons;
- 5 – characteristics of some problems on military and political history of the Late Bronze-Age steppe tribes in the territory of the Ukraine.

## CHAPTER I. CHARACTERISTICS OF SOURCES

Up to the present, the studies on articles of the Late Bronze-Age armament were conducted only in conjunction with the other categories of articles.

The first summary on metal articles including Bronze-Age armament implements of the North-Pontic coastal areas was given by Finnish archaeologist A.M.Tallgren. It appeared in 1926 and contained publications on all hoards of metal tools and casting forms for their production known by that time [Tallgren 1926].

Much attention was given to metal articles in publications by V.A.Gorodtsov [Gorodtsov 1905, 1907, 1928, 1940] and O.A.Krivtsova-Grakova [Krivtsova-Grakova 1949, 1955], who focussed their emphases on the cultural and historical interpretations of articles.

The Late Bronze-Age articles from the south-eastern part of Europe were thoroughly discussed in many papers by V.S.Bochkarev [Bočkarev, Lescov 1979], V.A.Dergachev [Dergačev 1975], A.M.Lescov [Lescov 1967; Bočkarev, Lescov 1979; Lescov 1981], I.T.Chernyakov [Chernyakov 1965, 1967, 1976a, 1982, 1985], E.N.Chernykh [Chernykh 1965, 1976, 1981] and I.N.Sharafutdinova [Sharafutdinova 1968, 1973, 1982]. Through these works, into scientific circulation, there was inserted information on typical materials from hoards and foundries, on separate casual finds of metal articles and casting forms, and there were given considerations on some aspect of their production, typology and chronology.

A new stage in studies on Late Bronze-Age metal articles of the Ukraine has come with the designation of the Late Bronze-Age metallurgical centers by Chernykh, on the basis of a broad use of spectral measurements, statistical analyses and a formal typology, as "groups of metal articles provided with certain territorial and chronological features" [Chernykh 1976]. The publication on casting-form bodies from the North-Pontic coastal areas by B.S.Bochkarev and A.M.Lescov [Bočkarev, Lescov 1979] has given new possibilities in defining the chronology and cultural origin of the distinguished metal groups. The papers by A.M.Lescov [Lescov 1981] on the Golurovo-Loboykovo metallurgical center and by I.T.Chernyakov [Chernyakov 1985] on some problems of the chronology and cultural origin of the Krasniy-Mayak metallurgical center have substantially improved our cultural-and-chronological notions about these centers.

The recent prominent and summarizing archaeological publications on the Late Bronze-Age in the Ukraine [Archaeology of the Ukr.SSR, v.1; Artemenko 1987; Berezanskaya 1982, 1986; Krushelnitskaya 1985; Otroshchenko 1986; Chernyakov 1985; Cherednichenko 1986; Sharafutdinova 1982, 1986] have substantially enriched (and changed, in some cases) our conceptions on particular historic processes, which took place in the territory of the Ukraine in the 2nd — the 1st millennia B.C. Some sections of these works dedicated to the implements of labour and weapons of the

Late Bronze-Age tribes have amplified substantially the existing conceptions on the given category of sources.

In the last few years, there have been published a number of summarizing works dedicated to Late Bronze-Age metal articles of the Danubian regions. Thus, M.Petrescu-Dimbovita issued a list of metal-article hoards found in the territory of Rumania, where he had distinguished hoard horizons of the BA2-HaB periods [Petrescu-Dimbovita 1977]. Since these hoards contain a great quantity of North-Pontic type articles, this publication is of great importance for defining the chronology of the North-Pontic coastal and Dnestr-basin areas and also for studying the relations between the ancient populations in the territories of the Ukraine and Lower-Danube basin.

In his publication "The Late Bronze Age of north-eastern Hungary", T.Kemenczei has refined the chronology and cultural origin of the Middle-Danube hoards referred to the BD-HaA2 periods [Kemenczei 1984], some of which contain articles similar to the finds in the territory of the Ukraine and primarily of the Dnestr basin.

A.P.Rumyantsev [Rumyantsev 1972, 1974] was the first to study the Late Bronze-Age weapons of the steppe zone of the Ukraine. He considered some questions on the development of Bronze-Age spear-heads in the North-Pontic coastal areas and outlined the general range of problems in investigating metal weapons of the Bronze-Age tribes in the southern areas of the Ukraine. Unfortunately, the studies were broken by his death.

Such a comprehensive factual and theoretical basis accumulated by archaeology by now has made it possible to consider the Late Bronze-Age weapons as an independent object of studies. This has made it possible, in turn, to consider typology and chronology of various categories of armament and some questions of its production, origin and development in time and space, and to project the cultural origin of armament groups being distinguished.

In this work, there have been used 295 armament articles (preferably of metal) and 91 casting forms for their production including both known and new finds. Since some articles represent occasional (out-of-complex) finds, indetermining their cultural origin, a special attention was given to casting forms for production of these articles as capable to state the places of production, and also to complex find along with ceramics (at settlements and in burials) and to mapping of weapons. As for chronological definitions, attention was focused on complex finds such as burials, settlements, hoards and foundries. The presence of great amounts of stone casting forms for production of armament articles, among other complex finds (the so-called foundries), has made it possible to define more exactly the character of finds of some weapon types and to outline the territories of their preferable production and of their use, respectively.

The typology adopted in this work is based on a formally-typological scheme for distinguishing Late Bronze-Age metal articles of South-Eastern Europe advanced by E.N.Chernykh [Chernykh 1970, 1976]. In the field of typology, owing to the

elaborations mentioned above, the main task of the given work was aimed to state a more precise definition of the cultural origin and the absolute chronology (if possible) of any particular type of weapon and to transform the formally-typological scheme into a particularly-historic one. Naturally, such a task has called for some changes in E.N.Chernykh's scheme, such as an integration of a number of types into a single unit or a division of one type into two. However, the number of such changes is not great. In imparting the scheme a particularly-historic content, a demand arose for departing from the alphanumeric type definitions, to use the names derived from the key complex finds or eponymous monuments along with the alphanumeric definitions, which is well-known method in the world archaeological practice. Many names of types adopted in the paper has long been known in archaeology and habitual. An essential distinguishing feature of such typological definitions is that they remind specialists a series of associations related to the definitions of times and the cultural origin of the given type of articles (e.g. "a dagger of the Krasniy-Mayak type", "a spear-head of the Seyma type", etc.). When the armament articles are analysed formally-typologically, there are used general conceptions of history of armament formulated by Yu.S.Khudyakov as applied to archaeological sources [Khudyakov 1979].

On the basis of the Late Bronze-Age materials, there are distinguished the following categories of offensive weapons and defensive armour:

Offensive weapons.

1. *Dagger*. A short-range offensive weapon for hand-to-hand fighting.
2. *Sword*. A short-range cutting-poiting weapon.
3. *Fighting ax*. A short-range specific cutting weapon.

Metal lugged axes are very rare in the Late Bronze-Age monuments of Ukraine. At that time, among the short-range cutting weapons, a dominant role was given to celts. In contrast to axes, celts represent a "metal head in the form of a massive sharpened wedge having a longitudinal socket to be set on a wooden elbow-shaped haft" [Gryaznov 1947: 70]. In fact, the shape of the haft and the way of fastening thereto have defined the purpose of the weapon capable to be used as a fighting or working ax, an adze or a mattock. Unfortunately, this kind of information is missing because of poor preservation of wood. The method advanced by Gryaznov for determining the type of a weapon, according to the remnants of a wooden haft preserved in the socket of the celt (which occurs very seldom), is far from perfection. As evident from studies by V.S.Patrushev on the celts from the Oldest-Akhmylovo cemetery, it is impossible to obtain an unambiguous definition of the goal of this or any other celt even in the case of a not bad state of preservation of wood in a socket [Patrushev 1971: 37-43]. However, as one of the methods for obtaining definitions, this method is worthy of notice. For definitions of this sort, of great importance are such characteristics as asymmetry, differences in ornaments on opposites sides, the presence of one or a number of lugs, distinctive features of the shape, etc. However,

in the whole, these possibilities may be put into practice only after comprehensive studies on all the celts of this or other region, which should be an object of a special investigation. In this study, we are forced to be confined only to those types of celts, the use of which in the part of axes is quite obvious, and to a supposition that in the Ukraine a considerable part of the Late Bronze-Age celts was used as weapons. Here, it should be noted that the military function of the tools mentioned is secondary, and the main and constant function of celts is their use as tools in production and economic activity.

4. *Rare types of percussive weapons*. Beak axes and battle axes as specific short-range percussive weapons.
5. *Spear*. A specific long-range pointing weapon. This type of weapon is represented by finds of metal heads.
6. *Bow*. A long-range missile weapon. No finds of bows are known in the Late Bronze-Age monuments under study. This type of weapon is represented by metal and bone arrow-heads.

Defensive armour. This kind of armament is aimed for protection against destruction by the enemy in battle. For the Bronze-Age monuments, this category of finds was solely occasional. They are represented by a single metal helmet and by two shields.

Some of armament articles found in the Late Bronze-Age monuments (primarily in the forest-steppe zone of the Ukraine) are similar to those of the Middle Bronze-Age (flint dart arrow-heads, flint tanged three-edged arrow-heads, stone perforated axes, flint daggers, spear-and javelin-heads). It is very difficult to differentiate these categories of armament from weapons of the Early and Middle Bronze Ages without special studies. They should be examined, as we believe, within the frame of studies devoted to weapons of the Cord-and Katakomba-culture chronological horizon. The present work deals only with metal armament articles made of copper and bronze specific for the Late Bronze Age, and with some occasional finds of stone and bone weapons from the "closed" complexes differing from similar articles of the Bronze Age.

The object of this work, in the field of chronology, is aimed to state and refine (if possible) the absolute and relative chronologies of particular archaeological cultures, groups of monuments, metallurgical centers, complexes and separate articles, i.e. to transform (as much as possible on the basis of the available materials) the Late Bronze-Age armament articles of Eastern Europe into a historical source. To this end, there were used only traditional methods of dating with no use of C14 dates. Such a position is based on the results of the foreign archaeologists' studies, who examined the possibilities of using the radiocarbon method of dating on the Bronze-Age monuments [Yakar 1979; Warren 1980; Goldmann 1981]. These investigations are generalised and formulated most thoroughly in the paper by J.Makkay "The crisis of prehistoric chronology" [Makkay 1985]: C14 dates may be used only in the

form of statistically reliable extracts for dating epochs, periods, horizons, stratigraphic layers, types and groups of monuments distinguished by traditional methods. In the present form, this method cannot be used for dating separate monuments and complexes. In accuracy and reliability, it substantially yields to traditional methods based on the chronological systems of ancient civilizations.

## CHAPTER II. WEAPONS OF FOREST-STEPPE TRIBES

The forests-steppe zone of the Ukraine (a transitional zone between the forest and steppe zones) is spread in the middle band of the country, from the eastern foothills of the Carpathians to the western offshoots of the Middle-Russian upland. The territory is conventionally divided into the following regions: the Upper-and Middle-Dnestr basins, the right-bank Middle Dnieper basin and the left-bank Middle Dnieper basin bounded by the middle course of the Northern Donets in the east.

In the Upper-and Middle-Dnestr basins, the following subsequent cultures were distinguished: the Komarov culture [Sveshnikov 1967; Berezanskaya 1985; Artemenko 1987], the Noua culture (Balaguri 1985) and the Thracian-Hallstatt monuments [Smirnova 1976; Iliyinskaya, Terenozhkin 1986] (Maps 1 - 4).

In the right-bank Middle-Dnieper basin, the Sosnitsa culture [Artemenko 1987] and the Byelogrudovo culture [Berezanskaya 1985] are distinguished. According to I.I.Artemenko, the Sosnitsa culture includes monuments of the Sosnitsa and Kiev variants of the East-Trzciniac culture, according to S.S.Berezanskaya [Berezanskaya 1985], and the Lebedovka-type monuments [Berezanskaya 1985].

The left-bank Middle-Dnieper basin has revealed the Srubnaya culture [Cherednichenko 1986], the monuments of which may be found both in the steppe and in the southern part of the forest-steppe zone, and the Bondarikha culture [Berezanskaya, Iliyinskaya 1985; Artemenko 1987].

### 1. WEAPONS OF THE KOMAROV-CULTURE TRIBES

The Komarov culture is located in the Middle-and Upper-Dnestr basins (Maps 1 and 3) and approximately dated within the range of the 15th — the 12th centuries B.C. [Sveshnikov 1967; Berezanskaya 1985].

Taking into account small amounts of materials, the Komarov-culture armament is considered as a whole in a descriptive manner without a fractional typological division. This group includes armament articles from the burial mounds in the vicinity of Ivaniye village [Sveshnikov 1967] referred by S.S.Berezanskaya to the Rowno-variant monuments of the East-Trzciniac culture [Berezanskaya 1985]. I.I.Artemenko suggest to consider these monuments as a contact zone between the Komarov, Trzciniac and Sosnitsa cultures, which cannot be referred to either of these cultures [Artemenko 1987:106].

1. *Daggers*. The dagger from the town of Kamenka Bugskaya [Sveshnikov 1967, Table XI, 1] has narrow three-edged blade, rhombic in section, with four holes and traces for rivets to be fastened to a haft (Fig. 1, 6). It is referred to a type

widespread in Central Europe. The latest variants of such daggers may be found in the Danubian hoards of the Koszider horizon [Mozsolics 1967].

Burial No.4 of a mound II near the village of Ivaniye, yielded a unique dagger with a broad willow-shaped blade having a broad rib, square in section, and a haft in the form of a circular socket cast integral with the blade. The socket housed a wooden rod with a mushroom-shaped cup at the top [Sveshnikov 1968, Fig. 4, 10]. The haft stop and the blade rib are decorated with an ornament in the form of triangles and rhombs (Fig. 1, 4). By the form of its blade, the dagger approximates those of the Krasniy-Mayak type specific for the Noua and Sabatinovka cultures. However, the forms of the rib and the haft approximate only those of daggers and swords from shaft-graves 4 and 5 of cemetery A in Mycenae [Müller-Karpe 1980, Tabl. 225, 9, 228, 5]. The ornament on the dagger rib repeats the patterns typical for the Komarov-culture ceramics, but the ornamentation manner on ribs is unusual for Eastern Europe and may be met only in the Eastern Mediterranean areas (on daggers from Greece, Anatolia and Egypt). However, the unique form and the decoration of the dagger from Ivaniye provide no means for determining its origin and date.

The dagger from burial mound VI of the Komarov cemetery [Kozłowski 1939, Tabl. XIII, 19] with a leaf-like blade, a rib circular in section and a short broad tang (Fig. 1, 8) is referred to a rather rare type. The nearest analogies to this are the daggers from the Seyma cemetery with "approximately trapeziform tangs", some of which have a metal haft set on the tang [Chernykh 1967, Fig. 3, 14-21, Fig. 4, 45, 58], and the dagger from the village of Voznesenky, the Byelozersky region of the Kherson district [Chernykh 1976, Tabl. XXXVIII, 6]. The dagger from the Komarov cemetery differs from those mentioned above by a clearly defined rib of circular section. Its haft was made of organic material (its traces are seen on the tang). Similar traces are seen on some daggers from the Seyma cemetery.

2. *Axes*. A stone perforated ax of elongated proportions (Fig. 1, 7) from burial mound No.48 of the Komarov cemetery [Sveshnikov 1967, Tabl. IV, 3]. In general, this type of weapon is specific for monuments of the Early- and Middle-Bronze Ages. However, they may be also met at the end of the Middle-Bronze Age. Such a supposition is supported by a find of a similar ax in the cemetery of the post-cord cultural group of Hemejnlebar, Lower Austria, along with the metal articles from the Haidusamson horizon [Müller-Karpe 1980, Tabl. 529, 1].

The bronze ax from the destroyed burial mound No.1 near the village of Ivaniye [Sveshnikov 1968, Fig. 1, 2] with a mushroom-shaped cup, an elongated tubular socket and a curved blade (Fig. 1, 1) has no similarities. Though some of its elements admit of its comparison with the Danubian ax-hammers of the B-type, according to A.Mozsolics, it generally represents an unique article, which may be considered as a continuation of the Borodino-type stone-ax traditions expressed later in metal. At present, it cannot be dated precisely. In terms of the same traditions, it

is also required, we suppose, to consider the ax found in the western part of the Volyn district. The ax has a mushroom-like cup and a curved blade in the form of a pole-ax (Fig. 1, 2). This ax is referred to the B-type of ax-hammers, according to A.Mozsolics. The nearest analogy thereto is from the hoard of Larga in Rumania [Petrescu-Dimbovita 1977, Tabl. 19, 6] referred to the Haidusamson hoard horizon. This type of axes is not very rarely in the Danubian hoards. If the given ax is considered in the same typological series including the ax from Ivaniye, as a continuation of the Borodino traditions in metal, it is most probable that culturally it is referred to the Komarov culture, but typologically the ax from Ivaniye is closer to the stone prototypes.

The interrelation of the Middle-Dnestr basin and the Danubian areas may be confirmed by the find of bronze battle-ax with a tubular butt in the village of Zabolotov, the Snyatinskiy region of the Ivano-Frankovsk district (Fig. 1, 3) [Kozłowski 1939, Tabl. XIII, 26]. According to A.Mozsolics, it is referred to the type Krtenov Ab specific for the Danubian hoards of the Haidusamson horizon and usually related to the Otomani culture [Mozsolics 1967].

To a later period, there are referred the following finds of imported Middle-Danubian axes. Thus, in the village of Stetseva, the Snyatinskiy region of the Ivano-Frankovsk district, there was found an ax-hammer of the B-type, according to A.Mozsolics (Fig. 2, 1) [Krushelnitska 1985, Fig. 3, 1], specific for the Koszider horizon of Danubian bronze articles. To the horizon of the Forro and Uriu hoards, there may be referred the ax with a rib at its socket from the village of Prilipche, the Zastavnyanskiy region of the Chernovitsy district (Fig. 2, 3) [Krushelnitska 1985, Fig. 3, 4]. This is the latest variant of axes with ribs on sockets, which may be met in hoards with celts referred to the Suciude-Sus and Piliny cultures. This makes it possible to refer the given ax to the latest stage of the Komarov culture.

One-lugged celts of hexahedral section with concave sockets found in the Grushka hoard (Fig. 3, 1) are referred to the same period as well as a series of occasional finds in the Upper-Dnestr basin [Żurowski 1949, Tabl. II, III, IV]. Traditionally, the appearance of this type of celts in the Carpathian region is related to the Noua culture. However, as noted by Petrescu-Dimbovita, such celts are most specific only for the Transilvanian hoards of the Uriu-Domenesty series. In trying to denote the cultural origin of hoards of this series, M.Petrescu-Dimbovita equally points both to the Otomani and Suciude-Sus cultures, and to the Wietenberg and Noua cultures [Petrescu-Dimbovita 1977, 21]. He notes that the area of spread of such hoards in Transilvania is superimposed on the territories occupied at that time by all the mentioned cultures. The characteristic property of hoards of the Uriu-Domenesty series, in contrast to hoards of the Risesty-Beleny series in Moldova, is the presence of large quantities of bronze articles of the Koszider type specific for hoards of the Koszider-Forro horizon, according to A.Mozsolics, associated with the latest phases of the Otomani and Wietenberg cultures and the Suciude-Sus culture [Mozsolics

1967, 1973], while hoards of the Risesty-Beleny series consist preliminarily of the Noua-type bronze articles.

In hoards of the Uriu-Domensty series, celts with concave sockets were found along with the Danubian-type articles (fighting ax-hammers, sickles with "knobs", spear-heads) specific for Hungarian bronze articles of the Forro horizon, which makes it possible to refer the time of their appearance in Transilvania, on the basis of recent datings of this horizon (1350-1300 years B.C.), to the second half of the 14th century B.C. (see Chapter IV).

Taking into consideration the fact that the main territory of spread of celts with concave sockets includes Transilvania and the Upper-Dnestr basin, they are likely to be associated with the Byeliy Potok-Kostysha-Komarov cultural circle and referred to the late stage of the Komarov culture in the territory of the Upper-Dnestr basin. It is interesting to note that the tradition of producing celts with concave sockets was kept till the Hallstatt time (see below).

The hoard of Grushka is a typical hoard of the Uriu series. It yielded articles, which exhibited contacts of the Late-Komarov culture tribes with the Noua and Suciude-Sus culture tribes.

3. *Arrow-heads*. Near the village of Ivaniye, in burial No.4 of mound II, there was revealed a flint leaf-like arrow-head with a straight somewhat broadened base [Sveshnikov 1968, Fig. 4, 9] (Fig. 1, 5). An arrow-head, approximating in shape, was found in burial mound No.16 of the Sosnitsa-culture Voytsekhovka cemetery [Lagodovskaya, Zakharuk 1956].

Defensive armour is represented by an arm-protective bracelet from the town of Kamenka Bugskaya.

Therefore, the armament group described above consists of: 1) armament articles specific for the Danubian cultures (a dagger from the town of Kamenka Bugskaya, a bracelet, an ax from Western Volyn, a battle-ax from Zabolotov, ax-hammer from the villages of Stetsovaya and Prilipche); 2) articles of the Danubian type exhibiting some local distinctions (an ax from Ivaniye, celts with concave sockets); 3) articles specific only for the Upper-Dnestr basin (a dagger from Ivaniye, a dagger from the Komarov cemetery).

The above mentioned material makes it possible to conclude that in the field of armament the Komarov-culture tribes were closer to the Bronze-Age Danubian cultures such as the Otomani, Tei, Wietenberg and Monteoru cultures compared with the weapons of the Dnieper-basin tribes.

## 2. WEAPONS OF THE NOUA-CULTURE TRIBES

In the Middle-and Upper Dnestr basins, the Komarov culture was substituted by the Noua culture (Maps 1 and 3).

The Noua culture was spread in the territory of south-eastern Transilvania, the Prut-river areas of Rumania, the forest-steppe of Moldova and the right-bank Middle-Dnestr basin. It is dated to the 13th — the 12th centuries B.C. [Balagury 1985: 481-488]. This work deals only with weapons of the Noua-culture tribes populating the Middle-Dnestr basin.

**Daggers.** This category of armament is represented by daggers of the Krasniy-Mayak type (partly of the H-34 and H-37 types, according to E.N.Chernykh), such as daggers with a leaf-like blade, a circular stop on the haft and a tang in the form of a rod oval, rectangular or quadratic in section. Such are the daggers from the Carpathian region [Krushelnitska 1985, Fig. 2] (Fig. 2, 5, 6). The dagger from the village of Orelets, the Ivano-Frankovsk district, with a broad leaf-like blade and a small rim-like bulge resembling a circular stop (Fig. 2, 7) may be also referred to the above type [Krushelnitska 1985, Fig. 2]. Similar daggers were found in the hoards of Beleny and Duda of Moldova. M.Petrescu-Dimbovita referred them to the series of the Resesty-Beleny hoards of the BD period, which were associated with the Noua culture [Petrescu-Dimbovita 1977, Tabl. 73, 20-22, Tabl. 80, 15].

**Fighting axes.** This category of Noua-culture weapons is represented by celts, the main bulk of which originates from hoards found in the territory of Rumania. Among them, the following types may be distinguished:

Hexahedral one-lugged celts of elongated proportions with concave sockets as the most common for the Transilvanian hoards of the Uriu-Domenesty series [Petrescu-Dimbovita 1977: 51-73]. In the Middle-Dnestr basin, this type was represented by finds from the hoard of Grushka [Sveshnikov 1964, Tabl. III], which had revealed a set of metal articles typical for the Danubian hoards of the Uriu horizon. Such celts are typical for the eastern areas of the Carpathian basin and associated with the Noua culture. However, it is not improbable that their use took place even during the late stage of the Komarov culture (Fig. 3, 1).

Celts of the Old-Transilvanian type (K-42 and K-44 types, according to E.NB. Chernykh) are one-lugged, hexahedral in section, with complicated arched or trapeziform faces. They are rather common in hoards of Rumania: the Risesty-Beleny series in Moldova, the Draina-de-Zhos - Oynak series in Muntania, the Nikolae Balkesku — Gora Dobrodjey series in Dobrudja [Petrescu-Dimbovita 1977: 73-80]. They were also found in hoards of the Sabatinovka-culture Krasniy-Mayak metallurgical center of the North-Pontic coastal region [Chernykh 1976]. In the Middle-Dnestr basin, they are represented by a find from the Oleshev hoard [Krushelnitska 1985, Fig. 9, 8] (Fig. 3, 7).

Celts of the East-Transilvanian type (K-32 and K-34 types, according to E.N. Chernykh) are one-lugged, hexahedral or oval in section with arched faces, sometimes with a "cavity" on one of the sides. This type is rather commonly represented in Rumanian hoards of the BD period. It is most frequent both in hoards and among occasional finds of the Sabatinovka-culture Krasniy-Mayak metallurgical center [Chernykh 1976]. In the Dnestr basin, the local production has been registered by a find of a casting form for making this kind of celts in the Krasniy-Mayak metallurgical center [Chernyakov 1965]. For the Middle-Dnestr basin, it is represented by a find from the Grushka hoard (Fig. 3, 8).

*Spear-heads.* In a settlement near the vilage of Ostrovets, the Ivano-Frankovsk district, there was found a casting form for Dremailovka-type spear-heads (partly, P-16 type, according to E.N.Chernykh) having a narrow leaf-like blade broadened in the middle part and a short funnel-shaped socket [Bočkarev, Lescov 1979, Tabl. 7, 56] (Fig. 2, 4). This type is specific for tribes of the Sabatinovka culture in the Lower-Dnieper basin (see section "Weapons of the Sabatinovka-culture tribes") [Balaguri 1964, Tabl. 1].

The spear-head from the village of Oleshev, the Ivano-Frankovsk district [Krushelnitska 1985, Fig. 9, 7], with a narrow small leaf-like blade and a long funnel-shaped socket approximates the Krasniy-Mayak type spear-heads (partly, P-16 type, according to E.N.Chernykh) (Fig. 2, 3). Such spear-heads are more specific for monuments of the Sabatinovka culture in the Lower-Dnestr basin (see section "Weapons of the Sabatinovka-culture tribes").

The hoard of Grushka revealed two spear-heads with a triple-ribbed broad pointed blade and a funnel-shaped socket [Żurowski 1949, Tab.XXXIV, 2,4] (Fig. 6, 2). Spear-heads of this type are widespread in monuments of the Carpathian basin, particularly in the Piliny-culture monuments of the BD-HaA1 periods [Veliacik 1983; Kemenczei 1984]. Similar spear-heads have been found in the Noua-culture hoards of Transilvania: Mosiu and Petrosany 1 (a series of Uriu-Domenesty hoards) [Petrescu-Dimbovita 1977, Tabl. 56, 26; 59, 4] of the BD period.

The spear-heads from the Grushka hoard with a broad pointed blade (the end is broken off) and a long socket with a rim at its base (Fig. 6, 3) approximates the shape of the Seyma-type spear-heads, which are specific for Eastern Europe but differ therefrom by lower dimensions. In the Carpathian hoards, such spear-heads are missing. It is most probable, that this type should be thought as imported to the Middle-Dnestr basin from eastern areas.

Therefore, the armament of the Noua-culture tribes in the Middle-Dnestr basin is represented by types of weapons specific for the Noua-culture hoards of the Prut basin and Krasniy-Mayak metalurgical center, i.e. of the Sabatinovka culture in the North-Pontic region. The common types of armament specific for the Noua and Sabatinovka cultures are the Krasniy-Mayak type daggers, the East-Transilvanian type celts and the Dremailovka-type spear-heads. An important distinguishing characteristic of the Noua-culture weapons is represented by celts with concave sockets, battle

axes of the Carpathian types and spear-heads with shaped ribs and flame-shaped blades (the type of armament abundant in the hoards of Rumania).

### 3. WEAPONS OF THE HALLSTATTIAN TRIBES IN THE BASINS OF THE UPPER AND MIDDLE DNIEPER

In the Ukraine and Moldavia, the Thracian Hallstatt is represented by two groups of monuments: Goligrady and Moldavian [Iliyinskaya, Terenozhkin 1986; Maleev 1981; Lapushnyan 1979] (Maps 2 and 4).

The Goligrady group occupies the Ternopol, Chernovitsy, Ivano-Frankovsk and Carpathian districts. It is dated within the range of the 11th to the 8th centuries B.C. [Iliyinskaya, Terenozhkin 1986: 37]. Its origin is not yet clear to the end. Most scientists associate this group with the monuments of the Upper-Tisa basin and consider it as result of migration. G.A.Smirnova refers this group to the single culture of Gava-Goligrady, which was spread over a vast territory from Transilvania, north-eastern Hungary, south-eastern Slovakia to the western areas of Ukraine. She dates it to the Central-European periods of BD-HaB [Smirnova 1976b] and notes that these monuments cannot be generally associated with the foregoing Noua culture. The origin of the Thracian Hallstatt cultures and their contribution to the formation of the Carpathian-basin cultures at the foregoing time remain still unsolved. The part of the Dneestr-basin cultures in these processes is solved to a still lesser extent. In her studies on the formation of the Gava culture in Eastern Slovakia, Slovakia's scientist S.Demetrova has come to a conclusion that the Thracian Hallstatt was formed, within this territory, on the basis of the Suciude-Sus culture under the strong influence of eastern "Goligrady" elements starting from period of BD-HaA1 [Demetrova 1986: 129]. Such studies demand a revision in considering the problem on the origin of the Goligrady-group monuments and explain L.A.Krushelnitska's observations on the existence of "Hallstatt" elements in the late monuments of the Komarov culture, i.e. point to a direct participation of the Komarov culture in the formation of this group of the Thracian Hallstatt [Krushelnitska 1985: 41-47].

The Moldavian group of the Thracian Hallstatt is generally assigned to a transitional period from the Bronze Age to the Iron Age. The earliest are the monuments of the Golerkany type and of the Kishenev settlement dated to the 12th — the 10th centuries B.C. [Iliyinskaya, Terenozhkin 1986: 37]. G.N.Smirnova points to the differences of these monuments from those of Goligrady and relate them with the monuments of the Babadag and Insula-Banuluy types of Rumania [Smirnova 1976b].

The monuments of the Lusatian culture in the territory of the Ukraine have been studied insufficiently. They are located in the areas of the upper and mid-

dle courses of the western Bug. Some investigators spread them eastward, to the Horyn-river basin. The monuments are dated to the end of the 2nd millenium B.C. [Iliynskaya, Terenozhkin 1986: 41].

The Vysotskaya culture occupies the upper course of the western Bug, the eastern part of the Lvov district and the west of the Ternopol district. It is dated to the 2nd and the 1st millenia B.C. [Iliynskaya, Terenozhkin 1986]. It was formed with the participation of the Trzciniec-Komarov, Noua and Lusatian cultural elements [Krushelnitska 1985: 71-84]. The Polish investigators (e.g., Z.Bukowski) incorporate these monuments with the Lusatian culture [Bukowski 1976].

In view of relatively small number of finds (complex, in particular) and shortcomings in the cultural-chronological division of the region, the armament of tribes of the Hallstatt period in the Upper-and Middle-Dnestr basins is discussed as a whole.

*Swords.* In the Dnestr basin there were commonly used swords of the Liptovsky type specific for the Gava culture in the Danube basin and the Lusatian culture in Poland. Their typology was formulated by J.Fogel on the basis of Lusatian-culture swords.

The swords from Koropets, The Buchach region, and Galich, the Stanislav region (Fig. 5, 1, 2), are referred to subtype XXC, HaA1-A2; the sword from Komarniky [Żurowski 1949, Tabl. XXXIII, 5] is referred to subtype XXD, BD-HaA1; and the sword from Zavalova [Żurowski 1949, Tabl. XXXIII, 3] falls in subtype XXF, HaA1-A2. The sword of a somewhat different type from Poddnestrany, which has a funnel-shaped haft [Żurowski 1949, Tabl. XXXIII, 6], is assigned to type XXIA dated to the HaB1 period [Fogel 1979: 56].

Though Liptovsky-type swords are widespread in the archaeological monuments of the Central Europe, the center of their production seems to have been in the Middle-Danube areas [Fogel 1979: 47-55], and their appearance in the Upper-and Middle-Dnestr basins may be related to the contacts with the Gava culture.

The next group is represented by swords specific for the Central-European urn-burial cultures including the Lusatian culture. The typology of the above swords has been treated by many scientists [Cowen 1956; Müller-Karpe 1961; Schauer 1971; Fogel 1979]. A most complete and improved typology of swords has been advanced by P.Schauer, and we shall follow this.

The sword from Galich and Burkanovo [Żurowski 1949, Tabl. XXXII, 1, 2] are referred to the Reutlinger type [Schauer 1971: 132-148], BD-HaA1; the swords from the Dnestr basin [Kozłowski 1939, Tabl. XV, 5] (Fig. 5, 3) and Komarniky [Żurowski 1949, Tabl. XXXII, 5] are referred to the Hemigkofen type [Schauer 1971: 157-160], HaA1-A2.

A rare and original version of the Liptovsky-type swords is represented by the sword from Yazlovets, the Buchach region (Fig. 5, 5), characterized by a spiral-shaped head. Generally, in Central Europe, Liptovsky-type swords reached the HaB1 period, when there appeared first swords with spiral-shaped heads, and this

makes it possible to date the given specimen to the 10th century B.C. The fact that swords with spiral-shaped heads appeared in the Dnieper basin in very ancient times has been supported by a sword haft from the village of Vorona, The Ivano-Frankovsk district, approximating Reutlinger-type swords in shape [Maleev 1984: 292]. This find in the form of an untreated casting bears witness to its local origin. In Central Europe, swords with spiral-shaped heads enjoyed wide use at the HaB2-HaC periods, though the center of their origin has not been still exposed. The finds of such early versions of swords with spiral-shaped heads near the village of Yazlovets and Vorona have made it possible to relate the Dnestr basin to the area of their origin and the early stages of its production. The Valya Rusuluy hoard has revealed a Danubian-type sword with a spiral-shaped head of lens-shaped section and an ornated blade [Dergachev 1975: 74 and Fig. 3, 1] (Fig. 5, 9). The hoard is dated to the 10th — the 9th centuries B.C.

An original group of swords unusual for Central Europe is represented by finds in the district of Przemyśl, Poland, adjacent to the Upper-Dnestr basin. One of them is a sword from Jarosław with a double-edged blade (its lower part is broken off) strengthened by a central rib circular in section and by two short ribs at the haft, which is provided with a flattened stop and has an oval aperture (Fig. 5, 4). The other find is from the vicinity of Przemyśl. It is a sword with a double edged triple-ribbed blade having a flattened stop and an angularly apertured haft with a small mushroom-like head (Fig. 5, 6). The third is from Rozhobovychy (the Khmelnytsk district, the Ukraine). It has a leaf-like triple-ribbed blade of a lens-shaped section and is provided with a flowing-down flattened stop and an apertured haft with a mushroom-like head (Fig. 6, 7) [Bukowski 1976, Tabl. I, 3; II, 1, 2]. Z. Bukowski dated these swords to the 13th — the 12th centuries B.C. [Bukowski 1976: 23] on the basis of numerous analogies from East Europe and by associating these swords with the Krasniy-Mayak type swords from the North-Pontic areas and Sosnowaya-Maza type swords from Lower-Volga basin and Western Khazakhstan. However, the swords of the Krasniy-Mayak type differ from those above mentioned in forms of their hafts and blades. The Sosnowaya-Maza type swords are characterized by a short leaf-like blade approximating the Krasniy-Mayak type swords in form and size, and by an apertured haft with a small mushroom-like head approximating the swords from Poland in form. The principal area of spread of Sosnowaya-Maza type swords is confined to the Volga basin and Khazakhstan, where the local production was recorded by a casting form revealed in the Sargara-culture Petrovka II settlement [Chernykh 1983, Fig. 9, 45].

The find of a sword in the Middle-Dnestr basin (see below), which has an apertured haft approximating those of the Sosnowaya-Maza type and a narrow blade approximating those of swords from Poland, has made it possible to distinguish a western version of swords with an apertured hafts in the forest-steppe zone of Ukraine. The above finds are likely to reflect a combination of Central-European and East-European technological and weapon-making traditions in the zone situ-

ated to the east from the Carpathians. Along with the swords from the district of Przemyśl, such contacts may be evidenced by the sword from the hoard of Dege in Hungary [Kemenczei 1984: 172, Tabl. CLXXIX, 1], which has a blade with a stop on the haft approximating those of Central-European Reutlingen-type swords (BD-HaA1) having apertured hafts. The existence of such contacts is evidenced by a fragment of an apertured sword haft found in the hoard of Ardud, Transilvania, the series of Uriu-Domenesty hoards of the 13th century B.C. [Petrescu-Dimbovita 1977, Tabl. 22, 4].

*Fighting axes.* The Hallstatt period in the Dneestr basin is characterized by a complete disappearance of lugged axes and by a wide spread of various types of celts. The appearance of the earliest types of celts in this region is traditionally associated with the Noua culture. However, it is not improbable that one of the types, such as hexahedral one-lugged celts of elongated proportions with concave sockets, appeared as far back as at the late stage of the Komarov culture (see above).

The continuation of local traditions in making celts with concave sockets is evident from the finds of casting forms in the Goligrady-group settlement of Myshkovichy and Gorodnitsa, and of celts in the hoards of Nedliska, Zalozhtsy and Uzin [Sveshnikov 1961, Fig. 7].

The foundry in the settlement near the village of Myshkovichy, the Ternopol region, was assigned by Yu.N.Maleev to the Goligrady-group monuments [Maleev 1976: 232-239]. L.A.Krushelnitskaya referred this settlement to the Vysotskaya culture and noted that the types of articles represented by the casting forms of this monument were specific for the Thracian Hallstatt [Krushelnitskaya 1985: 55-58]. One of the casting forms exhibits an elongated negative for a hexahedral one-lugged celt with a concave socket (Fig. 3, 3) related to a rather rare version of celts of this type. Similar celts were found in Transilvanian hoards of Dariya (HaA2), Novy Shashes and Vysuiya (HaB1) [Petrescu-Dimbovita, 1977, Tabl. 289, 8, 313, 5, 333, 2]. In the north-eastern part of Hungary, such celts were found in the hoards of Piritse and Zenten referred by T.Kemenczei to the second phase of the Gava culture (HaA-B) [Kemenczei 1984: 95, Tabl. CLXXXV, 9, CCIV, 19]. A similar celt was found in the hoard of Nedliska, the Lvov district (Fig. 3, 4) [Krushelnitskaya 1985: 81]. A relative rarity of celts of the given version in Transilvania and north-eastern Hungary, along with the find of a casting form in Myshkovichy, makes it possible to determine the Ternopol district as one of the centers of production of such celts.

A somewhat different version of celts with concave sockets and broad sometimes tapered blades originates from the hoard of Nedliska (Fig. 3, 6). A celt casting form of this kind was found in the Goligrady settlement of Gorodnitsa, the Ivano-Frankovsk district [Sveshnikov 1964, Tabl. 1, 13] (Fig. 3, 5). Such celts were also met in hoards of Transilvania within the range from HaA2 — the hoard of Finatse (similar to the celt from the hoard of Nedliska) — to HaB2 — the hoard of Tyrgu Sekuesh 1 (similar to the celt on the casting form from Gorodnitsa) [Petrescu-Dimbovita 1977, Tabl. 290, 11, 355, 13].

The Late Krasniy-Mayak group of celts points to the continuation of the Noua-Sabatinovka metallurgical traditions in the Dnestr basin at the Early-Hallstatt time. The celts from the village of Zavadintsy (the museum of the Kamenets-Podolsky Pedagogical Institute) (Fig. 3, 9, 10), which have numerous analogies in the Danubian hoards of the BD/HaA1 periods, are the earliest among them. To a later time, there is referred a celt from the village of Ivanchin (the Khmelnytsk cultural-historic district) (Fig. 3, 11). Great quantities of such celts were found in the Transilvanian hoards of the HaA1-A2 periods.

To the Goligrady type, there are referred celts from Krekhov and from burial V near the village of Gorodenky [Kozłowski 1939, Tabl. XV, 9, 11, 12] (Fig. 4, 2, 3, 4). The production of one of the versions of celts of this type in the Upper-Dnestr basin is confirmed by a casting form from the foundry of Myshkovichy (Fig. 4, 1). Numerous finds of celts of this type in hoards of the Danube basin have made possible to date them to the periods of HaA1-HaB1.

The Gava culture celts are represented by finds from the hoards of Zalozhtsy (Fig. 4, 5, 6) and Krekhov [Żurowski 1949, Tabl. VIII, 1, 2]. According to numerous analogies from the Danubian hoards, they are dated to the periods of HaA1-A2. The foundry of Klusheshty and the hoard of Finatse in Transilvania may be taken as an example [Petrescu-Dimbovita 1977, Tabl. 133, 1, 290].

The Lusatian group of celts of the Upper-Dnestr basin is represented by a great number of finds divided into two types. 1) The Slovakian type represented by Grubeshov's finds from Galich [Żurowski 1949, Tabl. IX] and by finds from the hoard of Nedliska (Fig. 4, 8, 9). Celts of this type are specific for the North-Slovakian version of the Lusatian culture [Veliáčik 1983: 41-42, Tab. XLVI, 2-5]. They are dated to the 12th — the 11th centuries B.C. 2) The Upper-Dnestr type of Lusatian celts (Fig. 4, 10, 11). In ornamentation, they are close to the Lusatian-culture celts of Poland, which are represented by casting forms from Piekary, Bojadło and Wołów [Gediga 1982, Fig. 11, 12, 13]. In shape, size and proportions they are close to some types of celts of the Krasniy-Mayak metallurgical center (e.g. celts from the Indulsky and Kurlozovsky Hoards) [Chernykh 1976, type K-38]. This type is dated in accordance with the find of a similar celt in the hoard of Uioara-de-Sus, Transilvania (HaA1) [Petrescu-Dimbovita 1977, Tabl. 217, 15].

The Late-Goligrady type (the "Ruda" type, according to L.Kozłowski) incorporates one-lugged asymmetric small celts specific for the Upper and Middle-Dnestr basins. They are represented by finds in Korzhov, Korneev, Bolshiye-Grobovichy, Molodyatino, Chervonograd [Żurowski 1949, Tabl. VI, VII], Ruda, Pudlovtsy, Sosulevka (Fig. 6, 7-9), Vorona [Sveshnikov 1961, Fig. 1-5] and in the hoard of Valya Rusuluy [Dergachev 1975, Fig. 3]. Celts of the given type are most specific for the Late-Hallstatt monuments of the Dnestr basin and dated to the periods of HaB1-B2, according to numerous finds in the Danubian hoards.

*Spear-heads.* This category of weapons in the Hallstatt-period monuments of the Upper-and Middle-Dnestr basins is represented by a small number of finds.

The spear-head with a flame-like blade and a long socket from the hoard near the village of Uzin [Sveshnikov 1961, Fig. 2] approximates the spear-head having a long socket from Lesnaya-Slobodka, the Kolomiya region [Kozłowski 1939, Tabl. XV, 28]. The heads of this kind are assigned to a widespread type of spear-heads of Central Europe, such as spear-heads with "flame-like" blades. The appearance of such heads is associated with the Middle-Danubian district of the Carpathian basin [Paylic 1963: 308], wherein they appeared during the Piliny culture. Spear-head from Lesnaya-Slobodka is related most closely to the finds from hoards of the Piliny-culture horizon assigned to the BD-HaA1 period [Kemenczei 1984: 22-23].

The dart-head from the hoard of Kirizhin (Fig. 6, 4) is referred to the Krasniy-Mayak type spear-heads (P-16 type, according to E.N.Chernykh) and to the Sabatinovka — Noua culture darts. The find of such a head together with Lusatian celts of an original version in the same hoard dated to the 12th century B.C. (see above) enables one to suppose that the upper boundary of existence of such heads somewhat penetrates into the Hallstatt time.

The spear-heads from Byelinichy and the village of Duplisko, the Zaleshchiky region [Kozłowski 1939, Tabl. 29, 33] (Fig. 6, 5, 6), are referred to a later period. They are related to the late versions of Danubian complex-ribbed spear-heads specific for the Gava-culture hoards of the HaA2-HaB1 periods [Kemenczei 1984].

*Defensive armour* of the Hallstatt time is represented in the Upper-Dnestr basin, by a bronze helmet from the village Kremennaya, the Kamenets-Podolsky region of the Khmel'nitsk district [Sulimirski 1970, Tabl. XLVIII] (Fig. 6, 10). In general, the helmet approximates the proto-Etruscan helmets of Italy and the Alpine zone of Central Europe, though there is no direct similarity to this find, and this introduces some difficulties in determining its chronological and cultural affiliation.

Thus, on the basis of the available materials, in the Upper- and Middle-Dnestr basins of the Hallstatt period there may be most clearly distinguished the following groups of armament:

I. The Gava-Goligrady group that includes both imported weapons specific for the Gava and Danubian cultures (celts, Liptovsky-type swords, triple-ribbed spear heads) and local forms related to the heritage of the Komarov (celts) and Noua (celts, spear-heads) cultures.

II. The Lusatian group that includes both weapons specific for the North-Slovakian version of the Lusatian culture (celts, multiribbed spear-heads, Reutlingen- and Hemigkofen-type swords) and local versions exhibiting a combination of Early-Lusatian and Krasniy-Mayak metallurgical and weapon-making traditions of the Noua and Sabatinovka cultures (celts).

There is a separate group formed of weapons of the 10th — the 9th centuries B.C. (celts of Ruda-type, swords with spiral-like heads, late versions of triple-ribbed spear-heads).

The available materials are insufficient to provide the distinction of weapons specific for the Vysotskaya culture, and this, we believe, supports the conclusion of

some scientists on a combined nature (Lusatian-Goligrady) of this group of monuments [Krushelnitskaya 1985: 72-84].

#### 4. WEAPONS OF THE SOSNITSA-CULTURE TRIBES

The Sosnitsa culture, according to I.I.Artemenko [Artemenko 1987], or the Kiev and Sosnitsa versions of the East-Trzciniec culture and the Lyebedovka group of monuments, according to S.S.Berezanskaya [Berezanskaya 1985]), occupied the territory of the Middle- and Upper-Dnieper basins (Maps 1, 3, 4). The Early-stage monuments are dated to the 15th — the 13th centuries B.C. The monuments of the middle stage are dated to the 13th — the 11th centuries B.C., and those of the late stage are dated to the 11th — the 9th centuries B.C. [Artemenko 1987: 106-113].

*Daggers.* This kind of weapons is represented by Krasniy-Mayak type daggers with circular stops (H-36 rtype, according to E.N.Chernykh) differing from the Krasniy-Mayak type proper by a more flattened oval stop and a more broadened and short tang. Daggers of such a sort are engraved in stone casting forms of the Golovorovo foundry (Fig. 7, 1, 4), and Derevyannoye and Mazepintsy foundries (Fig. 7, 2, 3) [Bočkarev, Lescov 1979, Tabl. 1, 16, 2, 22, 7, 21]. Such forms are also specific for the Loboykovo metallurgical center of the left-bank Ukraine assigned by most investigators to the Srubnaya-culture historical area [Cherednichenko 1986].

*Swords.* This group of weapons is represented by a sword from the Middle-Dnieper basin [Khanenko 1899, Tabl. XI, 39] (Fig. 7, 5), which is in the form of a narrow leaf-shaped blade strengthened with a thick rib of rhombic section and having a broad flattened stop, an ovally-apertured haft and a mushroom-shaped head. In its form, the sword haft approximates (but it is not identical in detail) those of the Sosnowaya-Maza type swords from the Volga basin and Western Khazakhstan [Chernykh 1983]. As the nearest analogies to this sword are found in the Dneestr basin (Fig. 5, 4, 6, 7), there has become possible to distinguish a western version of the Sosnowaya-Maza type swords.

*Fighting axes.* This category of cutting weapons of the Sosnitsa-culture tribes is represented by celts subdivided into the group of Kardashinka, Loboykovo and Krasniy-Mayak.

In the Kardashinka group, the celt on the casting form from the settlement of Zazimiye [Berezanskaya 1985, Fig. 119, 11] is the earliest. It is ludless and hexahedral in section. It has two widely spaced rims on the socket and is ornamented with a pattern in the form of two diverging whiskers. In form and proportions, this celt is close to Seyma-type celts [Chernykh 1970]. The celt close to those of the Seyma type but differing therefrom by the presence of a lug originates from the village of Khmelna, the Kanev region (Fig. 8, 5). The completely formed Karda-

shinka type (K-66, K-68 and partly K-70, K-72 types, according to E.N.Chernykh) is represented by finds from the settlement of Vita Lithuanian, the Medvedovka hoard (the Kiev district), the Kanev region and the village of Grishintsy (the Kanev region) (Fig. 8, 8-12). Such celts are specific for the Kardashinka metallurgical center (see Chapter IV). Conventionally, this group includes the celts from the village of Kozintsy [Berezanskaya 1985, Fig. 19, 1], which is lugless, hexahedral in section and has two rims on a quadrangular socket (Fig. 8, 14). Similar celts are engraved in the stone casting forms from the village of Ptakhovka and Novoalexandrovka (see "Weapons of the Byelozerka-culture tribes"), which are included into the complexes of the Kardashinka metallurgical center. This makes it possible to refer the celt of this type to the set of "Kardashinka"-form metal articles. Quadrangular and rectangular sockets with rounded angles are specific for the Lusatian- and Chernoleskaya-culture celts, and this makes it possible to assign the celt from Kozintsev to the late stage of the Sosnitsa culture.

