

**FLINT ARTEFACTS OF NORTHERN
PONTIC POPULATIONS
OF THE EARLY AND MIDDLE
BRONZE AGE: 3200 – 1600 BC**

Serhiy M. Razumov

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(BASED ON BURIAL MATERIALS)**

Serhiy M. Razumov

Translated by Inna Pidluska

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Editor's Foreword

The present study sums up the innovative research of Sergiey M. Razumov dealing with the question of funerary applications of flint artefacts documented in Pontic communities of the forest steppe and steppe tied to the prologue of the Bronze Age (3200-1600 BC), usually identified in the form of a sequence of archaeological cultures (according to Razumov as a Cultural-Historical Community; Yamnaya, Catacomb and Babyno)¹. The editors of *Baltic-Pontic Studies* believe research in this context ought to integrate studies on flint use and manufacture at the turn of the Neolithic and Eneolithic, as well as Early Bronze Age among academic circles in Central-Eastern and Eastern Europe. In this respect it could be said that to date there has been a lack of a complete picture of Pontic traditions of manufacture (technology and style), as well as an anthropological perspective of flint artefact applications.

Moreover, it is worth noting that Sergiey M. Razumov's study finds common ground with the broader cycle of studies on 'The Baltic drainage basin as a region of reception for the tradition of Early Bronze Age Pontic Cultures' in which growth has an important influence (see Chapter 7 in particular). The general question of a stage-by-stage summary of these studies shall be the subject of a forthcoming volume of *Baltic-Pontic Studies*.

In closing I would like to sincerely thank Professor Jerzy Libera (Marii Curie-Skłodowska University) and Dr Janusz Budziszewski (Cardinal Stefan Wyszyński University) for their invaluable assistance in regard to research and publication.

¹ See footnote 2, Introduction.

Editorial comment

1. All dates in the B-PS are calibrated [BC; see: Radiocarbon vol. 28, 1986, and the next volumes]. Deviations from this rule will be point out in notes [bc].
2. The names of the archaeological cultures and sites are standarized to the English literature on the subject (e.g. M. Gimbutas, J.P. Mallory). In the case of a new term, the author's original name has been retained.
3. The spelling of names of localities having the rank of administrative centres follows official, state, English language cartographic publications (e.g. *Ukraine, scale 1 : 2 000 000*, Kiev: Mapa LTD, edition of 1996; *Rèspublika BELARUS', REVIEW-TOPOGRAPHIC MAP*, scale 1:1 000 000, Minsk: *BYELORUSSIAN CARTOGRAPHIC AN GEODETIC ENTERPISE*, edition 1993).

INTRODUCTION

The emergence and development of a complex food-producing economy, dominated by extensive forms of cattle-breeding, in the territory of south-eastern Europe was accompanied by major cultural transformations. Major cultural – historical communities of the Early and Middle Bronze Ages were formed in the Steppe and Forest-Steppe areas. The environmental situation determined, to a large extent, the economic development of the Northern Pontic population towards nomadic cattle-breeding. That community developed a special kurgan (burial mound) type of burial construction, and wheeled means of transportation. Consolidation, mobility and activity of the Steppe tribes led to an increasingly complex social structure [Masson *et al.* 1982:33]. This was fully manifested as early as in the Middle Bronze and transition to the Late Bronze Age, when the Northern Pontic territory was populated subsequently by representatives of the Catacomb and Babyno² cultural – historic communities.³

Tools, made of isotropic raw materials, most commonly flint, which had dominated in the manufacture sphere for hundreds of thousands of years, started to gradually lose their importance. First and foremost, this occurred due to development of copper-and-bronze metallurgy. Metal tools had obvious strengths compared to stone tools: they were forgeable, plastic, could be sharpened at a more abrupt edge, made of re-usable material (i.e., could be melted and forged anew), and were multi-functional [Semenov 1957: 237]. Those advantages made it impossible for flint to compete with metal in such operations as cutting, chopping, and piercing, which were important not only for the economic activity but also in warfare. Hence, having seen their heyday in the Eneolithic era, stone tools were gradually replaced with copper-and-bronze ones.

Meanwhile, studies of Eneolithic – Bronze metal tools showed that as a whole they were far less common than the non-metal tools complex (even assuming that

² The term 'Babyno culture' (previously Mnogovalikovoy Pottery culture) was first introduced in *Baltic-Pontic Studies* 14:468 as agreed with Ukrainian scholars. One should note, however that in English some Ukrainian sources use the variant 'Babynce culture' and other scholars abroad the variant 'Babino culture'.

³ For taxonomic ranking of the Babyno culture (BC), or the Babyno culture circle, see Lytvynenko 2003: 38-45; 2009: 1-32.

metal tools could have been re-forged) – not only in terms of absolute quantity of finds but also in terms of functional diversity. This means that stone tools remained for a long time the key ones in the system of means of manufacture, and the most massively represented in the system of weaponry. Within the Bronze Age metal complex, over 60 percent of finds belong to the categories that were not directly connected with the economic sphere, i.e., with decorations and prestigious weapons [Chernykh 1997a:16; Skakun 1980: 34]. It is noteworthy that the same situation was reconstructed by researchers of Western European cultural entities of the Early and Middle Bronze Age [Childe 1952: 267, 327, 359; Clarke 1953: 186; Beuker, Drenth 2006: 286]. Therefore, because metal was difficult to obtain, flint remained important in a number of spheres. Hence, there is a need to undertake a complex study of manufacture and consumption of flint artefacts by the Early and Middle Bronze-Age Northern Pontic population.

Achieving this objective, however, is a challenge because of the condition of available archeological sources. Artefacts of the **Yamnaya, Catacomb, and Babyno cultural – historical communities (this study will use the following abbreviations: Yamnaya culture – YC; Catacomb culture – CC; Babyno culture – BC)** of south-eastern Europe are represented mostly by burial complexes. Hence the burial rite is our key source for the study of those societies. Cultural and chronological interpretation of materials of scarce studied settlements is itself a challenge due to the small extent of cultural layers, often mixed and ruined. First and foremost, this applies to flint artefacts that are not as chronologically and culturally informative as, for instance, ceramics or metal objects. That is why there is a need to compare materials from closed complexes, primarily from burial ones, in which flint artefacts comprise one of the most common contemporary kinds of stocks. It should be noted that unlike in settlements, the presence of flint in burial complexes was a result of first of all the norms of the burial rite and belief systems of the time. Due to that a complex study of such sources is impossible without a detailed analysis of semantic meanings of flint objects as grave goods. This does not exclude an indirect significance of such objects for reconstruction of the ancient population's economic activity, primarily for the purpose of the study of ancient technologies.

Although there is a research corpus of data from a substantial number of burials containing flint objects (while many more findings remain unpublished), there have been only a few attempts to perform their complex analysis, and those have focused on either a single category of finds (most usually, weaponry) or a particular territory and a short period of time. It is necessary to systematise the collected sources and ensure their due classification for the whole Northern Pontic area and the entire period of time under review.

This work aims at a complex study of flint artefacts and their role in the material and spiritual culture of the Northern Pontic population of the Early and Middle Bronze Age, based on the materials of burial sites.

The object of study comprises the economic and belief-system phenomena of the Early and Middle Bronze Age related to manufacture and usage of flint items.

The subject of the study is concerned with the flint artefacts and burial complexes that contain flint items.

The goal of the study is pursued through the key objectives:

- 1) Analysis of the current state of study of Early and Middle Bronze-Age flint artefacts
- 2) Cultural and chronological systematisation of sources based on a broad sample of sites
- 3) Creation of technological, functional and morphological typologies of various categories of flint items, and identification of sphere of their use
- 4) Analysis of key aspects and trends in the development of flint knapping in the Early and Middle Bronze Age
- 5) Attempts to reconstruct Bronze-Age belief systems linked to the use of flint in burial and funerary rituals

The chronological framework of this study comprises the period from late 4000 – early 3000 BC to the beginning of the second quarter of 2000 BC. The author prefers the so-called 'long periodisation', in which the beginning of the Bronze Age in the territory of South-eastern Europe coincides with the emergence of steppe burial mound (kurgan) cultures [Otroshchenko 2001: 12-16].

For the purposes of this study, the 'Northern Pontic area' includes the Steppe and, partially, the Southern Forest-Steppe from the Lower Danube and Middle Prut to the Lower Don and Middle Siverskiy Donets, including the Northern Azov area and the Crimea Steppe. It should be noted that with time due to constantly altering periods of aridisation and increasing humidity of the climate, as well as a result of human economic activity, the border of steppe and forest-steppe natural climatic zones shifted back and forth in the meridional direction [Masson et al. 1982: 333]. Therefore, the traditional term 'Bronze-Age Steppe Cultures' is used below to denote communities of the economic and cultural type of nomadic cattle breeders, regardless of the present-day localisation of the sites.

I. HISTORIOGRAPHY, SOURCE BASE, RESEARCH METHODOLOGY

I.1 THE ISSUE: RESEARCH HISTORY AND CURRENT STATUS

The research of Eneolithic – Bronze flint artefacts features a striking disproportion between a rather significant number of excavated and published materials and extremely rare attempts to comprehend their significance in specialist literature. Individual comments and conclusions are scattered across hundreds of scientific publications that are generally devoted to a broader scope of issues. Most of these publications will be mentioned when covering relevant issues in the subsequent chapters.

The history of the study of Bronze-Age flint artefacts should be viewed chronologically, in accordance with the stages of archeology and its development in respect to the Paleo-Metal Age. Conditionally, two main stages may be identified: (1) late 19th to mid-20th century; and (2) mid-20th to early 21st century.

Stage One

The period from late the 19th to early 20th century features the emergent interest of researchers in some types of flint artefacts that were mostly found in burials: primarily, in objects of warfare. It should be noted that Edward Tylor, a prominent British 19th century ethnographer and culture scientist, noted in his fundamental ‘Primitive Culture’ that flint tools had become particularly accomplished during the age of paleometals [Tylor 1989: 61].

Gorodtsov, who was the first to use the materials of the Middle Siverskiy Donets burial mound for identification of the main Bronze-Age steppe cultural entities, also paid attention to flint artefacts among other finds [1905: 174-255; 1907:211-285]. Naturally, as most contemporary researchers, he was interested, first and foremost, in the most morphologically pronounced objects, namely weaponry (arrowheads, darheads, knife-daggers). Meanwhile, Gorodtsov was the first to point to the ritual role of non-retouched flint flakes in Bronze-Age burials, and interpreted them as object of a ‘purification purpose’. This version was later shared by other researchers. Generally, publications of the time suggest that common tools and flakes that were not as attractive as ceramic or metal objects,

were traditionally left in the shadows as it were, and their detailed descriptions and images were unavailable.

The period of the 1920s to 1940s relates to the development of Soviet archeology with its typical focus on mass sources. Gorodtsov and his students continued their research at that time. The process of accumulation of materials from Bronze-Age burials continued, including flint objects, but little was done to study and interpret them. As before, their descriptions were confined to amorphous definitions like ‘a stone knife’, ‘a featureless flint’ [Loktiushev 1930: 7-32].