In the Loboikov group, the earliest are the celts on the casting forms from the foundry near village of Golovurovo, the Borispol region of the Kiev district [Sharafutdinova 1973]. They are one-lugged, hexahedral in section (Fig. 8, 3, 6) and two-lugged, oval in section with a somewhat curved asymmetric blade decorated with an oblique-stroke ornament (Fig. 8, 4). The later forms are represented by Kobakovo-type celts such as a two-lugged celt of hexahedral section (K-52 type, according to E.N.Chernykh) on the casting form from the Subbotovo camp (Fig. 8, 15) and two-lugged celts of oval section (K-54 type, according to E.N.Chernykh) on the casting forms from the Derevyannoye foundry, the Obukhov region of the Kiev district, and the Mazepintsy foundry, the village of Velikopolovetskoye of the Squira region, the Kiev district [Bočkarev, Lescov 1979, Tabl. 2, 7] (Fig. 8, 7, 16). Such celts are specific for the Loboikov metallurgical center. Conventionally, this group includes a small hexahedral asymmetric one-lugged celt from the Rzhishchev region (Fig. 8, 13), no analogy to which is known.

The Krasniy-Mayak group is represented by a two-lugged version of East-Transilvanian type celts (K-58 type, according to E.N.Chernykh) from the village of Golovyatino, the Smyela region of the Cherkassy district, and from the village of Bukrin the Rzhishchev region of the Kiev district (Fig. 9, 4, 2) and also by a two-lugged version of Late-Transilvanian type celts (K-60 and K-64 types according to E.N.Chernykh) from the vilage of Golovyatino (Fig. 9, 3). The given types of celts are specific for the Lower-Dnieper areas of the Sabatinovka-culture Krasniy-Mayak metallurgical center (see Chapter IV). The casting form from the village of Ryzhovka, the Uman region, (Fig. 9, 1) represents a one-lugged hexahedral celt specific for the western areas of the Krasniy-Mayak metallurgical center. An original herring-bone ornament specific for the forest-steppe cultures enables one to consider this to be a local variant.

*Rare types of percussive weapons.* A flat ax on the casting form from the settlement of Zazimiye [Berezanskaya 1985, Fig. 119, 11] and a socketed beak-ax from

the settlement of Luka Raykovetskaya found together with Sosnitsa-type ceramics [Berezanskaya 1972, Fig. 27, 2]. The flat ax from Zazimiye is similar to those from the hoard of Odaily-Podary, Rumania, of the BA period [Lescov 1981, Tabl. 8A] and from the Crete island, Knoss, Zafer Papoura, burial 7, the Late-Helladic II-IIIb periods [Müller-Karpe 1980, Tabl. 199, B4] (Fig. 7, 6).

The beak ax having a cast tapering socket and a narrow percussion end of trapezium section from the settlement of Luka Raykovetskaya (Fig. 7, 7) is similar to those from te Zavadovka foundry [Gershkovich, Klochko 1987: 110, Fig. 6, 1] and the Kinku hoard of Transilvania, period HaA1 [Petrescu-Dimbovita 1977, Tabl. 129, 1].

*Spear-heads.* Conventionally, they are subdivided into three main groups: 1) heads with a sharp-pointed blade (local type); 2) heads of the Krasniy-Mayak type (specific for the Sabatinovka- and Noua-culture tribes); 3) heads of the Loboikovovo type (specific for the inhabitants of the left-bank Dnieper areas).

Typologically, the first group includes the following spear-heads as appearing to be earliest: a head from the village of Barezino, the Zhashkov region of the Cherkassy district, (Fig. 10, 2); a head from the village of Sukhiny, the Rzhishchev region of the Kiev district [Artemenko 1967, Fig. 19, 3] ( Fig. 10, 3); a head cast by means of a clay casting form (as seen from its surface appearance) with a narrow pointed blade and a short socket, which was found in the town of Pereyaslav-Khmelnytsky (Fig. 10, 5); and a head with a narrow blade and a short broad socket made in the form of a "lug" at its base and provided with a hole to be fixed on a shaft, which was excavated by N.I.Vyeselovsky in the Kiev district [Tallgren 1926, Tabl. 108, 13] (Fig. 10, 1). The non-complex character of the finds presents some difficulties in determining their cultural and chronological origin. However, their archaic appearance enables one to regard them as the earliest forms of this kind of weapons in the Middle-Dnieper basin.

The spear-heads with pointed blades and long funnel-shaped sockets each having a lug at the blade base are assigned to some improved forms. Spear-heads of this kind are exhibited on the casting forms from the Golovurovo foundry (Fig. 10, 9-11). An analogous head was found in burial mound No.1 near the site of Panshchina in the vicinity of the village of Kvetun the Bryansk district [Padin 1963, Fig. 2]. A fragment of such an article is kept in the collection of the State Historical Museum of the Ukraine (Fig. 10, 8).

The later still more improved versions of spear-heads of this type are represented by finds from the village of Pugachevka, the Uman region, and from the Kanev region (Fig. 10, 4, 6). They have numerous similarities in the Central-European hoards of the BD-HaA11 periods.

The spear-heads from the village of Veremiye (Fig. 10, 7) and Yudinovo [Artemenko 1987, Fig. 51, 5] are similar to the "Dremaylovka"-type Sabatinovka-culture heads in shape of their sockets. However, they are characterized by a pointed form

of blades and this makes it possible to consider them as a local version specific for the southern areas of the Sosnitsa culture.

The Krasniy-Mayak group of spear-heads and darts is represented by spear-heads of the Dremaylovka and Krasniy-Mayak types (P-16 type, according to E.N. Chernykh). A number of Dremaylovka-type spear-heads were found in the settlement near the villages of Vishenky and Kozintsy (Fig. 9, 5, 7). Krasniy-Mayak type spear-heads were found near: the village of Selishche, the Cherkassy district; the village of Lesovichy, the Tarashcha region; the village of Prokhorovka, the Kanew region (Fig. 9, 6, 8, 9, 12). The given spear-heads are specific for the Krasniy-Mayak metallurgical center of the Sabatinovka- and Noua culture tribes (see "Weapons of the Sabatinovka-culture tribes"). Conventionally, this group includes the spear-heads from the Kanew district approximating the Krasniy-Mayak type spear-heads in shape (Fig. 9, 11). It also includes the spear-head from the village of Grebeny, the Rzhishchev region, having a broad leaf-like blade, a thick rib of rhombic section and a very short socket strengthened with a rim at its base (Fig. 9, 10), which was aimed for delivering cutting blows (see Chapter IV).

The Loboikov group is represented by spear-heads and apertured blades. Among them, there are distinguished spear-heads of the Zlatopol type characterized by broad pointed blades with large rounded apertures strengthened with one-three rims. Such spear-heads were found between the villages of Keliberda and Prokhorovka, the Kanew region (Fig. 11, 11), and near the village of Ivanovichy, the Vasilkov region of the Kiev district (a casting form bearing witness of the local production of spear-heads of this type) [Tallgren 1926, Fig. 108, 11] (Fig. 11, 3). This group also includes the spear-head with a narrow blade from the village of Khmelna, the Kanew region (Fig. 11, 2). The spear heads from the village of Kozintsy [Berezanskaya 1976] (Fig. 11, 5) and the village of Zaymishche, the Brovary region (Fig. 11, 4), are characterized by smaller sizes and have no rims on their sockets. They are likely to be considered as later versions of the Zlatopol type spear-heads that represent a further continuation of this development line.

The spear-head from the village of Keliberda (Fig. 11, 7) is assigned to the Zavadovka-type apertured spear-heads (see "Weapons of the Byelozerka-culture tribes"). As an example of the latest variant of apertured spear-heads assigned to the Late Bronze (Early-Iron Ages), there may be taken the spear-head from Kozintsy, which has a short funnel-shaped socket and small apertures at the base of its blade (Fig. 11, 6).

*Arrow-heads.* The Sosnitsa-culture settlements revealed comparatively large number of flint arrow-heads. All them are represented by the types specific for Cord-Ceramic culture monuments of the Middle-Bronze Age such as triangular dart arrow-heads and triangular tanged road arrow-heads exhibiting sometimes only somewhat more rough methods of flint working. As noted above, such types of armament should be a subject of special studies including Early- and Middle-Bronze

Age weapons. The complex of the Late-Bronze Age yielded only two finds of flint arrow-heads differing from those of the "Cord-culture". They are the above-mentioned arrow-heads from burial mound II in the vicinity of the village of Ivaniye and one leaf-like arrow-head with a base in the form of two sinking calks found in burial mound 16 of the Voytsekhovka cemetery [Lagodovskaya, Zakharuk 1956] (Fig. 11, 8).

Thus, weapons of the Sosnitsa-culture tribes are represented by three armament groups: Kardashinka, Krasniy-Mayak and Loboikovo. The Kardashinka group specific for the population of the right-bank Middle-Dnieper areas includes arrow-heads with pointed leaf-like blades and celts of the Kardashinka type.

The Loboikovo group includes Krasniy-Mayak type daggers of the Loboikovo version, apertured spear-heads and Kobakovskiy-type celts. The given kind of weapons is specific for the population of the left-bank Middle-Dnieper areas and bears evidence of contacts between the Sosnitsa-culture tribes and their eastern neighbours.

The Krasniy-Mayak group including Dremaylovka and Krasniy-Mayak type spear-heads and Krasniy-Mayak type celts makes allowance for contacts between the Sosnitsa-culture tribes and their southern neighbours - the Sabatinovka-culture tribes.

## 5. WEAPONS OF THE BYELOGRUDOVO-CULTURE TRIBES

The Byelogradovo-culture territory includes the eastern half of the right-bank Ukraine. In the north the boundary runs along the Kiev — Zhitomir — Rovno line, in the west it runs along the rivers of Zbruch and Goryn, in the south — along the Mogilev Podolsky — Kirovograd — Kremenchug line, and in the east it is along the Dnieper (Maps 2 and 4). Within the territory outlined there are distinguished two regions — the northern and the southern. This culture is dated to the 11th — the 9th centuries B.C. [Berezanskaya 1985: 501-502].

*Daggers.* The main part of finds includes Krasniy-Mayak daggers with circular stops of the Late-Zagradovka version specific for the Byelozerka culture (see "Weapons of the Byelozerka-culture tribes"). They are characterized by a narrow leaf-like blade, a highly-set circular stop separated from the blade and a long narrow tang. Daggers of this type were found in the village of Dumantsy, the Cherkassy region, in the village of Pilyava, the Kanev region, in the Tarashcha region, and in the village of Khmelna, the Kanev region (Fig. 12, 1-3, 5).

In case of the Byelogradovo-culture tribes the existence of an original form of daggers along with the Byelozerka forms is evidenced by a tanged dagger with a leaf-like blade having no stop that was found in a settlement near the village of

Sandraky, the Khmelnik region of the Vinnitsa district [Lagodovskaya 1954: 133-141] (Fig. 12, 4).

*Fighting axes.* This kind of weapons is represented by celts subdivided into the types as follows: the Kardashinka type (K-66, partly K-68, K-70 and K-72 types, according to E.N.Chernykh). They are represented by finds from the hoard of Staroseliye [Telegin 1982] (Fig. 12, 8) and in the vicinity of the villages of Chaplishche and Golovyatino, the Chigirin and Smela regions, respectively (Fig. 12, 9, 11, 12). The relationship of this type of celts with the Byelogradovo culture has been recorded by the find of a fraction of a stone casting form for making such celts in the settlement of Sobkovka (Fig. 12, 10). Besides, this group includes the celt from the village of Balakleya, the Smela region of the Cherkassy district (Fig. 12, 14). Celts of this type are also specific for the Sosnitsa and Byelozerka cultures. The finds of such celts in the hoards of Sokoleny and Staroseliye [Telegin 1982] (Fig. 12, 8, 13) together with Late East-Transilvanian lugless celts (K-12 type, according to E.N.Chernykh) enable one to synchronize the beginning of their production to the late stage of the Krasniy-Mayak metallurgical center activity. The upper date of such celts is determined by the find of an Early-Lusatian celt specific for the Danubian hoards of the HaA1 period, which was revealed in the Medvedovka hoard [Lescov 1981, Tabl. 4F] together with celts of the Kardashinka type.

The Lusatian celt from the Medvedovka hoard, the Rzhishchev region, is not a single find of Central-European celts in the Middle-Dnieper basin. Thus, in the villages of Karapishy and Ivanovka, the Mironovka and Uman regions, respectively, there were found celts (Fig. 12, 16, 17) approximating the Medvedovka-type celt in shape and assigned to the types, the Lusatian origin of which has been recorded by the casting forms revealed in Piekary, the Wrocław district and Bojadła, the Zielona Góra district, Poland [Gediga 1982, Fig. 11, 12]. Celts of the given types are widespread in the Danubian hoards of the HaA1-A2 periods. The celt from the village of Pikovets, the Uman region (Fig. 12, 18), is ornamented like Lusatian celts, though in form it is close to Krasniy-Mayak celts, and this makes it possible to consider it together with celts from the hoard of Karyzhin in the Upper-Dnieper basin (see above) as an Upper-Dnestrian version of Lusatian-type celts. The celt from the village of Andrushevka, the Zhitomir region (Fig. 12, 15), is assigned to the type represented by finds from the Early-Gava Danubian hoards, for example, the hoard of Balsa in Hungary, HaA1 [Kemenczei 1984, Tabl. CLVI, 5], and therefore supplements the finds of Central-European weapons in the Middle-Dnieper basin.

Further, in the Middle-Dnieper basin, this development line was continued by Chernoleskaya-culture celts of the Early-Iron Age [Terenozhkin 1961: 126-130], whose genetic relationship (named as Lusatian-Ukrainian) with Lusatian celts was noted by T.Sulimirski [Sulimirski 1936: 184]. Practically, celts of the Chernoleskaya culture are no different from those of the Lusatian culture either in form or size though there are some distinguishing features in ornamentation such as the use of herring-bone patterns in cannelures.

*Spear-heads.* The triple-ribbed spear-head from the Kiev district (Fig. 12, 7) is assigned to the Central-European type specific for the Carpathian-basin monuments of the BD-HaA1 period.

One of the latest bronze spear-heads found in the Middle-Dnieper basin is the head from the village of Staiky, the Rzhishchev region (Fig. 12, 6). It has a flat rib of trapeziform section specific for Central-European spear-heads of the Late-Bronze/Early-Iron Ages.

Therefore, the Byelogradovo-culture armament is composed: of Late-Kardashinka forms (celts) that seem to have been related, in this area, to the Sosnitsa-culture tribes; of Late-Krasniy-Mayak forms (daggers) specific for the Byelozerka culture; and of Central-European types of weapons (spear-heads, celts). In the Middle-Dnieper basin, the latter are represented by a set of articles specific for the armament of tribes inhabiting the Upper-Dnestr basin in the Hallstatt period.

## 6. WEAPONS USED IN THE SRUBNAYA-CULTURE HISTORICAL REGION

In Eurasia, the Srubnaya culture was one of the greatest cultures of the Bronze Age. It was spread over considerable portions of the Lower-Dnieper, Don and Volga basins and reached the foothills of the Ural [Krivtsova-Grakova 1955]. Nowadays, the areal of its spread is substantially shortened in the territory of the present Ukraine as a result of separation of the Sabatinovka culture as an independent division [Chernyakov 1985; Sharafutdinova 1982, 1986]. It is limited by the left-bank Dnieper areas and lies both in the steppe and forest-steppe zones (Maps 1 and 3). The Srubnaya culture is dated to the 16th — the 12th century B.C. [Cherednichenko 1986: 63-82]. The present level of knowledge, as Cherednichenko believes, requires "to consider the Srubnaya culture not as a single unit within the limits of Eastern Europe but as a Srubnaya-culture historical region including numbers of local groups of Srubnaya-culture monuments, which would be more properly called as independent cultures" [Cherednichenko 1986: 49].

Besides, the revision of concepts on the relationship practically between all the bronze articles from the North-Pontic areas of the Late-Bronze Age and the Srubnaya culture has resulted in the separation of Srubnaya-culture articles of the Krasniy-Mayak metallurgical center [Chernyakov 1985], and also of the Loboykovo, Kardashinka and Zavadovka metallurgical centers [Chernykh 1976]. As a consequence, the range of sources, the "Srubnaya-culture" origin of which may be determined quite definitely, has declined severely. Within the frame of the cultural-historical region in the territory of the Ukraine, there can be distinguished the Srubnaya and Loboykovo groups of armament.

There have been adopted the following forms as criteria for distinguishing the Srubnaya-culture group of armament in the territory of the Ukraine: 1) forms specific for Srubnaya-culture monuments in the Volga basin; 2) forms, the "Srubnaya-culture" origin of which is determined on the basis of finds in the complexes including Srubnaya-culture ceramics. To separate the Srubnaya-culture types of bronze articles, of great importance are the finds of first Srubnaya-culture casting forms in the settlements of Mosolovka the Don-basin [Pryakhin, Sagaydak 1975], and Usovo-Ozero, the North-Donets basin [Berezanskaya 1990] where have been revealed a great number of casting forms and articles, the Srubnaya-culture origin of which is out of doubt. These finds include:

*Daggers.* The leading type of Srubnaya-culture daggers is represented by weapons with narrow leaf-like blades each having a flattened stop on a flat tang pointed to its back (H-30 and H-32 types, according to E.N.Chernykh) /as an example of weapons, here are only taken articles having blades of no less than 10 cm long/. In the Ukraine, daggers of this type were found: in the Chuguyevo region, the Poltava district (Fig. 13, 1), in the settlement of Kapitanovo [Cherednichenko 1970, Fig. 1, 6], in the vicinity of the village of Kozintsy, the Pereyaslav-Khmelnytsky region [Berezanskaya 1986] (Fig. 13, 2, 3), in the settlement of Kalinovka near the town of Donetsk (from the report of Ya.P.Gershkovich) (Fig. 13, 5), in the settlement of Yanokhino, the Kharkov district, and between the villages of Obukhovka and Sugakovka, the Dnepropetrovsk region [Chernykh 1976: 118] (Fig. 13, 4, 6). A wide spread of such daggers in the eastern areas and the finds in the Srubnaya-culture settlements of the Ukraine allow for associating the daggers of this type with the Srubnaya culture quite definitely and for dating them to the 16th — the 15th centuries B.C. [Cherednichenko 1972: 154-156].

This development line was then extended by the production of daggers with broadened blades and protruding rims that were found near the villages of Byerestyagy and Grishintsy, the Kanev region, near the village of Shakhovka, the Konograd region of the Poltava district, in the vicinity of the Dnieper rapids [Chernykh 1976] and in the village of Pribuzhiye, the Domanevka region of the Nikolayev district (from the report by A.M.Balyshkin) (Fig. 13, 11). The production of daggers of this type in the Ukraine is recorded by finds of a number of casting forms in the settlement of Usovo-Ozero (Fig. 14, 3). The broadened leaf-like blades and protruding fine ribs obtained in the process of casting seem to have resulted from the influence of the Sabatinovka-culture traditions on the Srubnaya-culture casting methods. This type of daggers is specific only for the monuments in the territory of the Ukraine and it may be thought to be a local version.

*Fighting axes.* Until the recent time, the Srubnaya culture was assigned to the cultures that used celts as main kinds of percussive weapons and implements of labour. The separation of metal articles therefrom that were made at the Krasniy-Mayak, Loboykovo, Kardashinka and Zavadovka metallurgical centers including

all the types of North-Pontic celts and the absence of celts casting forms in the Srubnaya-culture settlements have called this thesis in question. Besides, as evidenced by the finds of lugged-ax casting forms in the settlement of Mosolovka [Pryakhin, Sagaydak 1975, Fig. 4, 5, 1, 2] and in the settlement of Usovo-Ozero, axes seem to have been the main types of percussive weapons and implements of labour during the Srubnaya culture. The axes from the Mosolovka settlement are referred to the late "broad lop-butted" type, according to E.N.Chernykh [Chernykh 1970: 58], characterized by that, in any case, the runner is positioned on the ax face. Such an ax with remnants of a casting boss on its face was found in the town of Divnogorsk, the Voronezh district [Tallgren 1926, Fig. 90, 7]. The extreme western find is presented by a casting form from the collection of A.Pol [Tallgren 1926, Fig. 99, 5] (Fig. 14, 5).

In forms of their blades and cutting edges, the axes on the casting forms revealed in the settlement of Usovo-Ozero are close to those found in the settlement of Mosolovka and in the Dnepropetrovsk district (Fig. 14, 1, 2), but the destruction of their butt portions presents difficulties in correlations of this kind. Besides, the casting forms from Usovo-Ozero have no auxiliary runners on their faces. It is most probable that they were cast through their lug parts. In general, such a technique of casting is taken as archaic for the Late-Bronze Age, but the fact that it was still in practice at that period is evidenced by the Ureky-type axes of the 15th /the 16th — the 13th centuries B.C. [Korenevsky 1981: 36] found in the Kuban metallurgical center, which differ from Srubnaya-culture axes in bade forms. In the North-Pontic areas, this type of axes was yielded in the Byerislav hoard [Dobrovolsky 1948, Tabl. 1] (Fig. 14, 3, 4). The latter was entirely composed of articles from the Kuban metallurgical center imported to the North-Pontic areas most likely by the Srubnaya-culture tribes.

*Spear-heads.* The find of a socket fragment of a spear-head casting form has made it possible to specify some distinguishing features of this kind of armament used by the Srubnaya-culture tribes of the Ukraine. Some of these features are presented by three widely-spaced rims on the socket (Fig. 14, 12). The whole form of such a spear-head is seen from the find near the village of Ivanovka, the Golaya-Pristan region of the Kherson district [Krivtsova-Grakova 1955] (Fig. 14, 6). A sharpened leaf-like form of the blade and a massive rib of circular section bring this spear-head closer to those of the Seyma type widespread in the Late-Bronze monuments of East Europe including the Srubnaya-culture burial mounds of Pokrovsk in the Volga basin [Krivtsova-Grakova 1955]. Rims provided on sockets are also specific for Zlatopol type spear-heads from the Loboykovo metallurgical center. Therefore, the finds in Usovo-Ozero and Ivanovka present a new type of Srubnaya-culture spear-heads most probably specific for the left-bank Ukraine. To the Srubnaya culture there is also referred the forged spear-head from the Poltava Museum of Regional Studies, which has a sharp leaf-like blade, a pronounced rib and a long rolled-up socket (Fig. 14, 7). A spear-head close thereto

in form was found in burial No.2 of mound No.15 near Pokrovsk [Tallgren 1926, Fig. 50, 1].

*Arrow-heads.* There was no metal arrow-head found in any Srubnaya-culture monument of the Ukraine. Among bone arrow-heads reliably associated with the Srubnaya culture, the following types may be distinguished:

A trihedral head with sharp edges and a concealed socket from the village of Fedorovka, the Zaporozhiye district (Fig. 14, 9). This arrow-head has many analogies in the Early-Srubnaya monuments of the Don and Volga basins. One of the versions of this type is presented by trihedral socketed arrow-heads with flat bases, which were found in the settlement of Chikalovka near the town of Kremenchug [Sharafutdinova 1964, Fig. 6] (Fig. 13, 10). These arrow-heads are more specific for the Late-Bronze monuments of the Dnieper basin, but their cultural origin remains unsolved.

To the Srubnaya culture there is assigned the tanged arrow-head of rhombic section from the settlement of Ilychevo (Fig. 14, 8), which has numerous analogies in Early-Srubnaya burial mounds of the Volga basin. This group also includes a bullet-like socketed arrow-head from the settlement of Kapitanovo (Fig. 14, 11). Similar heads were found in the Early-Srubnaya burial near the village of Cherebayevo [Sinitsyn 1959, Fig. 2], but the fundamental bulk of available bullet-like arrow-heads originates from the Sabatinovka- and Byelozerka culture settlements (see below), and this enables one to consider the North-Pontic areas to be the main region of their spread.

Therefore, the armament group presented in the Srubnaya-culture monuments of the Ukraine is not numerous, but there may be traced types of armament specific for the Srubnaya culture of the Don and Volga basins as well as the types specific for Srubnaya-culture monuments of the Ukraine and the types specific for Late-Bronze monuments of the Dnieper basin, the cultural origin of which is not yet clear at present.

The armament articles specific for complexes of the Loboykovo metallurgical center, which were found in the left-bank areas of the Ukraine, are discussed within the frame of the Loboykovo group, though that territory was traditionally involved in boundaries of the Srubnaya culture.

The Loboykovo metallurgical center was distinguished by E.N.Chernykh [Chernykh 1976: 190-195] as an area specific for the Late-Bronze metallurgy having a peculiar set of bronze articles and technological methods specific for the Late-Bronze Age of the left-bank Ukraine (Zavadovka-Loboykovo center). Having pointed to the fact that the Zavadovka foundry was related to the Byelozerka period and having included the Golovurovo foundry into the metallurgical center, A.M.Lescov considerably refined its chronological and territorial frames. Besides, he paid a special attention to the foundries and, having enlarged the peculiar set of articles specific for the given center, advanced a thesis on the Srubnaya-culture origin of tribes as the bearers of this metallurgical tradition [Lescov 1981, Golovurovo-Loboykovo

center]. Considering this center as it was determined in general by A.M.Lescov, it has been proposed to assign the name of Loboikovovo thereto as the most frequently used in literature.

N.N.Cherednichenko has come to the problem on the cultural origin of this metal group (metal articles of the Srubnaya-culture tribes in the Dnieper basin) more carefully and pointed to substantial differences thereof from Srubnaya-culture metal articles revealed in the Don and Volga basins [Cherednichenko 1986: 44-82]. He has advanced this statement as one of the reasons in favour of the necessity to divide the Srubnaya-culture historical community into a number of local groups that "would be more correctly called as independent cultures" [Cherednichenko 1986: 49].

The clear differences of metal articles of the Loboikovovo culture from those of the Krasniy-Mayak (Sabatinovka) and Srubnaya cultures disclosed by E.N.Chernykh, and the territory outlined by A.M.Lescov have made it possible to raise the question on the origin of this metallurgical center as a result of an independent culture, the distinction of which may be promising [Klochko 1987a]. However, the absence of settlement and burial complexes with such metal articles in combination with ceramics complicates the solution of this problem and makes the author to consider this group of metal articles and casting forms within the limits of the Srubnaya-culture historical region.

The armament of this group is composed of the following categories:

*Daggers.* They are presented by a version of Krasniy-Mayak type daggers with circular stops (H-36 type, according to E.N. Chernykh) each characterized by a more flattened oval stop and a broader but shorter tang. They were found in the foundries of Vyazovok and Dnepropetrovsk [Bočkarev, Lescov, 1979, Tabl. 3, 35, 7, 20, 21] (Fig. 15, 2, 3), in the settlement near the village of Bulanovo, the Poltava district (the Poltava Museum of Regional Studies, No.A 2034) (Fig. 15, 1), in the Kabakovo and Loboikovovo hoards [Lescov, 1981, Tabl. 1, 8, 3, 38, 39] (Fig. 16, 1, 4, 5), near the village of Khmelna, the Kanev region, in the Dnieper basin (Fig. 16, 2, 3), and in the burial mound near the village of Bayrak, the Velikaya-Bogachka region of the Poltava district (the Poltava Museum of Regional Studies, No.A 6933) (Fig. 16, 6). The above daggers approximate articles on the casting forms from the foundries of Golovurovo, Derevyannoye and Mazepintsy (see "Weapons of the Sosnitsa-culture tribes").

*Fighting axes.* This kind of armament is presented by Kabakovo-type celts, mainly by two-lugged celts hexahedral (K-52 type, according to E.N. Chernykh) or oval (K-54 type, according to E.N. Chernykh) in section. They have the form of engravings on the casting forms from Kapulovka, Vovnigy and Pilipchatino (Fig. 17, 6, 18, 1, 6). They are also presented by the finds from the Kabakovo, Loboikovovo, Trekhizbyenka and Blagoveshchenka hoards [Lescov 1981] (Fig. 17, 17), and by some occasional finds, e.g. from the State Historical Museum of the Ukraine (Fig. 17, 2).

*Rare type of percussive weapon.* The rare type of weapon specific for the given group is presented by metal articles such as tools with narrow often oblique cutting

edges and forged rolled-up short sockets. They were revealed in the Loboikovo hoard (Fig. 16, 8, 9) and in the vicinity of the village of Suvid the Kiev district (Fig. 16, 7).

*Arrow-heads.* The complexes with Loboikovo-type metal articles include very few arrow-heads.

Metal arrow-heads were found in the Loboikovo hoard: a bullet-like four-blade socketed head (Fig. 18, 6) and a forged head of rhombic section with broad triangular faces and a short socket (Fig. 18, 8). Similar heads were found on the bank of the Kamyshevakha river (Fig. 18, 9) and in the destroyed burial of mound No.6 near the village of Shirokoye, the Kherson district [Chernenko, Yakovenko, Korpusova 1967, Fig. 6, 3] (Fig. 18, 7). The arrow-head from the Museum in the town of Kakhovka (Fig. 18, 10) is a version of this type and differs therefrom by the length of its socket and by more pronounced ribs (Fig. 18, 10).

*Spear-heads.* They are presented by Zlatopol type heads with an apertured leaf-like pointed blade and a comparatively short socket strengthened with one-three rims at the base. The production of such spear-heads is evidenced by the find of a casting form in the Zlatopol foundry [Bodyansky, Sharafutdinova 1967: 90-93] (Fig. 15, 6). Similar spear-heads were found in the Crimea, near the village of Soldatovo, the Kharkov district [Zbruyeva 1952, Tabl. XX, 11, 18], and in the Loboikovo hoard [Lescov 1981, Tabl. 3, 42] (Fig. 15, 5, 7, 8). The two last-mentioned of them were free of ribs along the apertures. Later on, this development line was continued in Zavadovka-type spear-heads of the Byelozerka time (see below).

Thus, the armament of the Loboikovo group represents a comparatively developed and original group both in sorts of weapons and in types (forms and ornament) of armament articles substantially differing from the armament of the neighbouring tribes.

## 7. WEAPONS OF THE BONDARIKHA-CULTURE TRIBES

The principal region of the Bondarikha-culture expansion was in the forest-steppe left-bank areas of the Dnieper basin and in the middle course of the North Donets. Monuments of this culture were also revealed in the Don basin and in the Tsna-Moksha interstream region. In the north and in the west, the Bondarikha culture borders on the Sosnitsa culture. Its northern limit runs along the upper courses of the Sula, Psyel and Vorskla rivers, while in the south its limit is nearly coincident with the boundary of the forest-steppe (Maps 2 and 4). The Bondarikha culture is dated within the range from the end of the 12th century to the end of the 8th century B.C. (exclusive of the Maliye-Budky type monuments) [Berezanskaya, Iliyinskaya 1985; Artyemenko 1987]. According to Berezanskaya, the Maliye-Budky

monuments are dated to the 14th — the 12th centuries B.C. [Berezanskaya, 1982: 46; Buynov 1981].

The Bondarikha culture has turned out to be very poor in finds of weapons. This armament group includes:

*Daggers.* A dagger fragment having parallel blade faces was found in the settlement near the village of Oskol [Iliyinskaya 1959, Tabl. 1, 1] (Fig. 19, 3). It is usually taken as approximating the Byelozerka-culture daggers, but the absence of its haft, a rhombic section of its blade without a pronounced rib and substantial dimensions present difficulties in such correlations. It is most probable that the Bondarikha-culture tribes possessed their own traditions in making daggers with parallel blade faces.

Conventionally, the Bondarikha-culture armament group includes the dagger from the Kharkov Museum [Tällgren 1926, Fig. 109, 10] having a leaf-like blade with a fine roller-like rib, a flattened stop and a broken rectangularly-apertured haft decorated with oblique notches (Fig. 19, 5). In design of its haft and in form of its blade, this dagger is close to that from the Dnieper basin (see "Weapons of the Sosnitsa-culture tribes") and those of the Sosnowaya-Maza type from the Volga basin [Chernykh 1983].

*Sword.* The only sword of the Late-Bronze Age in the territory of the Bondarikha culture was found in the Belsk stronghold. It was assigned to the "western-type" swords and dated to the HaB2 period (the 9th century B.C.) [Kovpanenko 1973]. It is a long straight double-edged sword with a tanged haft, the end of which is broken-off (Fig. 19, 9). The haft is provided with five holes for fastening side plates of organic materials. The sword is referred to the Nenzinger type of swords, according to D.Cowen, which were widespread in Central Europe [Cowen 1956, Tabl. 5, 1-4], or to the Reutlingen type, according to P.Schauer [Schauer 1971, Tabl. 154], or the Lusatian-culture type III, according to J.Fogel [Fogel 1979: 27-31]. Swords of this type are dated to the BD-HaA1 periods.

*Fighting axes.* In the Bondarikha culture, percussive weapons are presented by celts. The earliest among them is the celt on the casting form from the Maliye-Budky settlement of Studenok V [Telegin 1959, Fig. 4]. It is a hexahedral one-lugged celt with two rims on its socket (Fig. 19, 4). In the whole, it is close to the celts from the Seyma burial mound [Bader 1970] both in proportions and in size and ornamentation. The only difference is seen in its lug, which brings it closer to celts of the Dnieper basin.

The later forms are presented on the casting forms from the Bondarikha settlement near the town of Izyum [Iliyinskaya 1967, Tabl. III]. They are made in the form of small hexahedral two-lugged implements. One of them is strengthened with an auxiliary rim on its socket (Fig. 19, 1, 2). It is a late Bondarikha-culture version of the Kabakovo-type celts from the Loboykovo metallurgical center (K-52 type, according to E.N.Chernykh). They differ from celts of the Kabakovo-type by an ornament in the form of a fine vertical rim from the socket to the blade. Similar

celts could be cast by means of casting forms that were revealed in the Zavadovo foundry (see "Weapons of the Byelozerka-culture tribes").

*Arrow-heads.* In the settlement of Studenok V, there was revealed a triangular flint arrow-head with a short triangular tang (Fig. 19, 6). It was found together with the above-mentioned celt casting form. The nearest analogies thereto originate from the Seyma burial mound [Bader 1970].

A number of bronze arrow-heads were found in the settlements near the village of Buzovka, the Magdalinovka region of the Dnepropetrovsk district [Romashko 1982: 57, Fig. 1, 2], and near the village of Zalineynoye, the Zachepilovka region of the Kharkov district [Romashko 1983, Fig. 2, 31], situated on the opposite banks of the Orel'y river and which were synchronous. They are two-blade triangular heads rhombic in section with short sockets and long acute blade-ends (Fig. 19, 7, 8). V.A. Romashko compared these arrow-heads with those of the Malaya-Tsimbalka type and this enabled him to date them to the 8th century B.C. [Romashko 1985]. However, the Malaya-Tsimbalka type arrow-heads [Klochko 1979] substantially differ therefrom in form of blades and in section. Besides, arrow-heads similar to those found in the mentioned Bondarikha-culture settlements were widespread in Central Europe of the BD-HaB1 periods [Mercer 1970: 213]. The Central-European origin and the cultural belonging of arrow-heads of this type are evidenced by the finds of casting forms used in their production in the Lusatian-culture monuments of Poland [Gediga 1982, Fig. 14, 15]. The Chernaya-Gora and Novocherkassk group monuments of the Kimmerian culture of the 9th — the 8th centuries B.C. yielded no arrow-head of this type.

In the whole, the materials from the Bondarikha-culture monuments cannot be considered as sufficient for providing profound characteristics of armament specific for the tribes of this culture. It is most probable that in the given territory, the production of weapons following the forms and traditions of the Loboykovo metallurgical center of the Srubnaya-culture period was still in progress for some time.

## CHAPTER III. WEAPONS OF STEPPE TRIBES

The steppe zone of the Ukraine is spread through its southern part from the lower course of the Danube up to the southern spurs of the Middle-Russian upland. It is about 500 km wide [The Ukrainian Encyclopaedia, v.20].

This territory involves the Srubnaya and Sabatinovka cultures followed by the Byelozerkka culture. The armament of the tribes having the Srubnaya culture, which was also spread in the forest-steppe left-bank areas of the Dnieper basin, is given in the preceding chapter.

### 1. WEAPONS OF THE SABATINOVKA-CULTURE TRIBES

The Sabatinovka culture was spread in the steppe zone of the Ukraine from the lower course of the Danube to the river of Obitochnaya (Maps 1 and 3). In the western and north-western areas of the Dneestr basin, its neighbours were the Noua-culture tribes. In the south-west, the Sabatinovka culture bordered on the Koslodgen culture. In the north of the right-bank Dnieper basin, approximately along the forest-steppe line, its neighbours were the Trzciniac-Komarov culture tribes and somewhat later its neighbours became the Byelogrudovo-culture tribes. The eastern border between the Sabatinovka-and Srubnaya-culture tribes does not seem to have been far from the Dnieper, exclusive of some Sabatinovka-culture settlements arranged along the Black- and Azov-sea coastal belt up to the river of Obitochnaya. Both in the west and in the east, the boundaries are clearly defined due to a compound character of the material cultures in the contact zones. The Sabatinovka culture is dated to the 14th - the 12th centuries B.C. [Sharafutdinova 1986: 83-116].

*Daggers.* They were the most common in the Sabatinovka culture, and Krasniy-Mayak type daggers (partly H-34, H-36 and H-37 types, according to E.N.Chernykh) took the leading part among them, i.e. daggers with leaf-like blades each having a circular stop on its haft and a tang in the form of a pintle of oval, rectangular or square section.

Daggers are presented on the casting forms from the foundries of Maliye-Kopany, Krasniy-Mayak, Voloshskoye [Bočkarev, Lescov 1979], Novokievka [Gershkovich, Klochko, Evdokimov 1987] and Androvka [Pislatiy, Budyilkina 1982]. They were also presented by finds from the village of Byerezgy [Dergachev 1975, Fig. 24, 7], from the hoard of Eliseevichy [Lescov 1981, Tabl. 3, B1], the towns of Novoazovsk and Svatovo, from the Kherson museum and the Zaporozhiye district [Lyashko 1986, Fig. 1] (Fig. 20, 1-3; 22, 1; 21, 4, 5).

The latest version of daggers of this type each characterized by a narrow blade is presented on the casting form from the village of Zagradovka, the Vysokopoliye region of the Kherson district [Bočkarev, Lescov 1979, Tabl. 14, 131]. This type of daggers is specific for the monuments of the Byelozerka culture (see "Weapons of the Byelozerka-culture tribes").

An unique type of daggers different from those of the Krasniy-Mayak type is presented on the casting form from the foundry of Maliye-Kopany. In form, this dagger is close to that from the Middle-Bronze hoard of Borodino [Krivtsova-Grakova 1949, Tabl. 22, 1]. It has a narrow parallelly-faced blade with a low fine rib broadening towards its stop and an apertured flat tang for fixing a haft (H-51 type, according to E.N.Chernykh) (Fig. 21, 1). The dagger on the casting form from the village of Marinovka [Bočkarev, Lescov 1979, Tabl. 12, 997b] and the Krasniy-Mayak foundry (Fig. 21, 7, 6) may be taken as an example of subsequent improvements of the given type. Each of such daggers has a short flattened tang, a clearly defined stop and a leaf-like blade. This group also includes daggers on the casting forms from the village of Dudchany, the Novovorontsovka region of the Kherson district, and the Voloshskoye foundry [Sharafutdinova 1982, Fig. 46, 3] — with a narrow leaf-like blade having a fine rib of square section, a broad stop and a complicated tang composed of an element circular in section, an auxiliary stop and a tang-pintle of square section (Fig. 21, 2-3). Hafts of such daggers were compound and might be composed of a metal element with a circular stop and a wooden or bone element fixed on a square tang. The last two daggers may be considered as articles which exhibit features specific for daggers of the Krasniy-Mayak and Borodino types, and this enables one to suppose that these types were coexistent for some time. The sites, where these daggers were found — the lower course of the Dnieper — and the complexes that included the finds have made it possible to consider them as a local version specific for the Sabatinovka-culture monuments of the Lower-Dnieper basin. Conventionally, this group also includes a dagger with a small roller-like broadening at the tang base, which resembles the circular stop from the hoard on the Ingul river [Symonovich 1966, Fig. 2, 8] (Fig. 23, 3). Such a form of the stop brings this dagger closer to that from the Liventsovka settlement (Fig. 23, 2) and to those from the village of Orelets, the Ivano-Frankovsk district (see "Weapons of the Noua-culture tribes"), and from the hoards of Beleny and Duda in Moldova that were assigned by M.Petrescu-Dimbovita to the series of the Risesty — Beleny hoards of the BD period associated with the culture of Noua [Petrescu-Dimbovita 1977, Tabl. 73, 20-22; 80, 15].

*Swords.* In the Sabatinovka-culture monuments, this kind of weapons is presented by an original type of short cutting swords — by Krasniy-Mayak type swords (H-48/50 type, according to E.N. Chernykh). The distinguishing features of such swords are as follows: 35-45 cm long, broad double-edged leaf-like blade with one or more ribs, a broad flattened stop, a flattened tang with an auxiliary oval stop, a compound haft with metal elements and a mushroom-shaped head on the haft.

The most ancient of them seems to be the sword from a Sabatinovka-culture burial in the mound near the village of Borisovka, the Tatarbunary region of the Odessa district [Chernyakov 1985, Fig. 56, 7]. It has a broad triple-ribbed pointed leaf-like blade, a broad flattened stop, a flat tang provided with a hole for fixing a wooden element of the haft. The latter was covered with a skin strap and had a bronze mushroom-shaped cup-head with two holes for fixing to the wooden part of the haft (Fig. 24, 1). In form and in way of fastening, the head of this sword is similar to those of the Crete-Mycenaean type swords and daggers of the MEII-LEI periods [Sandars 1963].

The finally constituted forms of Krasniy-Mayak type swords are exhibited in the casting forms from the foundries of Krasniy-Mayak [Chernyakov 1965: 111-113] and Novokievka [Gershkovich, Klochko, Evdokimov 1987, Fig. 8, 3] (Fig. 23, 4, 5, 12) and from the hoards of Lozovo [Dergachev 1975, Fig. 4] and Ingul [Symonovich 1966, Fig. 2, 13] (Fig. 23, 2, 3, 8, 9, 11). Besides, they are represented by the finds from the vicinities of the village of Voloshskoye, the Dnepropetrovsk district [Chernykh 1976, Tabl. XXXVII, 2], of the village of Chutulesty, the Floresty region of Moldova [Dergachev 1975, Fig. 9, 19] and from the Dnepropetrovsk district [Chernykh 1976, Tabl. XXXVII, 3] (Fig. 24, 6, 7, 10).

*Fighting axes.* The monuments of the North-Pontic coastal region have yielded a series of Central-European type battle-axes each with a circular cam on its butt. This series also includes axes from the Nikopol hoard [Tallgren 1926, Fig. 80], from the Dnepropetrovsk district [Chernykh 1976, Tabl. 30, 2] and from the hoards of Zhuravlinka [Chernykh 1976, Tabl. 10, 1, 2] and Kuryachy-Lozy [Chernyakov 1985, Fig. 61, 1] (Fig. 32, 2, 4-7). Besides, the Zhuravlinka hoard yielded an ax of another Central-European type, which is provided with a flange on its butt [Chernykh 1976, Tabl. 10, 3]. All these axes have numerous analogies from the Danubian hoards of the BC-BD periods. Most of them were revealed together with articles, which could be also met in the Danubian hoards of the 13th century B.C. [Petrescu-Dimbovita 1977: 51-80]. They represent imports thereto as a result of contacts between the Sabatinovka culture and the Danube-basin tribes.

One of the most numerous categories of finds among the metal articles referred to the Sabatinovka culture is presented by celts, among which are the following:

Celts of the Old-Transilvanian type (K-42 and K-44 types, according to E.N. Chernykh) — one-lugged, hexahedral in section with a complicated arched or trapeziform facet. They are presented by a great number of finds in hoards of the Krasniy-Mayak metallurgical center [Chernykh 1976: 81], e.g. in the hoard on the Ingul river [Symonovich 1966, Fig. 2, 11, 12] (Fig. 25, 2).

Celts of the East-Transilvanian type (K-32 and K-34 types, according to E.N. Chernykh). The name of this type, which was proposed by I.Nestor on the basis of finds of such celts in Transilvania, seems to be unsuitable. Due to the fact that the principal area of spread of celts of the given type is within the limits of the Krasniy-Mayak metallurgical center and the only casting form for making such celts

known nowadays originates from the Krasniy-Mayak foundry, it is advisable to give this type of celts the name of "Krasniy-Mayak". Celts of the type under discussion are one-lugged, hexahedral or oval in section with arched facets, sometimes with a "cavity" on one of the sides. This type was the most frequent in hoards and among occasional finds in the territory of the Krasniy-Mayak center [Chernykh 1976: 77], e.g. celts from the hoards of Ingul [Symonovich 1966, Fig. 2, 9, 10], Byetsilovo [Chernyakov 1968, Fig. 1] and Khristich [Dergachev 1975] (Fig. 25, 6, 7, 8). The local production has been recorded by the find of a celt casting form of this type in the Krasniy-Mayak foundry [Chernyakov 1965] (Fig. 25, 4). The prototype of such celts may be taken from the celt on the casting form from the Maliye-Kopany foundry [Bočkarev, Lescov 1979, Tabl. 4, 39a] (Fig. 25, 3).

One-lugged small celts hexahedral in section (K-38 type, according to E.N. Chernykh) were revealed in the hoard of Kuryachy Lozy [Chernyakov, Nikitin 1981, Fig. 2; 3, 1]. Similar celts were also presented by a number of occasional finds (Fig. 25, 1, 5). Such celts were frequently met in the territory of Rumania, e.g. in the hoards of the BD period [Petrescu-Dimbivita 1977: 51-80]. The production of celts of this type in the territory of the Ukraine has been recorded by the find of a casting form revealed near the village of Ryzhovka, the Uman region (see "Weapons of the Sosnitsa-culture tribes").

Among finds in the Lower-Dnieper basin, there is distinguished a group of two-lugged celts that combine Krasniy-Mayak and Loboykovo (a two-lugged form) traditions. A two-lugged version of Old-Transilvanian celts (K-60 and K-64 types, according to E.N.Chernykh) is engraved on a casting form found near the Tiligulsky estuary (Fig. 22, 5). A two-lugged version of Krasniy-Mayak celts (the East-Transilvanian type) /K-58 type, according to E.N.Chernykh/ is presented by the finds of casting forms revealed near the villages of Dudchany and Verchnetarasovka, the Kherson district (Fig. 22, 6, 8). A hexahedral two-lugged celt was found in the Dremaylovka hoard [Lescov 1981] (Fig. 22, 4). The unique two-lugged celt, in its shape approximating the Kabakovo-type celts from the Loboykovo metallurgical center, is engraved on a casting form from the foundry of Voloshskoye (Fig. 22, 7). It is most probable that such syncretized forms of celts occurred in the contact zone of Krasniy-Mayak and Loboykovo metallurgical traditions that was in line with the lower course of the Dnieper. The coexistence and close contacts between the bearers of traditions of the two above-mentioned metallurgical centers are evident from the fact that in the Khristich hoard there have been simultaneously found [Dergachev 1975] a number of Krasniy-Mayak type celts, a two-lugged version of the Krasniy-Mayak type and a Golovurovo version of the Kabakovo type (specific for the Loboykovo center) (Fig. 25, 8-10).

*Rare types of percussive weapons.* The Sabatinovka-culture monuments of the Lower-Dnieper basin yielded a number of unusual articles which may be classified as rare types of percussive weapons. Thus, the casting form from the Voloshskoye foundry exhibits a socketed beak-ax (an implement which is most likely to be

close, in its function, to forged beak-axes with rolled-up sockets from the Loboykovo center) having a ledged socket of oval section and a narrow spear-like ribed pin (Fig. 23, 1). The casting form from the Novokievka foundry (referred to the second horizon of the foundry, which is dated to the 14th - the 13th centuries B.C.) exhibits a hatchet-celt with a ledged socket and an oblique blade (Fig. 23, 4). A flat hatchet with a circular stop on its middle portion is engraved on the casting form from the village of Dudchany (Fig. 23, 5).

*Spear-and javelin-heads.* In the Sabatinovka culture, this type of armament is presented by a great number of finds that may be subdivided into three groups.