The work that stands out among studies in the 1930s is ‘Rodovoe obshchestvo stepey Vostochnoy Yevropy. Osnovnye formy materialnogo proizvodstva’ (‘The Kin-based Society of Eastern Europe’s Steppes. Main Forms of Material Manufacture’), a monograph by Kruglov and Podgaetskiy [1935]. For the first time, based on a massive material base it attempted to create a chronology of development of flint arrowheads in the southern part of steppe cultures [Kruglov, Podgaetskiy 1935: 59-61]. Although extremely schematic and based on outdated methodology, the chronology deserves attention as the first generalisation of its kind in historiography. Viewing the Bronze-Age steppe societies’ economy as entirely expropriating, the authors regarded arrowheads and dartheads as purely hunting weapons, while assuming that some could have also been used in armed clashes. The monograph also criticized pre-1917 archeologists and authors, contemporaries of the ‘Gorodtsov school’, for the lack of due attention to Bronze-Age flint artefacts. Yet, the authors did attempt to analyse the Yamnaya flint artefacts and drew a conclusion about the ‘microlythic appearance’ of the Culture’s tools.

Kruglov and Podgayetsky also noted the presence of various fragments and flakes in Catacomb graves, particularly assemblages of such objects later interpreted as ‘manufacture kits’. Without recognizing those ‘kits’ as a whole (due to the small quantity of materials and inadequate quality of publications), the authors drew a conclusion about the increasingly ‘saving’ attitudes of the Catacomb population: ‘Considerations of a purely material nature became superior to the religious custom’, which was assumed to have caused the replacement of ‘whole working tools, suitable for manufacture, with their fragments or simply splinters of flint that symbolized the real tools’. Similar ideas continued to be expressed by some researchers in subsequent decades. Meanwhile, notwithstanding the stage-based approach and unjustified tendency to diminish the level of the development of Eastern European steppe populations in the Paleo-Metal Age, the publication is Soviet archeology’s most significant work of the first half of the 20th century, attempting to reconstruct socio-economic relations of the period based on the maximum of available archeological data.

An important role in understanding the significance of flint items in a primitive ideology was played by an article by Zamiatin ‘*Miniatiurnye kremnevye skulptury v neoloite Severo-Vostochnoy Evropy*’ (‘Miniature Flint Sculptures in the Neolithic of North-Eastern Europe’) [1948: 85-123]. In order to explain the

phenomenon, the author presents a huge archeological and ethnographic material corpus from the cultures of Eurasia, North and South Americas, and pre-dynasty Egypt. Zamyatin managed to demonstrate that with the emergence of early metals, flint gained a special sacral meaning. Remarkably, this phenomenon appears to be universal throughout late primitive societies.

In their summarizing works on the Bronze Age, researchers had to rely on analysis of relatively common flint materials from settlement cultural layers and from complexes of grave goods. For instance, they are covered on several pages of a monograph by Popova [1955], *‘Plemena katakombnoy kultury’* (‘Tribes of the Catacomb Culture’). However, although attributed to the CC, the technique of making all the tools on long knife-like blades, knapped from large pyramid-shaped cores, today can only be perceived as a historiographic casus. Unjustifiably, ‘hoards’ of Eneolithic flint artefacts, for example, the Honcharivka ‘hoard’ from the Kharkiv Region [Popova 1955: 129, 163-166] were mistakenly attributed to the CC. Such mistakes in the study, and in other publications resulted, first and foremost, from the non-critical use of finds (mostly, the excavated material) from multi-layer settlements. Generally the researcher used the formal typology of flint tools, based on discretionary definitions of the excavation authors.

Krivtsova-Grakova had little to say about flint artefacts in her monograph *‘Stepnoe Povolzhie i Prichernomorie v epokhu pozdney bronzy’* (‘Steppe Volga and Black Sea Regions in the Late Bronze Age’); she believed they were completely absent in the Srubnaya (in her own interpretation) culture. However, it should be noted that the ‘Yamnaya time’ is described in the monograph as the period of ‘flourishing microlith technique’. The publication also quotes the idea, expressed in the study conducted by Popova, about the use of long pressure blades by the Catacomb population [Krivtsova-Grakova 1955: 50-53].

Hence, the first period of the history of study of Bronze-Age flint artefacts (i.e., the period of primary accumulation of materials) is characterized by the practical absence of special studies focusing on the issue and by discretionary (loose) definition of their types in publications. This can be explained by a generally relatively small number of publications on the Bronze Age of the Southern part of Eastern Europe.

Stage Two

The number of archeological sources began growing rapidly from the 1950s-1960s onwards, due to wide-scale excavations in new construction sites. Therefore, authors made efforts to apprehend the massive materials. Following the accumulation of data, the emergence of new methods of studying ancient implements, as well as the formulation of new objectives of archeology as a science (identification of cultural – historic communities (regions, culture circles), cultures and their local versions, the need for the most complete characteristics of their materials, socio-economic and ethno-cultural reconstructions, etc.) one could observe a gradual increase in the number of academic publications, partially or fully de-

voted to various aspects of manufacture and use of flint objects by the population of the southern part of Eastern Europe in the age of paleometals. We may identify several main directions of research, often closely intertwined: (1) formal-typological and technological description of flint items as an important component of the material culture of various regions and periods, (2) investigation of old manufacture with the help of the experimental – trasological method, (3) investigation of the typology of the Bronze Age weaponry and related attempts of reconstruction of the warfare and the nature of armed clashes between representatives of various ethno-cultural entities, (4) consideration of the social aspects of primitive manufacture (mainly in connection with ‘manufacture kits’ from Early and Middle Bronze burials) and (5) attempts to interpret semantic meanings of flint artefacts in the burial – funerary as well as other cultural complexes. We believe that the history of the study of Paleo-Metal Age flint objects in the second half of the 20th to early 21st century should be viewed through these five key directions.

(1) The vast majority of summarizing publications on the Early and Middle Bronze Age issues of south-eastern Europe archaeology, as well as a major part of publications on individual sites, contain at least casual references to flint items. However, usually they are limited to a matter-of-fact statement of their presence and approximate identification of their types based on their morphological features. That is why we believe it is necessary to focus only on individual publications that display attempts of at least a limited formal-typological and technological analysis of Bronze-Age flint items.

The monograph *‘Drevneyshie skotovody Volzhsko-Uralskogo mezhdurechia’* (‘The Oldest Cattle-breeders of the Volga-Ural Area’) by Merpert provides a rather detailed analysis of flint grave goods and refers to their distinctions in early and late Yamnaya burials [1979: 67-71]. It should be noted that at present burials of the ‘early’ stage are practically excluded from the Yamnaya community and attributed to various pre-Yamnaya Eneolithic groups [Dremov 2007:107]. Hence, there is a need to revisit the evolution of flint knapping and a change of types of flint items from Yamnaya graves in the Lower Volga, quoted by Merpert. Moreover, it is no longer possible to extrapolate his characteristics of flint tools to other regions of the YC; though, the researcher noted a tradition – common for the eastern and western territories of the YC – of occasional placement of single flakes and the most simple tools like scrapers and knives, into burial constructions.

Yarovoy, in his monograph *‘Drevneyshie skotovodcheskie plemena Yugo-Zapada SSSR’* (‘The Most Archaic Cattle-breeding Tribes of South-West USSR’) quoted statistics of flint items, but, unfortunately, failed to provide their detailed characteristics and images [1985: 79-80]. The researcher, however, made a noteworthy observation that practically all single arrowheads from Yamnaya graves had been causes of wounds, not burial objects.

Berezanskaya authored a chapter *‘Kammedobyvayushcheye i kamneobrabatyvayushcheye proizvodstvo’* (‘Stone Extraction and Stone Processing Manufacture’)

in a group monograph '*Remeslo epokhi eneolita-bronzy na Ukraine*' ('Craft of the Eneolithic – Bronze Epoch in Ukraine') [1994: 6-53]. Today that is practically the only study that focuses on the stone processing technology of almost all Eneolithic cultures in the Bronze Age of Ukraine. However, we cannot but point to its substantial drawbacks, such as the lack of clarity of technological terms, used to describe flint knapping. Generally, flint items of different Eneolithic – Bronze Age cultures were considered with sufficient care; far from all the categories of tools were sufficiently covered. Outdated data from the monograph by Popova and '*Mykhailivske poselennya*' ('The Mykhailivske Settlement'), a 1962 group publication, were not treated critically. Comparative analysis of items from various periods and territories, as well as statistics, are practically missing.

Teslenko produced a special publication, in which he tried to systematise flint artefacts from Yamnaya burials of the Right-bank *Nadporizhya* (Middle Dnieper current) [2000: 148-154], using predominantly the formal-morphological approach to their classification. As a result, the researcher focused mainly on objects of weaponry, while failing to provide any criteria for distinguishing spearheads and dartheads from knife-daggers, and taking only a quick look at more numerous working tools while practically ignoring individual, unmodified flakes in Yamanya burials.

Within recent years, Spitsina has introduced flint items of the Repin culture and the YC of the Lower Dnieper area to the academic circulation [2000: 53-75; 2001: 69-75]. In particular, she conducted a typological division of flint complexes of the middle and upper layers of the Mykhailivka settlement.

So far, technological analysis of flint items has been scarcely applied to Bronze Age materials. The reason is both objective (relatively small number of flint items from the collection of multi-layer Bronze-Age settlements, items of burial complexes containing flint being scattered in different storages/collections), and subjective factors (experts' lack of knowledge in regard to technological analysis methodology in the Bronze Age). The potential for fruitful cooperation between Stone and Bronze Age experts for the study of Bronze-Age flint artefacts can be seen from results of a joint investigation of materials from the Srubnaya and post-Srubnaya settlements' of the Siversky Donets area, conducted by Kolesnik and Gershkovich [1996: 8-13; 2001: 97-118]. A rather representative sample was used to outline general features of organisation of flint knapping in the Late Bronze Age on the territory of present-day Eastern Ukraine. Kolesnik's observations of technology can be used for the study of Early and Middle Bronze flint items, for the main methods of flint knapping had changed little within the entire epoch.

Recently, other Ukrainian researchers have started publishing and analysing flint collections of Eneolithic-Bronze settlements from the technique typology perspective [Berestnev 1997: 84-95; Sanzharov et al. 2000: 83; Britiuk 1996: 32-34; 1997: 34-41; 2001: 54-68; 2006: 33-40].

We should also note the most recent monographic studies focusing on individual regions and periods of the Bronze Age, which offered, among other things, typology of flint artefacts. Those include a detailed description of early Catacomb sites, produced by Bratchenko [2001], a situational review of the present-day left-bank Forest-steppe of Ukraine in the Middle and Late Bronze Age in a publication by Berestnev [2001], and descriptions of Bronze-Age Crimea completed by Toshev [2007]. However, none of those publications contain broad conclusions about either manufacture, or use of such artefacts in the household or the burial rite.

2) The publication of a monograph by Semenov, '*Pervobytnaya tekhnika*' ('Primitive Technology') [1957] was of a major research importance. For the first time, it developed methods of archeological experiment and micro-trasological analysis, which could be applied to objects of any period. Moreover, it enabled a more precise definition of functions of tools and specific features of ancient production techniques. The publication and subsequent works '*Razvitie tekhniki v kamennom veke*', ('Development of Technology in the Stone Age') [1968] by Semenov also addressed stone tools of the Paleo-Metal Age, including harvesting knives, hurling weapon heads, 'arrow shaft strengtheners', etc.

The group monograph '*Mikhailivske poselennia*' ('Mykhailivke Settlement'), published in 1962, may be regarded as the start of contemporary study of flint items of the Northern Pontic YC tribes. Not only did it offer a detailed description of 11 categories of flint tools, but also made justified assumptions about the nature of extraction of raw materials, as well as primary and secondary flint knapping. For the first time, a study on the Paleo-Metal Age suggested that the transition from a blading flint knapping technique to a flaking technique had not been caused by the decay of manufacture but by the change of its kind [Lahodovska *et al.* 1962:129]. However, the flint objects found in the middle and upper layers of the Mykhailivka settlement were analysed together, thus, denying us an opportunity to trace their changes in time. Recently, Korobkova studied the Mykhailivka objects trasologically and divided them into layers [Korobkova, Shaposhnikova 2004: 43-44; Korobkova, Shaposhnikova: 2005].

Special attention should be paid to a recent monograph '*Poselenie Mikhaylovka – etallonnyi pamiatnik drevneyemnoy kultury*' ('The Mikhaylovka Old Yamnaya Site') [2005]. Among other issues, the study provided a detailed account – at the contemporary level of knowledge – of the flint knapping technique used at the Mykhailivka settlement, separately for each of the three layers; it identified flint knapping sites; finally, it conducted a detailed micro-trasological analysis and obtained the results that substantially added to accuracy and complemented the existing ideas of the use of flint tools in the manufacture system of the steppe population of the Eneolithic – Early Bronze Age. The value of that work is hard to overestimate.

However, some critical remarks need to be made in regard to some of the ideas expressed in the monograph. First, they refer to the interpretation of trasological-planigraphical studies conducted by Korobkova, i.e., the reconstruction of economic and, more specifically, manufacture activity of Mykhailivka's population. In our view, the unconditional use of quantitative data in such reconstructions is not appropriate. Specific deposits of various categories of objects in the cultural layer should be taken into account. The presence of 'dozens and hundreds of differentiated skin-processing tools' in the upper layer should not serve as a reason to mention the existence of 'workshops' with major manufacture outputs and 'professional specialists' employed, for scrapers and piercers could be broken or lost very easily, and it is quite natural that a large number of them piled up gradually in the cultural layer for centuries during the time of the settlement. This is particularly true for argicultural tools (sickles and hoes) and arrowheads, which in normal conditions would be broken and lost mainly outside of the settlement.

Therefore, 103 arrowheads found among the upper-layer dwellings may be the evidence of armed clashes on the territory of the settlement⁴ rather than of 'improved methods of hunting' [Korobkova, Shaposhnikova 2005: 268]. Scarcity of agricultural tools in the middle layer, by all means, cannot be a reason for a conclusion about the complete absence of argiculture and, as a result, about 'buying grain for baking bread from the grain-growing people of the neighbouring Trypillya settlements' [Korobkova, Shaposhnikova 2005: 253]. It is even more curious to see the claim about the emergence of grain-growing practices of the population that left the upper (late Yamnaya) layer, 'under the influence of Trypillya neighbours' [Korobkova, Shaposhnikova 2005: 257]. As of today, there is no data indicating that Mykhailivka III was synchronous with even the latest of Trypillya sites [Nikolova 1994: 186], let alone the significant geographic distance between them.

Neither does the absence or scarcity of metal tools point to the absolute predominance of stone tools [Korobkova, Shaposhnikova 2005: 259], for the former, if broken, simply were not thrown away but smelted again.

Some reservations should be voiced about identifying 'craftsmen's workshops' with the help of trasological-planigraphic analysis. The very presence of processing sites in most cases raises no doubt, but we cannot agree with their interpretation. It should be noted that the cultural layer of Mykhailivka totalled, in some places, up to 2.4 metres and could have been accumulated for centuries. Manufacture tools and waste could accrue gradually throughout the centuries. Therefore, dozens of their clusters in the territory of the settlement may indicate that its residents had periodically engaged in various domestic manufactures (flint knapping, processing stone, metal, leather, wood, etc.) in the same places. This allows linking such clusters with individual households, but not with 'workshops of highly-skilled specialists' [Korobkova, Shaposhnikova 2005: 257].

⁴ See Kiyashko, Poplevko 2000:241-258.

Furthermore, the strongly expressed view about the presence of ‘artisan-professionals’ specialised in manufacture of flint arrowheads and spearheads, even though ‘no special workshops for their manufacture have been found’ [Korobkova, Shaposhnikova 2005: 281]. Instead, individually fluted abrasives (‘strengtheners’) and arrow- and spearhead blanks indicate, more probably, that arrows were made in every household (this very conclusion was made for the Middle Bronze Age Leventsovka fortress by Bratchenko [2006: 177]). Hence, in that work Korobkova could not avoid some modernisation of the nature of late primitive manufacture, which, unfortunately, is also the case in other researchers’ publications.

Generally, experiments and trasology, previously tested on Stone Age tools, began to be applied broadly to the study of artefacts of the Paleo-Metal Age only since the 1980s. Here, we should start with acknowledging the publications by Skakun [1980: 34-36; 1992: 18; 1999: 98], Korobkova, Sharovskaya [1983: 88-94] and other authors.

Korobkova stressed that ‘it is important to study stone, flint, bone, and ceramic tools of the Paleo-Metal Age, when communities use metal artefacts for their working processes, which, though, do not replace traditional kinds of non-metal tools’ [1983: 68-69].

The late 20th and early 21st centuries were marked by a number of research publications that paid even more attention to trasological study of flint items of the Paleo-Metal Age. This can be seen from a substantial number of studies focusing on individual sites and categories of tools [Chaikina 1994: 127-136; Razzokov 1994: 151-156; Shirinov 1999: 17-18; Mitiaeva 2000: 153-159; Gijn 1999: 38].

As trasologists have repeatedly stated in their works, the assumption about the decay and degeneration of flint knapping in the Bronze Age was incorrect [Sharovskaya 1994: 119-126; 1999: 80-82; Korobkova et al. 1999: 88-91].

In this context an article by Subbotin collected and systematised valuable information about flint and stone items of the YC of the western Northern Pontic area [Subbotin 2002]. Later on, Subbotin published a monograph [2003: 12-18, 37-66] describing the items in more detail, with the use of petrographical and micro-trasological analysis that had been conducted by Petrun and Shaposhnikova, respectively.

Importantly, the results of trasological analysis of well-preserved wooden objects from an early Yamanya complex (Sugokliya barrow, g. 5, Kirovohrad) provided convincing evidence of the predominance of metal chopping and cutting tools over stone ones in the process of making means of transportation already at the beginning of the Bronze Age, although metal finds in the burials were rare [Korobkova, Razumov 2006: 87-91].

3) At the current stage of research, objects of weaponry remain the most popular category in the investigation of flint items of the Paleo-Metal Age.

For instance, arrowheads and spearheads from the Konstantinovka settlement at the Lower Don, and trasological-planigraphical analysis of tools from that

settlement are in the spotlight of a number of studies conducted by Poplevko [1990: 92-94; 1994: 175-181; 1999: 95-97; Kiyashko, Poplevko 2000: 241-258].

Many issues, linked to the weaponry of the population of South-eastern Europe in the Early and Middle Bronze Age, were raised in publications by Bratchenko. As early as in his 1976 monograph, *'Nizhnee Podone v epokhu sredney bronzy'* ('The Lower Don Area in the Middle Bronze Age') he provided a detailed analysis of flint arrowheads from the Leventsovka fortress, and described not only their morphology, but also their manufacture technique [Bratchenko 1976: 124]. The issue of hurling weapons was explored by the author in his article *'Luk i strily doby eneolitu – bronzy Pivdnya Skhidnoi Yevropy'* ('Bows and Arrows of the Eneolithic – Bronze Age of the South of Eastern Europe'), which presented a vast collection of materials on stone arrowheads [Bratchenko 1989: 70-82]. Finally, his article *'Sootnoshenie kamennoy i bronzovoy industriy v eneolite i bronzom veke'* ('Correlation of Stone and Bronze Industries in the Eneolithic and Bronze Epoch') was one of the most complete works of its time focusing on stone grave goods of steppe cultures [1995: 79-94]. However, the author paid more attention to weapons, while leaving aside other categories of the grave goods. The views, expressed in that article, were developed by Bratchenko in his further publications [1996: 32-57].

Typology and dissemination of weapons of the southern part of the eastern European population were discussed in a special chapter of his monograph about the Leventsovka fortress [Bratchenko 2006: 239-295]. Having accumulated the author's findings of the previous years, that chapter is, in fact, the most fundamental recent work of all studies devoted to the weaponry of the south-eastern European population of the early and beginning of the Late Bronze Age. Specifically, it offers detailed typology of contemporary flint arrowheads. It should be noted that typology is based exclusively on morphological grounds, while almost disregarding technological differences of formally identical objects. The south-eastern European arrowheads of the Eneolithic – Bronze Age were addressed in much detail, with the use of numerous western European, Caucasian, and Middle East analogies. Unfortunately, unlike in the case of arrows, the author paid too little attention to the issue of spearheads, dartheads and knife-daggers of the Early and Middle Bronze Age.

Objects of weaponry, for instance, heads of Bronze-Age hurling weapons, were studied by Nielin in the Trans-Urals [1993: 40-41; 1999: 2-22], Goraschuk and Kuznetsov in the Volga Region [1999: 107-108], and Tkachov in the Don areas [1999: 112-117]. Arrowheads of Eastern European Bronze-Age cultures are the matter of focus of a chapter in a monograph by Kuzmina *'Abashevskaya kultura v lesostepnom Volgo-Urale'* ('The Abashevo Culture in the Forest-Steppe Volga and Urals area') [1992: 59-121]. The author analyzed typological and morphological features of arrowheads originating from sites of the steppe, forest-steppe and forest cultures of Eastern Europe of the Middle and Bronze Age, and

compared their parameters in order to identify cultural connections and development rules for their different types. The above publication is one of the most complete studies of the Bronze-Age hurling weapons, alongside with investigations by Bratchenko and Klochko. When searching for analogies, these Russian authors refer to materials from the Northern Pontic area. The important criteria, which they proposed for classification of stone weapon-heads of the Paleo-Metal Age, are partially used in this study.

Weapons of Eastern European steppe cultures were briefly described in studies by Gorelik that focused on primitive warfare and weaponry [1993: 62-72] and Stegantseva [1998: 52-57; 2005: 28-33]. Unfortunately, statistic samples used in the latter two studies are too incomplete. Flint arrowheads of the BC were analyzed in detail and classified in an article by Litvinenko [1998a: 46-52]. In one of his recent works the researcher provided a brief description of flint tools and weapons that had been discovered in graves of the Dnieper-Don BC that he had identified [Litvinenko 2006: 178].

The weaponry complex of the Northern Pontic Region's population of the Eneolithic, Bronze and the beginning of the Early Iron Age is the focus of research by Klochko. Its fullest analysis was provided in the monographs 'Weaponry of Societies of the Northern Pontic Culture Circle: 5000-700 BC' [Klochko 2001] and '*Ozbroyennia ta viyskova sprava davnoho naseleння Ukrainy*' ('Weaponry and Warfare of Archaic Populations of Ukraine') [Klochko 2006]. A major part of those studies is devoted to flint weapons of the Early and Middle Bronze Age. The author attempted to collect and systematise a huge volume of materials, though for that particular kind of weaponry, in our view, that objective has not been fully achieved. Apparently, it was the overwhelming nature of the study that also prevented the author from providing concrete data of the number of complexes that had contained specific objects of weaponry and of a correlation of their various types. To a certain extent, this also reduces the accuracy of the conclusions linked to reconstructions of the warfare and the nature of armed conflicts between the peoples of the Northern Pontic Region in the Early and Middle Bronze Age.