The first group includes heads that are likely to be the most ancient and seem to have been the basis for two other groups of spear-heads, which became the leading types of armament in the Sabatinovka culture. All they are characterized by rather fine "willowy" blades and cast funnel-shaped sockets. This group includes: the spear-head with a narrow leaf-like blade and a short socket from the vicinity of the town of Tsyurupinsk, the Kherson district, which is ornamented in the so-called "Mycenaean" manner [Tallgren 1937, Fig. 7, 1] (Fig. 26, 1); the spear-head found by A.V.Bodyansky on the river of Sura near the village of Voloshskoye, the Dnepropetrovsk district (Fig. 26, 7); and the spear-head from the Kerch peninsula [Lescov 1965, Fig. 1, 4] (Fig. 26, 6). The spear-head engraved on the casting form from the collection of A.Pol, which was found near the Nenasytets rapids on the Dnieper [Bočkarev, Lescov 1979, Tabl. 3, 34] (Fig. 26, 2), differs from the foregoing heads by a long socket. One of the distinguishing features of this clay casting form is that its lower portion is made without an auxiliary cavity to fix a core required for the process of forming sockets — a means typical for stone casting forms of the Late-Bronze Age in the North-Pontic coastal region and aimed to provide even socket edges. Both in form of articles and materials used for moulding (clay), and in socket design, the nearest analogy to the casting form found in the vicinity Nenasytets rapids is the spear-head casting form from the Middle-Bronze settlement of Nova-Zagora, Bulgaria [Chernykh 1978: 135]. This enables one to consider the above-mentioned features as archaic. A spear-head similar in form was found in the Dnieper basin [Chernykh 1976, Tabl. XXVII, 4] (Fig. 26, 3). This group also includes javelin-heads with narrow leaf-like blades and long sockets each having a lug. A casting form for making such heads was found in the foundry of Maliye Kopany, the Golaya-Pristan region of the Kherson district [Bočkarev, Lescov 1979, Tabl. 4, 41b], another casting form was found in the village of Kamennaya Balka, the Nikolayev district [Chernyakov 1985, Fig. 58, 3] (Fig. 26, 4, 5). A cast lug on the socket of each of these spear-heads differentiates the latter from all other spear-heads revealed in the North-Pontic region and is likely to be a chronological feature.

The next group is represented by spear-heads of the Dremaylovka type (partly of the P-16 type, according to E.N.Chernykh). A spear-head of this type has a narrow leaf-like blade broadened in its upper portion and a short funnel-shaped socket. Such spear-heads are exhibited on the casting forms from the Novokievka

foundry that were revealed in a Sabatinovka-culture settlement near the village of Novokievka, the Kalanchak region of the Kherson district [Gershkovich, Klochko, Evdokimov 1987] (Fig. 27, 1-3), and on the casting forms from the foundries of Voloshskoye and Marinovka (Fig. 27, 4, 7). Similar spear-heads were found in the Dremaylovka hoard [Lescov 1981, Tabl. 4, E1] (Fig. 27, 8) and near the Nenasytets rapids on the Dnieper (Fig. 27, 5). One of the spear heads of the given type is kept in the collection of Konderevich [Tallgren 1926, Fig. 108, 2] (Fig. 27, 6).

Spear- and javelin-heads of the Krasniy-Mayak type (partly of the P-16 type, according to E.N.Chernykh)- each with a short funnel-shaped socket and a narrow leaf-like blade, the faces of which are continuously even and pass into ribs on the socket — form a separate group. They are presented by a spear-head casting form (Fig. 28, 3) and a javelin-head casting form (Fig. 28, 2) from the Krasniy-Mayak foundry revealed near the village of Mayaky, the Kotovsk region of the Odessa district [Chernyakov 1965, Fig. 13, 1, 3]. A number of heads of this type were found in the hoards of Lozovo, the Nisporeny region of Moldova [Dergachev 1975, Fig. 4, 8], and of Krasna in Transilvania [Petrescu-Dimbovita 1977, Tabl. 134, 4] (Fig. 28, 1, 4), near the village of Razdolnoye on the Kalmius river (Fig. 28, 5), on the island of Igren on the Dnieper (Fig. 28, 6) and in the Dnieper basin (Fig. 28, 7, 8).

The head having a broad leaf-like blade strengthened with heavy ribs of complicated section and a very short socket with a rim at its base, which was revealed between the villages of Obukhovka and Sugakovka, the Dnepropetrovsk district, is conventionally assigned to the Sabatinovka culture (Fig. 29, 1). Similar heads dated to the 13th century B.C. were found in the hoard of Putreda, Muntenia, Rumania [Petrescu-Dimbovita 1972, Tabl. 96, 4], in the hoard of Alsdobsa in the north-east of Hungary, which is referred to the earliest Piliny-culture hoards of the BD-HaA1 period [Kemenzsei 1984: 20-27, 113; Tabl. XLI, 5], and in Enkomy, Cyprus [Catling 1964, Tabl. 14d].

A peculiar weapon was found in the village of Mikhaylovo-Apostolovo, the Kherson district [Tallgren 1937, Fig. 7, 4]. It has a broad leaf-like blade rounded at the end with a rib of circular section, a long funnel-shaped socket strengthened with a faceted belt at its base and a stop with two small holes at the blade base, which approximates in shape those on the hafts of the Krasniy-Mayak type daggers and swords. It is an original version of sword-daggers (Fig. 29, 2). The relation of this weapon with the Sabatinovka culture may be evidenced by the fragment of a casting form from the Novokievka foundry (Fig. 29, 3), which retains a stop at the blade base and a ledged socket.

The interrelation of the North-Pontic areas with Central Europe was evidenced by the fact that there were found numbers of Danubian spear-heads. Among them was a javelin-head with a flame-shaped blade from the Nikopol hoard (Fig. 32, 8). Besides, this hoard yielded a set of Danubian bronze articles typical for hoards of the Uriu-Domensty and Drayna de Zhos-Oynak series dated to the 13th century B.C. [Petrescu-Dimbovita 1977]. The Noviye-Troyany hoard dated to the 13th - the

12th centuries B.C. [Subbotin, Chernyakov 1982: 5-23] yielded a spear-head with a narrow flame-shaped blade of complicated section and a long socket (Fig. 32, 1). The principal amount of articles from this hoard, such as celts and sickles, has numerous analogies revealed in the Danubian hoards of the BD period (the 13th century B.C.). However, there is no article typical for the hoards of the HaA1 period (the 12th century B.C.) and, as a consequence, this hoard cannot be dated later than to the end of the 13th century B.C., which is in agreement with the dates stated in accordance with finds of the earliest spear-heads of this type [Paylic 1963].

*Arrow-heads.* The Sabatinovka culture is characterized by a wide use of bronze and bone arrow-heads, and three-edged (or three-bladed) and also bullet-shaped socketed bone arrow-heads hold the lead among them. In the whole, three-edged heads of the Sabatinovka culture approximate those of the Noua and Srubnaya cultures. However, the Sabatinovka-and Noua-culture arrow-heads are distinguished by a number of salient features and primarily by the presence of socketed heads together with tanged forms that were revealed in the settlements of Stepovoye (according to I.N.Sharafutdinova's report) (Fig. 31, 5), Gindesty [Melyukova 1961, Fib.10, 9] (Fig. 31, 6) and Magala [Smirnova 1972, Fig. 8, 13] (Fig. 31, 7). The tangs of such heads are fine and pointed, and seem to have been used with reed shafts. Most of these arrow-heads are three-bladed including socketed specimens such as found in the Liventsovka settlement (Fig. 31, 3, 4). One of the first attempts of embodying three-bladed socketed arrow-heads in metal may be presented by a casting form from the Kirovskoye settlement. It was aimed for making large socketed three-bladed arrow-heads with long blade ends slightly bent inward (Fig. 31, 1, 2). This is the most ancient casting form for making bronze three-bladed arrow-heads [Klochko 1981: 69], which may represent a prototype for one of the most popular types of arrow-heads in the Scythian time [Klochko 1982: 83].

Bullet-like socketed arrow-heads were revealed in the settlements of Sabatinovka, Gyrbovets and Peresadovka (Fig. 31, 8, 15, 16). A bronze bullet-like head entirely following the form of bone arrow-heads was found in a Late-Bronze burial near the village of Kaplany, the Suvorovo region [Agulnikov 1984: 94] (Fig. 31, 14). The following arrow-heads may be considered as bullet-shaped versions: bullet-like three-edged heads from the settlement of Kirovo and Trushesty (Fig. 31, 12, 13); polyhedral arrow-heads from the settlements of Magala and Ushkalka (Fig. 31, 9, 11); an arrow-head of quadrate section from the Kirovo settlement (Fig. 31, 10).

Dart triangular arrow-heads of bone found in the settlements of Gyrbovets, Kirovo and Liventsovskoye (Fig. 30, 13-17) form a separate type and essentially represent the continuation of Eneolithic-Middle Bronze traditions in making flint dart arrow-heads of bone.

The above types of arrow-heads are specific for the monuments of the North-Pontic areas included into the Srubnaya, Sabatinovka and Noua cultures.

Arrow-heads of bronze are subdivided into two groups: socketed arrow-heads and tanged arrow-heads.

The group of tanged arrow-heads includes the following types:

1. Heads with triangular blades, sharp long ends and sharpened rod-like tangs. A casting form for making arrow-heads of this type was found in the town of Kherson (Fig. 30, 10). A number of arrow-heads close thereto in form were found in the Sabatinovka-culture settlements of the Gradizhskoye region, the Poltava district (according to I.T.Chernyakov's report). Similar arrow-heads were revealed in the monuments of Greece and Asia Minor of the II and III Late-Helladic periods: Tikhro grotto; Sanatorium, shaft grave 3; Delos island, Artemision; Malta, tholos 2; Prosimna, grave 3 and 34; Troya VI. These arrow-heads (type V, according to H.G.Buchholz) are dated to the 15th - the 13th centuries B.C. and, as the author believes, point to the contacts between Greece and the North-Pontic areas of that period [Buchholz 1962: 29]. A casting form and metal heads revealed in the Dnieper basin point to existence of a local tradition in making arrow-heads of the given type and provide support for the proposal made by H.Buchholz on the North-Pontic origin of the latter.

A version of arrow-heads of this type (with a clearly defined rod-like tang) is engraved on a casting form from the settlement of Suvorovo VI, the Izmail region of the Odessa district [Chernyakov, Vanchugov, Kushnir 1986, Fig. 2, 2].

This development line was further continued in the production of triangular arrow-heads with sharp blade ends and long T-shaped tangs. An arrow-head of this type is engraved in the above-mentioned casting form from the settlement of Suvorovo VI (Fig. 30, 8). A metal head of this type was revealed in a damaged burial near the village Buyukany, the vicinity of Kishinev (from Dergachev's report) (Fig. 30, 9). The find of a similar head in the Magyar-culture stronghold of Nitryan-sky Hradok [Točik 1978, Tabl. CXXII, 25] makes it possible to relate the appearance of arrow-heads of this type to the Sabatinovka-culture time, while the find in the hoard of Tallga in the north-east of Hungary, which is related by T.Kemenczei to the early horizon of the Gava-culture hoards [Kemenczei 1984: 74-75; Tabl. 188, 4], enables one to suppose that this type of arrow-heads was in progress till the Byelozerka culture.

2. Arrow-heads with leaf-like blades strengthened with fine ribs having pin-like blade ends and rod-like tangs form a separate type. Such a head is engraved on the casting form from the settlement of Slobodka, the Lyubashevka region of the Odessa district (according to I.T.Chernyakov's report) (Fig. 30, 11). Similar arrow-heads were found in the tholoses of Yalisos on the Rodos island together with ceramics of PE IIA style, according to A.Furmanek, and in the layer of VIIa of Troya together with ceramics of PE IIIB style [Müller-Karpe 1980, Tabl. 182, 3; 218, 12]. The find of a casting form in the settlement of Slobodka points to the North-Pontic origin of arrow-heads of this type.

3. The Novoselitsy ash concentration (according to G.N.Toshcheva's report) yielded a triangular arrow-head of rhombic section with sharp blade ends and a short sharpened tang having a small pin at its end (Fig. 30, 12). There is no similarity

to this head and it is referred to the Sabatinovka culture merely conventionally.

Socketed arrow-heads may be subdivided into the following types:

1. Triangular arrow-heads with sharp thorn-like blade ends having ribs of circular section and protruding sockets. An arrow-head of this type was found in burial No.2 of mound 2 near the village of Kholmskoye, the Artsiz region of the Odessa district. (The skeleton was extended on a wooden bed in the supine position with its head oriented to the north, the arrow-head being in the spinal column-a wound?). The burial was in a narrow grave pit with rounded corners [Gudkova 1979: 323]). Another arrow-head of this type was excavated by A.Bodyansky in the vicinity of the village of Zlatopol, the Vasilievka region of the Zaporozhiye district (Fig. 30, 1, 2). A number of arrow-heads of this type and casting forms for making the same were found in the Middle-Danubian monuments of the Kurgan culture dated by V.Furmanek to 1450-1200 years B.C. [Furmanek 1973: 131]. This type also includes triangular arrow-head with widely spaced and intensively forged blades, which has a long socket with a rib circular in section much shorter than its blades (Fig. 30, 3). The arrow-head was found in the Late-Bronze layer of the multilayer settlement of Suvorovo 1, the Izmail region of the Odessa district [Chernyakov, Vanchugov, Kushnir 1986, Fig. 3, 16]. A similar head was found in the palace of Pylos, Greece, which had been set on fire by "the sea people", as N.K.Sandars stated, at the end of the 13th century B.C. [Sandars 1978: 55]. The absence of casting forms for making such arrow-heads in the Sabatinovka-culture monuments eliminates a more or less definite determination on whether this type of arrow-heads being of local origin or imported from the Danube basin.

2. Arrow-heads each with a broad leaf-like blade, a massive rib of circular or rhombic section and a hidden socket. They are presented by a number of versions: an arrow-heads with a broad pointed leaf-like blade, sharp blade ends and a massive rib circular in section, which was found in the ancient settlement of Skelka, the Kherson region (according to the report by S.B. Buyskikh) (Fig. 30, 4), together with small fragments of Bronze-Age ceramics, a fragment of a stone perforated ax and a bronze arrow-head with a narrow blade in the form of a laurel leaf and a broad but short socket of rhombic section (Fig. 30, 5). The socket of this head exhibits hardly visible traces of an ornament in the form a "lattice" made in the process of casting. A similar arrow-heads was revealed in the Srubnaya-culture settlement of Suskany I on the Volga river [Merpert 1958, Fig. 14, 14]. This type also includes an arrow-head having a broad blade, a hidden socket and a rib of rhombic section, which is from the Kakhovka-town museum. One of blades of this arrow-head is rounded, the other is sharpened in the form of a short pin (Fig. 30, 6). The arrow-head with a short socket, a broad leaf-like blade and rib of rhombic section from the village of Dibrovo, the Sinelnikovo region of the Dnepropetrovsk district (Archives of the Institute of Archaeology, Acad. Sci. of the Ukraine) is also referred to this type. The find of an arrow-head of this type at the settlement of Suskany I makes it possible to assign such heads to the Sabatinovka time, but the absence of casting

forms for making the same and an out-of-complex character of the finds in the Lower-Dnieper basin present difficulties in providing any more exact definition of their chronology and cultural origin.

*Defensive armour.* In the Sabatinovka culture this kind of weapon is presented by a round wooden shield with a skin covering decorated by bronze nails with broad heads arranged in the form of a solar sign. The shield was revealed in a combat burial mound near the village of Borisovka, the Tatarbunary region of the Odessa district [Chernyakov 1985, Fig. 56] (Fig. 23, 6).

Thus weapons of the Sabatinovka culture tribes are presented by articles specific for the Krasniy-Mayak metallurgical center. The western areas of this culture are characterized by the presence of imported articles of the Danubian-type armament, while the eastern areas — in the Dnieper basin — are characterized by the existence of syncretized forms which combine features specific for the Sabatinovka (Krasniy-Mayak) and Loboykovo metallurgical traditions, and by the presence of weapons referred to the Srubnaya culture.

## 2. WEAPONS OF THE BYELOZERKA-CULTURE TRIBES

The Byelozerka-type monuments classified by V.V.Otroshchenko as the Byelozerka culture are situated in the steppe belt of the North-Pontic coastal region from the Azov sea to the lower course of the Prut and the Lower Danube (Maps 2 and 4). The southern group of monuments is in the steppe areas of the Crimea up to and including the foothills. It is dated to the 12th - the 10th centuries B.C. [Otroshchenko 1986].

At present, some investigators persist in considering these monuments to be of the latest stage of the Srubnaya culture [A.M.Lescov, A.I.Melyukov, V.S.Bočkarev], while the others refer them to a separate archaeological culture, which arose under a strong influence of the Thracian Hallstatt (S.S.Berezanskaya, N.N.Cherednichenko, L.A.Novikova, E.S.Sharafutdinova) or of the Late-Bronze neighbouring cultures and the Early Thracian Hallstatt of the Carpathian-Danube basin (I.T.Chernyakov, V.P.Vanchugov) upon the Sabatinovka culture, or consider them as the latest stage of the Sabatinovka culture (I.N. Sharafutdinova). V.V.Otroshchenko associates the formation of this culture with the westward migration of the Srubnaya-culture tribes from the Left-Dnieper areas [Otroshchenko 1986]. V.P.Vanchugov distinguishes two local versions of the Byelozerka culture in the north-western part of the Pontic coastal region: the Tudorovo and the Balta versions. On the basis of specific materials, he managed to trace a subbase of the Sabatinovka nature for both of them and also the influence of the Carpathian-Danubian and Central-European cultures [Vanchugov 1987].

Weapons of the Byelozerka-culture tribes are presented by the following finds: *Daggers*. The late Zagradovka version of Krasniy-Mayak type daggers with narrow leaf-like blades, circular stops and rod-like tangs of tetrahedral section. Daggers of such a type appeared as far back as the Sabatinovka-culture time (see "Weapons of the Sabatinovka-culture tribes"). In the monuments of the Byelozerka culture, they are presented by finds from the hoard of Sokoleny [Dergachev 1975, Fig. 7] (Fig. 33, 3). Besides, they are exhibited in the casting forms from the foundry of Novoalexandrovka [Bočkarev, Lescov 1979, Tabl. 9, 11] (Fig. 33, 4). Similar daggers were found in the hoard of Myndresty [Dergachev 1975, Fig. 3, 22] (Fig. 32, 2) and in the Kherson region (Fig. 33, 1). The latest manifestation of this type is presented by bimetal "small daggers" with bronze tanged hafts, circular stops and iron leaf-like blades, which were met in the Byelozerka complexes [Otroschenko 1986: 139], but because of the small dimensions of their blades said articles cannot be considered in the category of weapons. Due to the same reason, the tanged "small daggers" with parallel blade faces specific for the Byelozerka-culture monuments cannot be referred to the category of weapons either [Otroschenko 1986: 139-140]. The continuation of Sabatinovka traditions in making compound dagger hafts in the Byelozerka culture is evidenced by the dagger casting form with a mushroom-shaped head from the Novoalexandrovka foundry (Fig. 33, 5).

*Swords*. The only find of a sword from the Byelozerka monuments is represented by a fragment of a sword with parallel blade faces from the hoard of Myndresty [Dergachev 1975, Fig. 3, 21] (Fig. 33, 6). Conventionally, it is referred to swords of the Central-European type because of the absence of its haft as the most diagnostic element.

*Fighting axes*. In the Byelozerka culture, fighting axes are presented by celts, which may be subdivided into the following types:

The Late-Sabatinovka (Late Krasniy-Mayak) type — two-lugged celts on the casting forms from the Novoalexandrovka foundry [Bočkarev, Lescov 1979, Tabl. 9, 77; 11, 90]; two-lugged celts of the Krasniy-Mayak type (K-58 type, according to E.N. Chernykh) specific for the Lower-Dnieper basin (see above), which are different from the Sabatinovka-time celts by an ornament in the form of triangles with their apices downwards (Fig. 35, 1); one-lugged celts of hexahedral section from the hoard of Sokoleny, the Zavadovka foundry [Gershkovich, Klochko 1987, Fig. 3] (Fig. 34, 1; 34, 2), which are the most common in hoards of the Krasniy-Mayak metallurgical center (K-38 type, according to E.N.Chernykh).

Two-lugged celts of the Kardashinka type (K-68, K-72 types, according to E.N.Chernykh) are presented by finds from the hoards of Sokoleny [Dergachev 1975], Krivoy Kut [Krivtsova-Grakova 1955] (Fig. 35, 3, 4, 8) and by the casting forms from the foundries of Novoalexandrovka, Kardashinka I, II and III, Voznesenka and Staraya Igren [Bočkarev, Lescov 1979, Tabl. 8-11]. Similar celts typical for the Kardashinka metallurgical center [Chernykh 1976: 185-190] were also met in the Byelogrudovo- and Sosnitsa-culture monuments of the forest-steppe right-bank

Dnieper basin (see "Weapons of the Sosnitsa-culture tribes" and "Weapons of the Byelogradovo-culture tribes").

Lugless celts of hexahedral section (K-46 type, according to E.N.Chernykh) are presented on the casting forms from Ptakhovka, Kardashinka II and Novoalexandrovka [Bočkarev, Lescov 1979, Tabl. 9, 77; 11, 90] (Fig. 35, 10). This type of celts is also specific for the Kardashinka metallurgical center.

The two-lugged celts of hexahedral section from the Zavadovka foundry (Fig. 34, 3-5) and the casting forms from the site of Solokha [Bočkarev, Lescov 1979, Tabl. 8, 72] may be considered, along with celts on the casting forms from the settlement of Bondarikha (see "Weapons of the Bondarikha-culture tribes"), as the continuation of development line in Kabakovo-type celts of the Lobykovo metallurgical center of the Left-Dnieper tribes (see "Weapons used in the Srubnaya-culture historical region"). This group also includes one-lugged celts of hexahedral section on the casting forms from the Zavadovka foundry and the site of Solokha (Fig. 34, 6).

A number of Danubian-type celts specific for hoards of the HaA1-A2 periods were revealed in the hoard of Novogrigorievka [Tallgren 1926] (Fig. 34, 7-10). They may be taken as imports, since there is no casting form for making such celts known in the North-Pontic region. The principal areal of spread of such celts is within the limits of the Middle-Danube basin (see, for example, "Weapons of the Noua-culture tribes").

*Rare type of percussive weapon.* The tradition in making socketed beak-axes specific for the population of the Dnieper basin during the Sabatinovka-culture time is seen to have been continued in the beak-ax from the Zavadovka foundry (Fig. 33, 8). It is a weapon with a cast conical socket and a narrow cutting edge trapeziform in section. V.S.Bočkarev and A.M.Lescov were mistaken in interpreting the negative on its casting form, when they took the chipped sides of the beak-ax negative as remnants of a spear-head negative. First, the sides are chipped not only at the cutting edge but through the whole length of the weapon casting form as well. Second, the depth of material disintegration is not greater than 1 mm, i.e. with such a miserable depth of destruction there could have been saved many traces of a spear blade, but they are missing. A similar beak-ax was found in an ancient Slav settlement near the village of Luka Raykovetskaya, in a layer including ceramics of the Sosnitsa culture [Berezanskaya 1972, Fig. 27, 2]. This beak-ax is only somewhat shorter than that from Zavadovka. The find of a beak-ax of such a type in the Transilvanian hoard of Kinku referred to the HaA period [Petrescu-Dimbovita 1977: 88-89; Tabl. 129, 1] enables one to date the Zavadovka-type beak-axes to the 12th century B.C. Weapons from hoards of North-Eastern Hungary assigned to the cultures of Ciyatitsa-Byuckaranios and Borsodgest-Kereckhedy and also to the cultures of Gava-Balsa, Talluya, Karsag and Rokhod of the HaA1-A2 periods [Kemenczei 1984] approximate morphologically those from Zavadovka but each of them differs therefrom by the presence of a massive roller on its socket.

*Spear- and javelin-heads.* They are subdivided into the following groups:

Spear-heads with pointed leaf-like blades (P-20 type, according to E.N. Chernykh) are presented by finds from the villages of Danku, the Kotovsk region of Moldova [Dergachev 1975, Fig. 8, 7] and Obukhovka, the Dnepropetrovsk district, from the hoard of Kalantayevo [Lescov 1981, Tabl. 4, H2] and the village of Petrovka, and also by the casting form from the village of Ptakhovka [Bočkarev, Lescov 1979, Tabl. 15, 149] (Fig. 36, 1, 2, 4, 6, 9). This type was widespread in Europe during the Early-Hallstatt period.

Javelin-heads with leaf-like blades each with a roller on its socket (partly P-22 type, according to E.N. Chernykh) that were found in the hoards of Valya Rusuluy and dated to the 10th -the 9th centuries B.C. [Dergachev 1955: 74 and Fig. 3, 7], and in the village of Mishurin Rog (Fig. 36, 3, 5). The latter is distinguished by the presence of a rib trapeziform in section and a hole at its blade base. The presence of such ribs is specific for the latest bronze spear-heads of the Kimmerian period [Terenozhkin 1976]. This type, as well as the foregoing one, was wide spread in the European monuments referred to the end of the Bronze Age.

Heads with narrow leaf-like blades and short funnel-shaped sockets each with a hole on its blade base that were found in the villages of Mayaky and Sanzheyky, the Odessa district [Chernyakov 1985, Fig. 58, 5, 12] (Fig. 36, 7, 8). In outline, they are very close to the Sabatinovka-culture heads of the Dremaylovka type, but the presence of a hole at the blade base (a feature specific for heads of the Late-Bronze/Early-Iron verge, as mentioned above) and a rib of trapeziform section, as it is to relate them to the Byelozerka time and consider them as the continuation of Sabatinovka weapon-making traditions in the Byelozerka culture.

Spear-heads of the Central-European type form a separate group.

Heads with pointed leaf-like blades and ribs of compound section are presented by a spear-head casting form from the foundry of Zavadovka [Gershkovich, Klochko 1987] (Fig. 37, 1) and by finds from the burial mound excavated near the village of Rodionovka, the Kirovograd district (Fig. 37, 4), and also from the Zaporozhiye region (Fig. 37, 6). The earliest heads of this type were revealed in the Piliny-culture monuments of the BD period. They are characterized by the presence of funnel-shaped sockets as, for example, from the hoards of Tiboldarok and Byukarayos-Foldvar in North-Eastern Hungary [Kemenczei 1984, Tabl. XXVII, 10, 11, 14; LV, 4]. A number of spear-heads approximating in form were revealed in the Danubian hoards of Galoshpetry, Uyoara-de-Sus and Shusheny referred by Petrescu-Dimbovita to the HaA1 period, and in the hoard of Kornesty of the HaA2 period [Petrescu-Dimbovita 1977, Tabl. 190, 4, 5; 146, 4; 306, 19; 251, 1]. Similar heads were also found in the hoards of Kek and Tisadob, Hungary, referred by T. Kemenczei to the Gava culture of the HaA1-A2 periods [Kemenczei 1984, Tabl. CLXXXI, 13-15; CLXXXIX, 4]. The spear butt of the Central-European type from the Odessa Archaeological Museum (Fig. 37, 5) is assigned to the same period.

The second type of Central-European spear-heads (heads with flame-shaped blades of compound section) is presented by casting forms from the town of Nikolayev and from the village Novotroitskoye, the Kherson district [Bočkarev, Lescov 1979] (Fig. 37, 2, 3). As for Central Europe, the origin of such spear-heads is related to the Middle-Danube areas of the Carpathian basin [Paylic 1963: 308], wherein they appeared during the Piliny culture and the analogies that may be considered as approximating the spear-heads from the North-Pontic region originate from the second horizon of the Piliny culture hoards of the BD-HaA1 periods [Kemenczei 1984: 22-23]. The casting forms for making such spear-heads from the North-Pontic coastal areas point to the local production thereof during the Byelozerka-culture period.

The Zavadovka type of spear-heads (P-12 type, according to E.N.Chernykh), which combine features of Central-European flame-shaped heads and Zlatopol type apertured heads of the Loboykovo metallurgical center, is exhibited on the casting forms from the Zavadovka foundry (Fig. 37, 9) and from the site of Solokha near the town of Kamenka-Dneprovskaya, the Zaporozhiye district [Lescov 1967: 2].

Conventionally, the Byelozerka culture includes apertured spear- and javelin-heads from the village of Lasky, Leopold and Mishurin Rog, and from the Odessa State Archaeological Museum and the Dnepropetrovsk Historical Museum (Fig. 37, 7, 8, 10-12). Typologically, they are all of a more late origin compared to the Zlatopol type apertured heads of the Loboykovo metallurgical center, but the absence of complex finds of such spear-heads introduce difficulties in the dating thereof.

*Arrow-heads.* It is a very rare category of finds in the Byelozerka monuments. It includes bone socketed arrow-heads of oval or trihedral section from the Kirovskoye settlement (Fig. 33, 9-10). They all follow the Sabatinovka-time traditions in making bone arrow-heads specific for the Dnieper basin, but they are a bit smaller in size.

The Sabatinovka-culture traditions in making tanged bronze arrow-heads were continued and improved in the Tudorovo-group of monuments. The arrow-heads of this sort include heads with T-shaped tangs from the settlement of Suvorovo VI and the burial near the village of Byukany (see "Weapons of the Sabatinovka-culture tribes").

The short-socketed arrow-head with long sharp blade ends reaching its socket base from the Kherson district (Fig. 33, 12) is also related to the Byelozerka time. It is similar to heads from the Bondarikha-culture settlements of Buzovka and Zalinейnoye (see "Weapons of the Bondarikha-culture tribes") and assigned to the type of arrow-heads widespread in Central Europe of the 12th - the 10th centuries B.C.

*Defensive armour.* To the Byelozerka time is related a circular bronze shield found in the Dnieper basin (the collection of A.Pol) (Fig. 33, 7). In shape, it approximates the Central-European bronze shields of the early-Hallstatt time but there is still no perfect analogy thereto.

Thus, through the whole territory of the Byelozerka-culture spread there may be traced features of continuation both of the Sabatinovka-culture traditions in

making some of the armament (spears, celts, daggers, arrow-heads) and the weapon-making traditions of Central Europe (the manner of making spear-heads). At the same time, there may be distinguished a number of local differences, and the most distinct of them are the Kardashinka forms specific for the tribes populating the forest-steppe Right-Dnieper areas, in addition to the Byelozerka culture, and the Zavadovka forms specific for the Left-Dnieper areas.

## CHAPTER IV. THE AGE AND ORIGIN OF THE ARMAMENT ARTICLES

The investigations on particular kinds of armament, on their typology and steps of improvement in time have made it possible to determine the predominant type of weapons for a particular chronological period within the limits of a particular territory, i.e. to determine the armament of particular archaeological cultures or groups of monuments (Klochko 1981) and correlate the latter with the metallurgical centers in conformity with E.N.Chernykh's classification [Chernykh 1976]. If the metallurgical centers are characteristic for particular groups of metal articles from the standpoint of production, the armament of a particular archaeological culture shows itself as a complex of distinctive features of this or any other group of weapons from the standpoint of military science and at the same time illustrates concrete historical relations between the Late-Bronze tribes populating the territory of the Ukraine and the neighbouring areas.

The principal source of absolute dates, in case of Eastern Europe of the Bronze Age, is the chronology of the Eastern Mediterranean regions based, in turn, on the historical chronology of Egypt. The transfer of these dates is accomplished by means of Central-European monuments, which may be taken as synchronous with these or any other monuments or archaeological cultures of Eastern Europe. Such stepped constructions may introduce errors, and the amount of such errors is accumulated as the distance from the regions of direct contacts between the European and Mediterranean cultures increases. Errors may also result from an uncritical attitude towards the constructions proposed by some Central-European authors, when the latter have raised their conventional dates to the rank of absolute. Among them are most of dates advanced by M.Gimbutas and A.Mozsolics for the periods of BA-BD, in particular.

Practically, until recently the absolute historical chronology of Central Europe commenced from the end of the 13th or the beginning of the 12th centuries B.C., if proceeding from the references proposed by G.Müller-Karpe for the monuments of the Alpine zone and Italy [Müller-Karpe 1959]. Any earlier date cannot be principally taken as absolute. Thus, one of the fundamental archaeological base marks — such as shaft graves in Mycenae — are dated in accordance with direct Egyptian imports of the 17th - the 15th centuries B.C. [Mylonas 1957]. The transfer of such dates to Central and Eastern Europe is accomplished primarily through the similarities of ornaments practically without any reliable analogies in the form of particular articles or ceramics, and this is the case when there are postulated statements on an imaginary backwardness and delay in the cultural development of Europe compared to the Eastern Mediterranean areas. The use of such "absolute" dates, as applied to Central-European monuments, has generated recently a great number of serious objections.

In the Eastern-Mediterranean areas, the spiral ornamentation (the so-called "Mycenaean ornament", "Mycenaean wave", "Mycenaean spiral ornament") is of thousand-year traditions, and its appearance in the monuments of Europe reflects a wide and long cultural contacts between the peoples of these regions visible as far back as the Eneolithic and the Early-Bronze Age [Salkovsky 1980: 310-311]. The character of the above interrelations was rather diverse and wide, and it manifested itself even in the use of separate signs of the A-type Aegean linear writing for ornamentation. This fact also points to an earlier period as compared to the shaft graves in Mycenae [Vladar, Bartonek 1977: 432]. Therefore the given epoch should be dated to the whole of the Middle-Helladic period of Greece (MH), 1900-1500 years B.C. [Goldmann 1981: 138].

Thus, the date of 1500 years B.C. appears improbable as the initial date for the BA horizon, the horizon of the Danubian bronze articles of Haidusamson — Apa (according to A.Mozsolics, synchronous to the early phase of Otomani, the early phase of Wietenberg, Füzesabony, Verbicioara II, III, Monteoru Ia, Toszeg, Sarata-Monteoru Ia, Otomani II, Maliye Kosigy, layer IVa, the early layer of Vesele, the middle period of the Magyar culture (Mozsolics 1967: 122), which is the base for the whole European chronology including the Pokrovsky, Seyma and early-Srubnaya culture horizons of Eastern Europe /A.I.Terenozhkin, A.M.Lescov, V.S.Bočkarev, E.N.Chernykh, N.N. Cherednichenko, etc./).

In his work devoted to links of Europe with Aegeida and Anatolia in the 2nd millennium B.C. on the basis of numerous archaeological and historical sources, Jan Bouzek, a Czech investigator, has managed to synchronize the Central-European period of BA2 with the Middle-Mycenaean (MM) and Middle-Helladic III (MH-III) periods of Greece and dated this period to the 17th century B.C.; the period of BA3 is synchronized with the Late-Helladic I period (LH-I) and dated to the 16th century B.C.; the period of BB (synchronized by A.Mozsolics with the Kosider-hoard horizon, the end of the Magyar, Füzesabony, Wietenberg, Vebicioara, Tey, Monteoru, Kyrna, Otomani III and Monteoru IIb cultures [Mozsolics 1967: 124]) is synchronized with the Late-Helladic II period (LH-II) and dated to about 1500 years B.C.; the period of BD is synchronized with the Late-Mycenaean IIIb period and dated to about after 1250 years B.C. [Bouzek 1985: 17].

According to this scheme, the absolute historical chronology also commences only from the middle of the 13th century B.C. (see below), and the dates of earlier periods remain generally conventional. However, the tendency in considering them to be more ancient is related not only with the general trend but also supported by many factors and similarities accumulated by the present. Of great importance is the distinction of the modern understanding of the Bronze-Age Central-Europe horizons as the cultural-chronological horizons correlated with particular archaeological cultures and groups of monuments — the understanding that is substantially more concrete historical than the initial scheme of metal-article evolution in Central Europe proposed by P.Reinecke, which remains unchanged in

form but is abstract and which derives its name from the "horizons of European hoards".

The scheme proposed by J. Bouzek is practically coincident with the scheme of synchronizing the cultures of Europe and the Near East proposed by G. Müller-Karpe [Müller-Karpe 1980], which is characterized by that it is synchronized with particular hoard horizons, cultures and groups of monuments including those that have been synchronized with the Late-Bronze monuments of the Ukraine.

The necessity in changes and refinement of chronology both of cultural-chronological horizons and of separate archaeological cultures in Eastern Europe results from the changes in chronology of Central Europe (when the synchronization of cultures remains unchanged) and also from numerous analogies and similarities to the East-European artefacts from East-Mediterranean monuments (see below) that illustrate intimate independent contacts between the East-European and Mediterranean centers. This makes it possible not only to refine the Central-European chronological references but also to create an independent East-European scale of absolute chronology synchronized with that of Near East and Central Europe, which is of prime importance. As noted by N.K. Sandars, "at present, the only way for refining the European chronology (i.e. by using the traditional methods — V.K.) is in the use of the 'northern bronze articles' from the East-Mediterranean areas that were revealed in the northern monuments" [Sandars 1979: 89].

Hereinafter, these problems will be discussed on the basis of Late-Bronze Sabatinovka- and Byelozerka-culture materials found in the territory of the Ukraine.

## 1. WEAPONS OF THE SABATINOVKA- AND NOUA-CULTURE TRIBES

The similarity of weapons referred to these cultures enables one to consider them in the same group, which consists of: two spear-heads (one of them is of a missile type), a short cutting sword with a leaf-like blade, a fighting knife-dagger, an ax-celt, a bow and a circular shield [Klochko 1986].

Traditionally, the Sabatinovka-culture weapons along with all other metal articles of the Krasniy-Mayak metallurgical center are considered as the continuation of development line in the late stage of improvements of the Srubnaya- and Seyma-culture metallurgical traditions (A.M. Lescov, V.S. Bočkarev, E.N. Chernykh). However the distinctive nature of the Sabatinovka culture, independent in origin and irrespective in chronology (Sharafutdinova, Chernyakov) has demanded a critical review of this consideration, which has been inconsistent for a long time with some specific archaeological materials. These problems will be below discussed on the basis of the main characteristics of the Sabatinovka-culture weapons.

One of the principal categories of these weapons is represented by cast spear- and javelin-heads, which are usually considered as the continuation of the Seyma line in the development of spear-heads (A.M.Lescov, V.S.Bočkarev, E.N.Chernykh). In his special study devoted to spear-heads of the North-Pontic region and the forest zone of East Europe, A.N.Rumyantsev has pointed to a series of distinctions which enable one to consider different lines in the development of spear-heads of these regions and treat the earlier sources of traditions in the production of East-European socketed spear-heads [Rumyantsev 1974]. To continue studies in this directions, it is necessary to discuss the appearance of this kind of weapons in more extended chronological and territorial aspects.

The most ancient metal spear-heads of Eurasia were of tanged forms widely used in Fore Asia, te Eastern Mediterranean regions and the Caucasus of the 3rd millenium B.C. [Schaeffer 1948; Martirosyan 1964; Popova 1963]. Single finds of spear-heads of this type are known in the Volga basin, the North-Pontic region and the Balkan areas. However, tanged spear-heads did not become widespread in the above regions [Popova 1963: 19-22; Chernykh 1978: 120-129]. In the first haft of the 2nd millenium B.C., they were throughout substituted by socketed heads.

In East-Europe metal (copper and bronze) socketed spear-heads appeared in the monuments referred to the end of the 3rd - the beginning of the 2nd millennia B.C. They are from the Pre-Seyma chronological horizon, very different in form and by methods of production. They are all forged and have rolled-up sockets. Their prototypes are unknown but the great number of forms and methods of production enables one to make out the initial stages in the evolution of this kind of weapons. They are represented by forged spear heads with pointed leaf-like blades of rhombic section and comparatively long unclosed rolled-up sockets that were found near the village of Kazanskaya in the Lower-Don basin (The catalogue of the Museum of History of the Don Cossaks) and near the farm of Traktirny on the Kuban river [Iessen 1950, Tabl. IV. 6] (Fig. 38, 5, 6). A similar spear-head (as evident from its description) was found in the hoard near the village of Krymskoye, the Lugansk district [Fedorovsky 1921: 23-24]. Somewhat different in form is the spear-head excavated by N.A.Veselovsky in the Kiev district [Tallgren 1926, Tabl. 108, 13] (Fig. 10, 1), which has a narrow blade and a short road socket provided with a tang at its base with a hole for fastening to a shaft. Typologically, it is the most ancient spear-head but, unfortunately, it cannot be dated because of lack of reliable complexes.

In the Transcaucasian region, the appearance of forged socketed spear-heads (typologically more improved and having a later origin as against the foregoing) is dated by A.A.Martyrosyan to the 19th - the 17th centuries B.C. [Martyrosyan 1964: 54]. However, the finds he used for determining the so early dates ere from the pre-evolutionary excavations. At present there are materials of a more late origin. According to A.Evans, shaft grave IV of Mycenae is dated to the 18th century B.C. This date was also used by A.A.Martyrosyan, but later on it was reviewed and redated by G.Mylonas to 1600-1500 years B.C. on the basis of Egyptian imports

[Mylonas 1957: 181]. The most ancient Syrian socketed heads from the cemetery of Ras-Shamra 1 are dated by F.A.Schaeffer to 1600-1450 years B.C. on the basis of Egyptian imports as well [Schaeffer 1948: 605]. As for Greece, the most ancient spear-heads with rolled-up sockets are known from the shaft graves of Mycenae the earliest of them being dated to the end of the 17th century B.C. [Mylonas 1957: 181]. In these regions, forged socketed spear-heads appeared all of a sudden to displace tanged heads, which were in practice up to the 13th century B.C., when they were substituted by spear-heads with all-cast sockets.

In East Europe, cast spear-heads (which are undoubtedly more improved from the standpoint of technology) appeared very early, practically at the same time with forged heads (proceeding from the modern level of knowledge). One of them is presented by a casting form from the settlement of Nova Zagora, Bulgaria. It is dated by E.N.Chernykh to the Middle-Bronze Age [Chernykh 1978: 135]. Similar spear-heads are also presented by finds from the Middle-Dnieper culture cemeteries such as a cast head with two asymmetric holes in the lower part of its socket from burial mound No.11, grave 1 of a Khodosovichy cemetery, and by cast spear-head with a pointed leaf-like blade of lens-like section having an unclosed socket with two holes in its lower portion from the cemetery of Strelitsa, grave 53 [Artemenko 1967, Fig. 20, 2; 47, 32]. The spear-head from the Khodosovichy cemetery is made of arsenous bronze approximating the Caucasian sorts of metal in composition. The spear-head from the Strelitsa cemetery is made of copper approximating the Balkan-Carpatian sort of metal, though no similarity thereto has been found in this region. For preparing a casting form for this very spear-head, as a model there was used a forged head with an unclosed socket. I.I.Artyemenko referred the Khodosovichy cemetery to the period dated to the 22nd - the 27th centuries B.C., the Strelitsa cemetery being referred to the 17th - the 15th centuries B.C. [Artemenko 1977: 39-40]. In the whole, he considered the period of the Middle-Dnieper culture as the Pre-Seyma period. In his analysis of the Kostromskaya and Kolontayevka type axes as basic types for the Fatiyanovo, Balanovo, Middle-Dnieper and Katakomba cultures, S.N.Korenevsky assigned them to the period "not later than the first half or the middle of the 2nd millenium B.C., i.e. to the Pre-Pokrovsk and Pre-Seyma horizons" [Korenevsky 1976: 29]. E.N.Chernykh dated the axes of the given type found in Bulgaria to the end of the 3rd - the beginning of the 2nd millenia B.C. and proposed to apply these datings to the monuments of East Europe [Chernykh 1978: 169]. In the Danube basin, axes of this type are referred to the period of BA1 synchronized by J.Bouzek with the EH II – EH III Early-Helladic periods, the chronological reference mark of which is dated to 2000 years B.C. [Bouzek 1985: 17]. The next period of BA2 that is the horizon of Haidusamson in the Danube basin, according to J.Bouzek and G.Müller-Karpe, takes its start from 1700 year B.C. An ax of the Kolontayevka type found in the Khodosovichy cemetery enables one to apply the above datings to all spear-heads of the given type and assign the latter to 1700 years B.C. as the upper dating limit.

The cast spear-head with a broad pointed leaf-like blade from the village of Sukhiny, Rzhishchev region [Artemenko 1967, Fig. 19, 3] (Fig. 10, 3), and the cast spear-head (made in a clay casting form as evident from its surface character) with a narrow pointed leaf-like blade and a short socket from the town of Pereyaslavl-Khmelnytsky, the Kiev district (Fig. 110, 5), are similar to the spear-head from the Khodosovichy cemetery.

Different forms, small sizes and primitive methods of production of the above-mentioned articles have made it possible to consider the latter to be specimens of the initial stage in the evolution of socketed spear-heads and treat East Europe as a probable region of their origin where they could appear at the end of the 3rd - the beginning of the 2nd millennia B.C., i.e. in the period, when spear-heads with rolled-up sockets were still in use in the neighbouring areas.

Later on, the evolution of this kind of weapons in the territory of East Europe resulted in at least two parallel lines of development: heads with broad pointed leaf-like blades and long sockets, i.e. the Seyma line, and heads with narrow leaf-like blades and short sockets, i.e. the Krasniy-Mayak line. The earliest representatives of the last line include the spear-head ornamented in the "Mycenaean style" from the vicinity of the town of Tsyurupinsk [Tallgren 1937, Fig. 7, 1] and the spear-heads from the village of Voloshskoye and from the Kerch peninsula [Lescov 1965, Fig. 1, 4] (Fig. 26, 1, 6, 7). The spear-head on a clay casting form from the collection of A.Pol found near the Nenasytets rapids on the Dnieper [Bočkarev, Lescov 1979, Tabl. 3, 34] and the spear-head with a narrow ornamented blade from the Dnieper basin [Chernykh 1976, Tabl. 27, 4] (Fig. 26, 2, 3) differ from the above spear-heads by long sockets. The distinguishing feature of the casting form from the Nenasytets rapids is absence of an auxiliary recess for fastening a core, a means necessary for the process of forming the socket, which is typical for stone casting forms of the North-Pontic region at the Late-Bronze stage and aimed to provide the production of spear-heads with even socket edges. The absence of such a recess introduced difficulties in placing a clay core through the center of the casting form and resulted in "broken" uneven socket edges as, for example, seen on the spear-head from the Dnieper basin (Fig. 26, 3). The nearest analogy of this casting form may be represented by the matrix from the Bronze-Age settlement of Nova Zagora, Bulgaria [Chernykh 1978: 135], which makes it possible to consider the above-mentioned characteristics as archaic. The given group also includes javelin-heads: one of them is presented by the casting form from the Maliye-Kopany foundry [Bočkarev, Lescov 1979, Tabl. 4, 41b]; the other is from the village of Kamennaya Balka, Nikolayev district [Chernyakov 1985, Fig. 58, 3] (Fig. 26, 4, 5). The sockets of the given heads are provided with cast lugs similar to those on sockets of the Seyma-type spear-heads, which most likely represents a chronological feature while the similar outlines of these heads approximate the outlines of the Dremaylovka-type spear-heads (see below). The foundry of Maliye Kopany is assigned to the earliest complexes of the Krasniy-Mayak metallurgical center, and the presence of a lug on the javelin-head

from this foundry makes it possible to consider the latter as a complex that is immediately close to the Seyma chronological horizon. Along with celt casting forms each with a "cavity" that approximate the celt on the casting form from Maliye Kopany, in the foundry of Pobit Kamyk, Bulgaria, there were unearthened casting forms for making Central-European type axes with elongated butts [Chernykh 1978, Tabl. 67], which may be met only in hoards of the Haidusamson horizon — the period of BA2 (the 17th - the 16th centuries B.C., according to J.Bouzek and G.Müller-Karpe). In addition to celts of the above type, the hoard of Dichevo yielded a Fore-Asia type rapier blade [Chernykh 1978, Tabl. 65, 5], which typologically approximates the Early-Aegean rapiers from Maliya, Kakovato (tholos B) and Akrokhory — a sort a swords dated to 1650-1550 years B.C. and "not later than 1500 year B.C." [Sandars 1961: 18; Tabl. 17, 1-3]. The facts mentioned above enable one to date the Maliye-Kopany foundry to the 16th century B.C. and refer the origin of the Krasniy-Mayak metallurgical traditions to the period of multirrim-ceramic culture in the North-Pontic region.

The Novokievka foundry unearthened in the Sabatinovka-culture settlement near the village of Novokievka, the Kalanchak region of the Kherson district [Gershkovich, Klochko, Evdokimov 1987], has made it possible to point quite definitely to a Sabatinovka affiliation of the later Dremaylovka-type spear-heads. The find of spear-heads similar to the articles from the first horizon of the Novokievka foundry (Fig. 26, 2) and from the tholoses on the Rhodes island (Yalisos, grave IV) [Sandars 1963, Tabl. 21, 1] and in the Crete island (Isopata, grave 3 and Knoss, Zafer-Popoura, grave 36) [Müller-Karpe 1980, Tabl. 198, B5; A5, 199] together with the Mycenaean-type rapiers, which were dated by N.K.Sandars to the first half of the 15th century B.C. [Sandars 1963: 149], make it possible to refer the appearance of this type of spear-heads to the 15th century B.C. The find of a spear-head of a later version of this type in the great hoard of weapons in Enkomy, Cyprus [Catling 1964, Tabl. 14, i, h] points to the use of spear-heads of this type up to the end of the 13th century B.C.