Hence, objects of weaponry currently comprise the best studied category of Bronze-Age flint artefacts. However, there is a need to have summarising studies that would be based on the broadest possible samples, and of detailed research into technological and functional aspects.

4) Since about the 1970s, a large number of publications has been gradually produced, related to the social interpretation of complexes that contained so-called 'manufacture kits'. Most of those sets contained flint objects (as well as raw materials and manufacture waste) and flint knapping tools. Specifically, we have counted 118 burials in the Northern Pontic Region, containing such 'manufacture kits', which comprises about 8% of the total number of flint-containing burials and less than 1% of the total number of complexes in our sample. Researchers differ

in their opinions about the interpretation of such complexes [for an overview of historiography, see: Chernykh 1997a: 12-45]. The key assumptions can be divided into three groups: (1) burials with ‘manufacture kits’ are graves of craftsmen – experts in specific branches of primitive production, (2) ‘manufacture kits’ mark ‘elite’ burials, i.e., graves of military chiefs, priests, leaders of kins that controlled the most important branches of manufacture (authors often unite the first and the second versions) and (3) the available source base does not allow making radical conclusions in so far as the direct connection of elements of the burial rite with economic or social realities of the ‘living’ culture is often incorrect, and generally the issue of the nature of primitive production needs to be addressed at a new quality level of methodology. In our view, the latter assumption appears to be the most appropriate, given the contemporary level of knowledge (see Chapter V.3).

It should be emphasized that the investigation of ‘manufacture kits’ containing flint items is only part of a major issue of identification of socio-economic forms of primitive kinds of manufacture, which requires separate further investigations. With that in mind, we will confine ourselves to only a brief overview of some studies that address the issue of primitive crafts in connection with ‘manufacture kits’ that contained flint objects.

First, a generally recognized interpretation of individual assemblages of grave goods in burial complexes of the Early and Middle Bronze Age (primarily for sites of the CC) as ‘manufacture kits’ was formed relatively late, in the 1970s-1980s. Since then the ‘kits’ have been regarded separately, based on clearly defined elements, most significantly, the presence of raw materials, special tools, semi-finished objects, and functional goods in a variety of combinations [Smirnov 1983: 171; Nikolova, Buniatian 1991: 133-135] (however, some researchers identified ‘manufacture kits’ based on only one or two objects, which created a so called misreading). Those elements, presumably, serve as arguments in support of interpretations of burial complexes with the ‘kits’ as burials of ‘professional craftsmen’.

For instance, Kovaleva expressed this opinion in a number of her publications. Among others, she raised important issues of identifying ‘craftsmen’ by such markers as flint knapping, ‘manufacture kit’ materials, as well as the description of the dissemination of raw flint in various Regions [Kovaleva 1983a: 61-63; 1984: 88-90]. In her doctoral thesis, she addressed – among other things – flint items from the Eneolithic – Bronze burial site in the area between the Samara and Oril rivers. Specifically, she used her materials to draw a conclusion about abrupt changes in the flint knapping technology in the period from the early to established Eneolithic (by the latter the researcher meant Early Yamnaya complexes) [Kovaleva 1987: 130]. She also supported the hypothesis by Klein [1968: 16] about Catacomb arrowheads as an indicator of high social status of the person buried, and extrapolated that hypothesis to Yamnaya burials [Kovaleva 1987: 130].

However, we cannot agree with the researcher's conclusions about the emergence of a flint knapping 'community craft' during the Catacomb period, which was allegedly proved by 'craftsmen's burials' that had had 'private ownership of the means of production' [Kovaleva 1987: 296]. Let us recall that burials containing manufacture tools were known at least as early as in the Mesolithic, and that the YC complexes feature a substantial number of 'production kits', although Kovaleva reconstructs purely household manufacture for the Yamnaya period. The point about blade-based edged chisels as an indicator of early Babyno burials [1987: 204] is unclear. Such chisels disappear as early as in the Eneolithic, and their presence in burial constructions may be explained by their secondary usage, probably, for a ritual purpose.

The interpretation of 'manufacture kits' as a marker of burials belonging to professional craftsmen was also made by Constantinescu [1987: 43-44] and Pustovalov [1990: 97; 1992: 29; 1995a: 32; 1995b: 211-221; 2000: 95-105].

Attempts to address the issue of the nature of Bronze-Age crafts in the south of Eastern Europe were made in a specialised article by Berezanska and Liashko [1989: 18-30]. However, in our opinion, the authors only outlined the circle of key issues, while the conclusions of their work are rather controversial. Having declared that 'burials of artisans (craftsmen) may also be regarded as a proof of existence of crafts / manufacture', they simultaneously stressed that 'the presence or absence of artisans' burials in a certain culture may not be regarded as an indicator of the degree and level of development of certain kinds of manufacture'. Further in the study they argue that burials with 'strengtheners' and arrow-heads (which comprise the predominant majority of burials with 'manufacture kits' of the Early and Middle Bronze Age) did not belong to 'master arrow-makers' but to another social group, 'warriors, and it is not excluded, representatives of the top social group'. Therefore, it is unclear how those complexes relate to the Bronze-Age crafts as 'a certain means of organization of labour'. In that sense, the objectives set at the beginning of the article, – i.e., to clarify the issue of the emergence and the nature of the Bronze-Age crafts based on the materials of the complexes containing the 'manufacture kits' – were actually not met. In our view, the result was quite natural, for those issues are, first and foremost, methodological and require a whole range of additional complex studies.

Sanzharov, whose earlier works also paid special attention to the issue of so-called 'manufacture kits' from Middle-Bronze burial complexes [Sanzharov 1985: 17-18; Sanzharov, Britiuk 1996: 68; Bratchenko, Sanzharov 2001: 87-98], has recently published a monograph focusing on 'arrow-makers' manufacture kits' from Catacomb graves studied in the territory of contemporary Ukraine [Sanzharov 2008]. In our opinion, one of the key advantages of that study was that it introduced four 'rich' unpublished Catacomb complexes to the research community. It should be noted that according to Sanzharov, the composition of the Catacomb 'manufacture kits' was proof of the existence of a 'specialised artisanry with

complex technologies'. According to the researcher, 'the craft of expert makers, primarily of arrows, was particularly prestigious, that is why arrow-making kits were attributed a sacred meaning, associated with weapon-making and warfare, with military force, might, and power as such' [Sanzharov 2008: 67-70].

The above now needs to be placed in context. First, various 'manufacture kits' have been known in complexes of a variety of cultures since at least the Mesolithic. Second, some of the Catacomb burials containing the 'kits' were in no way different – except for the presence of those 'kits' – from a number of ordinary graves (see: List of sources). Third, practically the same 'complex technologies' of making fine bifaces had existed at least since the Upper Paleolith, and it is not really clear why similar technologies of making arrow-heads in the Catacomb society indicate the existence of expert weapon-makers, while that would not be the case in – for instance – the Paleo-Indian society.

Kravets devoted several works to describing various categories of flint artefacts of the Middle and Late Bronze Age. He also repeatedly published 'manufacture kits' of the CC [1990:72-73; Kravets, Tatarinov 1997: 72-115; Kravets 1998: 23-27; 2001a: 21-22; 2001b: 1-42]. The author firmly believed that the Catacomb 'manufacture kits' had belonged, first and foremost, to the military elite burials, and he shared that conclusion with Berezanska and Lyashko.

Marina devoted a number of publications to describing 'manufacture kits' of the YC and flint artefacts from the territory between the Samara and Orel rivers, among others [Marina 1995: 64-71; 2000: 67]. Like Kovalyova, she interpreted the 'kits' as an indicator of the existence of expert craftsmen.

Litvinenko described the Babyno burials that contained manufacture tools, which usually include flint objects [1998b: 97-105]. The researcher did not go into detailed social interpretation of such complexes but confined himself to noting the presence of particular pieces of implements. He also pointed out to the continuity with the (CC), reflected by the burial ritual and the composition of the 'manufacture kits' themselves.

Reconstruction of the composition of the YC society of the north-western Northern Pontic area is the focus of research conducted by Ivanova. In her publications, she frequently applies the context analysis to flint artefacts in burial complexes, and addressed specific features of burials containing the 'manufacture kits' [2000: 4-20; 2001: 83-94]. However, the author rightly points out that the burial implements do not necessarily indicate the life-time specialisation of the buried individual.

A recent opinion suggests that 'manufacture kits' enclosed in wooden cases could in fact have been used for making 'sacred sticks', ritual (fortune-telling) rods of certain kinds of wood, proven to have been used by Indo-Iranian peoples [Kiyashko, Yatsenko 2001: 284]. Allegedly, this conclusion is proved by the presence of the sets in the burials that belonged to individuals of a high social status, including women and children. We believe – for all the interesting observations

made by the authors of this assumption – that in-depth analysis of ‘arrow-makers’ kits’ indicate exactly their specialisation in arrow-making.

A specialist in ancient metallurgy, Chernykh provides a comparison of mechanic properties of stone and bronze tools and their correlation in materials of the Eneolithic – Bronze Age in various cultures’, and pays attention to technological and organizational aspects of primitive production [Chernykh 1970: 09-111; 1972: 84].

Wood-processing tools of the Bronze Age, including those made of flint, were described in detail in publications by Liashko [1987: 46; 1993: 11-12; Liashko, Belov 1995: 166].

Some of the author’s works also discuss various aspects of the organization of manufacture in the Paleo-Metal Age, including the connection with ‘manufacture kits’ [Razumov 2004; Razumov, Shevchenko 2007; Korobkova, Razumov 2006; Lysenko, Razumov 2006]

5) As pointed above, the proposition of the sacral role of flint in Bronze-Age burial rites have been suggested by researchers since at least the late 1800s – early 1900s. However, until recently those ideas lacked clear and extensive argumentation, while flint – by definition – was regarded to be ‘the symbol of fire’ or a substitute for tools (following the *pars pro toto*).

Kovalyova was among the first researchers to attempt interpretation, from the perspective of Indo-Iranian mythology, of the custom of enclosing pieces of flint in the Early and Middle Bronze Age, while stressing the presence of unfinished flakes in a vast number of Scythian and Sarmatian burials [1981:45; 1987:204].

Pislariy also had noted a significant number of unfinished flakes and pieces of flint in burials of the Mnogovalikovoy Pottery (Babyno) culture, as he wrote in his PhD research ‘*Kultura Mnogovalikovoy keramiki Vostochnoy Ukrainy*’ (‘Mnogovalikovoy Pottery Culture of Eastern Ukraine’) [1983]. In his view, the purpose of those objects was determined by the cult sphere and connected with ‘purification of the burial place’ [Pislariy 1983: 13].

An interpretation of the custom to place flakes in the Mnogovalikovoy Pottery burial complexes (Babyno) was suggested in a monograph by Ilyukov and Kazakova, ‘*Kurgany Miusskogo poluostrova*’ (‘Barrows of the Miuss Peninsula’). The authors supported an old concept, common already in the time of Gorodtsov, namely that flint in burials signified a ‘fire ritual’ [Ilyukov, Kazakova 1988: 87-90].

Flint artefacts originating from the Yamnaya burial complexes of the North-Western Upper Azov area were addressed in detail in a dissertation study by Rassamakin [1990: 105-107]. Specifically, when describing unfinished flakes from the burials, the author regards them to be ‘symbols of objects’ and a reflection of the rational in Yamnaya populations rites’. Rassamakin also made an important observation related to the practice of burying broken, unfinished or deliberately destroyed spearheads, some of which also did not have shafts.