The spear- and javelin-heads of the Krasniy-Mayak type are dated on the basis of complex finds along with the articles typical for the Danubian hoards of the BD period, i.e. to the 13th century B.C.

The predominant role, among the Sabatinovka-culture daggers, was played by Krasniy-Mayak type daggers each having a leaf-like blade, a circular stop on its haft and a tang in the form of a pin oval, rectangular or quadratic in section (knives of the H-36, 37, 38 types, according to E.N.Chernykh). The name of "daggers" given to the weapons with such blades, that are more suitable for delivering cutting rather than thrusting stabs, is comparatively conventional and unable to illustrate more or less completely their possible application as fighting knives of a wide use.

A comparatively early appearance of this type of weapons as completely formed may be evidenced by the dagger casting form from the Maliye-Kopany foundry, on which the negative of a dagger with a circular stop was made earlier as against the

negative of a Borodino-type dagger [Chernyakov 1967: 23-27]. This fact is contrary to the theory that daggers having circular stops originate from the Early-Srubnaya culture knives with flattened stops [Krivtsova-Grakova 1955]. Besides, it is indicative of an independent line of the knife-dagger development generally simultaneous with the Early-Srubnaya culture. The closest prototypes for this kind of weapons may be represented by some finds from the Near East such as the dagger from the early-dynastic layer (2600-2300 year B.C.) of the Ningirsu temple in Lagashe, which is provided with a flat tanged haft having four holes on the tang, a circular stop and a leaf-like blade of rhombic section decorated with an engraved representation of a fantastic animal [Müller-Karpe 1974, Tabl. 188, 17]. The Anatolian-type spear-heads each with a leaf-like blade, a circular stop and a tang of quadratic section, which differ from the Pontic-type daggers only by the length of tangs, may be also taken as approximating the above-mentioned weapons in form. As an example there may be taken spear-heads from Tarsa, Gezlyu-Kule, the horizon of 1900-1700 years B.C., and from the hoard of Soloy-Pompeyopolis, 2200-2100 years B.C. [Müller-Karpe 1974, Tabl. 291, B7; 294, 8]. Using the find from the Maliye-Kopany foundry as a basis (Fig. 20, 1), the appearance of daggers of the above type in the North-Pontic region may be thus assigned to the 16th century B.C. The main period of practising daggers of the Krasniy-Mayak type presented on the casting forms from the Novokievka and Krasniy-Mayak foundries (Fig. 20, 4, 5) is dated, according to these complexes, to the 15th - the 13th centuries B.C. The latest daggers of this type — daggers of the Zagradovka version characterized by narrower blades (Fig. 22, 2; 33, 1-4) — are specific for the latest Sabatinovka- and Byelozerka-culture monuments. The find of a similar dagger in the hoard of Ugarita (the Ras-Shamra stronghold) (Fig. 39, 6), in the layers associated with the destruction of Ugarit by "the Sea Peoples", integrally with the Egyptian sword having the cartouche of Pharaoh Merneptakh (about 1224-1214 years B.C.) [Müller-Karpe 1980, Tabl. 151, A3] enables one to refer the appearance of such daggers to the end of the 13th century B.C.

Swords of the Krasniy-Mayak type are short cutting weapons about 35-45 cm long each with a leaf-like blade, a broad thickened stop and a compound tanged haft.

All attempts to derive the origin of those swords from the swords of the Danubian-bronze horizon of Haidusamson-Apa are inconvincing (V.S.Bočkarev). The Danubian swords of the Middle-Bronze Age represent the continuation of the development line of Central-European type swords with metal hafts each having a mushroom-shaped head and a triangular or pointed leaf-like blade fastened to the haft by means of rivets [Goldmann, 1981: 131-181]. These swords are substantially different from those of the Krasniy-Mayak type both in form and ornamentation. The construction and shape of the blades are also different. Besides, they differ by methods of connecting hafts to blades.

The Krasniy-Mayak swords are most likely to represent an independent line in the development of this kind of weapons in the North-Pontic region. Their forms, the

design of hafts and the outlines of blades point to their relationship with daggers of the Krasniy-Mayak type. The production and the use of such an original sort of short cutting swords, which approximate an ancient Greek xiphos or a Roman pedite gladius — infantry short cutting swords for close combats — according to their tactical characteristics and specifications, may be taken as an illustration of the character of the Late-Bronze Pontic tribes represented by such archaeological cultures as Sabatinovka, Noua and Koslodjeny.

The most ancient swords of this type are represented by a sword on the casting form from the foundry Pobit Kamyk, Bulgaria [Chernykh 1978, Fig. 68, 7], related most probably to the period of BA2, the 17th - the 16th centuries B.C., and by a sword from the grave of the burial mound near the village of Borisovka (Fig. 24, 1). In form and in manner of fastenning, the head of the latter is similar to those of the Crete-Mycenaean type swords and daggers referred to the CE III – PE I periods, the 17th - the 15th centuries B.C. The improved versions of Krasniy-Mayak type swords are dated to the 16th - the 13th centuries B.C. as may be evidenced by the finds of casting forms from the Novokievka and Krasniy-Mayak foundries and by the find from the Lozovo hoard including bronze articles typical for the Danubian hoards of the BD period.

A number of HaA1-horizon hoards in the Lower-Danube basin yielded swords with flat hafts of the Reutlingen type, according to Schauer, dated to the BD-HaA1 periods, each having a short broad leaf-like blade of the Krasniy-Mayak type. Both the form of blades and the method of production are specific for swords of the Krasniy-Mayak type (the hoards of Ayud, Band, Felnak, Pechitsa II) [Petrescu-Dimbovita 1977, Tabl. 106, 16, 17; 107, 1, 2; 115, 12; 141, 9; 170, 1]. The appearance of swords of the above combined type in the Danubian monuments of the 12th century B.C. points both to contacts of the bearers of technological and weapon-making traditions of Central-European tribes in the urn fields of burials and of Sabatinovka-Noua cultures related most probably to the so-called "expansion of the Noua culture in the Danube basin", and to the fact that swords of the Krasniy-Mayak type proper disappeared by the end of the 13th - the beginning of the 12th centuries B.C.

The dominant type of Sabatinovka-culture weapons for close combat is represented by celts. The origin of this kind of armament is still obscure. However, it is interesting to note that the principal areal of spread of weapons with cranked hafts (celts and flat axes with flanges) in the Bronze Age is within the forest and forest-steppe zones of east and Central Europe and overlies the territory of spread of cord-ceramic cultures of the previous time, when there were primarily used flat flint ax-mattocks with cranked hafts similar to those of celts and each having a work edge approximating them in form and size. Unfortunately, the available materials are insufficiently to trace the evolution of this type of weapons through the whole length of development.

The discovery of casting forms for making lugged axes, in the Srubnaya-culture

settlements of Mosolovka and Usovo Ozero, has completely solved the problem, as the author believes, on the relationship of the Srubnaya culture (at least of the Early-Srubnaya or Pokrovsk stage) with the "celtic" cultures and enables one to consider the Krasniy-Mayak line of celt development to be independent and parallel to that of the Seyma culture, which should be also considered at present separately of the Srubnaya culture as representing metallurgical traditions of eastern areas of the East-European and West-Siberian forest belt. The Krasniy-Mayak line is represented in complexes of the Krasniy-Mayak, Vyrbitsa and Dichevo centers of the Koslodjenty-Noua-Sabatinovka cultural-historical community, which began functioning in the 16th century B.C. (the foundries of Pobit Kamyk, Maliye Kopany and the hoards of Rishesty, Dichevo, Semerdjjevo), was continued up to the 13th century B.C., i.e. the beginning of the Byelozerka period.

The Sabatinovka-type armament specific for the Sabatinovka-and Noua-culture tribes and approximating the Koslodjenty-culture armament, which is represented by weapons from the Vyrbitsa and Dichevo centers, Bulgaria [Chernykh 1978], is substantially different from the armament of the neighbouring regions. Proceeding from the modern notions, the author dates it to the 16th - the 13th centuries B.C. In many respects, the origin of this group of armament remains obscure because of the fact that the origin of the Koslodjenty, Noua and Sabatinovka cultures in the West- and North-Pontic regions is still unclear.

## 2. WEAPONS USED IN THE SRUBNAYA-CULTURE HISTORICAL REGION

As noted above, the armament of tribes in this cultural-historical region is represented by two groups of weapons: weapons of the Srubnaya culture and weapons of the Loboykovo group.

In the territory of the Ukraine, the Srubnaya-culture armament is represented only by a few specimens, and without special investigations on weapons of the Srubnaya-culture tribes in the Volga and Don basins it is difficult to classify the given group of armament and determine its distinctive characteristics.

The available materials have made it possible to distinguish two types of weapons: daggers with flat stops (Fig. 13) and lugged axes (Fig. 14, 1-5). All other articles are included into this group quite conventionally. However, the scarcity of complex finds presents difficulties in dating this armament. As a whole, weapons of the above types are specific for complexes of the Pokrovsk and Seyma chronological horizons of East Europe, which were synchronized by N.N.Cherednichenko with the Central-European period of BA2 [Cherednichenko 1977] and dated by J.Bouzek to the 17th century B.C. At the same time, it might be well to point out the longevity

of the Srubnaya culture and its synchronism with the Sabatinovka culture, though there is no good reason, to my mind, for determining the "upper" date limits of the Srubnaya culture in the Ukraine.

Generally, the Loboykovo group of armament approximates the Sabatinovka group by a set of weapon categories (but not of weapon types). It is characterized by the absence of daggers and by the presence of an original sort of weapons for close combat — an alternative of Zlatopol type spear-heads with broad apertured blades (strengthened with circular ribs) each sharpened around its periphery (see below). This group of weapons is presented in complexes of the Loboykovo metallurgical center.

As prototypes for the Loboykovo-group spear-heads, there may be taken spear-heads with pointed blades of the Seyma development line. In the North-Pontic region, this group is represented by spear-heads from the Borodino (Bessarabian) hoard [Krivtsova-Grakova 1949]. This hoard also revealed a spear-head with a broad pointed leaf-like blade of a silver-base alloy. The head has a long forked socket with three ribs and a lug at its base. Besides, the head is decorated with a cast ornament in the form of triangles (Fig. 38, 3). This spear-head is very close to "forked" spear-heads from the Seyma and Turbino cemeteries both in form and metal composition [Chernykh 1976: 45], and therefore it may be thought to be of an import origin. The second spear-head revealed in the Borodino hoard has a pointed leaf-like blade with a thick rib of rhombic section, a long socket strengthened with a rim at the base and provided with down-directed lugs having holes for fixing to a shaft. The socket is encrusted with gold and decorates with an engraved ornament in the form of zigzags, triangles and notches (Fig. 38, 1). In shape, it is generally close to the Seyma spear-heads (spear-heads from the Seyma and Turbino cemeteries), though in metal composition (silver), in ornament (both in pattern and in manner of engraving) and in socket form it substantially differs therefrom [Chernykh 1965: 272]. This makes it possible to consider this spear-head to be a local version (within a limits of the Ukraine) — a prototype for the Golovurovo-type spear-heads of the Sosnitsa-culture (see below). The third spear-head from this hoard is presented by a socket (the blade is missing). In form and metal composition, it approximates the second head and differs therefrom only by absence of lugs. Besides, it differs therefrom by a throughout hole for fixing to a shaft and by engraved ornament in the form of a "running spiral" and upward-pointed triangles (Fig. 38, 2). The last feature also differentiates this spear-head from those revealed in the Seyma and Turbino cemeteries.

The problem on the origin and dates of Seyma-type spear-heads, as of the whole set of Seyma bronze articles, has drawn attention of many scientists. A thorough analysis of this problem is given by V.A.Safronov, for example in his "Datings of the Borodino hoard" [Safronov 1968]. In summing up the achievements of a many-year discussion, it is possible to distinguish two directions in solving these questions. One of them is the line of synchronization with the Anyan-culture bronze article

of China assuming an eastern origin of the Seyma bronze articles. The second line is the line of synchronization with the Mycenaean shaft-graves or with the Danubian bronze horizon of Haidusamson-Apa, which assumes either an East-Mediterranean or a Central-European origin of the given forms of metal articles.

The eastern line (Safronov, Tikhonov) is based on the fact that a number of Seyma-type spear-heads were found in Siberia (which are typologically more late than the European type) and on the dates based on the Chinese similarities in monuments of the Yun period (not earlier than the second half of the 14th century B.C.), and also on the supposition by B.G.Tikhonov on an eastern origin of the Seyma-type spear-heads [Tikhonov 1960: 25]. It should be noted that the Seyma-type spear-heads originating only from the north-western border areas of China were most ancient in China and could serve as the basis for the formation of China spear-heads of the Yun period [Varenov 1983: 100-123]. This point to the north-western origin thereof (for China). This conception is in agreement with the history of bronze metallurgy in China [Bader 1964: 138-139]. The hypothesis put forward by E.N.Chernykh and S.V.Kuzminykh on the origin of the Seyma metallurgy in a hypothetic metallurgical center situated somewhere in the Sayans may be considered as a modification of the above theory. The absence of any information on such a center presents problems in discussing this hypothesis and involves doubts in its conclusiveness, primarily because of the fact that the authors have mentioned relatively more late typological characteristics of Seyma bronze articles revealed to the east of the Urals as compared to the East-European finds.

The western line (Merpert, Bočkarev) is based on the attempts to associate the Seyma spear-heads with the West-European types, and on the datings of the Mycenaean shaft graves and of the Danubian bronze articles from the Haidusamson-Apa horizon. The absence of Seyma bronze articles in the complexes of the regions mentioned above makes such conceptions undemonstrable.

The existence of a number of metallurgical centers in Europe, which followed in this or any other extent the Seyma traditions (the Kazan, Ananyo, Kardashinka, Loboykovo centers), and also local sources of main types of metal articles make it possible to refer the origin of these metallurgical centers to the East-European culture (in forest and forest-steppe zones of this territory) and to consider the Loboykovo metallurgical center to be one of the local Post-Seyma centers.

The Golovurovo-type spear-heads are the most ancient spear-heads of the Loboykovo metallurgical center. On the one hand, they close to the Seyma type (in general outlines and in blade forms). On the other hand, they differ in proportions: by shorter sockets and by presence of rims at the base of each socket (Fig. 10, 8-11). Later on, this development line led to the appearance of Zlatopol apertured spear-heads. As a transitional type from the type of Golovurovo to the Zlatopol type spear-heads, there may be taken the spear-head from the Odaily-Podary hoard in Rumania, which is entirely composed of North-Pontic ar-

ticles [Lescov 1981] (Fig. 15, 4). The earlier types of apertured spear-heads are characterized by broad blades each sharpened along both of its edges and provided with solid ribs. This indicates that such spear-heads were preferably used as cut rather than thrust weapons (Fig. 11, 1; 15, 5). It is probable that initially, for such a purpose, there were aimed forked spear-heads of the Seyma type with broad pointed leaf-like blades each having a fine rib with two sprouts in the form of a fork in its lower portion adjacent to the socket. B.G.Tikhonov points to a discrepancy between such a form of blades and the function of spears as thrust weapons. Besides, he treated this sort of weapons to be archaic. This enables one to consider forked heads as the most ancient socketed spear-heads of this type with broken blades to provide support for such an assumption [Tikhonov 1960: 25].

The notion of forked heads as the most ancient metal socketed spear heads has not been confirmed (see above). The fractures on the known spear-heads of this type are more often oblique with respect to the spear axis and together with the apex each of them forms a step on the rib. The fractures of such a nature could occur only as a result of side strokes perpendicular to the blade plane.

A broad blade sharpened along both of its edges and the construction ill-suited (and probably undesigned) for thrusting make it possible to suppose that the main function of forked spear-heads was focused on cut strokes and strokes at an angle, i.e. to consider such spear-heads as weapons of the halberd type (here are meant only their functional but not morphological similarities). Some of the Zlatopol type spear-heads with broad pointed leaf-like apertured blades are characterized by still more pronounced cutting properties and exhibit similar specific functions. Apertures provided in such spear-heads are strengthened with arched ribs, which enable side loads produced by cut strokes to be more evenly distributed over the blade area. The appearance of similar (in function) weapons (Fig. 29) among the Sabatinovka-culture population of the Dnieper basin seems to have been associated with the direct influence of the above traditions existing in the Loboykovo metallurgical center.

A similar application of one of the types of Central-European Bronze-Age spear-heads (HaA/B) has been reconstructed by P.Schauer [Schauer 1979: 69-80].

By the end of the Sabatinovka period, the size of apertured spear-heads decreased and their blades became narrower, while during the Byelozerka-culture time there appeared spear- and javelin-heads with Zavadovka-type apertured flame-like blades, which exhibit their thrust functions quite definitely (see below).

The Loboykovo-group daggers are represented by daggers of a Krasniy-Mayak version each characterized by a more flattened oval stop and by a more broad but shorter tang (Fig. 15, 2, 3). These indications are best pronounced in the relatively latest daggers. The dagger from the earliest monument of the Loboykovo metallurgical center — the Golovurovo foundry — is practically no different from the Krasniy-Mayak type, and this make it possible to consider the given type of weapons

to be borrowed by the Loboykovo center from the Krasniy-Mayak metallurgical center at an early stage of their development.

Celts are represented by original two-lugged weapons of the Kabakovo type, ornamented as usual, which exhibit, along with the apertured spear-heads, the most pronounced characteristics of the Loboykovo-group weapons. The earliest celts of these types seem to be close to the Seyma (Studenok, Fig. 19, 4) and Early-Kardashinka forms (Zazimiye, Fig. 8, 1, 2). The latest forms (the Kabakovo type proper) approximate the Bondarikha and Zavadovka celts, which are most likely to be the continuation of this line of development. An original sort of weapons specific for the Loboykovo armament group is represented by socketed beak-axes. As prototypes for these weapons there may be considered adze-like tools from the Seyma and Turbino cemeteries [Bader 1970, Fig. 41, B; 67, 68], and from the Grokhan stronghold [Zbruyeva 1947, Fig. 19, 1]. In his publication O.N.Bader called these tools as beak-axes. Two similar weapons were revealed in the Emenska-Peshtera hoard, Bulgaria [Chernykh 1978]. Shaft graves IV and V of Mycenae yielded four such weapons, in total. One of them had a wooden cap decorated with a circular ornament and fixed to its narrow end. A number of articles very close thereto were found in Landvada, Denmark, and in Gyunderupgarde, North Germany, each having a bone head with a "Mycenaean wave" ornament. All these finds from the monuments of Greece and Central Europe are dated to the 17th - the 16th centuries B.C. and classified as percussive weapons of the beak-ax type [Goldman 1981: 138; Tabl. 31]. Among the Late-Bronze articles of the Ukraine, there may be distinguished a small group of weapons usually called as "socketed chisels". However, the outline, the size and the form of their cutting edges make it possible to refer them to a type of weapons approximating the Early-Iron beak-axes in function and consider them as the continuation of the development line of this kind of Middle-Bronze percussive weapons in Europe at the Late-Bronze stage. From the earlier sorts of weapons, they differ only by the method of fixing hafts, the so-called socket method, which is specific for Late-Bronze weapons of the "celt" period. The beak-axes with rolled-up sockets from the Loboykovo hoard (Fig. 16, 8, 9) are earliest among them. In the 16th - the 13th centuries B.C., there appeared beak-axes with cast sockets (the foundry of Voloshskoye synchronous with the second horizon of the Novokievka foundry), which were in use up to the end of the 13th - the beginning of the 12th centuries B.C. (Zavadovka foundry) (Fig. 23, 1; 33, 8).

Therefore, the given group of weapons represents a rather developed and original system of armament of pedestrian warriors, which included weapons for distant (bows), middle (spears) and close combats (cutting "spears", celts, beak-axes and daggers) [Klochko 1987].

The complexes including articles of the Loboykovo and Krasniy-Mayak types (the foundries of Golovurovo and Maliye Kopany, the hoards of Khristich and Loboykovo) make it possible to synchronize the metallurgical center of Krasniy-Mayak with that of Loboykovo and to date the latter to the 16th - the 13th centuries B.C.

The finds of a series of Loboykovo-culture complexes and single articles in the territory of the Sosnitsa culture (mainly of them — the Golovurovo foundry), along with the find of a Golovurovo type spear-head in the Sosnitsa-culture burial near the village of Kvetun, enable one to raise a question on the participation of the Sosnitsa-culture tribes in the formation and improvement of the given metallurgical and weapon-making traditions.

A special attention should be drawn to the problem on the eastern border of the Loboykovo metallurgical center. Single finds of Loboykovo-type weapons and hoards of similar articles were revealed far in the east, in the regions reaching the Volga and even the Urals. Among them are the hoards of Tereshkovo, the Voronezh district [Pryakhin, Sinyuk, Matveev 1981], Karmanovo in the Kama-river basin [Kuzminykh 1981], of Ilderyakovo and Derbedenovo [Chernykh 1970]. Many single articles including Loboykovo-type arrow-heads were found in the Volga basin and in the western areas of the Andron-culture spread [Avanesova 1975]. Single Loboykovo-type articles were also found in the Trans-Ural areas [Chernykh 1983]. However, typologically all these articles are, as a rule, of relatively late periods.

Taking into account a great number of foundries (including the Golovurovo foundry as the earliest of them) and numerous single casting forms unearthed in the Left-Dnieper and adjacent Right-Dnieper areas, it is proposed to locate the heart of this metallurgical center somewhere in the Left-Dnieper Ukraine, considering the spread of such metal articles eastwards as a relatively late phenomenon.

### 3. WEAPONS OF THE SOSNITSA-CULTURE TRIBES

As mentioned above, the armament of the Sosnitsa-culture tribes is represented by weapons specific for the Kardashinka, Loboykovo and Krasniy-Mayak centers.

In the territory of the Ukraine, of all metallurgical centers the Kardashinka center is the least investigated from the standpoint of the territory of spread, chronology and cultural nature. Practically, its origin is unknown.

As prototypes for celts of the Kardashinka type, there may be taken a series of finds from the Middle-Volga basin that enable one to consider this region to be center of their origin. First, here should be mentioned a celt engraved on the casting form from the settlement near the village of Zazimiye (Fig. 8, 1, 2), a lugless celt hexahedral in section with two widely spaced rims on the socket having an ornament in the form of down-directed ribs like whiskers. The reference of this weapon to an early date may be supported by a Seyma-type appearance thereof and by two engravings on the other sides of the same casting form — engravings of a socketed chisel and of a flat ax-adze. A similar socketed chisel is engraved on the casting form from the Early-Sabatinovka foundry of Maliye Kopany dated to the

16th century B.C. Flat axes similar to that from Zazimiye were found in the hoard of Odaily-Podary, Rumania, dated by A.M.Lescov to the 16th - the 15th centuries B.C. on the basis of a large heavily bent hook-like sickle of the Early-Srubnaya type [Lescov 1981], and in burial 7 of Knoss, Zafer-Popoura, dated to the 15th century B.C. [Müller-Karpe 1980, Taf.199, B4]. The complex last mentioned is of a particular importance for establishing absolute dates of the above articles, since this complex is dated in accordance with the Egyptian-history chronology. The celt from the village of Khmelna, the Kanev region (Fig. 8, 5), approximates those of the Seyma type and differs therefrom only by the presence of a lug. Meanwhile, the presence of two ribs on its socket makes it possible to consider this celt, on the one hand, to be a follower of the Seyma development line (or a local version of Seyma-type celts) and, on the other hand, to be an immediate predecessor of Kardashinka-type celts. These finds have supported to some extent some Seyma features Kardashinka-type celts, as mentioned by E.N.Chernykh, and enable one to record a certain influence of Seyma metallurgical traditions upon the shape formation of some articles from the Kardashinka metallurgical center. Pointed leaf-like spear-heads found in considerable amounts in the Middle-Dnieper basin, which is also famous of numerous finds of socketed spear-heads from the preceding Pre-Seyma chronological horizon, may be considered to be the continuation of Seyma traditions as well.

The above-mentioned analogies makes it possible to refer the formation of this metallurgical center to the 16th - the 15th centuries B.C., and the territory of spread of the earliest finds enables one to refer this center, at initial stages of its development, to the Sosnitsa culture, according to I.I.Artemenko (to the Kiev version of the East-Trzciniac culture, according to S.S.Berezanskaya, since the predominant part of finds is from the right-bank areas of the Middle-Dnieper basin). Such complexes as the Sokoleny, Staroseliye and Medvedovka hoards make it possible to trace the life time of this center up to the 12th century B.C. At the late stage, the territory of its spread was extended southwards and included areas of the Byelogradovo and partly of Byelozerka cultures in the Dnestr-Dnieper interstream region, according to V.V.Otroshchenko.

The presence of foundries and single casting forms from the Loboykovo metallurgical center in the Middle-Dnieper areas affirms the likeness of Kardashinka- and Loboykovo-type metal articles in shape, as noted by E.N.Chernykh, and enables one to point out intimate contacts between the bearers of these metallurgical traditions, especially at the early stages of their development. It is most probable that the bearers of Loboykovo metallurgical traditions should be considered in combination with the left-bank population of the Middle-Dnieper basin (the Sosnitsa version of the East-Trzciniac culture, according to S.S.Berezanskaya), though such an interconnection would present problems due to the absence of complex finds. However, the latest versions of Zlatopol apertured spear-heads were revealed in the Left-Dnieper regions, and one of them was in the Late-Sosnitsa (Lebedovka) settlement near the village of Zaymishche, the Brovary region (Fig. 11, 4-6).

The Krasniy-Mayak group of weapons is represented by spear-and javelin-heads, and by celts of the 14th - the 13th centuries B.C. (most of these types are specific for the Sabatinovka-culture population of the Lower-Dnieper areas). This group is illustrative of contacts between the Sosnitsa-culture tribes and their southern neighbours — the Sabatinovka-culture tribes. And the beginning of such contacts, as evident from the analogies of weapons on the casting forms from Maliye Kopany, Golovurovo and Zazimiye, is within the range of the 16th - the 15th centuries B.C.

#### 4. WEAPONS OF THE KOMAROV-CULTURE TRIBES

In general, weapons of the Komarov-culture tribes approximate the armament of the Danubian population. However, there are some differences, and one of them is the use of one-lugged celts with concave sockets (at the late stage) and of such unique articles as the ax and the dagger from the burial mound near the village of Ivaniye.

It should be noted that there is a discrepancy between dates of the culture and some types of weapons, which is caused, as the author believes, by the following reasons:

The Komarov-culture dating based on numerous finds of Danubian bronze articles from the Kosider horizon is true only partially, since the modern level of knowledge on the Kosider horizon has considerably changed. At present, it is considered to be the final stage of the Haidusamson horizon, which terminates with the beginning of the Forro horizon [Mozsolics 1973]. At present, the Haidusamson horizon is dated to 1700-1550 years B.C. The Kosider and Forro horizons are dated to 1500-1350 and 1350-1300 years B.C., respectively. The beginning of the Uriu horizon is referred to 1300 years B.C. [Müller-Karpe 1980]. It is interesting to note that some of Komarov-culture metal articles are similar to finds from the Haidusamson-horizon hoards. It is concerned not only with the weapons mentioned above but also with some adornments revealed in the burial mound near the village of Ivaniye.

The pin decorated with a little triangular shield from the burial mound excavated in 1938 [Sveshnikov 1968, Fig. 1, 11] is similar to those from the burial mound of Kisapostag, East Hungary (1700-1600 years B.C.) [Müller-Karpe 1974, Tabl. 521, C]. The wire pendants from the burial near the village of Ivaniye are similar to those from the cemeteries of the Nitra group, Slovakia, and of Hemejlebarn, Lower Austria (1700-1600 years B.C.) [Müller-Karpe 1974, Tabl. 528-529], where the pendants were found together with Cyprus-type pins. The last fact also points to a relatively early period, not later than the 16th century B.C. [Flourentzos 1978]. The pin from

burial No.1 of mound II near the village of Ivaniye [Sveshnikov 1968, Fig. 4, 15] is imported from the East-Mediterranean regions and may be referred to a widespread Near-Eastern type that was popular from the middle of the 3rd millennium B.C. up to the first half of the 2nd millennium B.C. The latest finds are represented by articles from the Early-Assyrian tomb of Assur, the 19th - the 16th centuries B.C. [Müller-Karpe 1980, Tabl. 104, 18, 21]. The last mentioned analogies are of particular importance because of their absolute historical dates. This makes it possible to check up the correctness of conceptions advanced by some scientists from Central Europe and to outline independent reference marks on the Near-East chronological scales with respect to the monuments of the Dnestr Basin.

Therefore, the available materials make it possible to refer the beginning of the Komarov culture to the 17th century B.C., and this is in agreement with changes in the chronology of the Danubian cultures. Besides, it is possible to retain the former synchronization of the Haidusamson- and Kosider-hoard horizons with earlier phases of the Otomani, Wietenberg, Tey and Monteoru cultures of the Danube basin.

The final stage of the Komarov culture is coincident with the appearance of the Noua culture in the Upper-Dnestr regions, which may be evidenced by a great number of monuments of this culture [Balagury 1986: 482]. By this period, there may be assigned the appearance of new types of weapons in this region, which are similar to those from many Danubian hoards of the Forro and Uriu horizons (1350-1200 years B.C.). This provides support for G.N.Smirnova's observations she performed in the settlement of Magala 1 that enabled her to assign the latest stage of the Komarov culture to the end of the 14th century B.C. [Smirnova 1976: 127].

## 5. WEAPONS OF TRIBES POPULATING THE UPPER-AND MIDDLE-DNESTR REGIONS

The armament of the Hallstatt period in the Dnestr basin is also substantially close to weapons of the Danubian regions. First of all, here should be mentioned the Gava and Lusatian cultures. The armament articles of the Dnestr basin of this period have numerous analogies revealed in complexes and hoards of the HaA1-A2 periods. Proceeding from the new chronology of the Late-Bronze Age of Central Europe proposed by J.Bouzek, the above-mentioned armament groups may be dated to the 12th - the 11th centuries B.C., since the Central-European period of HaA1, according to the given chronology, is synchronized with the Middle-Helladic IIIC period of Greece and dated to 1200-1100 years B.C., and the period of HaA2 is synchronized with Sub-Mycenaean (Early-Protogeometric) period of 1100-1000 years B.C. [Bouzek 1985].

In the 10th - the 9th centuries B.C., one lugged celts of the Ruda type became one of the principal types of armament in the Dnestr basin. It should be noted that it was precisely this type of celts that were included into the hoard containing bridle elements of the Thracian-Kimmerian type from the Danube basin, i.e. the hoard that exhibited traces of the invasion of Central Europe by eastern tribes at the end of the Bronze Age — the beginning of the Early Iron Age [Kemenczei 1984: 94-95]. The Central-European chronology of the 11th - the 8th centuries B.C. has been developed rather poorly. Starting from the 11th century B.C., there was a "dark age" in the East-Mediterranean regions associated with the invasion thereof by "northern tribes" [Snodgrass 1977]. The monuments of this period are dated imperfectly, according to the Egyptian chronology, and this, in turn, presents difficulties in determining dates related to Central and East Europe. Therefore, many chronological constructions for the given period of Central Europe are based on a formal typology. In some cases, this results in misunderstandings. Thus, in his publication on the hoard in the village of Pryud, Hungary, T.Kemenczei notes that, according to the basis set of articles unearthed, the given hoard should be dated to the 10th - the 9th centuries B.C., but the presence of bridle elements of the Kimmerian type prevents the reference of this hoard to any period earlier than the 9th - the 8th centuries B.C. [Kemenczei 1981: 29-42]. Here should be noted that Pre-Scythian monuments of the North-Pontic regions have no chronology independent of that for Central Europe. The only historical date that denotes the end of this period is the middle of the 7th century B.C., when the Scythians returned from their Fore-Asiatic campaign. No complex of the Novocherkassk-group monument contains bridle elements similar to those mentioned above. There are only typological similarities. The celts from the hoard near the village of Pryud are similar to those from the Vetits hoard in Rumania dated to the 8th century B.C. also on the basis of a bridle [Petrescu-Dimbovita 1977, Tabl. 326]. A number of analogous celts all of the Ruda type were revealed in the hoard of Valya Rusuluy dated by V.A.Dergachev to the 10th - the 9th centuries B.C. [Dergachev 1975: 74] on the basis of numerous similarities from the Danube basin. Therefore, the finds of celts without bridles are dated to the 10th - the 9th centuries B.C., while the celts accompanied by bridle elements are dated to the 9th - the 8th centuries B.C. This points most probably to an imperfection of the typology and chronology of the Kimmerian bridles. One-ringed bits and bridle elements from the above-mentioned hoards may be considered as specific Dnestr types of Kimmerian-period horse harnesses and which, according to the celts, should be dated to the 10th - the 9th centuries B.C. This is in agreement with the time of appearance of another Kimmerian type of bridles -bridles of the Novocherkassk type referred to the 10th - the 9th centuries B.C. [Klochko, Murzin 1987]. The last fact enables one to refer the first penetration of the East-European mounted Kimmerians into Central Europe to the end of the 10th - the beginning of the 9th centuries B.C. This penetration was responsible for the appearance of articles of the Chernogorovka, Novocherkassk and Dnestr

types in Central Europe. The existence of such articles in the available complexes is indicative of the participation of representatives of the Middle- and Lower-Dnestr basin in the above-mentioned events.

The Ruda-type celts and the Chernoleskaya-culture celts decorated with "hering-bone" ornaments are referred to a rare type of celts found in the Ukraine. On the basis of complex finds their use could be traced as far back as the beginning of the Early-Iron Age.

## 6. WEAPONS OF THE BYELOGRUDOVO-CULTURE TRIBES

As noted above, weapons this culture are represented by the Late Krasniy-Mayak forms similar to those from complexes of the Byelozerka culture and by the Late-Kardashinka and Central-European types of armament. The long useful life of Kardashinka-type celts up to the 12th century B.C. and the dating of the Central-European types of weapons to the period of HaA1-A2 enable one to refer this group of armament to the 12th - the 11th centuries B.C. The determination of upper chronological limits of this group of weapons presents some difficulties because of the absence of more late articles in the Byelogradovo culture and due to the imperfection, as the author believes, of the Chernoleskaya-culture chronology at its early stages. However, the above problems are beyond the scope of this study.

## 7. WEAPONS OF THE BONDARIKHA-CULTURE TRIBES

The earliest finds of this group of weapons, which are very few in number, occur from the Maliye-Budky settlement of Studenok V. They are represented by a celt and by an arrow-head (Fig. 19, 4, 6). On the one hand, this celt approximates Seyma-type celts. On the other hand, it may be considered to be a prototype of one-lugged versions of the Kabakovo-type celts from the Loboikov metallurgical center. The flint arrow-head has numerous analogies in the Seyma-horizon monuments of the Volga basin. Proceeding from the synchronization of the Seyma horizon with the Central-European period of BA2, these finds may be approximately dated to the 17th - the 16th centuries B.C.

Celts on the casting forms from the settlement of Bondarikha are the latest "Zavadovka" versions of Kabakovo-type celts of the Loboikov metallurgical center. They are typical for complexes of the latest Zavadovka stage of development

of this metallurgical center and may be dated to the 12th - the 11th centuries B.C. in conformity with the Zavadovka foundry [Gershkovich, Klochko 1987].

The bronze arrow-heads from the settlements of Buzovka and Zalineynoye (Fig. 19, 7, 8) are referred to a type of arrow-heads widespread in Central Europe. The upper limit of existence of this type of arrow-heads is dated to the period of HaB1, i.e. to 10th century B.C.

The sword from the Belsk stronghold is assigned to the Central-European type of Reutlingen, which is dated to the period of BD-HaA1 (1250-1100 years B.C.), and thus it cannot be dated to any period later than the 12th century B.C. [Fogel 1979: 31]. Just as the Byelogrudovo culture, this group includes no weapons of a later origin. This phenomenon may be partially explained by an earlier transition (than it was formerly thought) to the production of main implements of labour and weapons of iron (see below).

## 8. WEAPONS OF THE BYELOZERKA-CULTURE TRIBES

Through the whole territory of spread of the Byelozerka culture, there may be traced both the continuation of the Late-Sabatinovka weapon-making traditions (spears, celts, daggers, arrow-heads) and the wide use of Central European types of weapons (spear-heads, celts, arrow-heads, shields). Meanwhile, the Dnestr-Dnieper interstream region is characterized by the appearance of Kardashinka-type weapons specific for the forest-steppe tribes of the Right-Dnieper areas and by the use of Zavadovka-type weapons popular in the Left-Dnieper basin.

The Central-European types of weapons are represented by forms specific for the periods of HaA-A1, i.e. the 12th - the 11th centuries B.C. The spear-head from the village of Radionovka (Fig. 37, 4) is an exception to this rule and seems to have been valid up to the 10th century B.C. [Klochko, Murzin 1987].

As for Kardashinka-type celts, the upper limit of their existence is assigned to the period of HaA1 (the 12th century B.C.), as evident from finds together with Late Krasniy-Mayak and Lusatian celts (see above). However, it is not improbable that more late versions of celts of the given type will be available from other complex finds.

The Zavadovka group of armament is represented by a few monuments in the Left-Dnieper basin (the Zavadovka foundry, a casting form from the site of Solokha, the settlement of Bondarikha and a number of single articles). According to the principal categories and types of weapons (apertured spear-heads and two-lugged celts), this group is an immediate follower of Loboikov traditions (within the same territory) and should be dated to the 13th - the 11th centuries B.C. in conformity with the Zavadovka foundry [Gershkovich, Klochko 1987].

It should be noted that the Byelozerka culture, just as the Byelogrudovo and Bondarikha cultures, is free of bronze armament articles dated to the 10th century B.C.

Similar phenomena may be also traced on the materials from Central Europe. Thus, on the basis of a great number of materials from hoards, settlements and single burials, A.Laslo, a Rumanian investigator, has come to a conclusion that in the territory of Rumania the production of implements of labour and weapons of iron dates back to the epoch of HaA and to the beginning of the HaB period, i.e. the 10th century B.C., when it completely forced out implements of labour and weapons made of bronze [Laslo 1977: 53-73]. J.Bouzek, a Czech investigator, dates the beginning of the Iron Age in Central Europe to the period of HaB1 (1000 years B.C.) [Bouzek 1985a: 92]. An analogous picture may be observed in the Ukraine: the last-dated complexes with bronze articles (implements of labour and weapons) are referred to the 11th - the 10th century B.C.; articles of iron may be met even in monuments of the Sabatinovka culture; and the beginning of wide use of iron in the territory of the Ukraine is referred by some investigators to the 11th - the 10th centuries B.C. [Bidzilya, Voznesenskaya, Nedopako, Pankov 1983: 15-19]. Naturally, it does not mean that the production of single articles and even types of articles (e.g., arrow-heads) of bronze was completely ceased. In contrast, during the Scythian time, bronze arrow-heads were used most extensively. At the end of the Late-Bronze Age spear-heads, swords, axes and daggers as articles of maximum metal consumption, were the first to disappear. Naturally, this process could not proceed evenly in different areas, and this is evident from the unevenness of archaeological sources. In the territory of the Ukraine, the finds of bimetallic weapons of transitional types (with bronze hafts and iron blades) are very rare. With a few exceptions, no continuity of bronze forms in iron weapons is observed.

The origin of the Kimmerian principal types of weapons of the Early-Iron Age revealed in the Ukraine is beyond the scope of this study. However, it should be noted that the finds of a great number of iron armament articles in the Kimmerian monuments, which articles differ by their improved forms and methods of production, point to the fact that the early stages of evolution of iron weapons and their relation with the latest forms of bronze articles are inaccessible for investigations at present because of lack of sources.

## CONCLUSION

Studies on separate kinds of armament, on the technologies of their production and development in time enable one to classify the predominant types of weapons and to determine the chronological periods of armament groups, within a particular territory, for particular archaeological cultures (Klochko 1981), which can reflect both the level of development of the military science in ancient times and the relations between particular ancient peoples and the population in the adjacent regions. By means of such studies it is also possible to trace the continuity of these or any other traditions and the processing technologies in time.

The available materials are sufficient to distinguish the following groups of armament:

The armament of the Komarov-culture tribes which includes: 1) weapons specific for the Danubian cultures; 2) weapons of the Danubian types having local distinctive characteristics; 3) weapons specific only for the Upper-Dnestr areas. All the above characteristics are specific for the armament of the Komarov-culture tribes, which is more close to that of the Bronze-Age Danubian cultures, such as the Otomani, Tey, Wietenberg and Monteoru cultures, than to the armament of tribes in the Dnieper basin. This group of armament is dated to the 17th - the 14th centuries B.C.

The armament of the Noua-culture tribes of the Dnestr basin, which is represented by weapons specific for the Noua-culture hoards of the Prut basin and for the Krasniy-Mayak metallurgical center of the Sabatinovka culture in the North-Pontic regions. Daggers of the Krasniy-Mayak type, celts of the East-Transilvanian (Krasniy-Mayak) type and Dremaylovka-type spear-heads are common and specific both for the Noua and Sabatinovka cultures. Celts with concave sockets, battle-axes of the Carpathian types and spear-heads having ribs of complicated section and flame-shaped blades are specific for the Noua-culture armament (the types of weapons that are the most frequent for the Danubian hoards). The given group of armament is dated to the 14th - the 13th centuries B.C.

The armament of tribes populating the Dnestr basin in the Hallstatt period, which is represented by the following groups:

1. The Gava-Goligrady group of armament including both imported weapons specific for the Gava culture of the Danube basin (celts, swords of the Liptovsky type and three-ribbed spear-heads) and weapons of local forms associated with the heritage of the Komarov and Noua cultures (celts and spear-heads).

2. Lusatian group including both imported weapons specific for the North-Slovakian version of the Lusatian culture (Lusatian-type celts of the Slovakian version, spear-heads of complicated section, swords of the Reutlingen and Hemigkofen types) and weapons of local versions resulted from the combination of the Early-Lusatian and Noua-Sabatinovka metallurgical and weapon-making traditions

(celts). This group is dated to the 12th - the 11th centuries B.C. There is a separate group, which is composed of armament articles of the 10th - the 9th centuries B.C. (celts of the Ruda-type, swords with spiral-shaped haft-heads and three-ribbed spear-heads of the latest versions).

Weapons of the Sosnitsa culture are represented by three groups: the Kardashinka, Krasniy-Mayak and Loboykovo groups.

The Kardashinka group is specific for the tribes populating the right-bank areas of the Middle-Dnieper basin. It concludes spear-heads with pointed leaf-like blades and Kardashinka-type celts.

The Loboykovo group includes Krasniy-Mayak type daggers of the Loboykovo version, apertured spear-heads and Kabakovo-type celts. This group is specific for the tribes populating the left-bank areas of the Middle-Dnieper basin and demonstrates contacts between the Sosnitsa-culture tribes and their eastern neighbours.

The Krasniy-Mayak group includes spear-heads of the Dremaylovka and Krasniy-Mayak types, celts of the Krasniy-Mayak type and demonstrates contacts between the Sosnitsa-culture tribes and their southern neighbours — the Sabatinovka-culture tribes. In the whole, this group of armament is dated to the 16th - the 10th centuries B.C.

Weapons of the Byelozerka-culture tribes are represented by Late-Kardashinka forms associated most probably, in this region, with the Sosnitsa-culture tribes, by Late Krasniy-Mayak forms specific for the Byelozerka culture and by Central-European types of weapons. The latter are represented by finds from the Middle-Dnieper basin specific for the tribes of the Upper-Dnestr areas in the Hallstatt period. This group of armament is dated to the 12th - the 11th centuries B.C.

Weapons used by tribes of the Srubnaya-culture historical region may be divided into two groups: the Srubnaya and Loboykovo groups. The armament group representing the Srubnaya-culture monuments of the Ukraine is very scanty. There may be traced types of weapons specific for the Srubnaya culture of the Don and Volga basins, types specific for the Srubnaya-culture monuments of the Ukraine, and types specific for the Late-Bronze monuments of the Dnieper basin. This group is approximately dated to the 17th - the 13th centuries B.C. Here should be noted that the upper dates of this group call for some refinements. The Loboykovo group of armament seems to be comparatively improved and unique both in set of weapon categories and in type (form or ornament) of armament articles. The latter substantially differ from weapons of the neighbouring cultures, except for the Sosnitsa-culture tribes of the Left-Dnieper basin. This group is dated to the 16th - the 13th centuries B.C.

The materials from the monuments of the Bondarikha culture are deficient to provide a detailed outline of its armament. It is most probable that for a period of time, some types of weapons that followed forms and traditions of the Loboykovo metallurgical center or the Srubnaya-culture period were still in production within this territory. The finds from the Maliye-Budky settlement of Studenok V are dated

to the 17th - the 16th centuries B.C. The other articles are dated to the 12th - the 11th centuries B.C.

Weapons of the Sabatinovka-culture tribes are represented by types specific for the Krasniy-Mayak metallurgical center. One of the distinctive features of the western areas of this culture is the presence of imported weapons of the Danubian types, while its eastern areas, i.e. areas of the Dnieper basin, are characterized by the existence of syncretized forms, which combine properties specific for the Sabatinovka (Krasniy-Mayak) and Loboykovo metallurgical traditions, and of armament articles of the Srubnaya-culture types. This armament specific both for the Sabatinovka- and Noua-culture tribes and approximating the Koslodjny-culture weapons, which are represented by articles from the Vyrbitsa and Dichevo metallurgical centers, Bulgaria, substantially differs from the armament used in the adjacent regions. Proceeding from the modern knowledge and the analogies revealed in the East-Mediterranean regions, the given armament group is dated to the 16th - the 13th centuries B.C.

Through the whole territory of spread of the Byelozerka culture there may be traced both the continuation of traditions in producing some types of Sabatinovka-culture weapons (spears, celts, daggers, arrow-heads) and the adoption of Central-European weapon-making traditions (e.g., methods of making spear-heads and celts). At the same time, there may be distinguished a number of local features, the most pronounced of which may be observed in the Kardashinka forms specific, with the exception of the Byelozerka culture, for the tribes populating the forest-steppe areas of the Right-Dnieper basin, and in the Zavadovka forms specific for the Left-Dnieper regions. This group of armament is dated to the 12th - the 11th centuries B.C.

By the present, the monuments of the Middle-and Lower-Dnieper basins of the BD-HaA2 periods have revealed a comparatively great number of weapons of the Central-European types. Of particular interest are the casting forms for making weapons of the above types, which are indicative of the local production thereof. The author believes that the appearance of such kinds of weapon in the Dnieper basin could take place only because of a migration of the bearers of Central-European (including Lusatian) weapon-making and metallurgical traditions [Klochko 1992].

The end of the late-Bronze Age was expressed as the beginning of the Early-Iron Age, as a new "Kimmerian" epoch in the history of peoples in the territory of the Ukraine. It was an epoch of military campaigns of the historical Kimmerians against peoples of the Danube basin, the Balkans and Asia Minor. These historical events were responsible for the spread of Novocherkassk, Chernogorovka and Goligrad cultural elements (primarily of armament articles and bristles) in Central Europe.

This epoch was characterized by fundamental changes in military science associated with the use of iron articles in the armament and the emergence of such a new fighting arm as troops on horseback. It was a double qualitative leap, which

caused the disappearance of some old types of weapons and the emergence of new types such as short compound bows and arrows to go with them, short thrust swords and large iron spear-heads, i.e. the armament specific for the subsequent Scythian epoch.

As noted above, the armament elements represent one of the most important sources of information, when studying links between ancient peoples. The following facts may be given as examples.

In addition to Sabatinovka-type ceramics [Rutter 1975: 17-32; Sandars 1978: 142; Chernyakov 1984: 34-42] and adornments [Hochstetter 1981] found in the East-Mediterranean regions, the archaeological materials illustrating the links between the North-Pontic and East-Mediterranean peoples in the 2nd millennium B.C. also included metal articles. Thus, the North-Pontic hoards (Kozorezovka and Shchetkovo) reveal metal articles of Mediterranean types. The Kozorezovka hoard unearthed in the Nikolayev district [Tallgren 1926, Fig. 95] revealed an Aegean double-edged pole-ax and a sickle specific for the Dichevo hoards in Bulgaria. The Shchetovka hoard unearthed in the Kirovograd district was entirely of Aegean-type articles such as double-edged axes and sickles [Tallgren 1926, Fig. 95]. Analyses conducted by E.N.Chernykh have shown that metal articles from the Shchetkovo hoard are referred to the local group of left bank specific for the Left-Dnieper regions of the Ukraine [Chernykh 1976: 106]. All the articles from this hoard are rough castings never used (even not fit for use). Partially, some of them are obviously spoiled in the process of casting. Proceeding from his studies on Aegean-type double-edged pole-axes and casting forms found in England, in Balkan and North-Pontic regions, A.Harding, an English scientist, has advanced a proposal that such weapons represent indications of the activity of Crete-Mycenaean trade-artisan colonies in these regions [Harding 1975: 200]. As for the British Isles and the Balkans, this supposition is supported by finds of Crete-Mycenaean ceramics of the 15th - the 13th centuries B.C. For the North-Pontic regions, the absence of finds of this sort presents difficulties in solving this problem. However, the present-day knowledge is quite sufficient to consider the above-mentioned hoards as indications of intimate contacts between the North-Pontian and East-Mediterranean regions.