The work by Tsymidanov focuses specifically on the sacral role of flint flakes in Srubnaya burials. Using folklore and mythological sources, primarily of Indo-Iranian origin, he made a convincing argument in favour of the importance of flint in the burial and remembering practices of the late Bronze Age [1995: 486-488; 2004: 55-56].

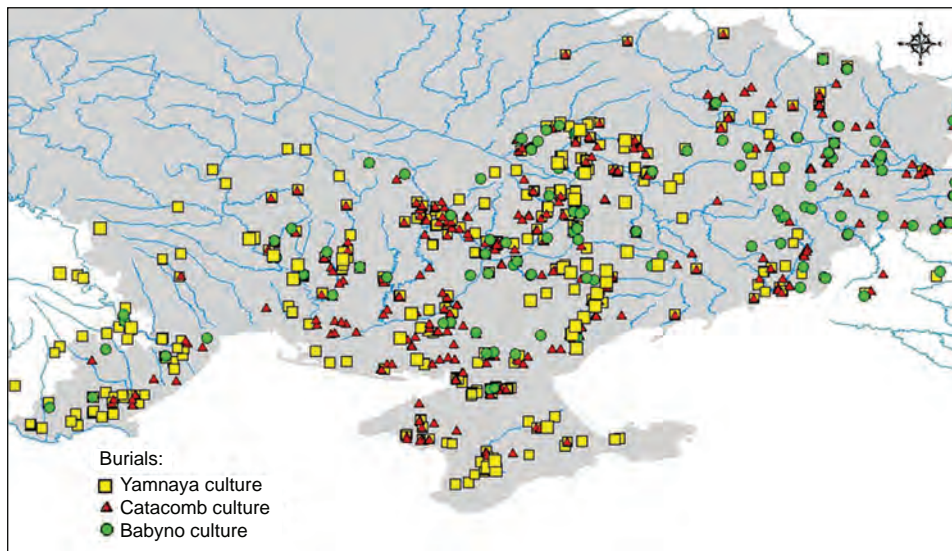
Hence, as we may see, the topic of this study has been covered in a vast number of publications that address the gamut of its aspects. The historiography of this issue is inseparably connected with the historiography of the Bronze Age of eastern Europe in general. Individual issues within our topic are part of more general problems.

Therefore, it was only since the mid-20th century, after a long period of primary accumulation of materials on the Bronze Age, together with a rapid increase in a number of sources, that we could observe a trend towards the most complete socio-economic and ethno-cultural reconstructions, in the making of which researchers inevitably had to include flint artefacts – a most common category of finds in the complexes of that time. By the end of the 20th century, the process of the comprehension of the growing source base resulted in the identification of five key interconnected directions of study of those artefacts.

Meanwhile, notwithstanding the significant number of academic publications, the vast number of studies in this context has not resulted in accumulating knowledge that would provide a synthesis of the achievements to date, based on the data on all the five dimensions. First and foremost, this refers to the works based on materials from burial sites. As we noted above, currently those materials are the most suitable for further socio-economic and ethno-cultural reconstructions due to the closed nature of the complexes and the availability of developed stratigraphic columns. Therefore, a number of important factors, including specific features of the raw materials base and primary flint knapping, the nature of tool and weapon blanks, the technique of making bifaces and implements, and the role of flint objects in burial rites and funerary practices, are in fact beyond the scope of study for most researchers. As a result, existing reconstructions present a somewhat distorted general picture of socio-economic processes of the Early and Middle Bronze Age.

I.2. THE SOURCE BASE

The study has used a substantial number of sources that are necessary, in their own ways, for implementation of its objectives. Those sources can be divided into categories as follows: archeologic, ethnographic, literature, folklore, linguistic, creative arts and natural science data.



Map 1. Burials with flint artefacts

The principle role belongs to the archeologic materials. They include individual artefacts and their sets that are parts of various complexes: burials and burial constructions in general, sanctuaries, offering stones, hoards, housing complexes and settlement sites in general, places of excavation of raw materials, primary and secondary processing workshops, as well as odd finds. The latter, due to their separation from the cultural and chronological context, usually carry little information. Numerous types of flint artefacts were rather widespread, and they could also emerge in convergence at different periods and at different territories [Chernykh 1970: 84]. Due to the lack of reliable archeological context, the materials from open complexes (first and foremost, this applies to materials from settlements, particularly the multi-layered ones), have been included for the purposes of this study as additional only. The main attention, as the title of this study suggests, is paid to grave goods.

Individual finds from burial complexes (raw materials, debitage, blanks, whole or fragmented artefacts) and collections of flint artefacts found in the relevant context that allows attributing them culturally and chronologically with sufficient accuracy represent the most important category of sources. Thorough investigation and classification of those sources are necessary for researching the strategy of extraction and use of raw materials, flint knapping techniques, organization of flint processing, and the use of flint implements in the Early and Middle Bronze Age.

In our view, the use of analogies from a geographically and chronologically vast range of archeological sources – from the Far East to Egypt, and from the Paleolithic to the Middle Ages – ensures sufficiently objective research results. This

applies, first of all, to the reconstruction of semantic meaning of flint artefacts in the context of the burial and funerary rituals.

Generally, this study reviewed 1,520 Early and Middle Bronze Age burial complexes with flint artefacts from the Northern Pontic area (Map 1). The total number of studied burials amounts to about 16,700 complexes (it is impossible to give a more precise figure due to a large number of ruined burials and those without any implements). That includes about 7,100 Yamnaya, 7,400 Catacomb, and 2,200 Babyno burials. The burials containing flint artefacts comprise over 9% of the total. Noteworthy, notwithstanding the different number of complexes of the three cultural-historic communities included in the sample, they have about the same proportion of burials containing flint objects: from 8% to 10% of the total. Materials from settlements as well as burial and settlement sites from neighbouring territories were included as analogies.

We attributed 710 flint-containing complexes to the YC (47% of the total number of flint-containing complexes; meanwhile, the complexes with flint comprise up to 10% of the Yamnaya burials in the Northern Pontic area). They include burials of the so-called Kemi-Oba culture. We share the opinion of a number of researchers who attribute those sites to the YC.⁵ Human remains in 446 Yamnaya burials (62% of the total) were positioned contracted on the back, located predominantly in the eastern sector or included as secondary burials to the barrows containing primary Eneolithic burials. According to researchers, such were the predominant majority of burials at early stages of the Yamnaya culture. Their occurrence decreased significantly at the late stage, when buried bodies were mostly contracted on the side and lacked definite positioning [Nikolova 1994: 12-36]. We counted as many as 216 (31%) flint-containing complexes of that kind. Finally, 7% (48 complexes) were cenotaphs and ruined graves.

Burials of the CC comprise 615 complexes (40% of the total number of flint-containing burials and slightly over 8% of the total studied Catacomb burials). Flint artefacts were found in 78 (13%) of the Early Catacomb burials: mostly rectangular shafts and chambers, skeletons contracted on the back or on the side. The second group comprises 104 (17%) complexes of the Donets culture: rectangular shafts, oval chambers, skeletons mostly contracted on the right side. The predominant majority of the Catacomb complexes containing flint objects are 409 (65%) burials of the Ingul culture that can be identified by circular shapes of their entrance shafts and chambers and outstretched or slightly contracted positions of the skeletons. 24 complexes (5%) were attributed to other cultures, mostly the late Catacomb: the Bakhmut and Manych types, including pit burials [Sanzharov 2005: 127-136].

The Babyno flint-containing burials are represented by 195 complexes (13% of the total number of flint-containing complexes and 9% of the Babyno burials of

⁵ See Gening 1987: 37-38; Toshev 2001: 182-199; 2002a: 23-33; 2002a: 99-111; Shchepinskiy, Toshev 2001: 50-86; Shchepinskiy 2002; Burov, 2007: 73-75.

the Northern Pontic area included in this study). 56 burials (28%) were arranged in chests made of wooden blocks (frames); to those we add several burials in stone chests. There were also 126 pit burials (65%) (for details, see: List of sources). Their shapes and kinds of overlay were not always possible to identify, particularly in secondary burials included in the mounds. There were 13 (7%) burials in side-wall niches, mostly in the right-bank Dnieper area. We found no flint artefacts in the Babyno burials made in logs. It should be noted that all burials in the frames and 95 pit burials (rectangular, overlays made of blocks, less commonly of slabs) belong to the Dnieper – Don BC, identified by Litvinenko [2006: 157-187]. Other complexes belong to the western area of the BC (the Prut – Dnieper culture, according to Lytvynenko) and are located predominantly in the steppe area between the Bug and Dnieper rivers and the west Northern Pontic area.

When studying the roles of flint tools in domestic manufacture, it is important to analyse, alongside with the tools, the artefacts they could be used to produce. Those mostly include objects made of wood, bone and horn. When studying traces left on Bronze-Age bone buckles and cheek-pieces, Usachuk concluded that some of them had been processed with flint cutting tools, and reconstructed the methods used by primitive bone-cutters [Usachuk 1998: 128; 1999:71]. In our joint work with Korobkova we used traceological analysis results as the basis for our reconstruction of the manufacture of wooden details of the early Bronze-Age means of transportation [Korobkova, Razumov 2006: 87-91].

Recreating mythological ideas, to which flint artefacts were linked, requires consideration of the contexts of those objects in the places of rituals, burial, and cult complexes. A prominent researcher of primitive thinking, Claude Lévi-Strauss argued that the very presence of a sacral object in its place made it sacral [Lévi-Strauss 1994:121].

The study of organisation of flint processing manufacture and the role of flint tools in economies of different Early and Middle Bronze cultures requires that settlement sites are analyzed alongside with the burial sites. Unfortunately, planigraphical analysis has been used very rarely, which can be explained, to a large degree, by a small number of studied settlements and the complex stratigraphic conditions of most of them. Publications by Poplevko [1999:95-97], Kolesnik and Gershkovich [1996; 2001], as well as by Korobkova [Korobkova, Shaposhnikova 2005] can be regarded as successful examples of using this category of sources for the purposes of study of the above issue.

The second most important group are **ethnographic** sources of study. However, from the very start we should recognize that we have practically no direct ethnographic analogies for the paleo-metal age at the territory of south-eastern Europe. Therefore, any similarities between archeological finds and reliable ethnographic evidence should be made with great caution. Though, we cannot completely reject the existence of such parallels, as well as relics of tra-

ditions and beliefs of the later populations of that territory. As far as our specific topic is concerned, ethcographic evidence of relics of the ritual usage of flint and similar rocks in the burial and funerary rites has been registered, for instance, for the present-day population of the Southern Caucasus [Tekhov 1977:66]. Those data are in accord with archeological researchs. Ethnographic materials also play an important role in studies that look into forms of organisation of craft in the Early and Middle Bronze Age.

The use of **literature** and **folklore** sources, primarily for reconstruction of semantic meaning of flint artefacts in burial and funerary rites, also causes certain difficulties. We do not have a single written Paleometal-Age source that is connected to events taking place in the territory of South-eastern Europe of that time. Hence, the data of written sources of the ancient East can only be used as distant analogies.

Terminology also needs to be clarified. The term ‘folklore’, in its original meaning, was used to denote non-specialised spiritual culture of lower social strata of societies familiar with writing, and, in that sense, is a part of **ethnography**. One of the founding fathers of the contemporary traditionalism, René Guénon, described the significance of folklore for understanding history as follows; ‘The people preserve, without being aware of it, remainders of old traditions, which come from the past so distant that it would be hard to define and that we have to refer to the dark area of ‘pre-history’; in a way, folklore plays a role of a more or less subconscious collective memory ...’ [Guénon 1997:53]. Hence, we should separate folklore sources from other (general) written sources, even though the former are known to us in their written form. The aspects of our interest can be found in popular tales, which contain remainders of mythology of Indo-European peoples [Propp 1996], as well as popular ritual songs, spells, etc. [Eremina 1984: 203].

At the same time, a number of written sources cannot be regarded as literature. Literature sources, in the proper sense, are the works of antique and, to an extent, medieval authors.⁶ However, they also often record a modified mythological tradition.

Practically all written sources from the Ancient East that are of interest in the light of the issues of focus of this work, may be described as **mythological** sources. They are extremely important for the study of ancient religious ideas. Yet, while similar sources of Ancient Egypt and Mesopotamia have been quoted only as rather distant analogies [Khuk 1991:36; Svetlov 1993:5], the sites of mythology of Indo-European peoples, and more specifically, Indo-Iranian peoples, whose ancestors, probably, populated South-eastern Europe and adjacent territories in the Paleo-Metal Age, allow us making certain parallels with archeological data [Kovaleva 1981a: 45; 1987: 204]. This applies, first and foremost,

⁶ See Herodot II, 86; VII, 69; Titus Livius I, 24; Ivakin, Chernetsov 2001:38.

to the *Rigveda*, the *Avesta*, and other sites of the Indial, Iranian, Hittite, Ancient Greek, Ancient Roman, Germanic, and Slavonic mythology. Special attention should be paid to the Caucasian heroic epic poetry, Narty, which has Iranian mythological roots [Abaev *et al.* 1957:10; Alieva *et al.* 1974:18; Dumézil 1976: 10, 62]. However, we should stress again that all reconstructions, based on ethnographic, folklore, and written sources, are of rather conditional nature, which is caused primarily by the incomplete archeological sources [Klein 1978: 12]. Studied remainders of burial complexes comprise an insignificant proportion event if compared to the primary material contents of burial and funeral actions, let alone actions that had no material representation. That said, the remainders are still traces of certain activity, which we can and should reconstruct to the extent possible.

Linguistic sources on our topic are virtually non-existent. The fundamental work by Gamkrelidze and Ivanov, '*Indoyevropeiskiy yazyk i indoyevropeitsy*' ('Indo-European Language and Indo-Europeans') contains practically no glosses connected to flint and related rocks. We can only note that for the general Indo-European era the authors allow a term that denotes flint, as opposed to metal, sickle [Gamkrelidze, Ivanov 1984: 692]. Old toponyms of the Northern Pontic area may be used as linguistic sources, as they, according to Trubachev, have Indo-Aryan stems connected with the notion of a stone, including flint [Trubachev 1999:229].

Similarly, we have practically no **decorative art** sources on our topics. An exception is an image on the anthropomorphous stele, found at the top of barrow 1 near the village of Ust-Mechetinskaya of the Rostov Region (Russia). According to the author, the image at the back surface of the stele, next to the stylised bull head, was a flint knife-dagger for sacrificial offerings [Koziumentko 1993: 50]. No analogies of that image have ever been found. It should be noted that when studying archeological materials, including flint artefacts of the Paleo-Metal Age, some researchers use decorative sources originating from the Ancient East as a proof for their conclusions. This concerns, among others, flint arrowheads [Bratchenko 1989: 80; Nuzhnyi 1992: 117-119].

The inclusion of anthropological data is necessary, first of all, for determining gender and age of buried individuals whose burials contained specific flint implements. It is impossible to determine those implements' places in the social and sacral spheres without the gender and age data. A noteworthy experience of the use of archeological sources in that area was provided by the studies by Ivanova [Ivanova 2000: 9; Ivanova, Subbotin 2000: 57] and Kovaleva [Kovaleva 1998: 38].

Finally, data of other natural sciences, primarily geology and mineralogy, serve as a source for the study of raw material base, places of excavation of flint and other isotropic rocks [Krimgolts 1974: 9-18; Petrun 1969: 68-79; Shamanaev 1999: 48-50]. Marks on animal bones, left as a result of chopping carcasses with

flint tools and discovered by osteologists, can also serve as a source [Araujo 1999: 115-116].

Let us summarise: the categories of sources used in this study can be divided – based on their significance for addressing the objectives of the study, into two uneven groups. The first group includes archeological sources, which, due to specificity of the issues addressed, form the basis for all other categories: ethnographical, mythological, linguistic, creative arts, and data of natural sciences are secondary. Most of them were used exclusively in Chapter VI, the objectives of which (reconstruction of semantic load of flint artefacts in the burial rite) go beyond archeological methods and require the involvement of relevant sources from other academic fields. Ethnographic sources (weaponry of the people known to ethnography, their flint processing techniques) and the data of natural sciences (anthropology and petrography) were used for meeting the objectives in Chapters IV and V.

I.3. RESEARCH METHODOLOGY

The objectives of this study are achieved through historical-comparative, combinatory-statistical, cartographic, and structural-semantic research methods that are traditional for the archeological science.

Special consideration needs to be given to methodological foundations of study of flint objects, which have been developed as of today in substantial detail, namely, the typological – morphological, functional, and technological methods.

The typological – morphological approach aims at studying the object's form [Matiukhin 1999: 123]. Its method of building typological sequences (rows) works rather effectively, first and foremost, for the study of more or less stable forms of flint artefacts. It is applied in this study mostly for classification of biface weapons (hurling weapon heads) and knives – daggers, and partly for classification of working tools (alongside with the functional approach). The approach was chosen for the analysis of those artefacts because their morphology is most strongly determined by their function, and not by the nature of the blanks or by wearing in the process of use. The need to make weapons precisely determined to cause damage inevitably led to certain standardisation of heads and sorting them into groups based on specific features of use (simple or composite bow, absence or presence of defense weapons in the hands of the enemy and the nature thereof). Accordingly, weapons had different battle parts (in the Bronze Age, practically all arrowheads had convergent points, as – unlike in Ancient Egypt –

transversal arrowheads disappear in the Northern Pontic area as early as in the Neolithic), as well as size, weight, and different ways in which they were fastened to their hafts.

The purpose of the functional approach is to determine functions, methods and nature of use of tools. For that purpose, classification is based on determining the function of a tool – cutting, chopping, adzing (rasping), etc., rather than on similarity of forms [Matiukhin 1999: 124]. Hence, implements on flakes without any special maintenance, which comprise the predominant majority of the Bronze-Age flint complexes, from a formal typological perspective look like debitage, while in fact they were used as knives to cut meat, skins, wood, for scraping or sawing hard materials, etc. [Razumov 1999a: 15]. In the Paleo-Metal Age, when most of flint implements were made of rather amorphous hammered flake blades (contrary to the previous period, with the important role of a blading technique), the typological – morphological approach is little suitable for classification of implements due to their ‘amorphous’ shapes. Therefore, the typology of such implements should be based primarily on their functions as determined by the nature of fashioning and wearing (thinning) of the implements’ working parts. The functional approach relies on the experimental, micro- and macrotrassological methods [Korobkova 1983:27; Masson 1999:11]. We apply those methods mostly for determining functions of the working tools contained in burial stocks, in particular the so-called ‘manufacture kits’.

The purpose of the third, technological, approach is to recreate methods and techniques of modification (finishing) of objects, based on the knowledge of laws of physics, experimental data, planigraphy, and stratigraphy of sites, archaeological context of the finds, and ethnographic data [Giria 1993: 20-38; 1997: 20-33; Matiukhin 1999: 124]. The technological approach served as the foundation for our work in the field of flint knapping, in particular for identification of techniques used for primary processing of raw materials and specifics of making working tools and bifaces. Meanwhile, this approach is unsuitable for studying characteristics of usage of finished implements. From the technological perspective, practically the whole stock of Early and Middle Bronze-Age tools is defined by a single term: ‘retouched flakes’. That is why we use technological definitions mostly for classification of unmodified artefacts without secondary finishing: cores, flakes, blanks, which are necessary for reconstruction of the flint knapping techniques.

The above methodologies of the study of flint artefacts have their strengths and weaknesses. The synthesis of all three approaches alone allows considering flint artefacts as whole, systemic objects [Kotov 1999: 9]. Therefore, we analyzed the entire variety of Early and Middle Age flint artefacts of the population of the Northern Pontic area, taking into account as much as possible of their characteristics, while focusing specifically on those that contribute most to meeting the objectives of this study.

In conclusion it can be stated that a historiography of issues related to the study of flint implements of the population of south-eastern Europe does exist. Moreover, it should be noted that it experienced a particularly dynamic growth from the mid-21st to early 20th century, as a result of the rapidly growing source base. Studies published within that period can be conditionally grouped into five directions: typological descriptions of flint implements in the context of individual sites and regions, experimental – trasological methods, typology of weaponry, the issue of primitive craft and the semantic load of flint implements in cult complexes. Meanwhile, notwithstanding the large amount of publications, two facts stand out. First, there is practically no significant research discussion on the issue. Second, there is a lack of publications that would synthesise all five existing directions. This study aims to – at least partially – fill that lacuna.

The review of the source base convinced us of its complete suitability for meeting those objectives. Further analysis is based on archeological sources: 1,520 burial complexes of the Early and Middle Bronze Age. To address specific objectives, we also used ethnographic, mythological, linguistic, creative arts sources, and data of natural sciences.

Finally, this work was completed both with the help of methods that are traditional for any archeological research, and special methods aiming at a complex investigation of flint implements as systemic objects.

II. FLINT ARTEFACTS WITHOUT SECONDARY MODIFICATION

In our view, implements without secondary modification, i.e., displaying no retouch or traces of being used as working tools or weapons, include flakes and their fragments, as well as cores and pieces of flint raw material (concretions, flint pebbles, and their fragments). Although there are traces of modification on some flake arrowhead blanks or implements from so-called ‘manufacture kits’, we note that fact but do not deem it necessary to separate them from the general stock of flake blanks bearing no traces of secondary modification. The very term ‘manufacture kit’ is mostly purely conditional and not entirely appropriate, but is already standard in research literature (for details, see Chapter V.5.2). *This study uses the term ‘manufacture kit’ to denote a relatively compact assemblage of grave goods within the confines of a burial construction, when all or a predominant majority of its components may be connected to a certain technological process or processes (raw materials, instruments, semi-finished product, manufacture waste, and functional objects).*

II.1. ARTEFACTS WITHOUT SECONDARY MODIFICATION OF THE YAMNAYA CULTURAL – HISTORIC COMMUNITY BURIALS

II.1.1. SUPINE BURIALS

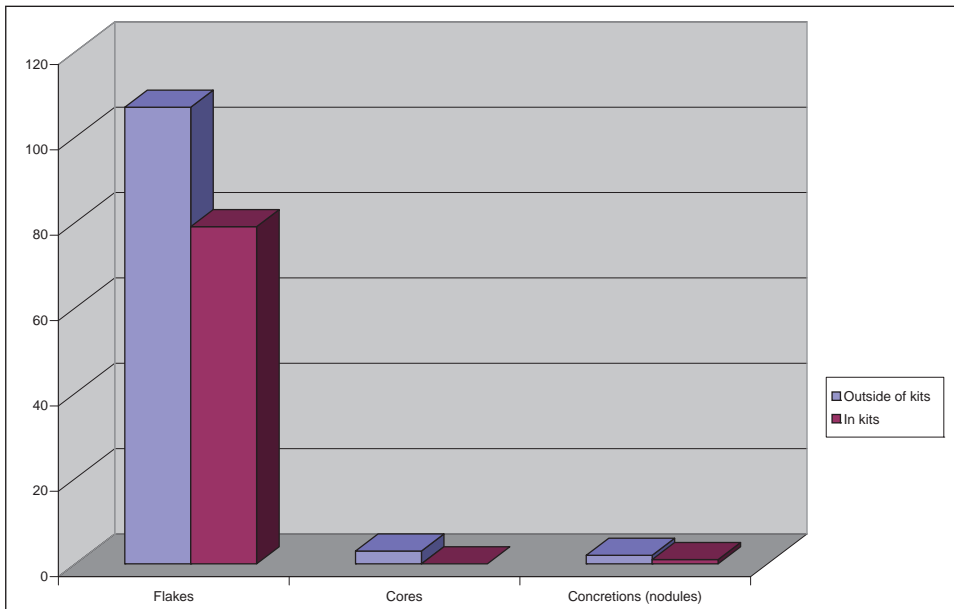
Most finds of flint in burial complexes of the Early Bronze Age are represented by various **flakes and their fragments** (see Table 1; Diagram 1), even though some artefacts, classed by researchers as flakes, display secondary modification and hence could be considered tools or blanks.