The nearest analogies to the spear-head on the casting form from the first horizon of the Novokievka foundry [Gershkovich, Klochko, Evdokimov 1987] (Fig. 27, 2) originate from tholoses on the islands of Rodos and Crete, where they were revealed together with Mycenaean rapiers dated by N.K.Sandars to the first half of the 15th century B.C. [Sandars 1963: 149 and Fig. 21] (Fig. 39, 1-3).

There is known a flat ax similar to that on the casting form revealed in the settlement near the village of Zazimiye (Fig. 7, 6), which was unearthed in Knoss, Zafer-Papour, burial 7 (Fig. 39, 7). One of said tholoses on the island of Rodos (Yalissos), where a number of Dremaylovka-type spear-heads were found together with local imitations (characterized by forged rolled-up sockets), yielded an arrow-head (Fig. 39, 8) similar to those engraved on the casting forms from the settlement of Slo-

bodka in the Lower-Dnestr basin (Fig. 30, 11). As noted by N.K.Sandars, the finds of "northern" weapons in the monuments of Greece point to the fact that Mycenaean rulers hired mercenaries in the northern regions. According to N.K.Sandars, such hired warriors were from the Balkan and Danube-basin regions [Sandars 1978: 93-94]. However, an analysis of the above-mentioned materials indicates that such weapons have similarities only in the monuments of the Koslodjeny-Noua-Sabatinovka cultural circle.

Later on, the character of interrelations between peoples of the East-Mediterranean and North-Pontic regions changed. The name of the nation that was the first to take part in the invasion of Egypt by the Sea Peoples sounds like the Shardanians. The Shardanians appeared on the borders of Egypt in the 14th century B.C. They attacked the Nile delta prior to the Northern War of Ramzes II (i.e. before 1285/6 years B.C.), and in the battle near Kadesh they took part in the Egyptian army as mercenaries [Sandars 1978: 50, 161]. N.K.Sandars suggests that in this battle the Sea Peoples took also part on the side of the Hattians. It is interesting to note that in the relief representations of Luksor exhibiting scenes of the above-mentioned battle the Shardanians are shown with circular shields similar to that from the Sabatinovka burial near the village of Borisovka, while the allies of the Hattians are shown with short pointed leaf-like swords similar to that from the same burial (Fig. 40, 1).

The concept of the "Sea-People Invasion" implies a chain of historical events that took place in the East-Mediterranean regions in 1250-1150 years B.C. and resulted after all in the weakening of Egypt and in the downfall of the Hattian state and Mycenaean Greece, and also brought about fundamental changes in political and ethnic maps, in economy and material cultures of peoples populating this region. The historical and archaeological sources chosen and systematized by N.K.Sandars have made it possible to distinguish a series of facts that demonstrate the participation of Central- and East-European peoples in the above-mentioned events [Sandars 1978]. In his studies, J.Bouzek has managed to limit the circle of sources and to reveal the facts that confirm the participation of representatives of the Urn-Burial culture of Central Europe in the "Sea-People Invasion" [Bouzek 1985]. The finds of Sabatinovka-culture ceramics [Chernyakov 1984], Noua-culture bone pins [Hochstetter 1981] and Sabatinovka-type weapons [Klochko 1987a] in the East-Mediterranean regions have completed the circle of sources that can provide support for the participation of the Koslodjeny-, Noua- and Sabatinovka-culture representatives from the West- and North-Pontic regions in the above events and that can also confirm the migration of a part of these tribes to the Balkans and Asia Minor.

A number of Dremaylovka-type spear-heads were found in a Mycenaean-time burial of Stavros, Thessalia [Bulletin de Correspondance Hellinique, CX, 1986] and in the great "weapon" hoard of Enkomy, Cyprus (Fig. 39, 5). In the same hoard, in the layers associated with the destruction of ancient Enkomy (the capital of Cyprus at that time) by the "Sea Peoples", there was found a spear-head with a

short and a broad leaf-like blade similar to those from the Dnieper basin [Catling 1964] (Fig. 39, 4). All of them represent the latest versions of Sabatinovka-culture spear-heads. A dagger of the late version of the Krasniy-Mayak type was found in Syria, the stronghold of Ras-Shamra (ancient Ugarit, the capital of the principality bearing the same name), in a hoard of 1224-1214 years B.C. (see "Weapons of the Sabatinovka-culture tribes") that was unearthed in a layer associated with the destruction of ancient Ugarit by the "Sea Peoples" [Sandars 1978]. Tanged arrow-heads similar to those on the casting form from the settlement of Slobodka were found on the island of Rodos and in Troy, layer VIIa containing Sabatinovka-type ceramics (see "Weapons of the Sabatinovka-Culture tribes") (Fig. 39, 8, 9). A socketed arrow-head similar to that from the settlement of Suvorovo was found in the palace of Pylos burned down at the end of the 13th century B.C. [Sandars 1978].

At the first sight, the above materials seem to be insufficient for a thorough historic interpretation. However, it should be noted that here have been used only those materials which enable one to deal with the problem on the participation of East-European peoples in the above-mentioned events, while the whole bulk of materials collected by N.K.Sandars and J.Bouzek is much wider and includes materials related to the Balkans and Central Europe, apart from East Europe. The complex finds associated to this or any other extent with particular historical events that are described in written sources and well dated are of principal interest. In general, the number of archaeological evidences that point to the participation of European peoples in the "Sea-People" invasion substantially exceeds the amount of archaeological substantiations of other historical events in ancient times such as for example, the Scythian campaigns against Asia Minor, etc.

This range of sources may be supplemented by some iconographic materials. In the Egyptian relief representations, the "Sea Peoples" are usually shown with circular shields similar to that from the burial near the village of Borisovka and with two spears in hands, one of the spears being shorter than the other (Fig. 40, 2). The fact that spear-heads were made by sets in pairs has been recorded, for example, by the casting forms from the Novokievka and Krasniy-Mayak foundries (Figs. 27, 28). One of the spear-heads on any of these casting forms is less in size and looks like a javelin-head. Another Egyptian relief from Medinet Habu depicts a warrior armed with a short leaf-like sword, which is very close to those of the Krasniy-Mayak type in shape (Fig. 40, 3). Some of the bronze statuettes from the island of Sardinia represent warriors armed with circular shields approximating that from the Borisovka burial and having short cutting swords of the Krasniy-Mayak type (Fig. 41, 1, 2). N.A.Kraskovskaya, a Russian ethnographer, who studied the origin of the Sardians — the ancient population of Sardinia — advanced a proposal that they were the descendants of the legendary Shardanians, who "together with other 'Sea Peoples' came to Egypt and Libia from Asia Minor and then seized a part of Sardinia" [Kraskovskaya 1980: 44]. It is most likely that the bronze statuettes from Sardinia represent Sardinian Ancestor, the son of Hercules [Kraskovskaya 1980: 44].

Naturally, the identification of northern peoples, who took part in the events associated with the political history of the East-Mediterranean regions in the second half of the 2nd millennium B.C., should be carried out with the use of a great number of historical, linguistic and archaeological sources. However, the available materials are quite sufficient to provide support for the fact that the peoples of the North-Pontic regions undoubtedly took part in the invasion of the East-Mediterranean regions, and primarily of Asia Minor and Levant by Sea Peoples [Klochko 1987a, 1990]. The statement and substantiation of participation of the Late-Bronze European peoples in the invasion of Egypt by the Sea Peoples on the verge of the 13th - the 12th centuries B.C. provide broad prospects for history and archaeology of Europe. The European chronology, in turn, is provided with new basic absolute dates, which by their significance cannot be second even to such a remarkable date of the middle of the 7th century B.C. as the withdrawal of the Scythians from Midia and which have deepened the historical period of Central and East Europe as far back as the 13th century B.C.

The iconographic materials and written sources have made it possible to reconstruct in general terms, the distinctive characteristics of the "Sea-People" military science, which was responsible for the decline of chariot tactics and for the appearance of heavy infantry troops using tactics close to that of the succeeding "Doric" phalanges [Sandars 1978]. The same materials have made it possible to reconstruct a panoply consisting of a circular shield, a laminated armour, greaves, a metal helmet, spears (often two spears per one warrior), a short cutting sword and a leaf-like battle knife-dagger. Some elements of this panoply are similar to those of the Sabatinovka and Loboykovo groups of the North-Pontic armament. Some of its other elements are similar to those of the Late-Bronze armament of Central Europe. Such a complete equipment of a warrior was not typical for countries and peoples of the ancient East and for the East-Mediterranean regions of the 2nd millennium B.C., but it formed the basis of armament systems of ancient Greece, Hallstatt and Rome.

The above-mentioned materials are far from being sufficient to embrace the whole amount of sources that can illustrate the links between the ancient peoples in the territory of the Ukraine and the adjacent regions. As for the Dnestr-basin population, of fundamental importance are the links between the tribes of the Carpathian region and Poland. In case of the Left-Dnieper Ukraine, of great importance are the contacts with the eastern neighbour. However, these problems are associated with such a wide range of sources that their amounts and characters call for classifying them as independent directions requiring special studies.

## REFERENCES

Avanesova N.A.

- 1975 K woprosu o bronzovykh strelakh stepnykh plemen epokhi bronzy, in: Trudy Samarkandskogo Gos. Universiteta, Novaya seriya, Vyp.270, 27-60.

Agulnikov S.M.

- 1984 Kurgany epokhi bronzy u s. Kaplany, in: Kurgany v zonakh novostroyek Moldavii, 90-97, Kishyniev: Shtiintsa.

Artemenko I.I.

- 1967 Plemena Verkhnego i Srednego Podneproviya v epokhu bronzy, MIA, 1967, No.148.
- 1977 Srednee i Verhnee Podneproviye w kontse eneolita i v epokhu bronzy (seredina III - nachalo I tysyacheletiya do n.e.), Avtoref. diss. dokt. ist. nauk., Moscow.
- 1987 Pozdnyy bronzovy vek lesnoy polosy Evropeyskoy chasti SSSR, in: Epokha bronzy lesnoy polosy SSSR, 106-118, Moscow: Nauka.

Bader O.N.

- 1964 Drevneyshiy metallurgi Priuraliya, Moscow, Nauka.
- 1970 Basseyn Oki v epokhu bronzy, Moscow, Nauka.

Balaguri E.A.

- 1964 Livarni matritsy z poselennya pizniy bronzy bilya s. Ostrovets, Ivano-Frankovskoy oblasti, in: Materialy ta doslidzhennya z arkheologii Prikarpattya i Volyni, Vyp.5, 28-39.
- 1986 Kultura Noa, in: Arkheologiya Ukr.SSR, t.1, 481-488, Kiev, Naukova Dumka.

Berezanskaya S.S.

- 1972 Srednyy period bronzovogo veka na Ukraine, Kiev: Naukova Dumka.
- 1976 Lebedovskaya kultura, in: Eneolit i bronzovy vek Ukrainy, 190-221, Kiev: Naukova Dumka.
- 1982 Severnaya Ukraina v epokhu bronzy, Kiev: Naukova Dumka.
- 1985 Vostochnoshinetskaya kultura, in: Arkheologiya Ukr. SSR, t.1, 437-444, Kiev: Naukova Dumka.
- 1985 Pamyatniki lebedovskogo tipa, in: Arkheologiya Ukr. SSR, t.1, 445-450, Kiev: Naukova Dumka.
- 1985 Byelogrudovskaya kultura, in: Arkheologiya Ukr. SSR, t.1, 499-511, Kiev: Naukova Dumka.
- 1990 Uovo-Ozero - poseleniye srubnoy kultury na Severskom Dontse, Kiev: Naukova Dumka.

- Berezanskaya S.S., Iliyanskaya V.A.  
 1985 Bondarikhskaya kultura, in: Arkheologiya Ukr. SSR, t.1, 512-518, Kiev: Naukova Dumka.
- Berezanskaya S.S., Sharafutdinova I.N.  
 1985 Sabatinovskaya kultura, in: Arkheologiya Ukr. SSR, t.1, 488-498, Kiev: Naukova Dumka.
- Bidzilya V.Y., Voznesenskaya G.A., Nedopako D.P., Pankov S.V.  
 1983 Istoriya chernoy metallurgii na territorii USSR (III v. do n. e. — III v. n. e.), Kiev: Naukova Dumka.
- Bočkarev V., Lescov A.  
 1979 Jung und Spätbronzezeitliche Gussformen im Nördlichen Schwarzmeergebiet, München: C.H.Becr'sche Ver., PBF, Abt.19, Br.1.
- Bodyansky A.V., Sharafutdinova I.N.  
 1967 Bronzolitaynaya masterskaya u s.Zlatopol na Nizhnem Dnepre, in: Arkheologicheskiye issledovaniya na Ukraine v 1965-1966 gg., 90-93, Kiev: Naukova Dumka.
- Bouzek J.  
 1985 The Aegean, Anatolia and Europe: cultural interrelations in the second millenium B.C., Praga: Academia.  
 1985a K otazkam pocatku doby zelazne ve sredni Evrope, Archeologicke rozhledy, T.XXXVII, 83-92.
- Bratchenko S.N.  
 1969 Bagatosharove poselennya Liventsivka 1 na Donu, Arkheologiya, t.22, 210-231.
- Buchholz H.G.  
 1962 Die Pfeilgedätter aus dem VI Schachtgrab des Mykene und die helladischen Pfeilspitzen, Jahrbuch des Deutschen archäologischen Institute, B.72, 1-58.
- Bukowski Z.  
 1976 Elementy wschodnie w kulturze łużyckiej u schyłku epoki brązu, Warszawa: PAN.
- Buynov Yu.V.  
 1981 Bondarikhaskaya kultura, Avtoref. kand.diss., Kharkov.
- Catling H.W.  
 1964 Cypriot bronzework in the Mycenaean world, Oxford: University Press.
- Cherednichenko N.N.  
 1970 Poseleniye srubnoy kultury na Luganshchine, SA, No.1, 233-238.  
 1972 Do klasifikatsii rannyo-zrubnykh nozhiv, in: Materialy XIII konf. Institutu Arkheologii AN Ukr.RSR, 154-156, Kiev.

- 1977 Khronologiya zrubnoy kultury Pivnichnogo Prichernomor'ya, Arkheologiya, No.22, 3-20.
- 1986 Srubnaya kultura, in: Kultury epokhi bronzы na territorii Ukrainy, 44-82, Kiev: Naukova Dumka.
- Chernyakov I.T.
- 1965 Krasnomayatskiy klad liteyshchika, KSOGAM, 87-123.
- 1967 Tekhnika izgotovleniya liteynykh form i metallicheskiykh izdeliy v Severnom Prichernomor'ye v epokhu pozdney bronzы, in: Pamyatniki epokhi bronzы Yuga Evropeyskoy chasti SSSR, 179-184, Kiev: Naukova Dumka.
- 1967 Iz istorii bronzoliteynogo proizvodstva v Severnom Prichernomor'ye, ZOO, Vyp.2, 23-37.
- 1968 Betsilivskiy skarb piznoy bronzы, Arkheologiya, T.XXI, 134-145.
- 1984 Svyazi sabatinovskikh plemen Severnogo Prichernomor'ya s Vostochnym Sredizemnomoriem (po keramicheskim nakhodkam), in: Severnoye Prichernomor'ye, 34-42, Kiev: Naukova Dumka.
- 1985 Severo-Zapadnoye Prochernomor'ye vo vtoroy polovine II tysyacheletiya do n.e., Kiev: Naukova Dumka.
- Chernyakov I.T., Vanchugov V.P., Kushnir V.G.
- 1986 Drevneyshiy bronzoviy nakonechniki strel Severnogo Prichernomor'ya, SA, No.2, 47-56.
- Chernykh E.N.
- 1967 Iz istorii metallurgii plemen epokhi bronzы Yuga Povolzh'ya i Priuraliya, in: Pamyatniki epokhi bronzы yuga Evropeyskoy chasti SSSR, 196-213, Kiev: Naukova Dumka.
- 1970 Drevneyshaya metallurgiya Urala i Povolzh'ya, Moscow.
- 1976 Drevnyaya metalloobrabotka na Yugo-Zapade SSSR, Moscow: Nauka.
- 1978 Gornoye delo i metallurgiya v drevneyshey Bolgarii, Sofia: BAN.
- 1981 Klad iz Konstantsa i voprosy balkano-kavkazskikh svyazyey v epokhu pozdney bronzы, SA, No.1, 19-24.
- 1983 Problemy obshchnosti kultur valikovoy keramiki v stepyakh Evrazii, in: Bronzoviy vek stepnoy polosy Uralo-Irtyskogo mezhdurechiya, 81-99, Cheliabinsk.
- Cowen J.D.
- 1956 Eine Einführung in die Geschichte der bronzenen Griffzungchwerter in Süddeutschland und den angrenzenden Gebieten, BRGK, T.36, 46-60.
- Demetrova S.
- 1986 Pocatky Gavskej kultury na Vychodnom Slovensku, SIA, T.XXXIV-1, 97-129.
- Dergachev V.A.
- 1975 Bronzoviy predmety XIII-VIIIvv. do n.e. iz Dnestrovsko - Prutskogo mezhdurechiya, Kishynev: Shtiintsa.

- Dobrovolsky A.V.  
1948 Berislavskiy skarb bronzovoy doby, *Arkheologiya*, T.II, 151-162.
- Fedorovsky A.S.  
1921 Doistoricheskiye razrabotki mednykh rud i metallurgiya bronzovogo veka v Donetskom Basseyne, in: *Voronezhskiy istoriko-archeologicheskij sornik*, Vyp.2, 5-11.
- Flourentzos P.  
1978 The so-called "Cypriot pin" in the Near East and Europe, *Archeologicke rozhledy*, T.XXX, c.4, 408-419.
- Fogel J.  
1979 *Studia nad uzbrojeniem ludności kultury łużyckiej w dorzeczu Odry i Wisły*, Poznań: UAM.
- Furmanek V.  
1973 Bronzova industrie Stredodunjske mohyleve kultury na Morave, *SlA*, T.XXI-1, 25-145.
- Gediga B.  
1982 Metalurgia brązu w kulturze łużyckiej na Śląsku, *Pamiętnik Muzeum Miedzi*, T.1, 109-129.
- Gedl M.  
1982 Zarys dziejów metalurgii brązu na ziemiach polskich do początków epoki żelaza, *Pamiętnik Muzeum Miedzi*, T.1, 33-65.
- Gershkovich Ya.P., Klochko V.I., Evdokimov G.L.  
1987 Novokievskaya liteynaya masterskaya i problemy khronologii sabatinovskikh pamyatnikov Nizhnego Podneproviya, *SA*, No.2, 142-158.
- Gershkovich Ya.P., Klochko V.I.  
1987 Svyazi plemen Nizhnego Podneproviya v epokhu pozdney bronzy (po materialam Zavodovskoy masterskoy), in: *Mezhplemennyye svyazi epokhi bronzy na territorii Ukrainy*, 101-114, Kiev: Naukova Dumka.
- Goldmann K.  
1981 Die mitteleuropäische Schwertenwicklung und die Chronologie der Altbronzezeit Europas, *Acta Praehistorica et Archaeologica*, T.11/12, 131-181.
- Gorodtsov V.A.  
1905 Rezultaty arkheologicheskikh issledovaniy v Izyumskom uyezde Kharkovskoy gubernii v 1901g., in: *Trudy XII Arkheologicheskogo syezda*, Moscow.  
1907 Rezultaty arkheologicheskikh issledovaniy v Bahmutskom uyezde Ekaterinoslavskoy ub. 1903, in: *Trudy XIII Arkheologicheskogo syezda*, Moscow.  
1928 K voprosu o kimmeriyskoy kulture, in: *TSA RANION*, T.II.  
1940 Arkheologicheskiye izyskaniya na Donu i Kubani, in: *Pamyatniki drevnosti na Donu*, Rostov.

- Gryaznov M.P.  
 1947 K metodike opredeleniya tipa rubyashchego orudiya (topor, teslo), KSIIMK, Vyp.XIV,170-173.
- Harding A.  
 1975 Mycenaean Greece and Europe: the evidence of the bronze tools and implements, Proceedings of the Prehistoric Society, V.41, 183-202.
- Hochstetter A.  
 1981 Eine Nadel der Noua-Kulture aus Nordgriechenland (Ein Beitrag zur absoluten Chronologie der späten Bronzezeit im Karpatenbecken), Germania, T.59, 2, 239-259.
- Iessen A.A.  
 1950 K khronologii bolshikh kubanskikh kurganov, SA, No.2, 157-202.
- Iliyanskaya V.A.  
 1959 Raskopki poseleniya bondarikhskey kultury u s. Oskol, KSIA AN Ukr.SSR, Vyp.8, 80-84.  
 1967 Novi dani pro pamyatki doby bronzy v livoberezhnomu lisostepu, Arkheologiya T.X, 50-63.
- Kemenczei T.  
 1981 A prűdyi koravaskori kincslelet, in: Communicationes Archaeologicae Hungaricae, 29-42.  
 1984 Die Spätbronzezeit Nordostungarns, Archaeologia Hungarica, series nova, LI, Budapest: Akademiai Kiado.
- Khanenko B. and V.  
 1899 Drevnosti Podneproviya, Kiev, T.1.
- Khudyakov Yu.S.  
 1979 Osnovniye ponyatiya oruzhevedeniya, in: Novoye v arkheologii Sibiri i Dalnego Vostoka, 184-193, Novosibirsk: Nauka.
- Klochko V.I.  
 1979 Nekotoriye voprosy proiskhozhdeniya bronzovykh nakonechnikov strel Severnogo Prichernomoriya VIII- VIIvv. do n.e., in: Pamyatniki drevnikh kultur Severnogo Prichernomoriya, 40-46, Kiev: Naukova Dumka.  
 1981 Ob odnoy iz liteynykh form Kirovskogo poseleniya, in: Ispolzovaniye metodov tochnykh nauk v arkheologii, 65-69, Kiev: Naukova Dumka.  
 1982 K voprosu o proiskhozhdenii skifskikh nakonechnikov strel, in: Materialy po khronologii arkheologicheskikh pamyatnikov Ukrainy, 80-83, Kiev: Naukova Dumka.  
 1981 K voprosu o voyennom dele plemen epokhi bronzy Severnogo Prichernomoriya, in: Aktualnye problemy arkheologicheskikh issledovaniy v Ukrainy SSR. Tez. Dik. Resp. Konferentsii molodykh uchenykh, Kiev, 4.

- 1986 Sistema vooruzheniya sabatinovskoy kultury, in: Tez. dok.n. prak. seminaru "Problemy okhrany i issledovaniya pamyatnikov arkheologii v Donbassie", 23-25, Donetsk.
- 1987a Sistema vooruzheniya Loboykovskogo ochaga metalloobrabotki, in: Tez. dok.n.prakt. seminaru "Problemy okhrany i issledovaniya pamyatnikov arkheologii v Donbasse", 73-75, Donetsk.
- 1987b Arkheologicheskiye svдетельstva uchastiya naseleniya Severnogo Prichernomoriya v nashestvii "Narodov Morya" na Vostochnoye Sredizemnomoriye. Aktualniye problemy istoriko-arkheologicheskikh issledovaniy, in: Tez. dok. VI Resp.konf.molodykh uchenykh, 69-70, Kiev.
- 1990 "Narody Morya" ta pivnichne Prichernomoriya, Arkheologiya, No.1, 10-18.
- 1992 Vostochnaya granitsa (na Levoberezhnoy Ukrainie) vliyaniy kruga Lyzhnitskoy kultury, in: Ziemie polskie we wczesnej epoce zelaza i ich powiazania z innymi terenami, 183-190, Rzeszów.
- Klochko V.I., Murzin V.Yu.
- 1987a O vzaimodeystvii mestnykh i privnesennykh elementov skifskoy kultury, in: Skify Severnogo Prichernomoriya, 12-19, Kiev: Naukova Dumka.
- 1987b O datirovke chernogorsko-novoчерkasskikh pamyatnikov, in: Kimmeriytsy i skify, Tez. dok. vsesoyuznogo sem. posv. pamyati A.I.Terenozhkina, Kirovograd.
- Kovpanenko G.T.
- 1975 Bronzoviy mech s belskogo gorodishcha, SA, No.4, 248- 249.
- Korenevsky S.N.
- 1976 O metallicheskih toporakh Severnogo Prichernomoriya, Srednego i nizhnego Povolzhziya epokhi pozdney bronzy, SA, No.4, 16-32.
- 1979 O metallicheskih nozhakh yamnoy, poltavkinskoy i katakombnoy kultur, SA, No.2, 33-48.
- 1981 Vtulchiye topory - oruzhiye blizhnigo boya epokhi sredney bronzy Severnogo Kavkaza, in: Kavkaz i Srednaya Aziya v drevnosti i srednevekoviyeye, 20-41, Moscow.
- Kozłowski L.
- 1939 Zarys pradziejów Polski południowo-wschodniej, Lwów.
- Kraskovskaya N.A.
- 1978 Zagadochniye bashni Sardinii, SA, No.4, 137-147.
- 1980 Nekotoriye problemy dofinikiyskoy kolonizatsii Sardinii, SA, No.5, 34-44.
- Krivtsova-Grakova O.A.
- 1949 Bessarabskiy klad, Tr.Gim.
- 1955 Stepnoye Povolzhziye i Prichernomoriye v epokhu pozdney bronzy, MIA, No.46, 1-168.

- Krushelnitskaya L.I.  
 1985 Vzaïmozvyazki naselennya Prikarpattya i Volyni z plemenami Skhidnoy i Tsentralnoy Evropy, Kiev: Naukova Dumka.
- Kuzminykh S.V.  
 1981 Metalloobrabotka srubnykh plemen Zakamiya, in: Ob istoricheskikh pamyatnikakh po dolinam Kamy i Beloy, 41-70, Kazan.
- Lagodovskaya E.F.  
 1954 Poseleniye vremen pozdney bronzy v s. Sandraki, Arkheologiya, T.IX, 133-141.
- Lagodovskaya O.F., Zakharuk Yu.M.  
 1956 Novy doslzhennya Voytsekhovskogo mogilnika, AP Ukr.RSR, T.VI, 69-74.
- Laslo A.  
 1979 Anfänge der Benutzung der Bearbeitung des Eisen auf dem gebiete Romäniens. Acta Archaeologica Hungarica, T.229 (1-2), 53-75.
- Lescov A.M.  
 1963 Neskolko bronzovykh izdeliy iz Kerchenskogo poluostrova v sobranii Odeskogo arkheologicheskogo muzeya, KSOGAM.  
 1967 O severoprichernomorskom ochage metalloobrabotki v epokhu pozdney bronzy, in: Pamyatniki epokkhi bronzy yuga Evropeyskoy chasti SSSR, 143-178, Kiev: Naukova Dumka.  
 1974 Die Skythischen Kurgane, Antike Welt, 2, 51-93.  
 1981 Jung und spätbronzezeitliche Depotfunde im nördliche Schwarzmeergebiet, München (PBF, Ab.20, Bd.5).
- Lyashko S.N.  
 1986 Bronzoviy kinzhal srubnoy kultury iz fondov Zaporozskogo muzeya, SA, No.1, 248-250.
- Makkay J.  
 1985 The crisis of prehistoric chronology, in: Mitteilungen des Archäologischen Institute des Ungarischen Akademie der Wissenschaften, No.14, 53-70.
- Maleev Yu.N.  
 1976 Liteyniye formy s poseleniya Myshkovichi v Podnestroviye, in: Eneolit i bronzoviy vek Ukrainy, 232-239, Kiev: Naukova Dumka.  
 1981 Istoriya plemen Zapadnoy Podolii i Prikarpatiya v kontse bronzovogo - nachale zheleznogo vekov, Avtoref. kand. diss., Kiev.  
 1982 Galshtatskiye gorodishcha v Zapadnoy Podolii i Prikarpatiyе, in: Mezhplemenniyе svyazi epokhi bronzy na territorii Ukrainy, 86-101, Kiev.  
 1984 Raskopki na yuge Ternopolshchiny, AO, 1982-1984, 291- 292.
- Marinatos S.  
 1967 Kleidung, Haar und Barttracht, Gottingen (Archaeologia Homerica, Bd.1, Kap.A,B).

- Martirosyan A.A.  
1964 Armeniya v epokhu bronzy i rannego zheleza, Erevan.
- Melnik K.  
1893 Katalog kollektzii drevnostey A.N.Pol, Kiev.
- Melyukova A.I.  
1961 Kultury predskifskogo perioda v lesostepniy Moldavii, MIA, No.96, 5-52.
- Mercer R.G.  
1970 Metal Arrow-heads in the European Bronze and Early Iron Ages, Proceedings of the Prehistoric Society, V.36, 171-236.
- Merpert N.Ya.  
1958 Iz drevney istorii Srednego Povolzhiya, MIA, No.61, 45- 156.
- Mozsolics A.  
1967 Bronzefunde des Karpatenbeckens. (Depotfundhorizonte von Haidusamson und Kosziderpadlas), Budapest, Akademiai Klado.  
1973 Bronze und Goldfunde des Karpatenbeckens, (Depotfundhorizonte von Ferro und Opalyi), Budapest, Akademiai Klado.
- Müller-Karpe H.  
1959 Beiträge zur Chronologie der Urnenfelderzeit Nördlich und Südlich der Alpen, RGF, T22.  
1974 Handbuch der Vorgeschichte, München: C.H.Beck'sche Ver., B.3.  
1980 Handbuch der Vorgeschichte, München: C.H.Beck'sche Ver., B.4.
- Mylonas G.E.  
1957 Ancient Mycenae, the capital city of Agamemnon, New Jersey.
- Otroshchenko V.V.  
1986 Byelozerskaya kultura, in: Kultury epokhi bronzy na territorii Ukrainy, 117-152, Kiev: Naukova Dumka.
- Padin V.A.  
1963 Kurgany epokhi bronzy okolo Trubchevska, SA, No.1, 289- 293.
- Patrushev S.V.  
1971 Kely Starshego Akhmylovskogo mogilnika i ikh funktsyonalnoye naznacheniye, KSIA, Vyp.128, 37-43.
- Poulik J.  
1963 K problemetike cakanskej kultury v Karpatskej kotline, SIA, T.11, 269-388.
- Petrescu-Dimbovita M.  
1977 Depozitele de dronzuri din Romania, Bucuresti: AN SRR.
- Pislariy I.A., Budylnina G.N.  
1982 Klad liteyshchika epokhi bronzy iz s. Androvo, in: materialy po khronologii arheologicheskikh pamyatnikov Ukrainy, 61-67, Kiev: Naukova Dumka.

- Popova T.B.  
1963 Dolmeny stanitsy Novosvobodnoy, Trudy NMIU, Vyp.XXXIV.
- Pryakhin A.D., Sagaydak V.I.  
1975 Metalloobrabatvayushchaya masterskaya na poselenii srubnoy kultury, SA, No.2, 176-186.
- Pryakhin A.D., Sinyuk A.T., Matveev Yu.P.  
1981 Tereshkovskiy klad epokhi pozdney bronzы v Srednem Podoniye, SA, No.3, 281-285.
- Romashko V.A.  
1982 Poseleniye finalnoy bronzы - rannego zheleznoogo veka u s. Buzovka Dneprovskoy oblasti, in: Drevnosti Stepnogo Podneproviya, 54-59, Dnepropetrovsk.  
1983 Poseleniye i mogilnik nachala 1 tys. do n.e. u s. Zalineynoye na Kharkovshchine, in: Drevnosti Stepnogo Podneproviya, 54-60, Dnepropetrovsk.
- Rumyantsev A.N.  
1972 Metaleva zbroya plemen pıvdnya Evropeyskoy chastiny SRSR v dobu bronzы, in: Tez. dop. XV nauk. konferentsii institutu arkheologii AN Ukr. RSR, 154-157, Odessa.  
1974 Nekotoriye voprosy razvitiya nakonechnikov kopiy epokhi bronzы v Severnom Prichernomoriye, SA, No.1, 12-23.
- Rutter J.  
1975 Ceramic evidence for northern intruders in southern Greece at the beginning of the Late Helladic IIIC period, AJA, v.75, 17-32.
- Safronov V.A.  
1968 Datirovka Borodinskogo klada, in: Problemy arkheologii, 75-128, Leningrad: Nauka.
- Salkovsky P.  
1980 Spiralova ornamentika starsej doby bronzovej v Karpatskej kotline a na Dolnom Dunaji, SIA, T.28-2, 287-311.
- Sandars N.K.  
1961 The first Aegean bronze swords and their ancestry, AJA, v.65,1, 17-30.  
1963 Later Aegean bronze swords, AJA, v.67,2, 117-154.  
1978 The Sea Peoples. Warriors of the ancient Mediterranean 1250-1150 B.C., London: Thames and Hudson.
- Schaeffer F.A.  
1948 Stratigraphic Comparee et Chronologie de l'Asie Occidentale, London.
- Schauer P.  
1971 Die Schwerter in Süddeutschland, Österreich und der Schweiz, München (PBF, Ab.4, Bd.2).

- 1979 Eine Urnenfelderzeitliche Kampweise, Archäologisches Korrespondenzblatt, No.9, 69-80.
- Sharafutdinova I.M.
- 1964 Poselennyya epokhi pizniy bronzy poblizu Kremenchuka, Arkheologiya, No.17, 153-169.
- 1973 Bronzolivarna maysterskaya z Golovurova na Kyivshchini, Arkheologiya, No.12, 61-70.
- 1982 Stepnoye Podneproviye v epokhu pozdney bronzy, Kiev: Naukova Dumka.
- 1986 Sabatinovskaya kultura, in: Kultury epokhi bronzy na territorii Ukrainy, 83-116, Kiev: Naukova Dumka.
- Shmagliy N.M., Chernyakov I.T.
- 1970 Raskopki kurganov epokhi bronzy v tatarbunarskom rayone Odesskoy oblasti v 1965 godu, SA, No.1, 109-120.
- Smirnova G.I.
- 1972 Noviye issledovaniya poseleniya Magala, ASGE, Vyp.14.
- 1976 Magala 1 i nekotorye voprosy khronologii pozdnekomarovskoy kultury v Prikarpatii, in: Eneolit i bronzoviy vek Ukrainy, 118-134, Kiev: Naukova Dumka.
- 1976 Gavsko-goligradskiy krug pamyatnikov Vostochno-karpatskogo basseyna, ASGE, Vyp.17, 18-34.
- 1985 Osnovy khronologii predskifskikh pamyatnikov Yugo-Zapada SSSR, SA, No.4, 33-53.
- Snodgrass A.M.
- 1971 The Dark Age in Greece, Edinburg: University Press.
- Subbotin L.V., Chernyakov I.T.
- 1982 Novotroyanivskiy skarb ta pytannya obminu metallom za dobi pizdniy bronzy, Arkheologiya, No.39, 5-23.
- Sulimirski T.
- 1936 Zagadnienie ekspansji kultury łużyckiej na Ukrainę, WA, T.XIV.
- 1970 Prehistoric Russia in outline, London: Thames and Hudson.
- Sveshnikov I.K.
- 1961 Dva bronzovi skarbi z Stanislavskoy oblasti, MDAPV, vyp.30, 52-58.
- 1964 Pamatky goligradskogo tipu na Zakhidnomu Podilli, MDAPV, vyp.5, 40-66.
- 1967 Kultura komarowska, Archeologia Polski, T.XII,1, 39-100.
- 1968 Bogatye pogrebeniya komarovskoy kultury u s. Ivanye Rovenskoj oblasti, SA, No.2, 159-168.
- Symonowich E.A.
- 1966 Ingulskiy klad, SA, No.1, 127-142.
- Tallgren A.M.
- 1926 La Pontide prescythique apres 1 introduction des metaux, ESA, T.II, 5-246.

- 1937 Studies of the Pontic Bronze Age, ESA, T.XI, 103-121.
- Telegin D.Ya.  
 1956 Doslidzhennya poselen epokhi bronzy na Dintsi, AP URSR, T.VI, 75-84.  
 1982 Staroselskiy klad pozdney bronzy iz Cherkasskoy oblasti, SA, No.1, 222-224.
- Terenozhkin A.I.  
 1961 Predskifskiy period na Dneprovskom Pravoberezh'ye, Kiev: Naukova Dumka.  
 1965 Osnovy khronologii predskifskogo perioda, SA, No.1, 62- 85.  
 1976 Kimmeritsy, Kiev: Naukova Dumka.
- Tikhonov B.G.  
 1960 Metallicheskiye izdeliya epokhi bronzy na Srednem Urale i v Priural'ye, MIA, No.90.
- Točík A.  
 1978 Nitriansky Hradok - Zamecek, Nitra.
- Varenov A.V.  
 1983 Inskiy kopiya, in: Izvestiya Sibirskogo otdeleniya AN SSSR, No.1, Vyp.1, 100-123.
- Vanchugov V.P.  
 1986 Zaklyuchitelnyy period bronzovogo veka v Severo- Zapadnom Prichernomoriye (Byelozerskaya kultura), Avtoreferat kand. diss., Kiev.
- Veliačík L.  
 1983 Die Lauzitzen Kultur in der Slowakei, Nitra (Studia Archaeologica Slovaca).
- Vladar J., Bartonek A.  
 1977 Zur der Beziehungen des Ägaischen, Balkanischen und Karpatischen Raumes in der Bronzezeit, SIA, 1977, T.XXV-2, 371-432.
- Warren P.  
 1980 Problems of Chronology in Crete and the Aegean in the Third and Earlier Second Millenium B.C., AJA, v.84,4, 487-499.
- Yakar J.  
 1979 Troyan and Anatolian Early Bronze Age Chronology, Anatolian Studies, v.29, 103-135.
- Zbruyeva A.V.  
 1947 Gorodishche Grokhan, KSIIMK, Vyp.XVI, 52-65.  
 1952 Istoriya naseleniya Prikamiya v ananiynskuyu epokhu, MIA, No.30.
- Żurowski K.  
 1949 Zabytki brązowe z młodszej epoki brązu i wczesnego okresu żelaza w dorzeczu górnego Dniestru, Przegląd Archeologiczny, T.VIII,2, 155-247.

## ABBREVIATIONS

AJA	– American Journal of Archaeology
AO	– Arkheologicheskiye Otkrytiya
AP URSR	– Arkheologicheskiye Pometki Ukr.RSR
ASGE	– Arkheologicheskiy Sbornik Gosudarstvennogo Ermitazha
DPIM	– Dnepropetrovsk Historical Museum, Dnepropetrovsk
ESA	– Eurasia Septentrionalis Antiqua
KSIA AN SSSR	– Kratkiye Soobshcheniya Instituta Arkheologii AN SSSR
KSIA AN USSR	– Kratkiye Soobshcheniya Instituta Arkheologii AN Ukr.SSR
KSIIMK	– Kratkiye Soobshcheniya Instituta Istorii Materialnoy Kultury
KSOGAM	– Kratkiye Soobshcheniya Odesskogo Gosudarstvennogo Arkheologicheskogo Muzeya
MDAPV	– Materialy i doslidzhennya z arkheologii Prikarpattya i Volyni
MIA	– Materialy i Issledovaniya po Arkheologii SSSR
MIDK	– Museum of History of the Don Cossacks, Novocherkassk, Rostov district
NMIU	– National Museum of History of the Ukraine
OAK	– Otchet Arkheologicheskoy Komissii
OGAM	– Odessa State Archaeological Museum
PBF	– Prahistorische Bronzefunde
SIA	– Slovenska Archeologia
SA	– Sovetskaya Arkheologiya
SAI	– Svod Arkheologicheskikh Istochnikov
TSA RANION	– Trudy Sektsii Arkheologii Rossiyskoy Assotsiatsii Nauchno-Issledovatel'skikh Institutov Obshchestvennykh Nauk
ZOAO	– Zapiski Odesskogo Arkheologicheskogo Obshchestva



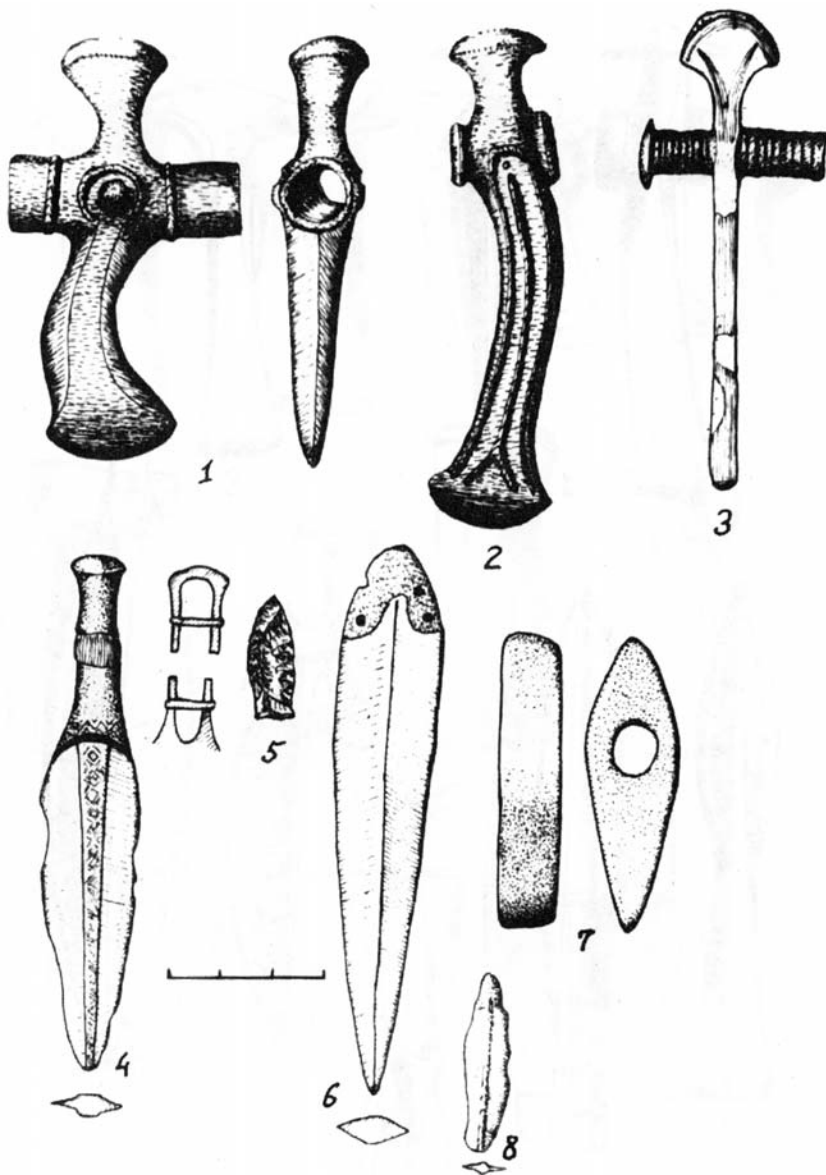


Fig. 1 Weapons of the Komarov-culture tribes.

1 - v.Ivaniye, mound I; 2 - West Volyn; 3 - v. Zabolotov; 4, 5 - v.Ivaniye, mound II, burial 4;  
6 - t. Kamenka Bugskaya; 7 - Komarov cemetery, mound 48; 8 - Komarov cemetery, mound VI.

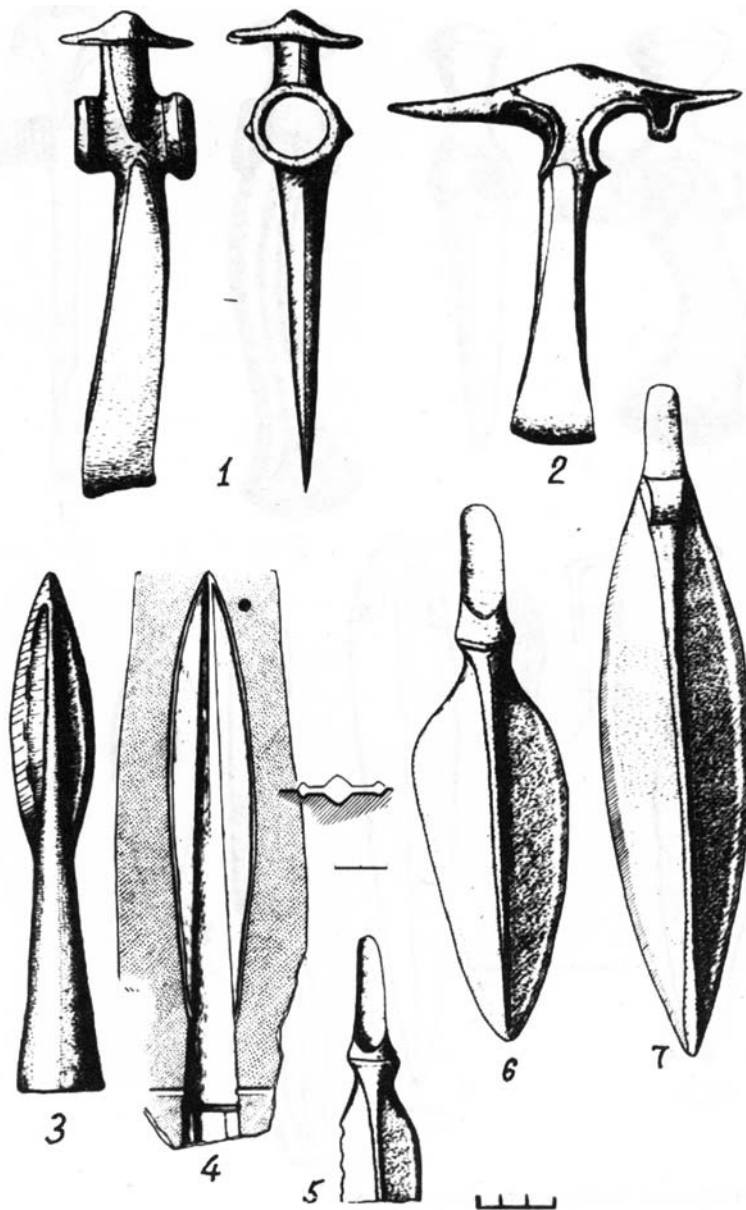


Fig. 2 Weapons of the Noua-culture tribes.  
 1 - v.Stepovaya; 2 - v.Priplipche; 3 - Oleshev hoard; 4 - Ostrovets settlement; 5, 6 - Prikarpatiye; 7 - v. Orelets.

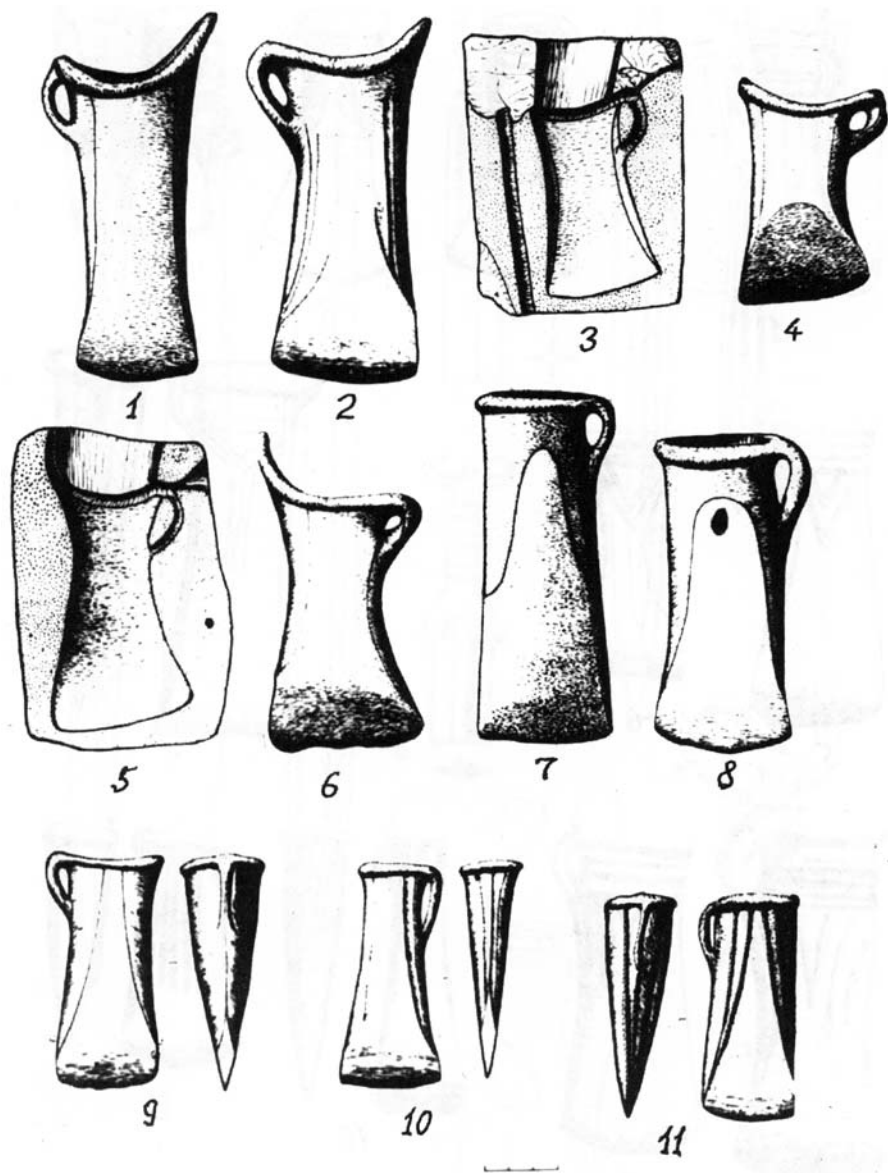


Fig. 3 Weapons of the Dnestr-basin tribes.  
 1 - Grushka hoard; 2 - Zalizhtsy hoard; 3 - Myshkovichi foundry; 4-6 - Nedliska hoard;  
 7 - Oleshev hoard; 8 - Grushka hoard; 9, 10 - Zalozhtsy hoard; 11 - v. Velikiy Ivanchin.