Out of 446 graves with skeletal remains contracted on the back, 228 complexes (more than half) contained flakes and their fragments (Table 1), even

Table 1

Flint implements without secondary modification in burials of Yamnaya culture

Burials \ Type	Flakes out of kits (amount of wares / amount of complexes)	Flakes in kits	Cores out of kits	Cores in kits	Concretions out of kits	Concretion in kits	Total
Contracted on the back	348 / 228	82 / 13	6 / 6	1 / 1	2 / 2	-	439 / 250
Contracted on the side	182 / 110	233 / 10	-	1 / 1	-	1 / 1	417 / 122
Cenotafs, destroyed	42 / 24	-	-	-	-	-	42 / 24
Total	572 / 362	315 / 23	6 / 6	2 / 2	2 / 2	1 / 1	898 / 396



Diag. 1. Flint artefacts without retouch in the burials of the Yamnaya culture

without counting the graves containing ‘manufacture kits’. In almost all of them flakes represented the only category of flint goods, and often any goods at all (Fig. 3). It should be emphasized that only 21 out of 315 flakes displayed secondary modification or utilization retouch. Others showed no traces of flintknapping; neither do the parameters of most allow regarding them as tool blanks. Thus 7 items were covered with patina, i.e., belonged to an earlier period of time and two unmodified flakes were obtained from pieces of quartzite. The burials mostly contained one flake, less often 2 or 3, occasionally up to 10, all located in different places of burial construction; 82 flakes were found in 13 ‘manufacture kits’, left at the human remains contracted on the back. Special attention should

be paid to grave 33 in barrow 7 near the village of Nikolske in the Slobodzeya district of the Republic of Moldova. Left to the skull of an adult (aged 18-20) there was a cluster of 33 unmodified flakes. Two wooden wheels were placed on the burial pit ledge. No other items were found in the grave. It should be noted that individuals buried with parts of carts were considered representatives of the highest strata of the Yamnaya society [Ivanova, Tsimidanov 1993:30].

Hence, we counted a total of 430 flakes in 242 complexes with skeletal remains contracted on the back.

Cores are very rare in Yamnaya graves. Only 7 items were recorded at skeletal remains contracted on the back. In a painted stone chest of the main burial of Skelya 1.1 (the Crimea) of the 'Kemi-Oba culture', placed at the feet of the buried adult there were 8 flakes, a bronze knife, a bone artefact, and a core for making pressure blades. In our view, in this unusual complex the core was actually a re-used implement from an earlier period of time (Mesolithic – Neolithic). In the primary burial of an adult, Vilna Druzhyna 1.3 (Kherson Region), the core for making hammered flakes lay in the ancient horizon near the pit. A similar core was found in a double burial Prymorske 1.25 (Odessa Region) alongside a baby skeleton (a scraper on a flake was placed near the adult corpse). A multi-platformed core (Fig. 1:1) was found in a 'manufacture kit' of the Oleksandrivka 1.32 grave (Odessa Region) together with a double-blade racloir – cutter and 11 flakes. In Yamnaya grave found in the territory of the Republic of Moldova (Korzhevo 8.13) a rough-prism core together with an unmodified flake and a necklace of animal teeth was placed by the skull of the buried adult. At the Oknitsa 1.8 complex (primary burial) together with an unmodified flake at the feet of the buried child there was an object interpreted by the authors as 'a blank for a massive chopping tool' [Manzura *et al.*, 1992: 11, Fig. 4:5-6]. In our view, this item should rather be interpreted as a worn-out core for making flakes, resembling a biface (see Chapter V). The Nikolske 10.8 burial (Republic of Moldova) contained a grinding adze made on a core for pressure blades. a secondary usage of an implement made in an earlier period of time could also be observed in that case. Finally, in one more case a core, a granite hammerstone, and two shells were found in the burial's overlay (Shevchenko 4.7, Dnipropetrovsk Region).

We can also quote cases of finding **core-like flakes**. Nine have been found: three as part of manufacture kits, three over the grave overlays, two by the children's skulls in smears of ochre, and one clutched in the left hand of an adult from the primary burial, Plyushchivka 1.48 (Mykolayiv Region). Generally, both cores and core-like flakes may be considered debitage and, possibly with the exception of some of the 'manufacture kits', we believe that in the funerary practice those implements attained a function that was not connected with their routine use. This is proved, in particular, by their location in the burials.

Flint concretions and pebbles without traces of modification were found only in two burials: Lomonosove 1.20 – the Crimea (primary burial, a concretion

of Crimean stone and an unmodified flake at the feet of an adult), and Mykolayivka 4.9 – Odessa Region (secondary burial, a Dniester flint pebble at the feet of an adult, possibly used as a grinder).

II.1.2. CONTRACTED BURIALS

Flakes and their fragments in Yamnaya burials contracted on the side comprise (without ‘manufacture kits’) 177 items found in 110 complexes (Table 1). 71 of the burials contained skeletons on the right side and 113 flakes; 39 graves had skeletal remains positioned on the left side and 64 flakes. 21 of the flakes displayed traces of being used (19 in the right-side burials and 2 in left-side burials). Four flakes were covered with patina (all in right-side burials). Separately, let us note the find of two unmodified flakes of obsidian, probably of the Caucasian origin, under the skull of an adult, buried contracted on the left side, in the complex of Dolynske 1.27 (Kherson Region). Nine ‘manufacture kits’ contained 28 more flakes (16 in 6 left-side burials, and 12 in right-side burials). Standing separately there is a unique complex of secondary burial 13 in barrow 4 at the village of Pereshchepyne (between the Oril and Samara rivers, Dnipropetrovsk Region). An adult and a child were buried contracted on the right side, heads to south-west. 206 flakes were placed compactly along the adult’s left upper arm bone by the wall; according to the author of the excavation, those flakes were the ‘debitage of knapping a large implement of an axe type [Telegin *et al.*, 1973-6:30, Fig. 24]. Immediately on top of the flakes there was a knife – dagger with a catch (Fig. 32:3). Other items found at the adult skeleton included a bronze ‘awl’ (above the left shoulder among the flakes) and a silver spiral pendant under the skull. Thorough investigation of the flint implements from that grave found that 205 flakes belong to one nodule grind-stone of high-quality chalk flint and, most likely, are the debitage of making the above knife – dagger from the same grave. The metal ‘awl’, found among the debitage, could in fact be the pressure tool used to make the knife – dagger. Let us note that one of the flakes was split – unlike the others – from a pebble of local alluvial flint. It has two symmetrically positioned notches and bears no trace of thinning (Fig. 32:4), which allows an assumption that it was used as a miniature charm figurine.

Generally, 120 burials on the side contain a total of 415 flakes.

A flaking **core** was found only in the Velyka Bilozirka I 2.11 complex (Zaporizhya Region), where it belonged to a ‘manufacture kit’, possibly for skin-processing. However, it was not placed among other items (a flake, bone tools)

Table 2

Flint implements without secondary modification in burials of Catacomb culture

Burials \ Type	Flakes out of kits (amount of wares / amount of complexes)	Flakes in kits	Cores out of kits	Cores in kits	Concretion out of kits	Concretions in kits	Total
Early Catacomb culture	48 / 37	57 / 6	2 / 2	3 / 1	-	-	110 / 46
Donets culture	83 / 46	189 / 12	-	6 / 2	3 / 3	2 / 1	283 / 64
Ingul culture	297 / 205	370 / 27	6 / 6	9 / 2	3 / 3	103 / 5	788 / 248
Other groups	3 / 1	303 / 6	-	4 / 3	-	76 / 1	386 / 11
Total	431 / 289	919 / 51	8 / 8	22 / 8	6 / 6	181 / 7	1567 / 369

but under the skull of a woman aged about 35, contracted on the left side. Other finds included two core-like flakes, both in the territory of the Crimea, outside of the ‘manufacture kit’ context but one of the two placed among the bones of dismembered skeletons in a group grave.

The only concretion was also found in the Crimea in the ‘manufacture kit’ of Tankove 9.22 at the hands of a skeleton contracted on the right side.

Finally, 24 cenotaphs or ruined graves of the Yamnaya culture contained 42 flakes (Table 1), of which only one bore traces of being used.

II.2. ARTEFACTS WITHOUT SECONDARY MODIFICATION OF THE CATACOMB CULTURAL – HISTORIC COMMUNITY BURIALS

II.2.1. EARLY CATACOMB CULTURE BURIALS

With the exception of ‘manufacture kits’, 37 Early Catacomb burials contained 48 **flakes** (Table 2), of which 2 displayed utilisation retouch, one was made of quartzite, 6 unmodified flakes lay at children’s skeletons, including in double and group graves (man, woman and child, the flake placed in the child’s right hand). In a stand-alone complex from the Crimea (Bolotne 14.28), five unmodified flakes were found in a smear of ochre together with a bronze knife and an awl at the feet of two skeletons that lay face to face ‘cuddling’ each other.

Other items in the chamber were four wagon wheels and a sack of grain. In another double early Catacomb burial, a retouched flake was found in the lower jaw of an adult, buried contracted on the left side; a child’s skeleton lay nearby. In three cases unmodified flakes were placed under the bones (there was a stele in the block of one of those graves, Novokamyanka 3.9, Kherson Region), and in

one case among the bones of dismembered human remains. Grave 13 of barrow 6 at the village of Hovorukha (Luhansk Region) contained a massive flake (7 x 5 cm) placed at the right hand of the buried adult, used as a kind of a tray. On it there were two figurines of ochre, two shells (one of them a stamp); by the hand there was an ornamented hammer-like pin and a bunch of sticks. It is apt to recall that such selections of grave goods have been connected by researchers to representatives of cults [Kovaleva 1987:325; Kiyashko, Yatsenko 2001:284]. In one case a flake was found in a pile of charcoal at the bottom of the entrance shaft; in another, on a step at the entrance. Finally, in six cases flakes – from 1 to 6 items – were found in the filling of the chambers.