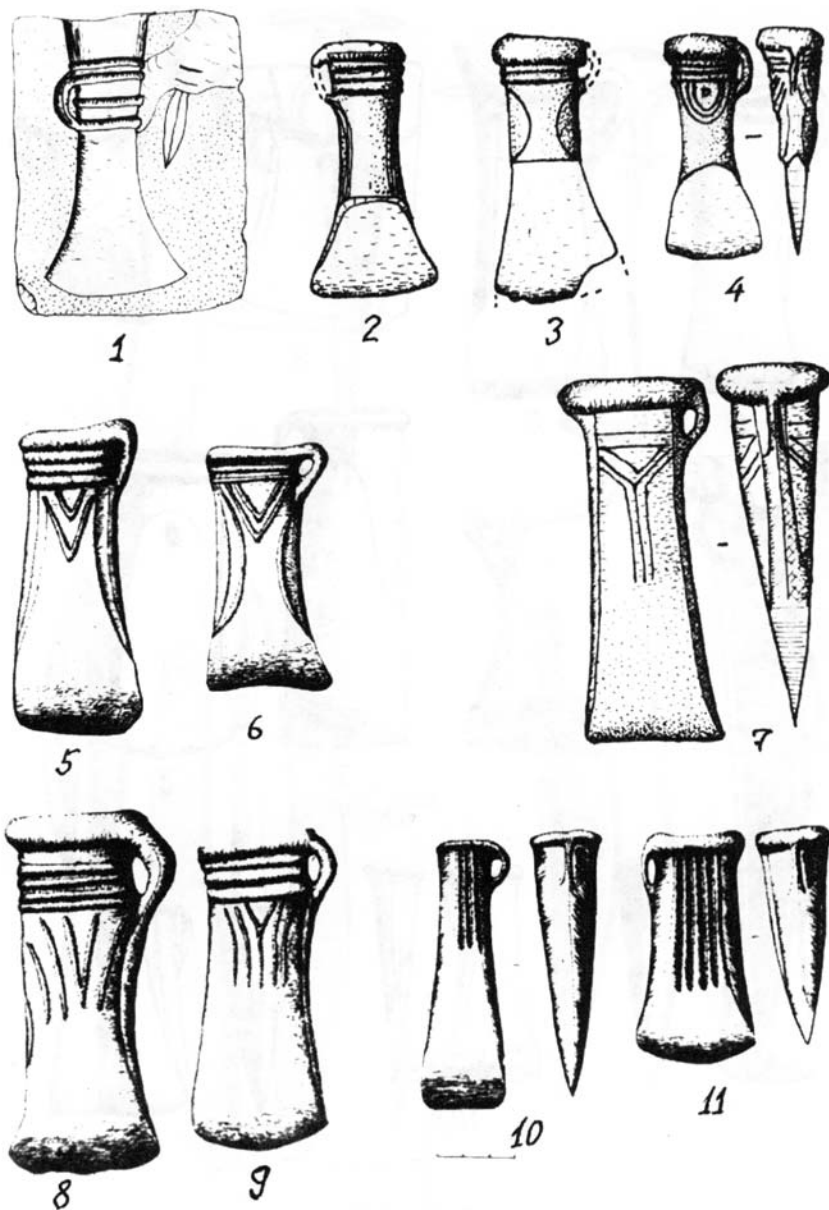


Fig. 4 Weapons of the Dnestr-basin tribes.  
 1 - Myshkovichi foundry; 2, 3 - v. Krekhov; 4 - v. Gorodenka; 5, 6 - Zalizhtsy hoard;  
 7 - Galich hoard; 8, 9 - Nedliska hoard; 10, 11 - Karyzhin hoard.

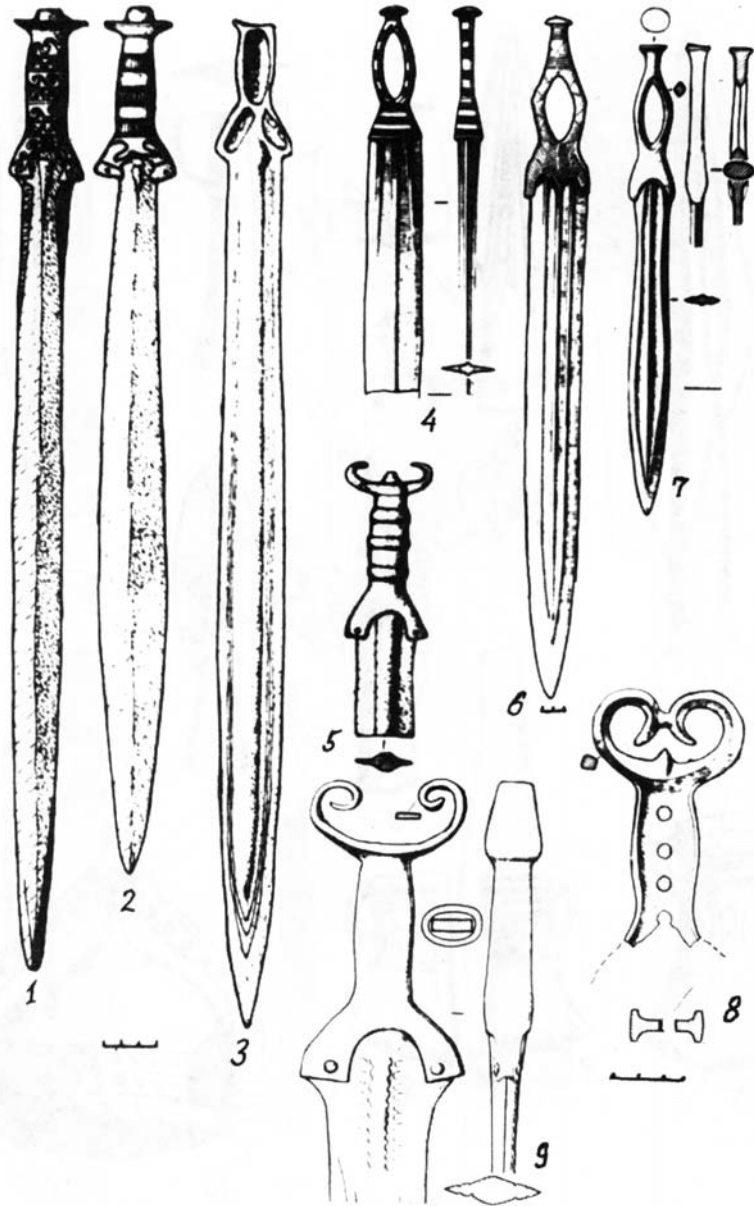


Fig. 5 Weapons of the Dnestr-basin tribes.  
 1 - v. Koropets; 2 - t. Galich; 3 - Prikarpatiye; 4 - t. Yaroslav; 5 - v. Yazlovetz; 6 - t. Przemyśl;  
 7 - v. Rozhubovichi; 8 - v. Vorona; 9 - Valya-Rusuluy hoard.

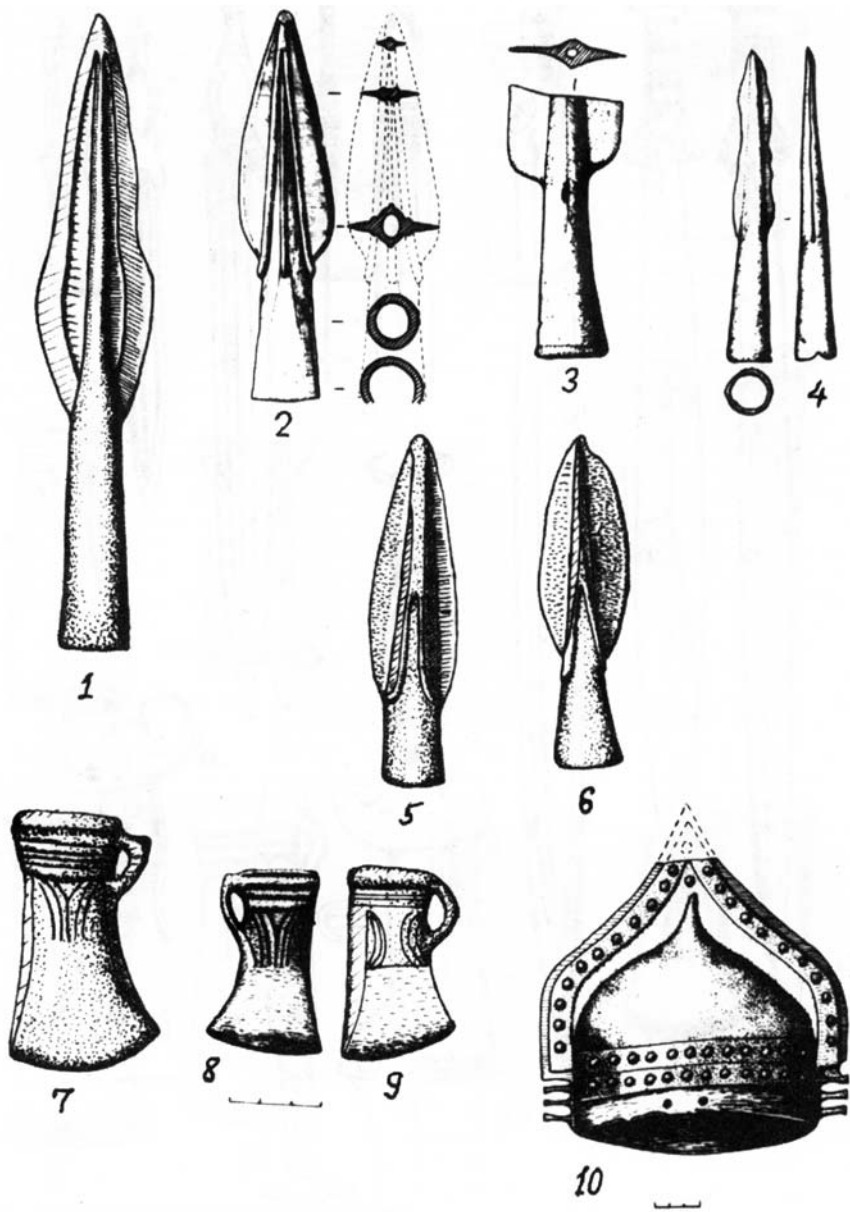


Fig. 6 Weapons of the Dnestr-basin tribes.  
 1 - Lesnaya Slobodka; 2, 3 - Grushka hoard; 4 - Karyzhin hoard; 5 - v. Balichi; 6 - v. Dupliska;  
 7 - v. Ruda; 8 - v. Pudlovtsy; 9 - v. Sosulevka; 10 - v. Kremennaya.

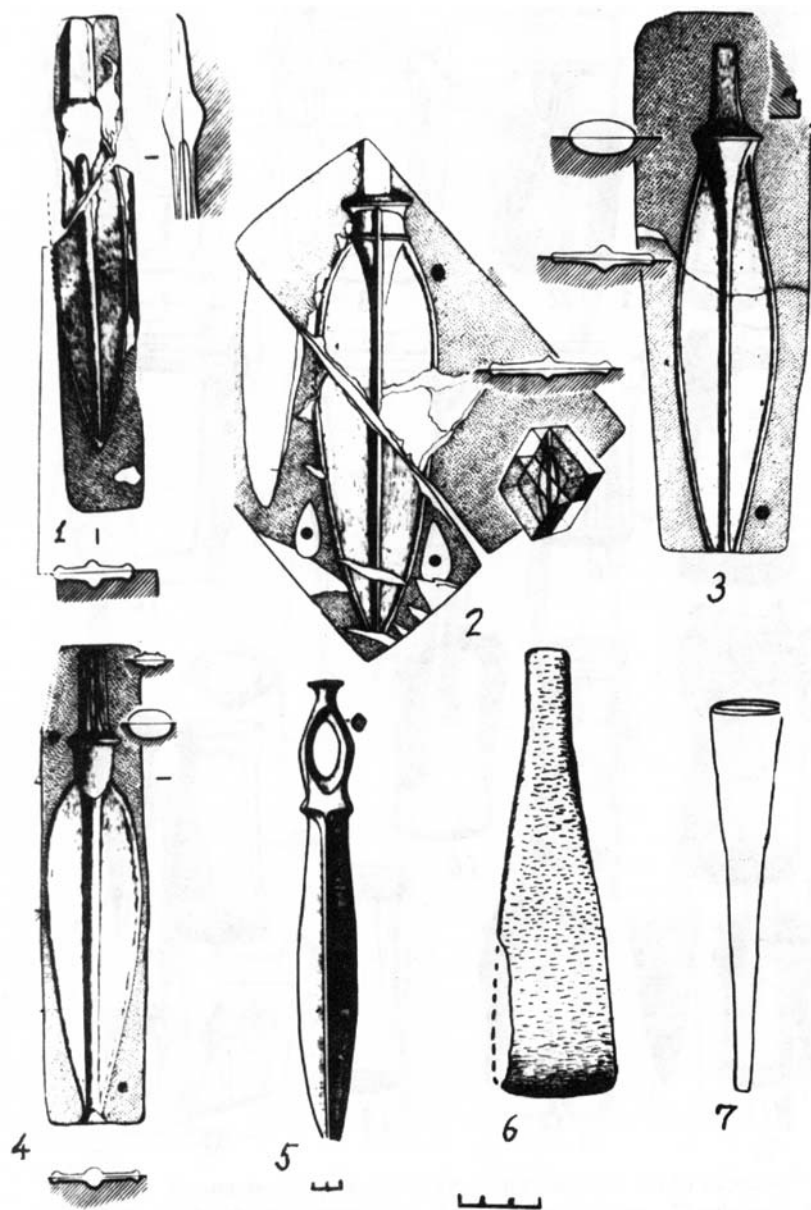


Fig. 7 Weapons of the Sosnitsa-culture tribes.  
 1,4 - Golovurovo foundry, 2 - Derevyannoye foundry; 3 - Mazepintsy foundry; 5 - Kanev region; 6 - set. Zazimiye (reconstruction); 7 - set. Luka Raykovetskaya.

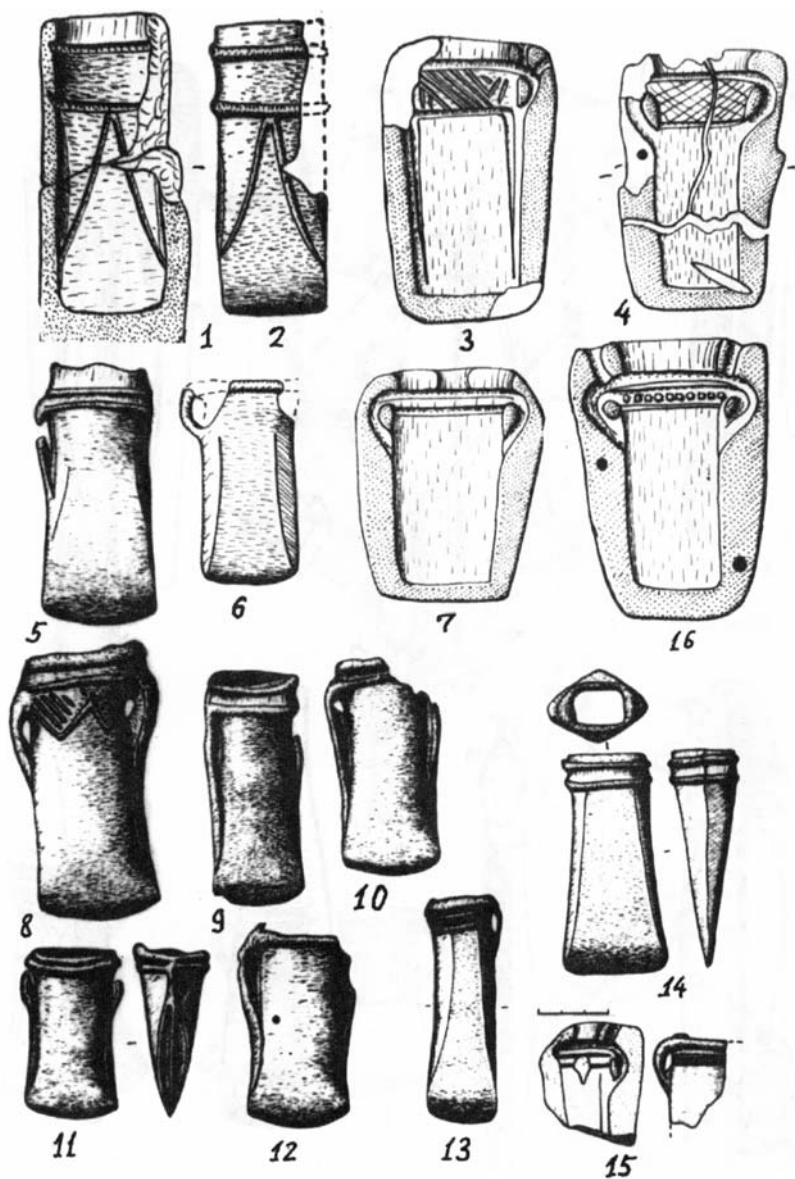


Fig. 8 Weapons of the Sosnitsa-culture tribes (Krasniy-Mayak group).  
 1,2 - set. Zazimiye (2 - reconstruction); 3,4,5 - Golovurovo foundry; 6 - v. Khmelna;  
 7 - Derevannoye foundry; 8 - set. Vita Litovskaya; 9 - Medvedovka hoard; 10 - Kiev district;  
 11 - Kanev region; 12 - v. Grishintsy; 13 - Rzhishchev reg.; 14 - v. Kozintsy; 15 - Subbotov  
 stronghold; 16 - Mazepintsy foundry.

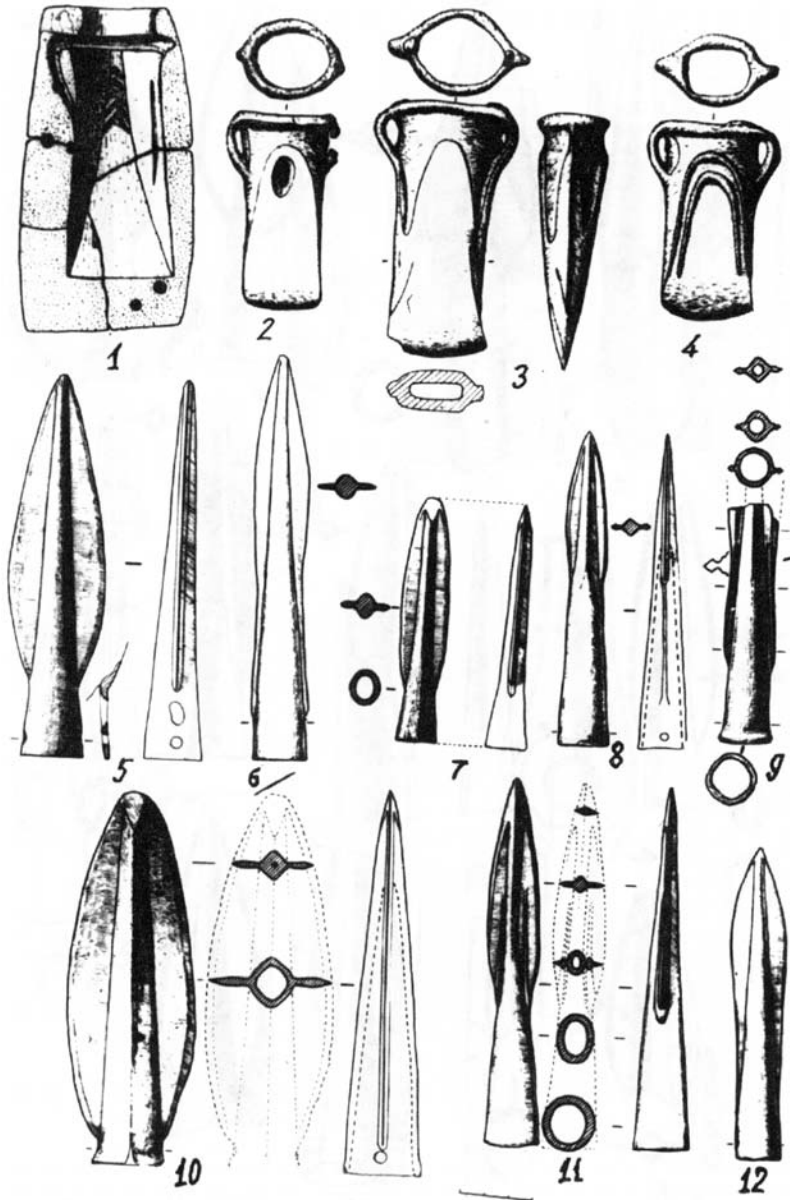


Fig. 9 Weapons of the Sosnitsa-culture tribes.  
 1 - v. Ryzhovka; 2,3 - v. Golovyatino; 4 - v. Bukrin; 5 - v. Kozintsy; 6 - v. Selishche;  
 7 - v. Vishenki; 8 - v. Lesovichy; 9 - v. Prokhorovka; 10 - v. Grebeni; 11 - Kiev district;  
 12 - v. Grishintsy.

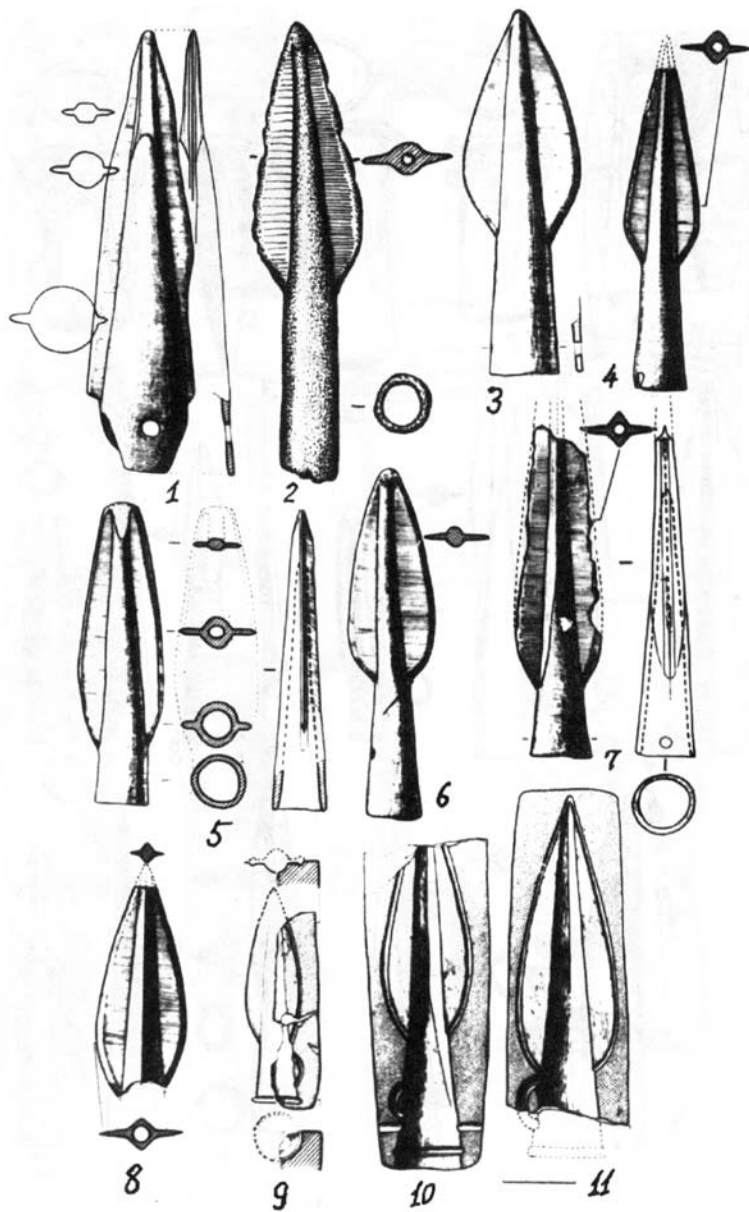


Fig. 10 Weapons of the Sosnitsa-culture tribes.  
 1 - Kiev district; 2 - v. Berezino; 3 - v. Sukhiny; 4 - Kanev reg.; 5 - t. Pereyaslav-Khmelniyskiy;  
 6 - v. Pugachevka; 7 - v. Veremiye; 8 - NMIU; 9-11 - Golovurovo foundry.

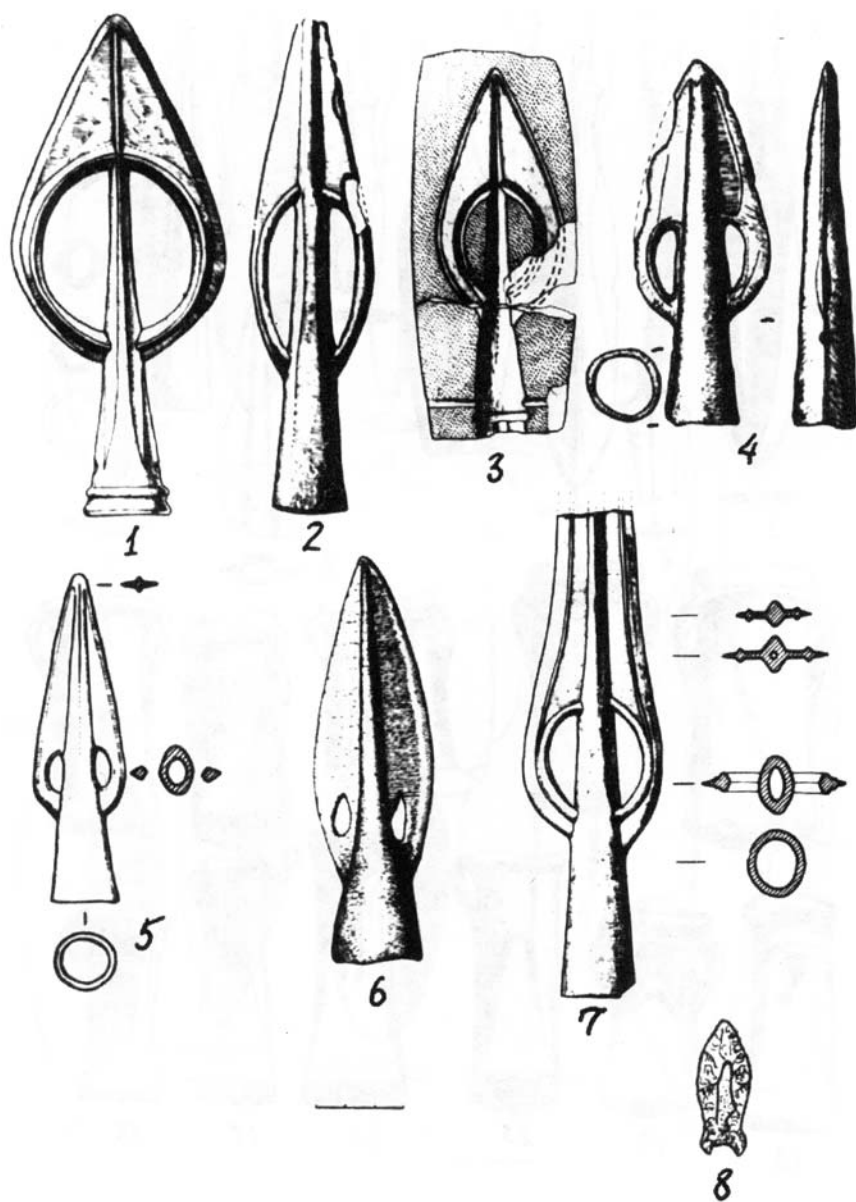


Fig. 11 Weapons of the Sosnitsa-culture tribes.  
 1,7 - v. Keliberda; 2 - v. Khmelna; 3 - v. Ivankovichi; 4 - v. Zaymishche; 5,6 - v. Kozintsy;  
 8 - Voytsekhovka cemetery.

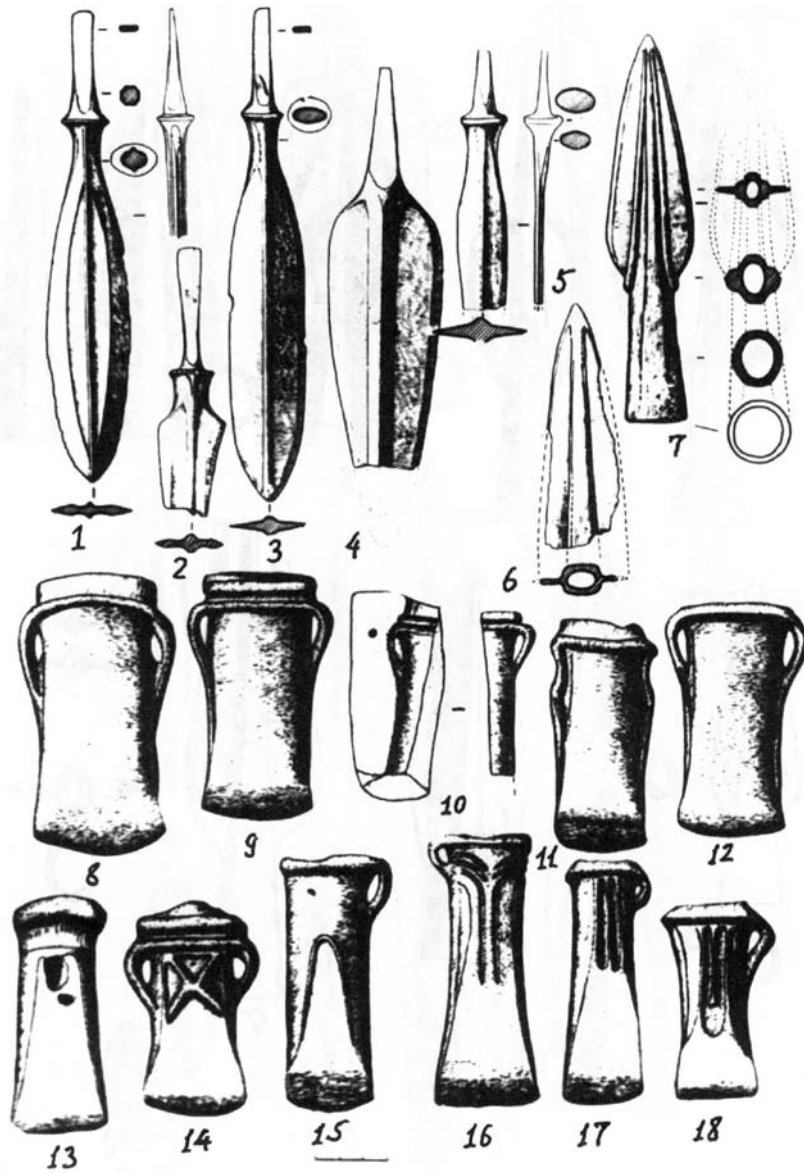


Fig. 12 Weapons of the Byelogradovo-culture tribes.

1 - v. Dumantsy; 2 - v. Pilyava; 3 - Tarashcha reg.; 4 - set. Sandraki; 5 - v. Khmelna;  
 6 - v. Stayaki; 7 - Kiev dist.; 8,13 - Staroseliye hoard; 9 - v. Chaplishche; 10 - v. Sobkovka;  
 11,12 - v. Golovyatino; 14 - v. Balakleya; 15 - v. Andrushevka; 16 - v. Karapyshi;  
 17 - v. Ivanovka; 18 - v. Pikovets.

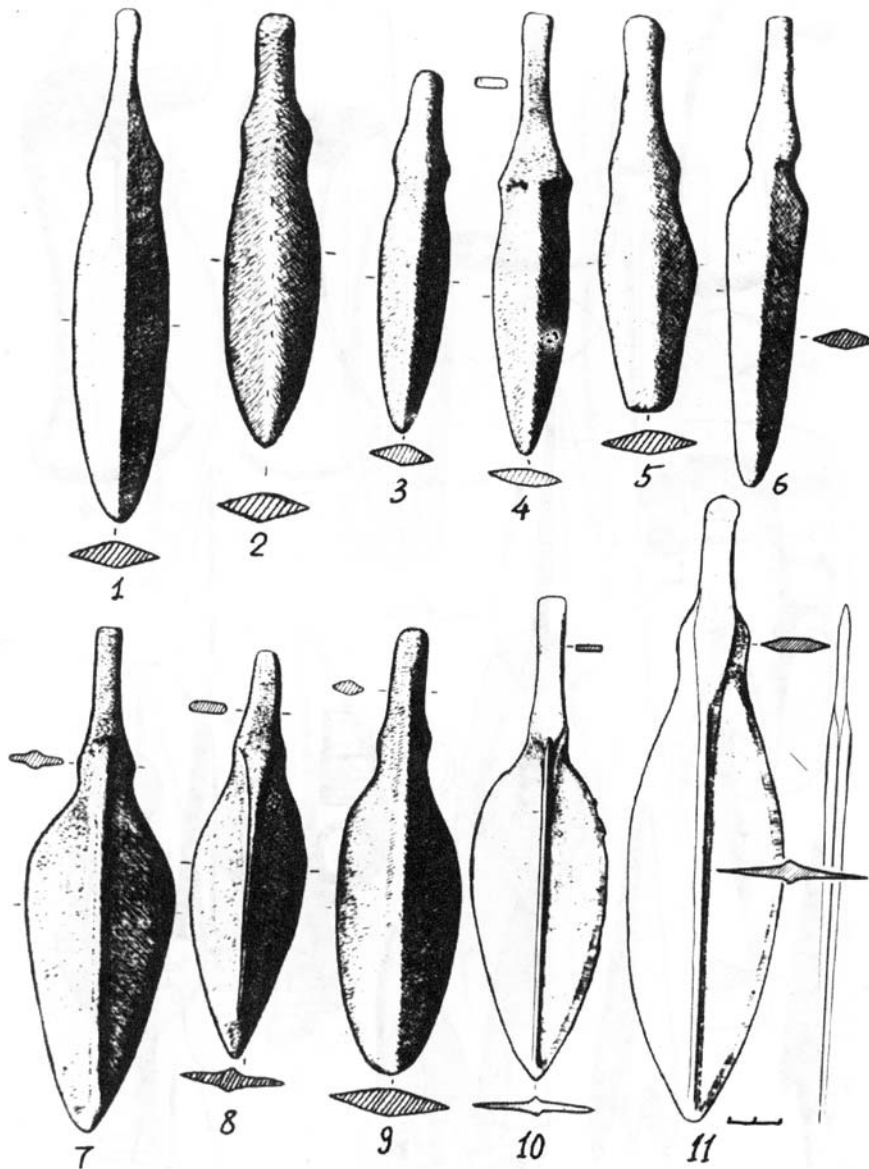


Fig. 13 Weapons used in the Srubnaya-culture historical region (Srubnaya group).  
 1 - Chutovo reg.; 2 - set. Kapitanovo; 3 - v. Kozintsy; 4 - set. Yakhonino; 5 - set. Kalinovka;  
 6 - v. Obukhovka and v. Sugakhovka; 7 - v. Byerestyagi; 8 - v. Grishintsy; 9 - v. Shakhovka;  
 10 - area of Dnieper rapids; 11 - Pribuzhiye.

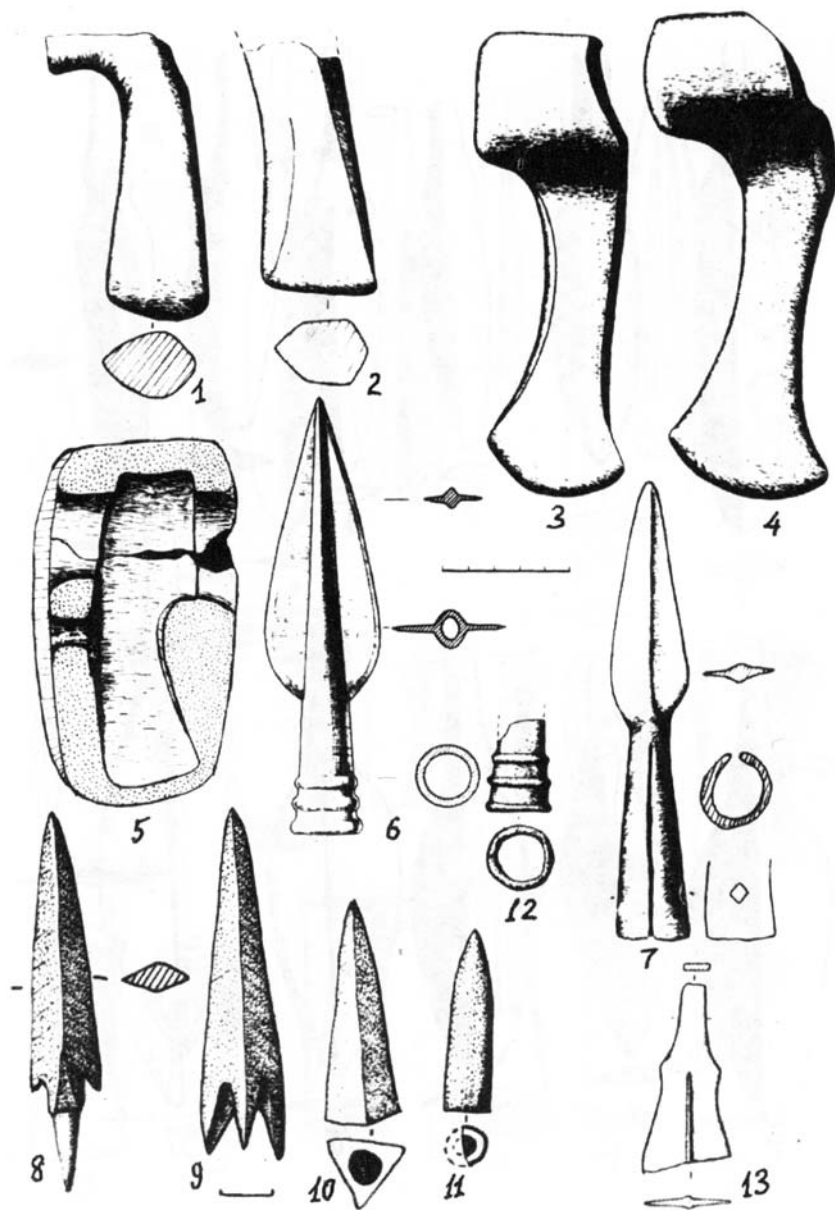


Fig. 14 Weapons used in the Srubnaya-culture historical region (Srubnaya group).  
 1,2,12,13 - set. Usovo-Ozero (reconstruction); 3,4 - Berislav hoard; 5 - A.Pol's collection;  
 6 - v. Ivanovka; 7 - Poltava dist.; 8 - set. Iliychevo; 9 - v. Fedorovka; 10 - set. Chikalovka; 11  
 - set. Kapitanovo.

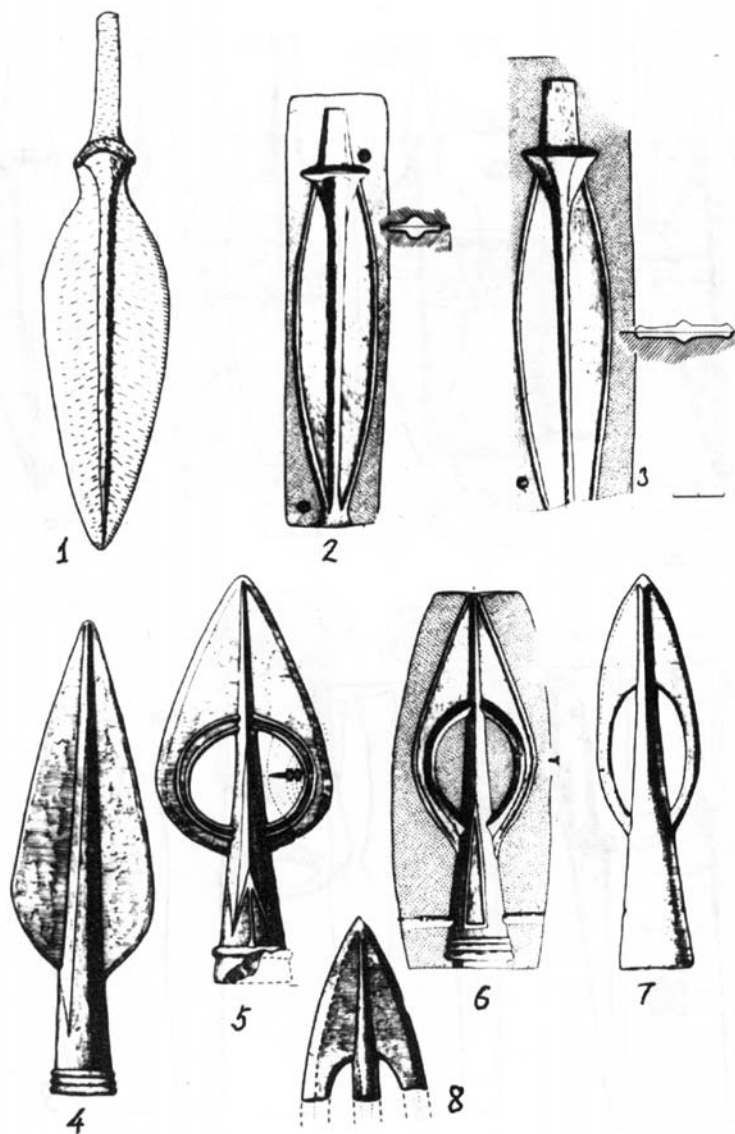


Fig. 15 Weapons used in the Srubnaya-culture historical region (Loboykovo group).

1 - v. Bulanovo; 2 - t. Dnepropetrovsk; 3 - v. Byazovok; 4 - Odayli-Podary hoard; 5 - Crimea; 6 - Zlatopol; 7 - v. Soldatovo; 8 - Loboykovo hoard.

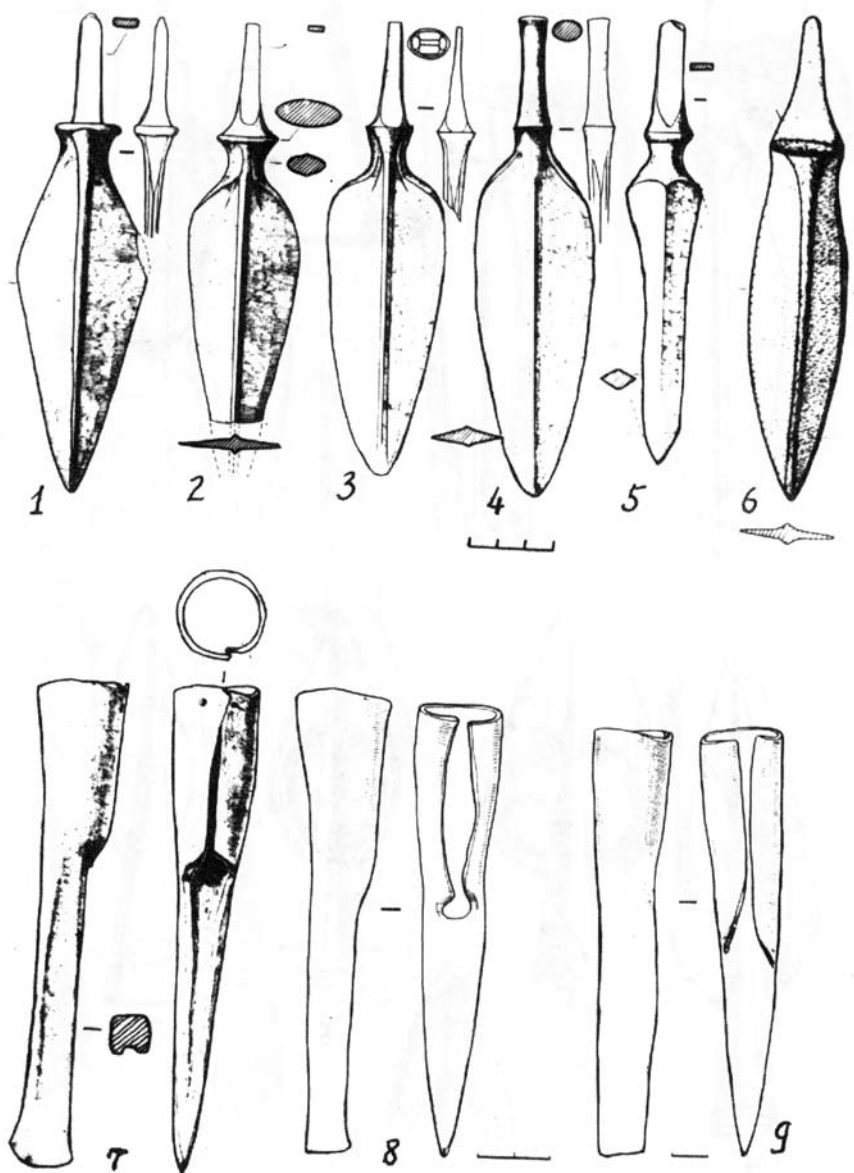


Fig. 16 Weapons used in the Srubnaya-culture historical region (Loboykovo group).  
 1 - Kabakovo hoard; 2 - v. Khmelna; 3 - Dnieper basin; 4,5 - Loboykovo hoard; 6 - burial mound near v.Bayrak; 7 - v. Suvid; 8,9 - Loboykovo hoard.

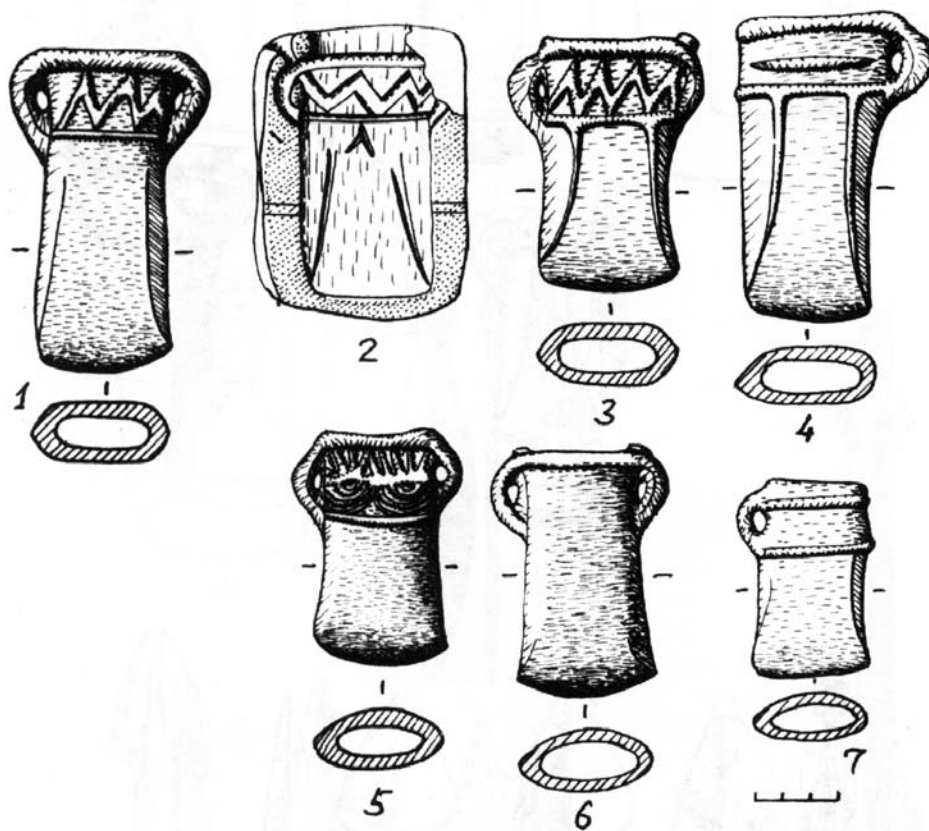


Fig. 17 Weapons used in the Srubnaya-culture historical region (Loboykovo group).  
 1 - hoard near v.Trekhizbyenka; 2 - v. Prilipchatino; 3,4 - Blagoveshchenka hoard;  
 5,7 - Loboykovo hoard; 6 - Kabakovo hoard.

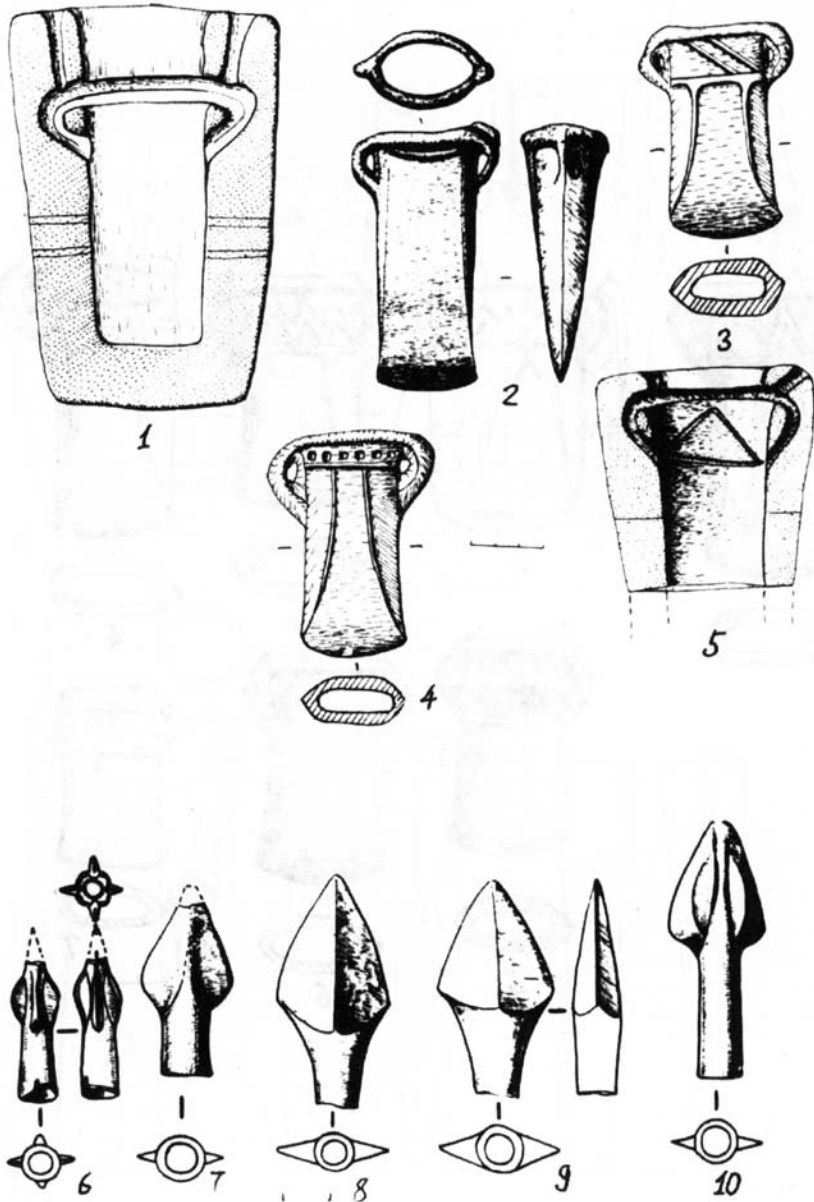


Fig. 18 Weapons used in the Srubnaya-culture historical region (Loboykovo group).

1 - v. Kapulovka; 2 - NMIU; 3,6,9 - Loboykovo hoard; 4 - Kabakovo hoard; 5 - v. Vovnigi; 7 - burial mound near v. Shirokoye; 8 - r. Kamyshevakha; 10 - t. Kakhovka.

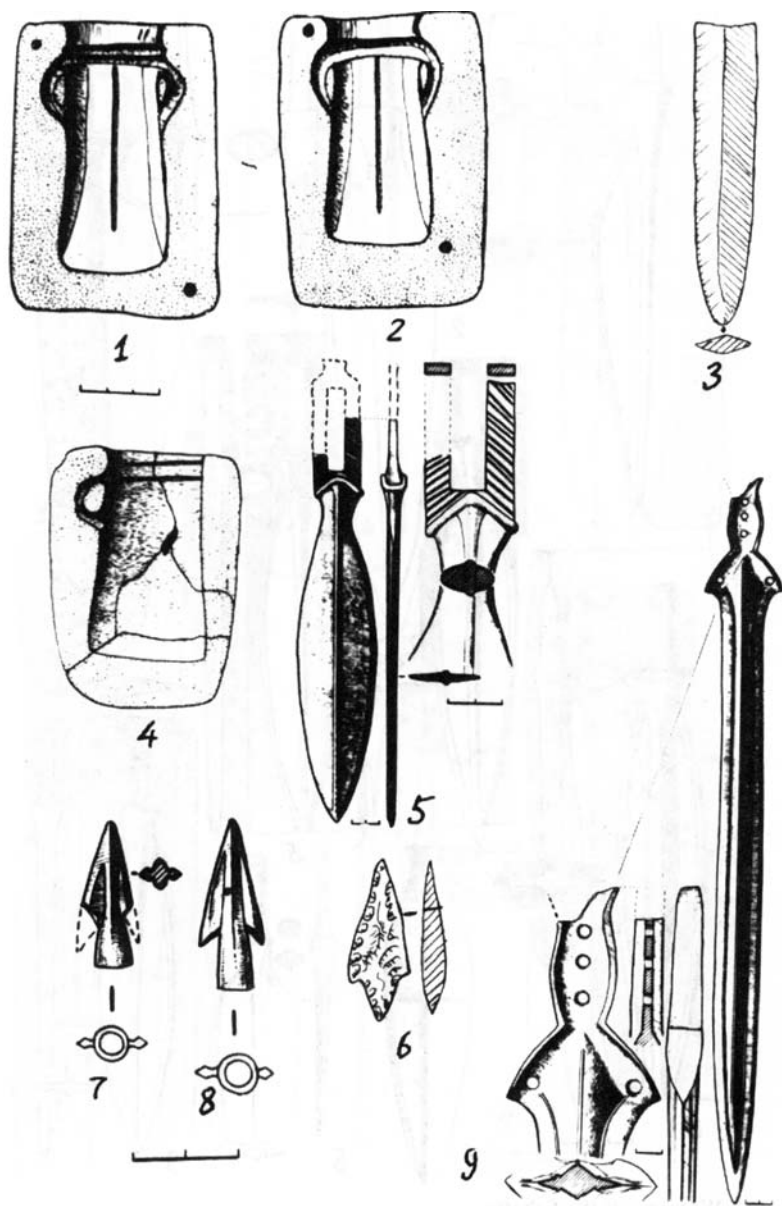


Fig. 19 Weapons of the Bondarikha-culture tribes.  
 1,2 - set. Bondarikha; 3 - set. Oskol; 4,6 - set. Studenok V; 5 - Kharkov museum;  
 7 - set. Buzovka; 8 - set. Zalineynoye; 9 - Belsk stronghold.

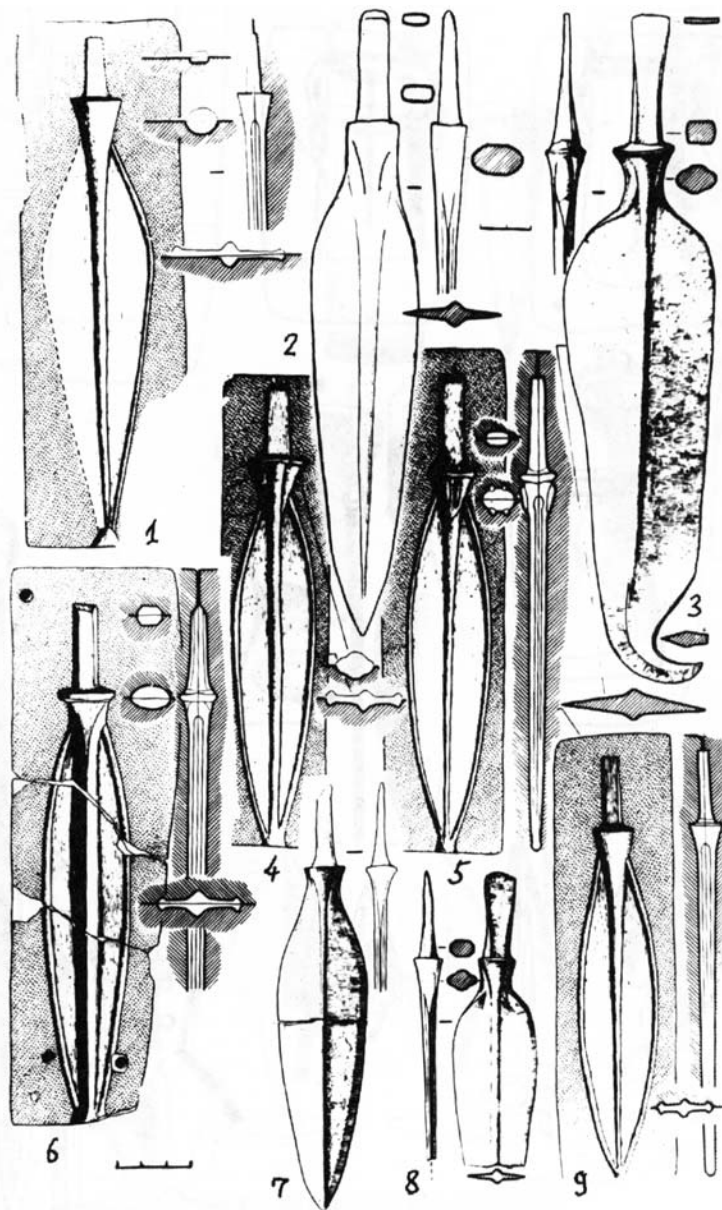


Fig. 20 Weapons of the Sabationovka-culture tribes.  
 1 - Maliye-Kopany hoard; 2 - v. Berezki; 3 - Eliseevichy hoard; 4 - Novokievka foundry;  
 5 - Krasniy-Mayak foundry; 6 - Voloshskoye foundry; 7 - t. Novoazovsk; 8 - t. Svatovo;  
 9 - Androvka foundry.

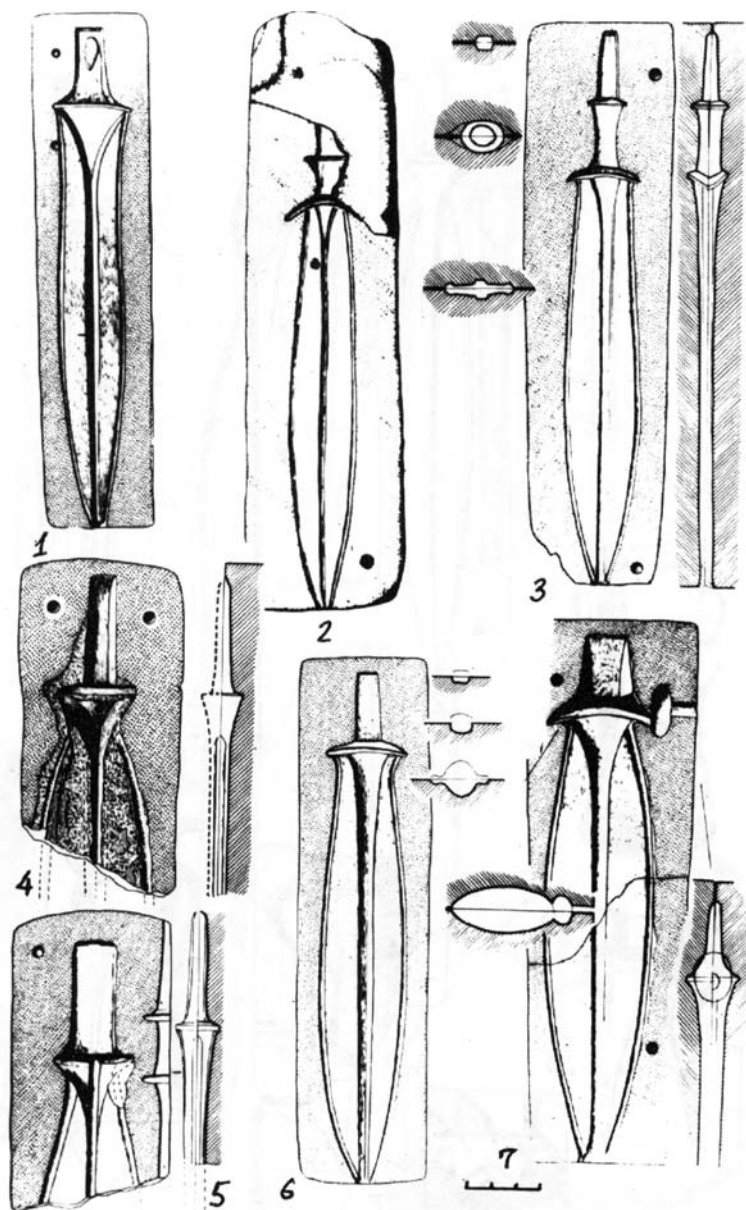


Fig. 21 Weapons of the Sabatinovka-culture tribes.

1 - Maliye-Kopany foundry; 2 - v. Dudchany; 3,4 - Voloshskoye foundry; 5 - Novokievka foundry; 6 - Marinovka foundry; 7 - Krasniy-Mayak foundry.

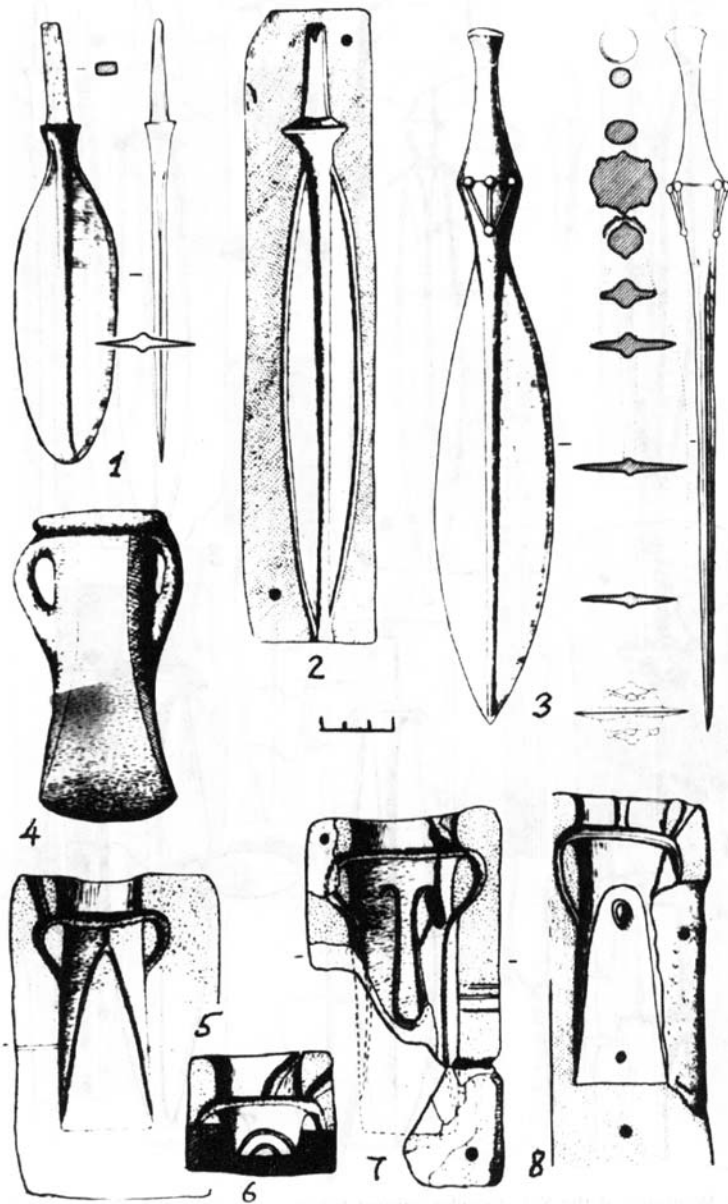


Fig. 22 Weapons of the Sabatinovka-culture tribes.

1 - Kherson museum; 2 - v. Zagradovka; 3 - Zaporozhiye dist; 4 - Dremaylovka hoard;  
5 - Tilingulsky liman; 6 - Verkhnetarasovka foundry; 7 - Voloshskoye foundry; 8 - v. Dudchany.

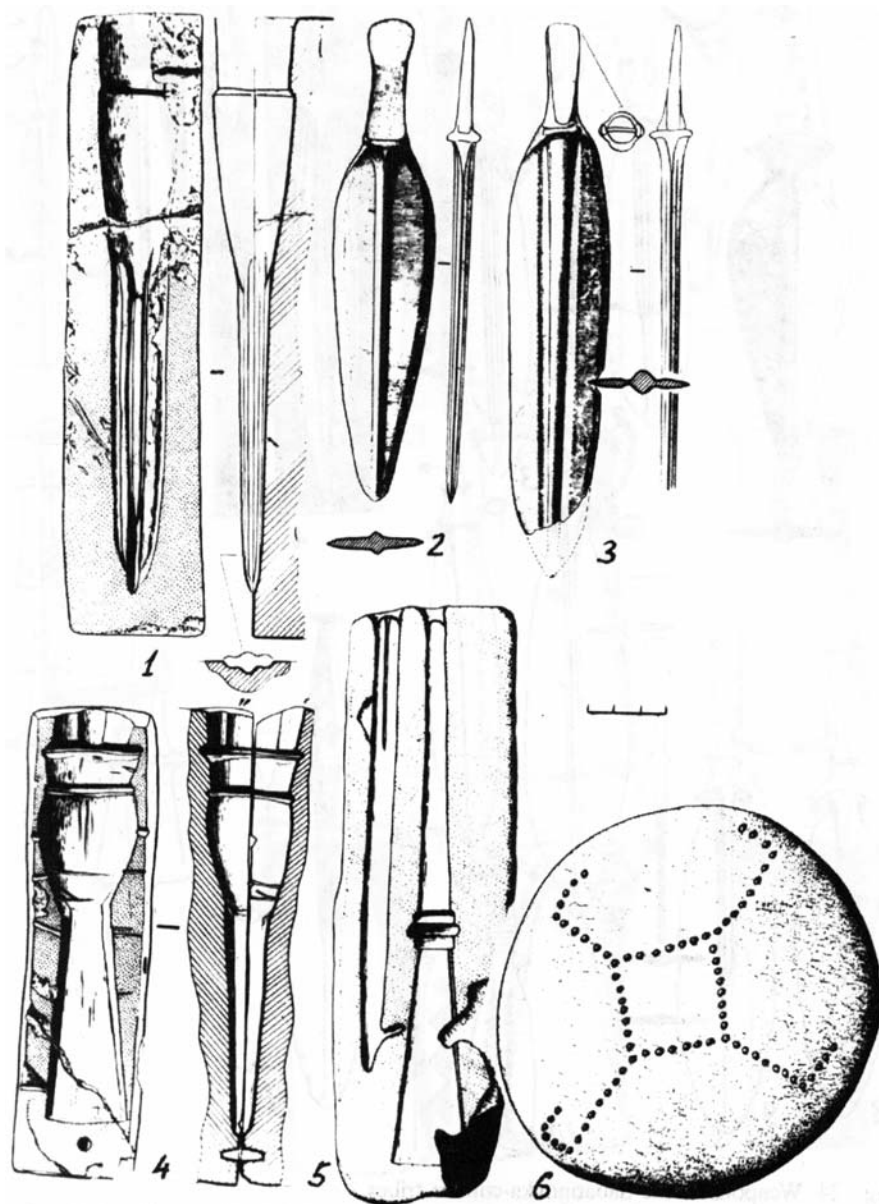


Fig. 23 Weapons of the Sabatinovka-culture tribes.  
 1 - Voloshskoye foundry; 2 - set. Liventsovskoye; 3 - Ingul hoard; 4 - Novokievka foundry;  
 5 - v. Dudchany; 6 - burial mound near v. Borisovka.

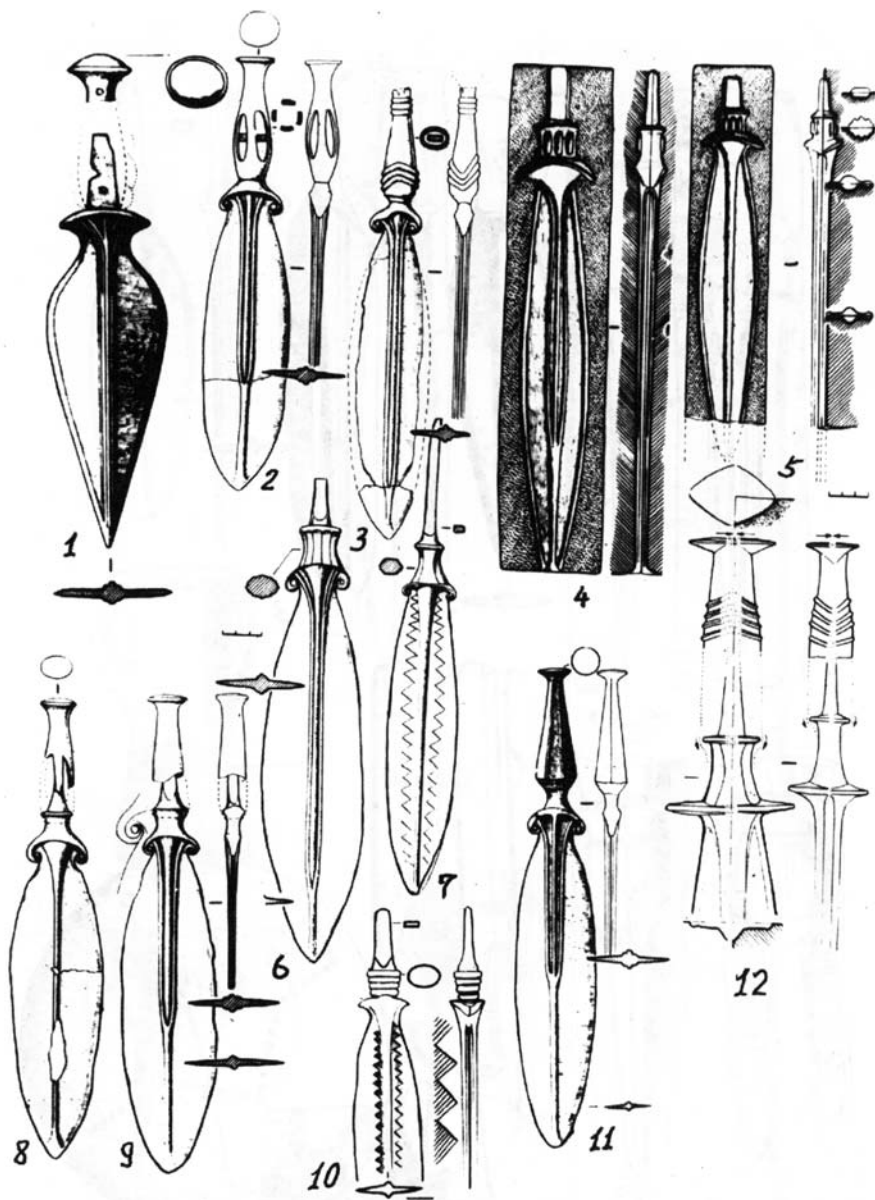


Fig. 24 Weapons of the Sabatinovka-culture tribes.  
 1 - burial mound near v. Borisovka; 2,3,8,9 - Lozovo hoard; 4,5 - Krasniy-Mayak foundry;  
 6 - Chutuleshty; 7 - Dnepropetrovsk dist.; 10 - v. Voloshskoye; 11 - Ingul hoard; 12 - Novo-  
 kievka foundry (reconstruction).

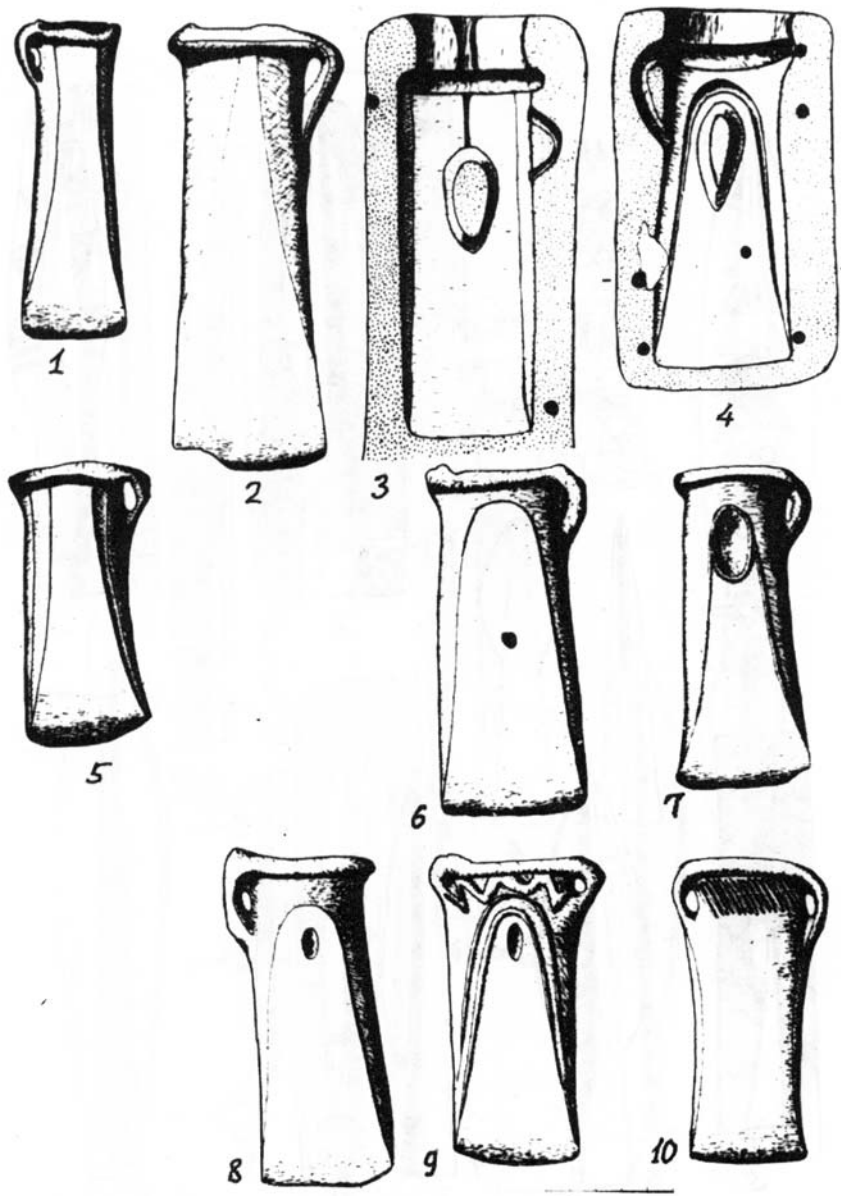


Fig. 25 Weapons of the Sabatinovka-culture tribes.  
 1,5 - Kuryachi-Lozy hoard; 2,7 - Ingul hoard; 3 - Maliye- Kopany foundry; 4 - Krasniy-Mayak foundry; 6 - Byetsilovo hoard; 8-10 - hoard near v.Khristich.

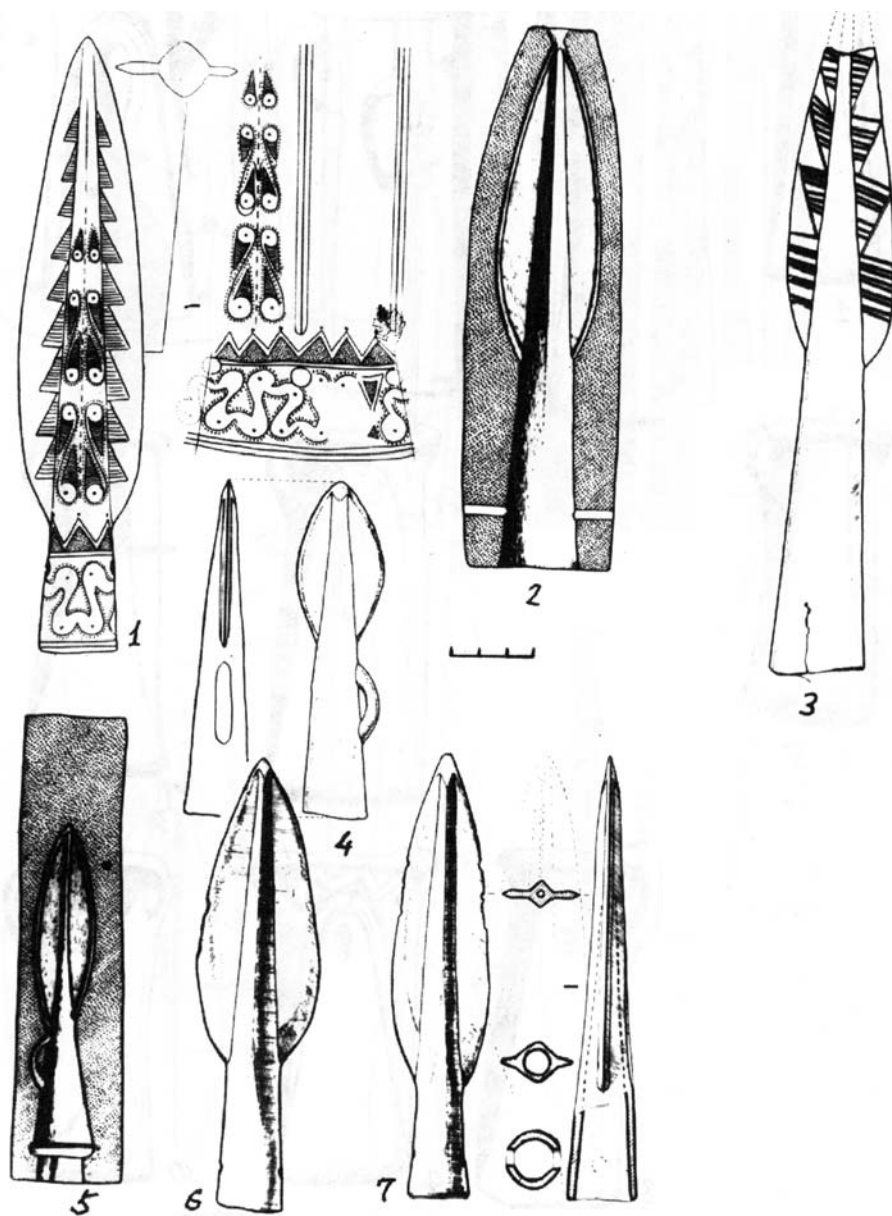


Fig. 26 Weapons of the Sabatinovka-culture tribes.  
 1 - t. Tsyurupinsk; 2 - Nenasytets rapids; 3 - Dnieper basin; 4 - v. Kamennaya Balka;  
 5 - Maliye-Kopany foundry; 6 - Kerch peninsula; 7 - v. Voloshskoye.

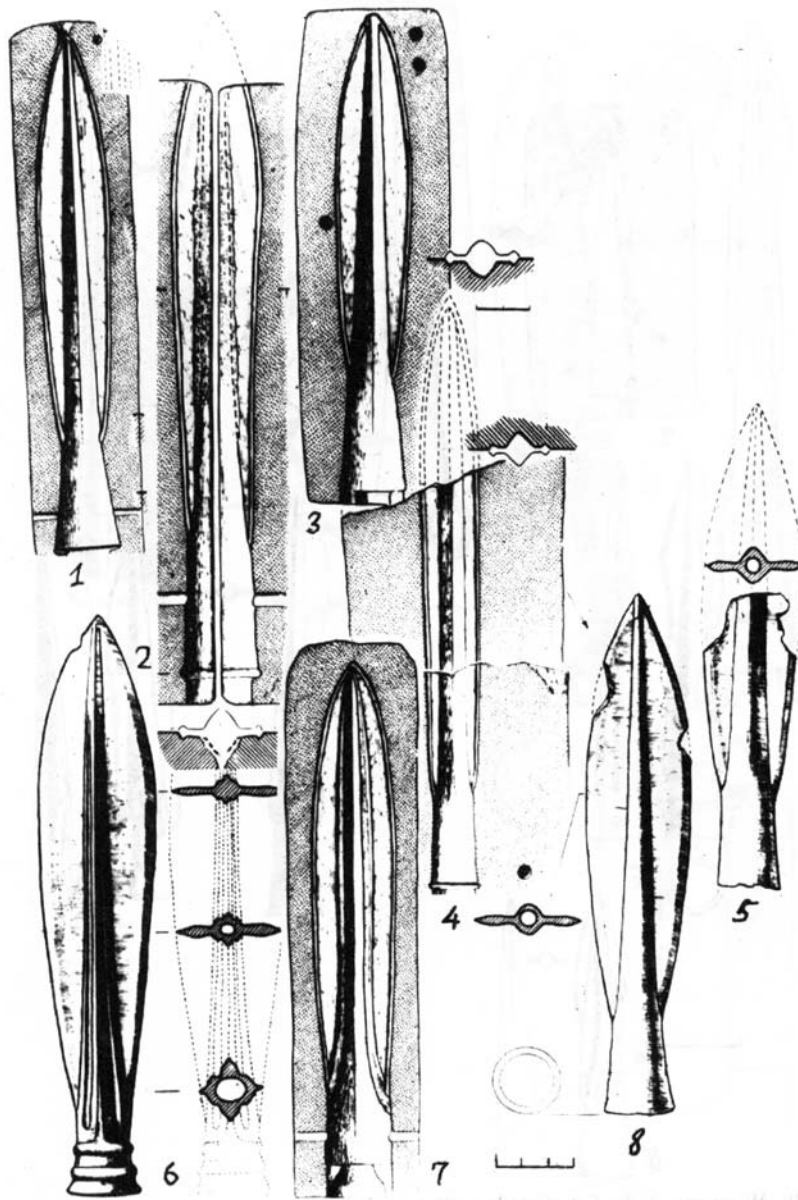


Fig. 27 Weapons of the Sabatinovka-culture tribes.  
 1-3 - Novokievka foundry; 4 - Voloshskoye foundry; 5 - Nenasytets rapids; 6 - Dnieper basin;  
 7 - Marinovka hoard; 8 - Dremaylovka hoard.

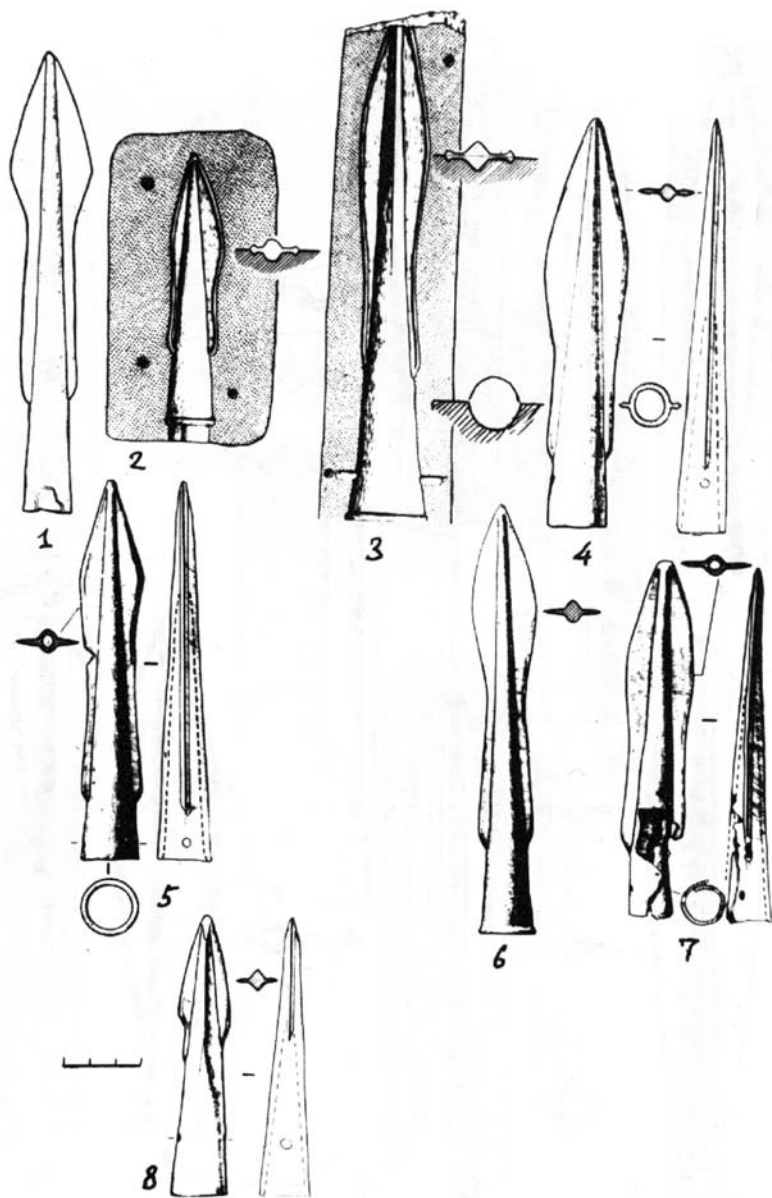


Fig. 28 Weapons of the Sabatinovka-culture tribes.  
 1 - Krasna hoard; 2,3 - Krasniy-Mayak foundry; 4 - Lozovo hoard; 5 - v. Razdolnoye;  
 6 - Igren island; 7,8 - Dnieper basin.

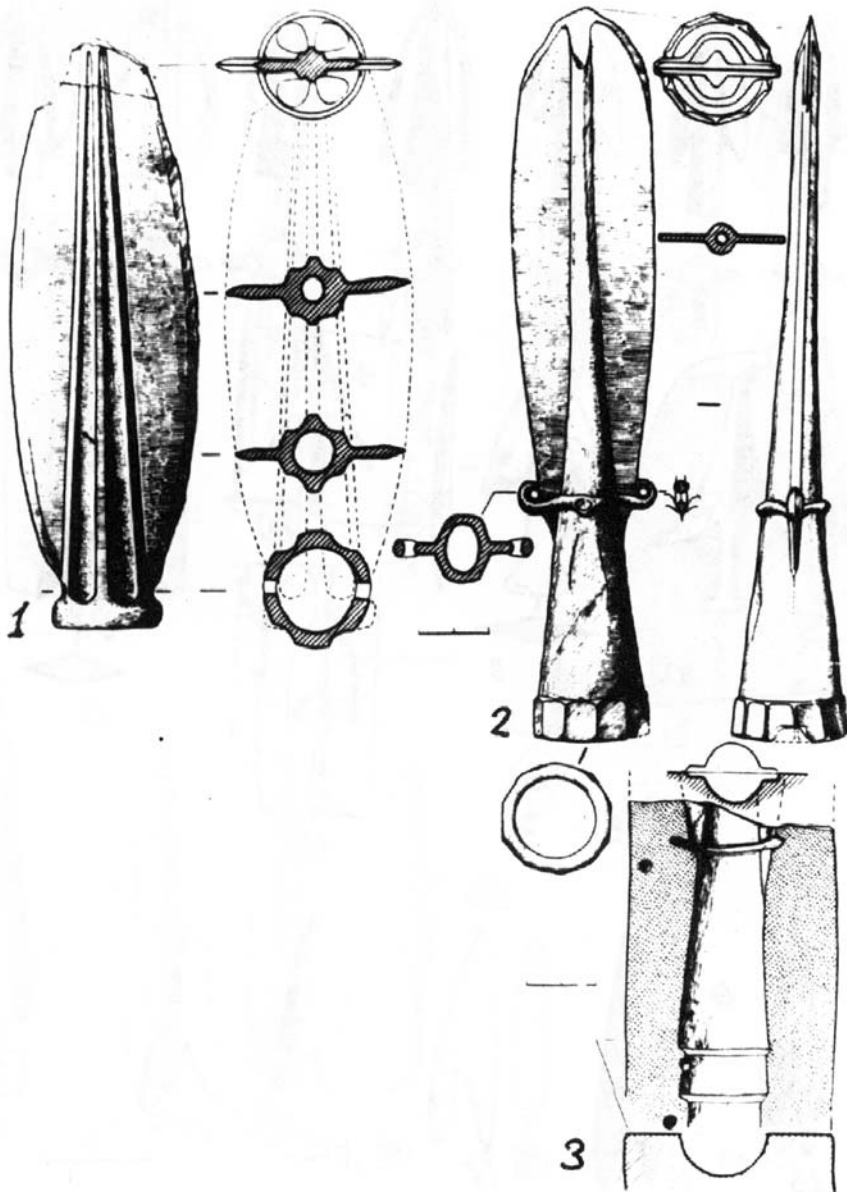


Fig. 29 Weapons of the Sabatinovka-culture tribes.  
 1 - v. Obukhovka and v. Sugakhovka; 2 - v. Mikhaylovo- Apostolovo; 3 - Novokievka foundry.

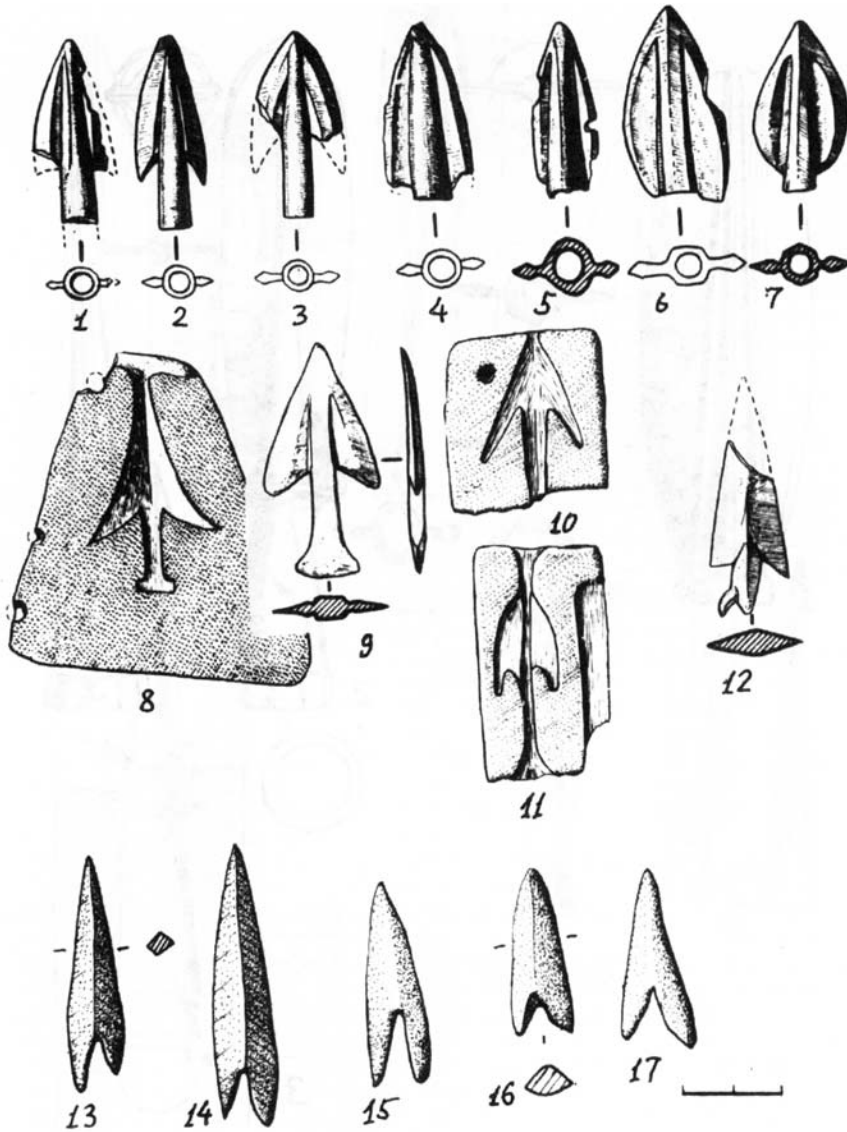


Fig. 30 Weapons of the Sabatinovka-culture tribes.

1 - burial mound near v. Kholmskoye; 2 - v. Zlatopol; 3 - set. Suvorovo; 4,5 - Skelka stronghold; 6 - t. Kakhovka; 7 - v. Dibrovo; 8 - set. Suvorovo IV; 9 - burial mound near v. Buyukany; 10 - t. Kherson; 11 - set. Slobodka; 12 - Novoselitsy ash concentration; 13-15 - set. Gyrbovets; 16 - set. Kirovskoye; 17 - set. Liventsovka.

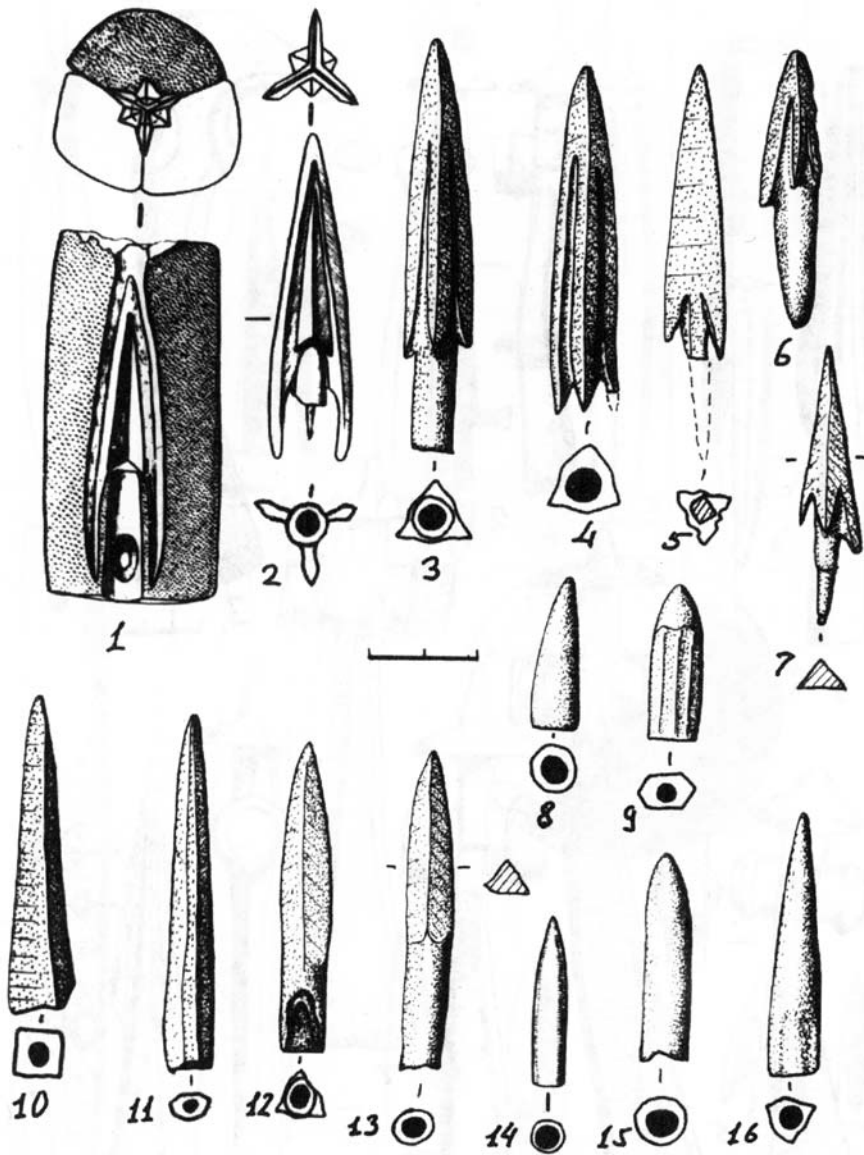


Fig. 31 Weapons of the Sabatinovka-culture tribes.  
 1,2,10,12 - set. Kirovskoye; 3,4 - set. Liventsovka; 5 - set. Stepovoye; 6 - Gindeshty; 7,9 - set. Magala; 8 - set. Sabatinovka; 11 - set. Ushkalka; 13 - set. Trusheshty; 14 - burial mound near v. Kaplany; 15 - set. Gyrbovets; 16 - set. Perisadovka.

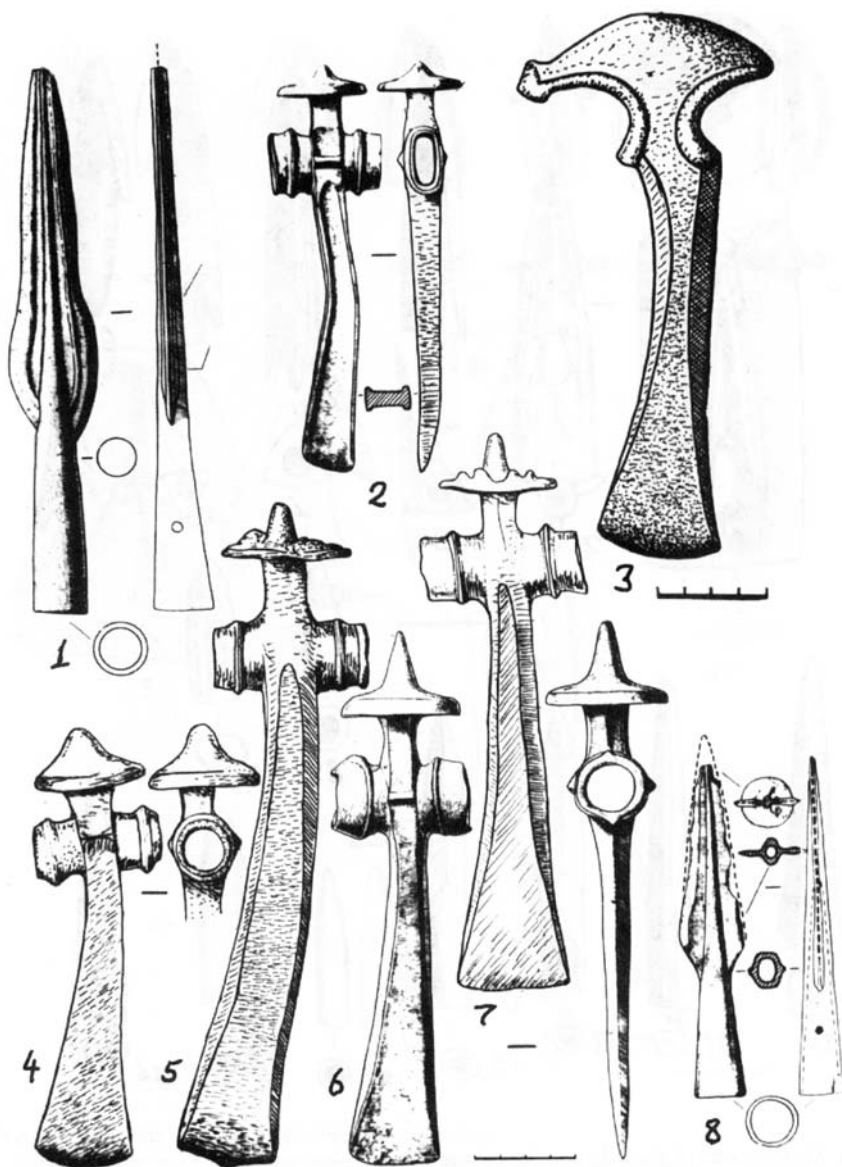


Fig. 32 Weapons of the Sabatinovka-culture tribes (Danubian group).  
 1 - Noviye-Troyany hoard; 2,8 - Nikopol hoard; 3,5,7 - Zhuravlinka hoard; 4 - Dnepropetrovsk dist., 6 - Kuryachy-Lozy hoard.

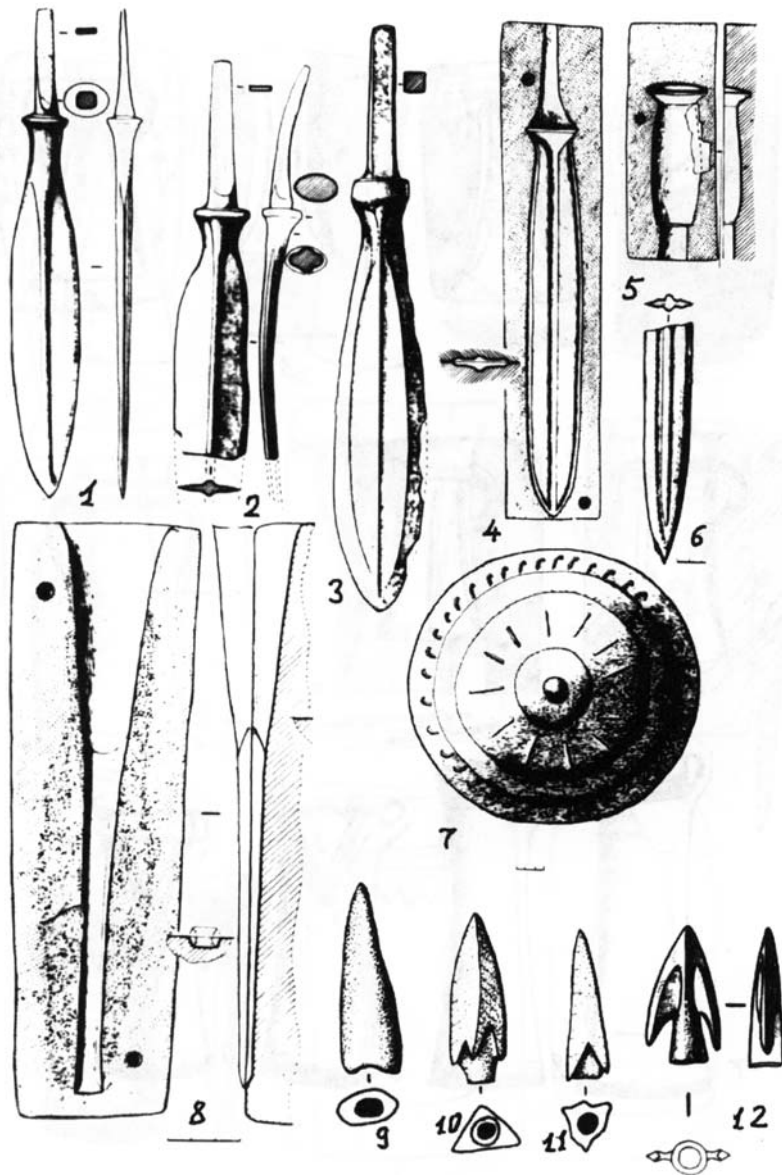


Fig. 33 Weapons of the Byelozerka-culture tribes.  
 1,12 - Kherson dist.; 2,6 - Myndreshty; 3 - Sokoleny hoard; 4,5 - Novoalexandrovsk foundry;  
 7 - Dnieper basin; 8 - Zavadvka foundry; 9-11 - set. Kirovo.

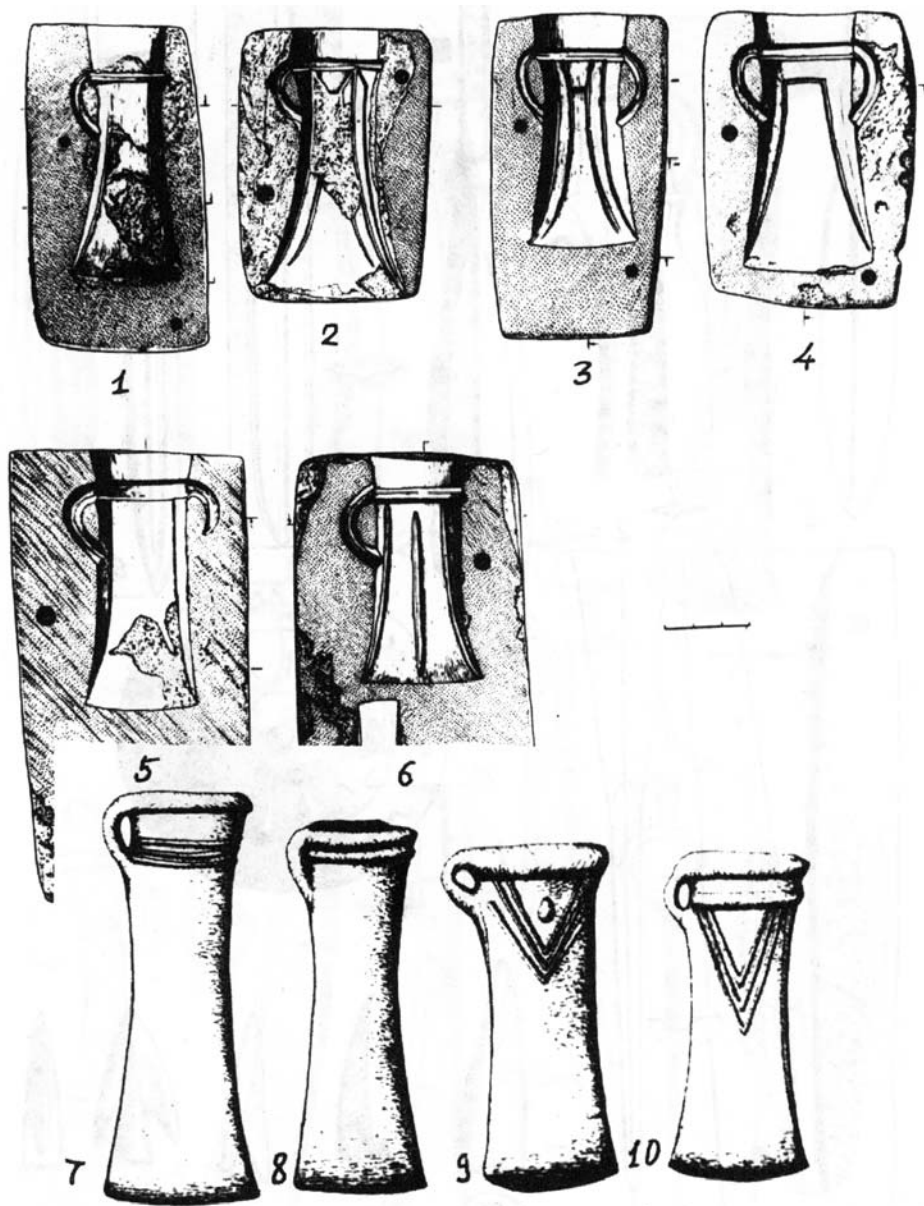


Fig. 34 Weapons of the Byelozerka-culture tribes.  
 1-6 - Zavadovka foundry; 7-10 - Novogrigoriyevka hoard.

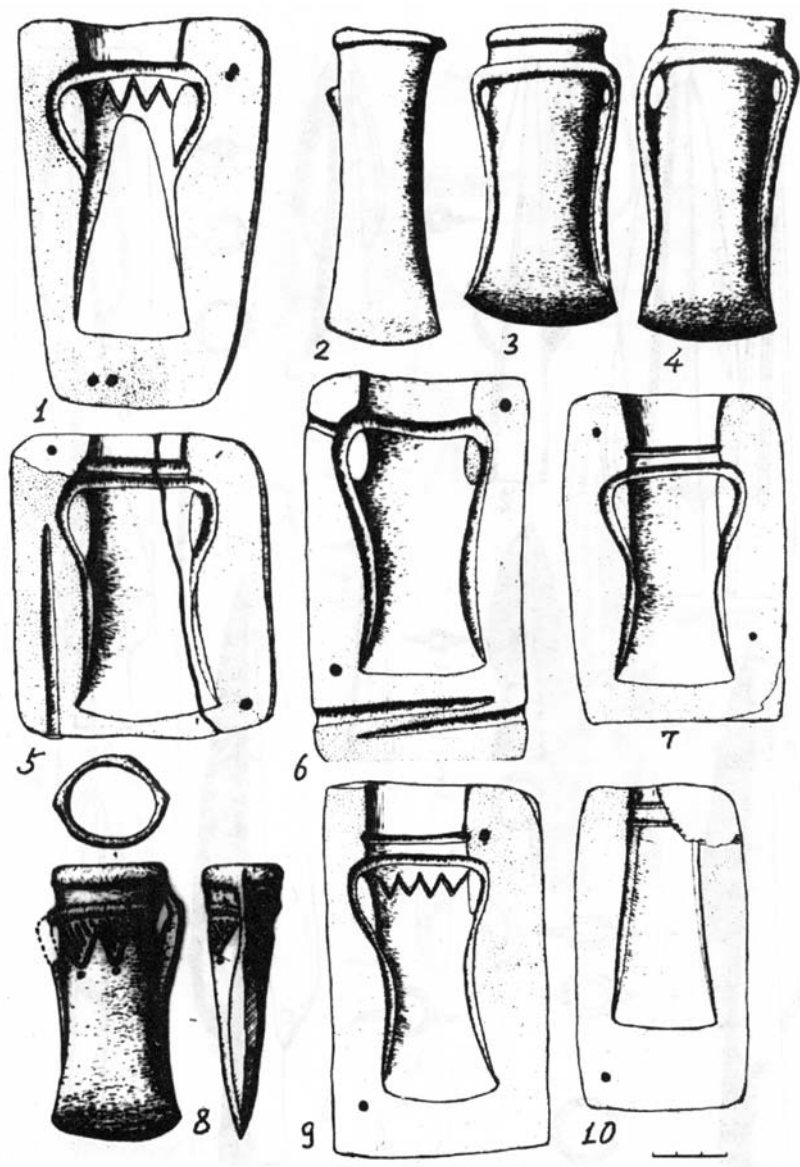


Fig. 35 Weapons of the Byelozerka-culture tribes.  
 1,5 - Novoalexandrovsk foundry; 2-4 - Sokoleny hoard; 6,7,9 - Kardashinka foundry;  
 8 - Krivoy-Kut hoard; 10 - v. Ptakhovka.

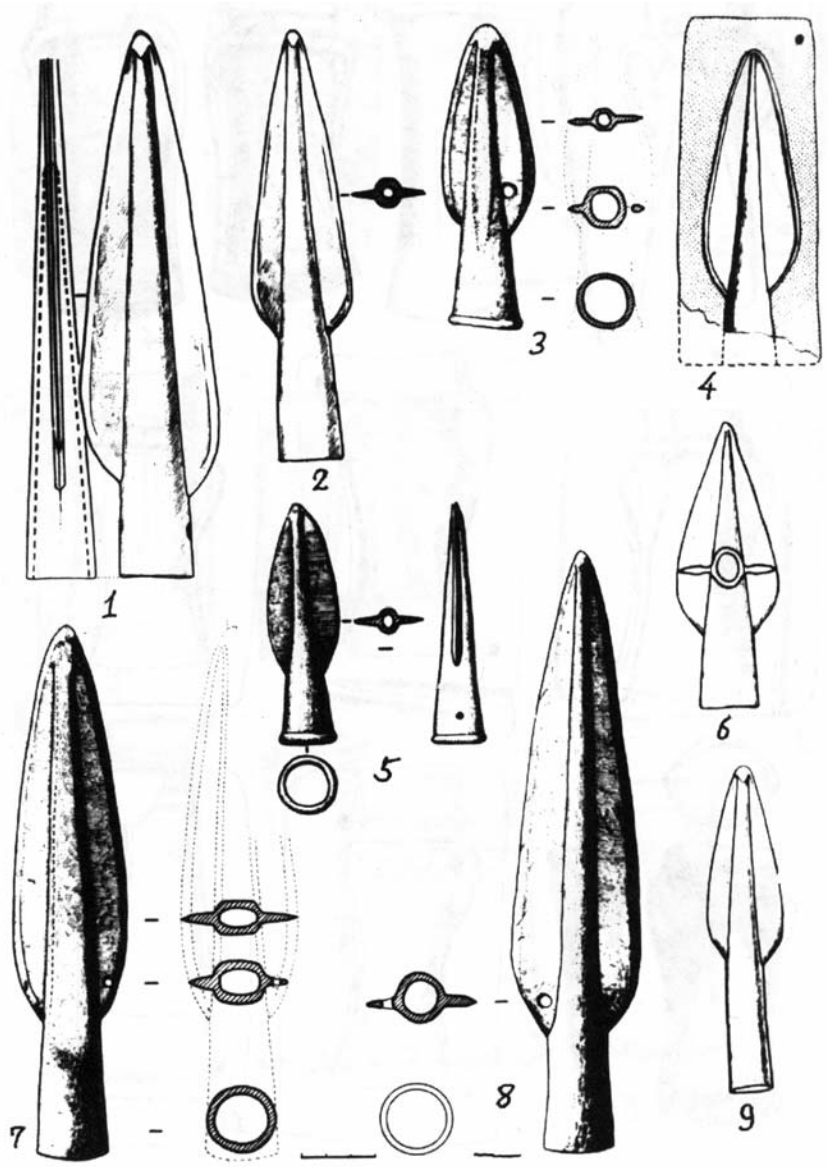


Fig. 36 Weapons of the Byelozerka-culture tribes.  
 1 - v. Danku; 2 - s. Obukhovka; 3 - v. Mishurin Rog; 4 - v. Ptakhovka; 5 - Valya-Rusuluy hoard; 6 - Kalantayev hoard; 7 - v. Mayaki; 8 - v. Sanzheyka; 9 - v. Petrovka.

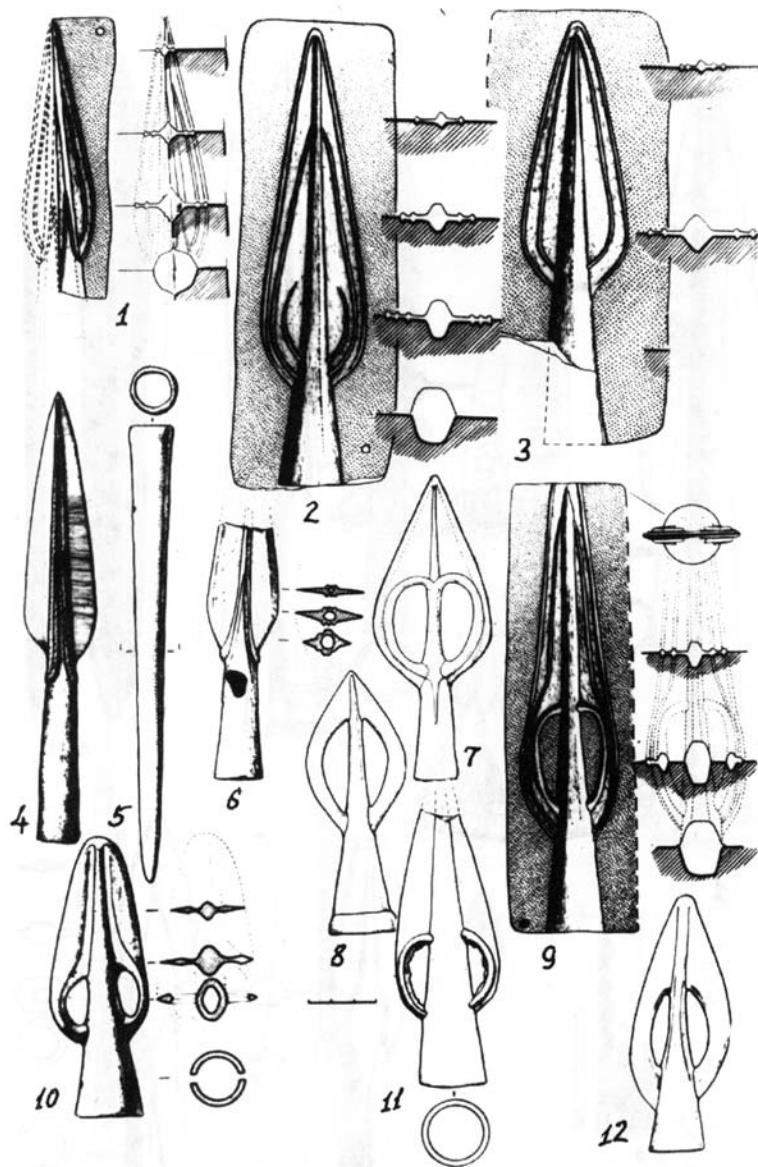


Fig. 37 Weapons of the Byelozerka-culture tribes.  
 1,9 - Zavadovka foundry; 2 - Novotroitskoye; 3 - t. Nikolayev; 4 - burial mound near v. Radionovka; 5,12 - OGAM; 6 - Zaporozhiye reg.; 7 - v. Laski; 8 - v. Leopold; 10 - v. Mishurin Rog; 11 - DPIM.

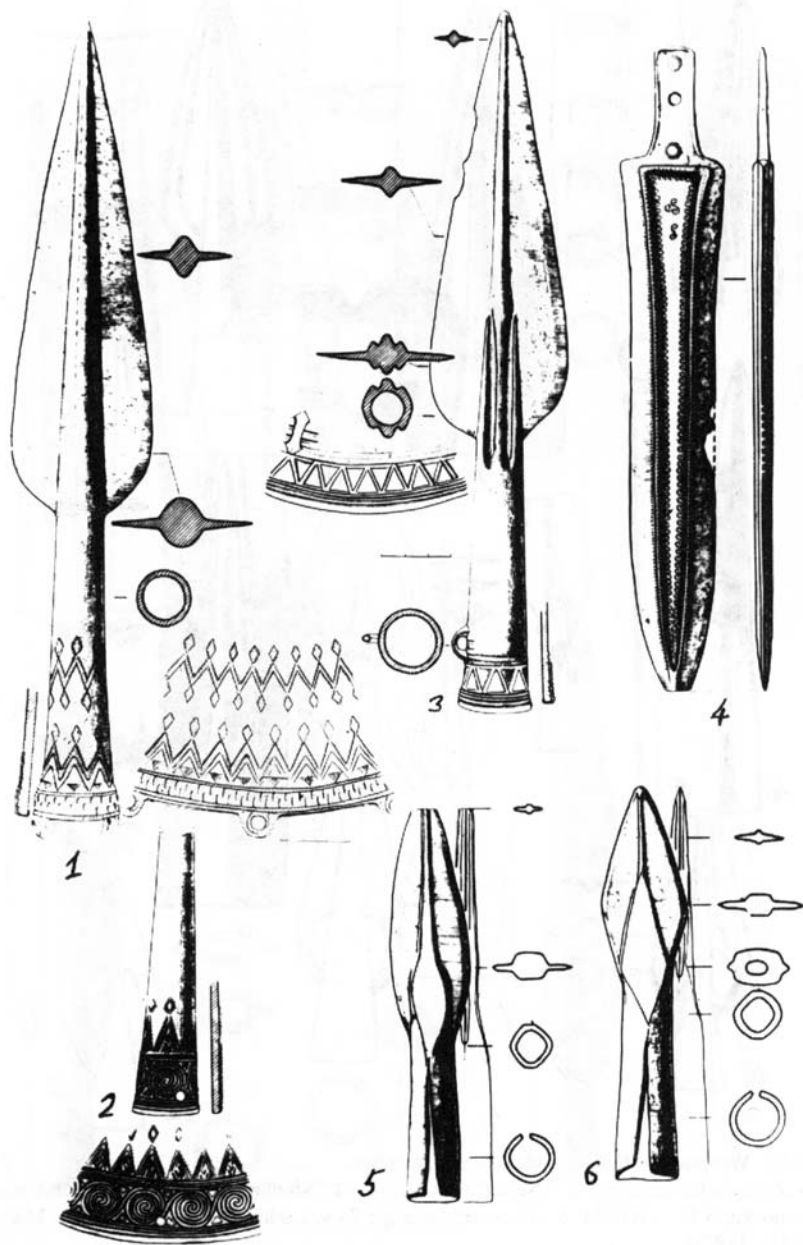


Fig. 38 1-4 - Borodino hoard; 5 - v. Kazanskaya; 6 - Traktirniy farm.

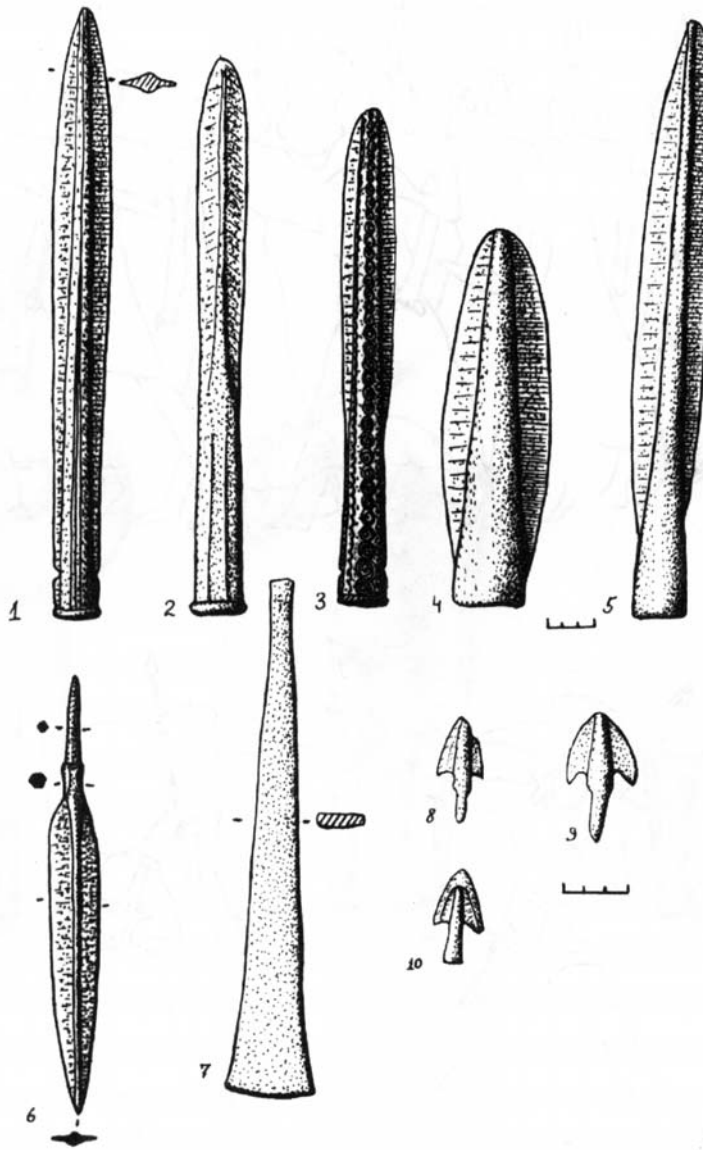


Fig. 39 Finds of North-Pontian weapons in the East-Mediterranean.  
 1 - Crete, Knoss, Isopata, burial 3; 2 - Crete, Knoss, Zafer Papoura, burial 36; 3 - Crete, Arhanes; 4 - Cyprus, Enkomi; 5 - Cyprus, Enkomi, weapon hoard; 6 - Ugarit hoard; 7 - Crete, Knoss, Zafer Papoura, burial 7; 8 - Rodos, Yalisos, necropolis; 9 - Troy, layer VIIa; 10 - Pilos, palace.

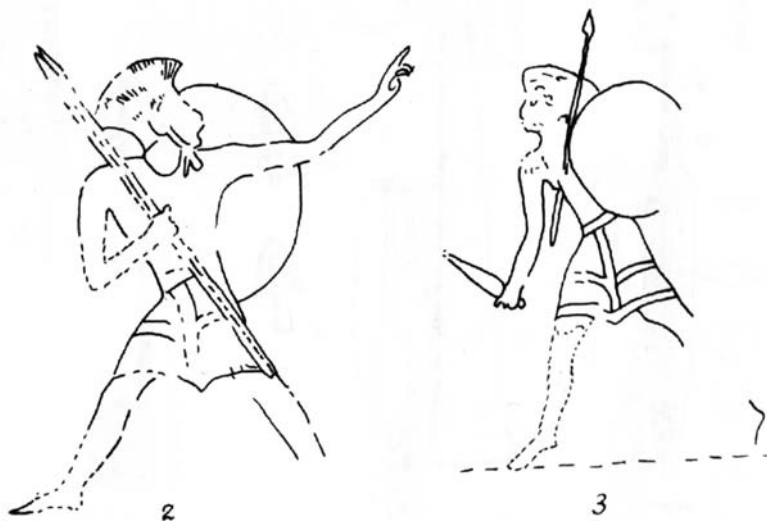
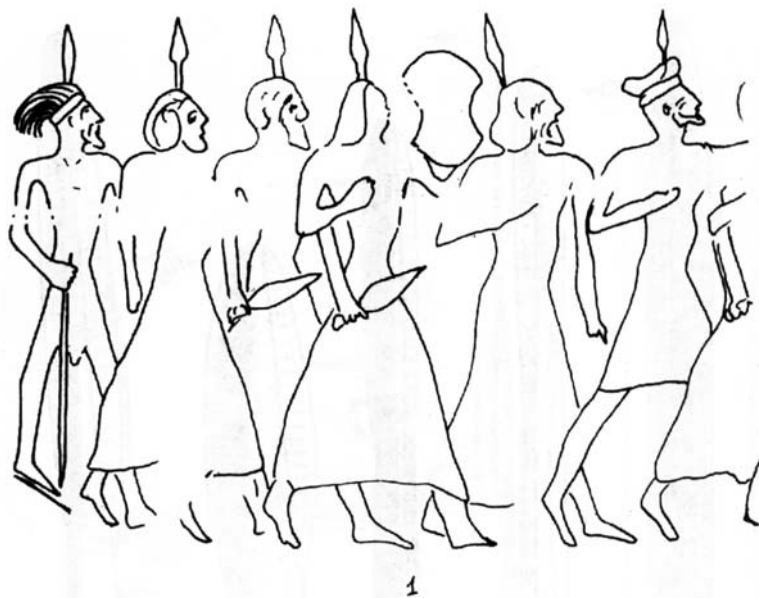


Fig. 40 1 - relief from Luksor (scene of a battle near Kadeshe);  
2,3 - reliefs from the temple in Medinet Habu with scenes of the first Libian war of Ramzes III.

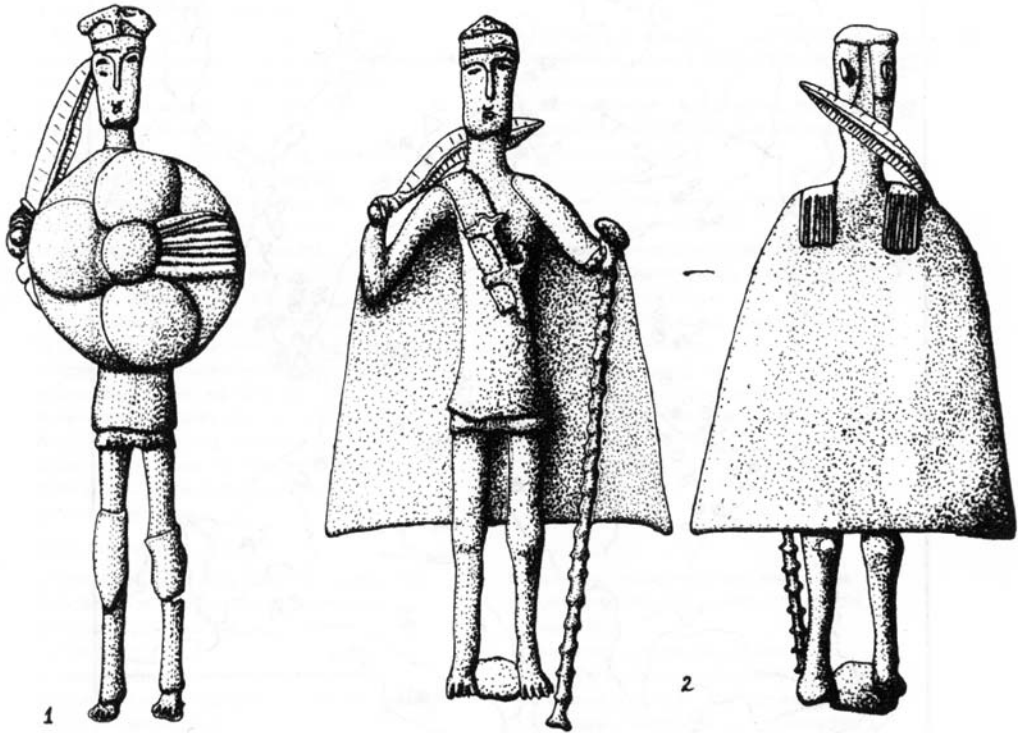
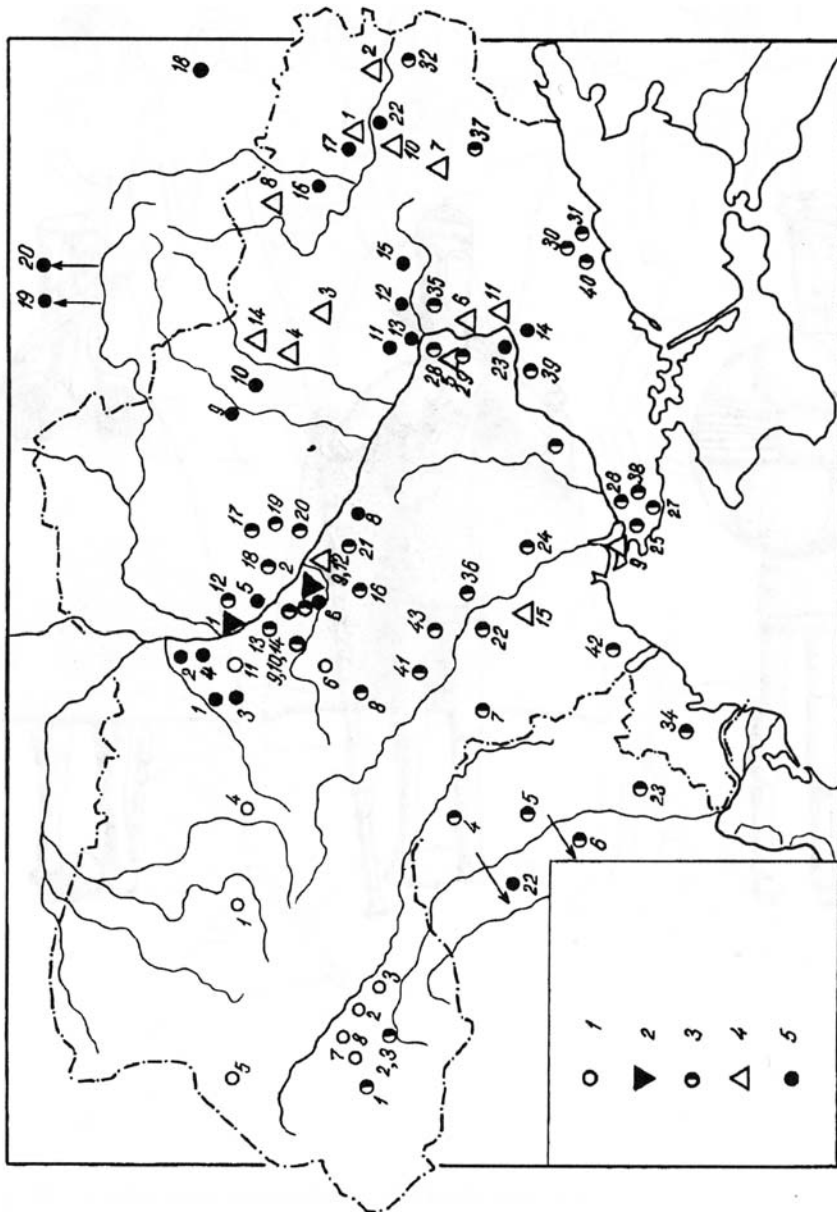


Fig. 41 Bronze statuettes from Sardinia island.



Map 1 *Armament groups of the 16th - the 13th centuries B.C.*

### *The Komarov group.*

1. Ivaniye v., Dubno reg., Rovno dist.
2. Zabolotov v., Snyatin reg., Ivano-Frankovsk dist.
3. Komarov cemetery, Komarov v., Ivano-Frankovsk dist.
4. Voytsekhovka cemetery, Kolosovka v., Zhitomir dist.
5. Kamenka Bugskaya t., Lvov dist.
6. Berezino v., Zhashkov reg., Cherkassy dist.
7. Stetsovaya v., Snyatin reg., Ivano-Frankovsk dist.
8. Prilipche v., Chernovitsy dist.

### *The Kardashinka group.*

1. Zazimiye set., Brovary reg., Kiev dist.
2. Khmelna v., Kanev reg., Cherkassy dist.

### *The Sabatinovka group.*

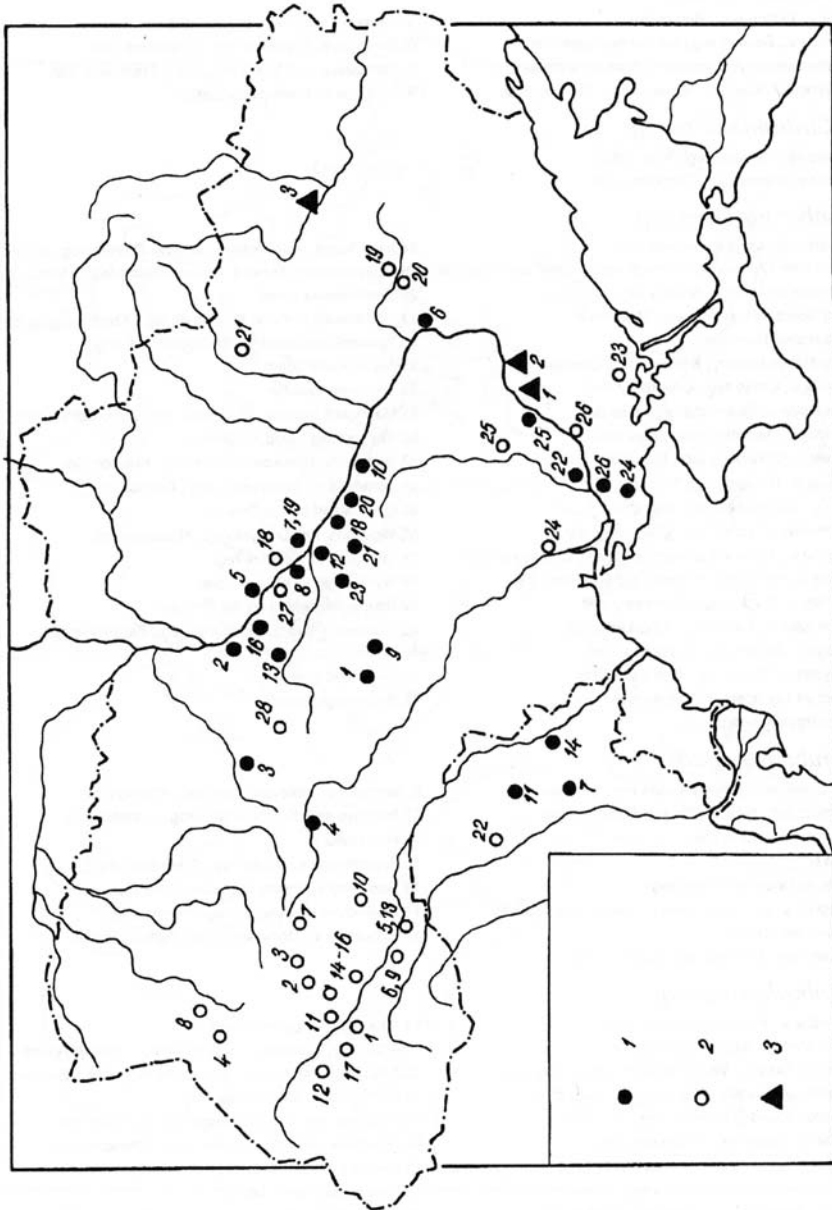
1. Ostrovets set., Ivano-Frankovsk dist.
- 2,3. Hoard near Oleshev v., Tlumach reg., Ivano-Frankovsk dist.
4. Hoard near Khristich v., Soroky reg., Moldova
5. Lozovo hoard, Nisporeny reg., Moldova
6. Krasna hoard, Rumania
7. Krasniy-Mayak foundry, Kotovsk reg., Odessa dist.
8. Ryzhovka v., Uman reg., Cherkassy dist.
9. Kashevatoye v., Tarashcha reg., Kiev dist.
10. Lesovichy v., Tarashcha reg., Kiev dist.
11. Vitachev v., Obukhovo reg., Kiev dist.
12. Vishenky v., Borispol reg., Kiev dist.
13. Bukrin v., Rzhishchev reg., Kiev dist.
- 14,15. Khmelna v., Kanev reg., Cherkassy dist.
16. Selishche v., Korsun-Shchevchenko reg., Cherkassy dist.
17. Kozintsy v., Pereyaslav-Khmelnytsky reg., Kiev dist.
18. Grishintsy v., Kanev reg., Cherkassy dist.
19. Prokhorovka v., Kanev reg., Cherkassy dist.
20. Leplyaya v., Kanev reg., Cherkassy dist.
21. Golovyatin v., Smela reg., Cherkassy dist.
22. Kuryachy-Lozy hoard, Nikolayev dist.
23. Noviyе-Troyany hoard
24. Ingul hoard, Antonovka v., Novaya Odessa reg., Nikolayev dist.
25. Maliye-Kopany foundry, Golaya-Pristan reg., Kherson dist.
26. Dremaylovka hoard
27. Novokievka foundry, Kalanchak reg., Kherson dist.
28. Vdoshskoye foundry, Dnepropetrovsk reg.
29. Avraamovka hoard
30. Androvka foundry
31. Marinovka foundry, Berdyansk reg., Zaporozhiye dist.
32. Raygorodka hoard, Lugansk t.
33. Dudchany, Novovorontsovka reg., Kherson dist.
34. Borisovka v., Tatarbunary reg., Odessa dist.
35. Igren island on the Dnieper
36. Migeys v., Pervomaysk reg., Nikolayev dist.
37. Kalinovka v., Donetsk reg.
38. Tsyurupinsk t., Kherson dist.
39. Nenasytets rapids on the Dnieper
40. Eliseevichy hoard, Berdyansk reg., Zapozhiye dist.
41. Zhuravlinka hoard
42. Byetsiiovo hoard
43. Dobryanka hoard

### *The Srubnaya group*

1. Usovo-Ozero set., Krasniy-Liman reg., Donetsk dist.
2. Kapitanovo set., Novo-Aydar reg., Lugansk dist.
3. Chutovo reg., Poltava dist.
4. Poltava t.
5. Vovnigy v., Dnepropetrovsk reg.
6. Obukhovka v. and Sugakovka v., Dnepropetrovsk dist.
7. Kalinovka set., Donetsk t.
8. Yanokhino set., Borovsk reg., Kharkov dist.
9. Ivanovka v., Golaya-Pristan reg., Kherson dist.
10. Ilyichevo set., Krasniy-Liman reg., Donetsk dist.
11. Fedorovka v.
12. Byerestyagy v., Kanev reg., Cherkassy dist.
13. Grishintsy v., Kanev reg., Cherkassy dist.
14. Shakhovka v., Kongrad reg., Poltava dist.
15. Pribuzhiye v., Domanevka reg., Nikolayev dist.

### *The Lobykovo group*

1. Ivankovichy v., Vasilkov reg., Kiev dist.
2. Suid v., Vyshgorod reg., Kiev dist.
3. Mazeptintsy foundry, Velikopolovetskoye v., Kiev dist.
4. Derevyannoye foundry, Obukhov reg., Kiev dist.
5. Golovurovo foundry, Borispol reg., Kiev dist.
6. Khmelna v., Kanev reg., Cherkassy reg.
7. Keliberda v. and Prokhorovka v., Kanev reg., Cherkassy dist.
8. Subbotovo stronghold, Chigirin reg., Cherkassy dist.
9. Bayrak v., Velikaya-Bogachka reg., Poltava dist.
10. Bulanovo v., Poltava dist.
11. Kabakovo hoard, Kobelyaky reg., Poltava dist.
12. Lobykovo hoard, Dnepropetrovsk t.
13. A foundry, Dnepropetrovsk t.
14. A foundry, Zlatopol v., Vasilievka reg., Zapozhiye dist.
15. A foundry, Vyazovok v., Pavlograd reg., Dnepropetrovsk dist.
16. Soldatovo v., Kharkov dist.
17. Studenok set., Krasniy-Liman reg., Donetsk dist.
18. Tereshkovo hoard, Boguchar reg., Voronezh dist.
19. Kvetun v., Trubchevsk reg., Bryansk dist.
20. Karmanovo hoard, tataria
21. Pilipchatino v., Krasniy-Liman reg., Donetsk dist.
22. Odaily-Podary hoard, Rumania
23. A foundry, Kapulovka v., Nikopol reg., Dnepropetrovsk dist.



Map 2 *Armament groups of the 13th - the 10th centuries B.C.*

### *The Kardashinka group*

1. Sobkovka set., Uman reg., Cherkassy dist.
2. Vita-Litovian set., Kiev dist.
3. Luka Raikovetskaya set., Zhitomir dist.
4. Sandraky v., Khmelnik reg., Vinnitsa dist.
5. Kozintsy set., Pereyaslav-Khmelnitsky reg., Kiev dist.
6. Obukhovka v., Dnepropetrovsk dist.
7. Danku v., Kotovsk reg., Moldova
8. Kanev reg.
9. Pugachevka v., Uman reg., Cherkassy dist.
10. Kalantayevo hoard, Kirovograd dist.
11. Myndreshty hoard, Teleneshty reg., Moldova
12. Dumantsy v., Cherkassy dist.
13. Tarashcha reg.
14. Sokoleny hoard, Nisporeny reg., Moldova
15. Pilyava v., Kanev reg., Cherkassy dist.
16. Veremiye v., Obukhovo reg., Kiev dist.
17. Grishintsy v., Kanev reg., Cherkassy dist.
18. Golovyatino v., Smela reg., Cherkassy dist.
19. A hoard near Medvedovka v., Rzhishchev reg., Kiev dist.
20. Chaplishche v., Chigirin reg., Cherkassy dist.
21. Balakleya v., Smela reg., Cherkassy dist.
22. A hoard near Krivoy-Kut v., Kherson dist.
23. A hoard near Staroseliye v., Gorodishche reg., Cherkassy dist.
24. Ptakhovka v., Skadovsk reg., Kherson dist.
25. Novoalexandrovsk foundry, Kherson dist.
26. Kardashinka foundry, Tsyurupinsk reg., Kherson dist.

### *The Dneestr group and "Danubian"-type articles.*

1. Grushka hoard, Ivano-Frankovsk dist.
2. Zalozhtsy hoard, Ternopol dist.
3. Myshkovichy foundry, Ternopol dist.
4. Nedliiska hoard, Lvov dist.
5. Zavadintsy hoard, Kamenets-Podolsky dist.
6. Gorodnitsa foundry, Chernovtsy dist.
7. Ivanchin v., Khmelnik reg.
8. Krekhov v., Lvov dist.
9. Gorodenka t., Ivano-Frankovsk dist.
10. Karyzhin hoard, Dunayevtsy reg., Khmelnitsky dist.
11. Galich hoard, Ivano-Frankovska dist.
12. Ruda v., Zhidachov reg., Lvov dist.
13. Pudlovtsy v., Kamenets-Podolsky dist.
14. Sosulevka v., Chertkovo reg., Ternopol dist.
15. Koropets v., Buchach reg., Ternopol dist.
16. Yazlovets v., Buchach reg., Ternopol dist.
17. Vorona v., Ivano-Frankovsk dist.
18. Keliberda v., Kanev reg., Cherkassy dist.
19. Buzovka set., Magdalinovka reg., Dnepropetrovsk dist.
20. Zalineynoye set., Zachepilovka reg., Kharkov dist.
21. Belsk stronghold, Kotelva reg., Poltava dist.
22. Valya-Rusuluy hoard, Moldova
23. Novotroitskoye v., Kherson dist.
24. Nikolayev t.
25. Radionovka v., Shirokoye reg., Kherson dist.
26. Novogrigoryevka hoard, Kherson dist.
27. Medvedovka hoard, Rzhishchev reg., Kiev dist.
28. Andrushevka v., Zhitomir dist.

### *The Zavadovka group*

1. Zavadovka foundry, Kherson dist.
2. Solokha site, Kamenka-Dneprovskaya reg., Zaporozhiye dist.
3. Bondarikha set., Izyum reg., Kharkov dist.



Map 3 *Archaeological cultures of the 16th - the 13th centuries B.C.*

1. The Komarov - culture; 2. The Noua - culture; 3. The Sabatinovka - culture; 4. The Sosnitsa - culture; 5. The Srubnaya - culture.



Map 4 *Archaeological cultures of the 13th - the 10th centuries B.C.*

1. The Gava-Goligrady - culture; 2. The Thracian Hallstatt; 3. The Kemi-Oba - culture; 4. The Byelozerka - culture; 5. The Vysotskaya - culture; 6. The Lusatian - culture; 7. The Chernoleskaya - culture; 8. The Milogrady - culture; 9. The Sosnitsa - culture; 10. The Bondarikha - culture.

Viktor I. Klochko  
Institute of Archaeology  
Ukrainian Academy of Sciences  
252014 Kiev  
Vydubickaya 40  
Ukraine

The B-PS series is an emanation of cooperation of scientific centres in Poland and the Ukraine, centered around the Team of Studies of the History of the Boprderland of the Eastern Institute — Department of Prehistory of Poland of the Institute of Prehistory of Adam Mickiewicz University in Poznań and the Institute of Archaeology of Academy of Sciences of the Republic of Ukraine in Kiev.

Orders regarding B-PS should be adressed directly to the Editorial Office (Baltic-Pontic Studies, Institute of Prehistory, Św. Marcin 78, 61-809 Poznań, Poland).

The publication is carried out within the research project No 1 P108 067 04 financed in the years 1993-1995 by Komitet Badań Naukowych (Committee for Scientific Research).

ISBN 83-86094-00-1