Additionally, six ‘manufacture kits’ (two ‘arrow-maker’s kits’, two ‘caster kits’, one flintknapping kit, and one unidentified kit) contained a total of 57 flakes, including two arrowhead blanks. It should be stressed that each of the ‘caster kits’ contained a massive unmodified flake, one of which was covered with patina.

Cores for the flakes, completely worn-out, were found only in two graves (North-Western Upper Azov area (Fig. 1:2) and the Lower Don) where they were the only grave goods. Three analogical items were registered as part of the flintknapping ‘manufacture kit’ in grave 12 of barrow 1 at the village of Oktyabrskoe (Upper Azov area, Donetsk Region), which also included 21 unmodified flakes.

II.2.2. DONETS CULTURE BURIALS

46 graves of the Donets Catacomb culture contained 83 flakes (Table 2), of which only one displayed utilisation retouch and six other flakes were covered with patina (one of them lay inside the skull of the child’s skeleton). In two cases the flakes were located at the bottom of the entrance shafts, and in one case, on the overlay of the late Donets pit burial. In 15 burials, flakes were found in the filling of the shafts and chambers near the entrance, including in three cases immediately in the filling of the entrances to the catacombs. In this connection it is necessary to mention grave 1 of barrow 1 at the village of Nova Astrakhan (Luhansk Region). An unmodified flake was placed on top of the butt end of one of the eight vertical beams that served as the block to the entrance to the chamber. In our view, some flakes in the filling of the shafts and the chambers, particularly in the filling of the entrance and on the steps, were connected in fact with blocking the entrance to the chambers and were displaced as a result of the construction’s decay. This is also true for other cultural groups of the Catacomb culture.

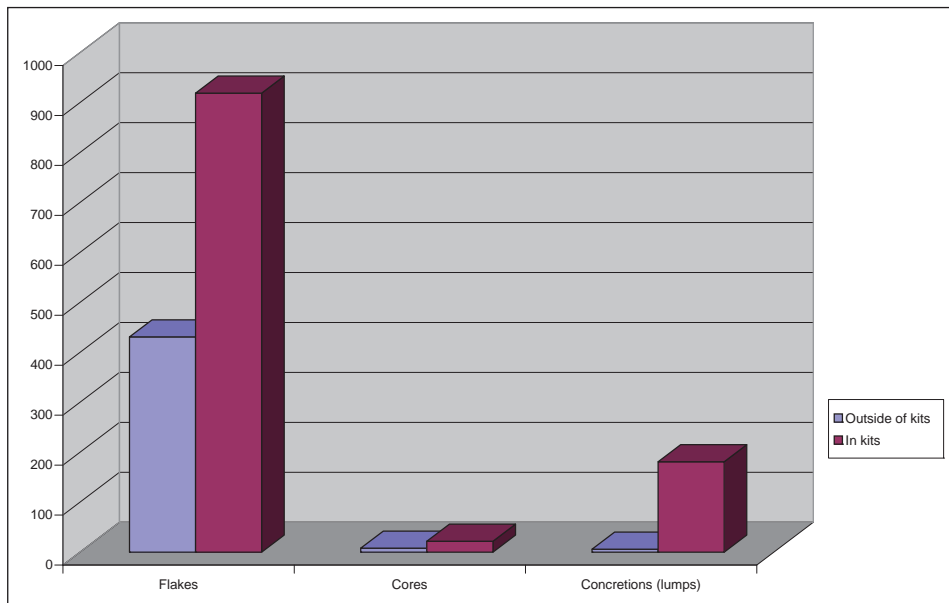
In all, 189 flakes were found in graves containing ‘manufacture kits’: 98 flakes in 9 ‘arrow-maker’s kits’ (including 22 arrowhead blanks), 2 in a ‘seamstress’s kit’ (with the tools and application blanks for making ‘festive’ clothes), and 1 massive unmodified flake in the ‘caster kit’. In grave 14 of barrow 1 near Mohyliov (Dnipropetrovsk Region), 88 flakes lay as a compact mass (in a bag or a basket) under the knees of the skeleton contracted on the back, as if ‘supporting’ them. The exact number of flakes and blanks (‘several dozens’) found in the ‘arrow-maker’s kit’ in a Catacomb burial in the barrow near the village of Cherevkivka (now the territory of Slovyansk, Donetsk Region), unfortunately, remains unknown [Gorodtsov 1905: 235].

In the basin of the middle current of the Siverskiy Donets, two Donets Catacomb graves containing ‘arrow-makers’ kits’ included two and four flaking cores, respectively. Both burials are out of the ordinary. The Novomykolayivka 2 2.1 complex (Donestk Region), in addition to the ‘manufacture kit’ containing two cores (Fig. 1:4), also contained a drilled axe – hammer and a wooden bowl, and the skull of the deceased had been placed on a large bird’s wing (Fig. 50).

Four of the graves contained **concretions** – a quartzite grind-stone in each of two burials (one placed on a step in the shaft together with a firepan), and one concretion in the burial of four children. Raw materials were found only in one ‘arrow-maker’s manufacture kit’ (Novomykilske 1.5, Luhansk Region), in which a concretion of chalk flint was found in a bag together with functional arrowheads and flake blanks. Also a flaked blade was placed between the skulls of two buried adults.

II.2.3. INGUL CULTURE BURIALS

The largest number of **flakes** was found in burials of the Ingul Catacomb culture (Table 2; Diagram 2): 297 items in 205 complexes (without taking into account the ‘manufacture kits’). 8 items displayed utilisation retouch, 7 were covered with patina, 8 were removed from quartzite grind-stones. The flakes were located differently in the graves. Unlike in the Donets culture’s burials, flakes on the step or in the filling of the entrance were found in only five cases. Most often they were placed under the skull (in two cases – below the ‘pillow’) or immediately next to it (in 53 burials, one of them with a trepanised skull). In 34 burials the flakes lay next to the right arm, including in 12 cases – immediately close or under the right hand (in the Semenivka 2 1.3 complex, Zaporizhya Region, four flakes has been placed in a specially dug hole, upon which the right hand of the body was placed thereafter). In 19 burials the flakes were placed near



Diag. 2. Flint artefacts without retouch in the burials of the Catacomb culture

the right foot, in 4 burials – near the left leg, in 26 cases near the left hand. In 12 burials the flakes were placed on the ribs of the deceased, including several flakes in each of two cases. In 2 complexes the flakes were placed between the jaws, in five others – between the legs. In two burials they appeared to mark different parts of the body, one flake placed at each shoulder and each knee (in one case, additionally at each foot). In one complex two flakes were placed at the skull of a dog buried together with the deceased individual (Blyzniuky 5.10, Dnipropetrovsk Region). In 9 cases the flakes were found in the filling of the chambers, including directly over the skeleton. On this occasion it is worth referring to grave 13 of barrow 2 near the village of Semenovka (Kherson Region), where a small unmodified flake was stuck in the ceiling of the chamber over the skull of the buried, outstretched on the back (one more flake was found at the right elbow). In our view, a significant number of the flakes, found in the filling of the chambers over the skeletons, could be initially stuck precisely in the ceiling. This also applies to other cultural groups of the Catacomb culture.

In all, there were found 18 flake-containing burials of the Ingul culture included drilled axe – hammers, 5 included maces, one (two adults and a child) included a turned-over wooden cup; there were also 13 plaster modelled skulls (two cases registered traces of embalming the entire body) and 12 ritual unbaked vessels (in Novooleksandrivka 16.10 complex, Dnipropetrovsk Region). Three flakes were found directly in a pile of fragments of such a vessel to the right

of a woman's skull, in a smear of ochre. Finally, parts of wagons (wheels) were found in four graves containing flakes. In three, however, (Zamozhne 3 15.4, 15.6, Zaporizhya Region), the blocks were made of one-thirds of what most probably had been a single three-section wheel.

A total of 370 flakes, including at least 97 arrowhead blanks, were found in 27 'manufacture kits' (20 'arrow-makers kits', 2 flintknapping kits, one metal-processing and 4 unidentified kits). It should be noted that it was far from always the case that the flakes were simply clusters of blanks. For instance, the primary burial 2 (which is rather rare for the Ingul culture) of barrow 12 near the village of Filatovka (the Crimea) there were 12 flakes to the right of the buried man, stretched on the back; two flakes were between the ribs, one in the filling over the skull, and only one in the 'arrow-maker's manufacture kit' to the right of the pelvis. The grave goods included a mace, a bronze knife, a bronze 'awl', a shell with ochre; the skull of the dead man had been plaster modelled.

Cores for making flakes were included in 8 graves of the Ingul culture (Fig. 1.3), but only in two of the cases were they part of the 'manufacture kits' (a flintknapping and an 'arrow-maker's kit', yet another 'arrow-maker's kit' contained a lengthwise core trimming flake). In the other 6 complexes in 2 cases the cores were placed near the skull (one, covered with patina and used for making pressure blades, from an earlier time), the right knee, the right shoulder, on the small of the back (a man aged 50-60, Makiyivka 3.6, Donetsk Region), and at the bottom of the entrance shaft (the chamber contained a double burial, a woman and a man with a mace). The largest number of cores for making flakes – 8 items – were found in an 'arrow-maker's kit' at Kairy 2 1.13 (Kherson Region). There was a drilled axe – hammer above the right shoulder of the buried man aged 25-30 (the skeleton displays traces of fire), his hands were tied with a leather belt with bronze tubular beads and four red deer teeth.

The kit also included seven unmodified **concretions**. Flint concretions and pebbles were found in seven other Ingul graves, including in four 'manufacture kits'. The primary burial 11 (cenotaph) of barrow 12 near the village of Zhovtneve (group 3, Zaporizhya Region) contained 78 concretions as a compact mass – in a bag or a basket – in the north-eastern corner of the chamber. a similar cluster (16 items) was found among flint goods in the shaft of grave 9 of barrow 4 near the village of Zaplavka (group 1, Dnipropetrovsk Region). Two other kits contained one concretion each (one in a child's burial, another in a complex with a quiver set, the buried man's trepanized skull had been plaster modelled). Individual concretions were located as follows: at the feet, on the ribs (this concretion was painted with ochre), at the bottom of the shaft (displaying several flakes, covered with patina).

II.2.4. OTHER CULTURE GROUPS

The total of 290 **flakes** were found in 5 graves of the Bahmut type, including 81 arrowhead blanks with initial preparatory blades as part of four ‘arrow-makers’ manufacture kits’.

A Manych-type grave with an ‘arrow-maker’s kit’ (Oleksandrivsk 1.49, Luhansk Region) contained a wooden case with 10 unmodified flakes and 3 items on which the shaping of arrowheads had been started. In a double burial 9 (an adult and a child) of barrow 1 near Zymohirya (Luhansk Region) three flakes and a scrapper lay in a basket near the child’s skull, beneath an alabaster vessel among a set of adornments.

A ‘bifacial-type’ **core** (Fig. 2) was found in an arrow-maker’s ‘manufacture kit’ in the late catacomb grave 3 of barrow 3 of mine No 22 group (Ordzhonikidze, Dnipropetrovsk Region). Two ‘arrow-maker’s kits’ (Artemivsk 1.1, 4.1, Donetsk Region) (Fig. 58; 60) contained three cores. a conical core for large pressure blades (Artemivsk 1.1) comes from Eneolithic workshops at the village of Krasne near the barrow group [Kravets, Tatarinov 1997: 75]. Two cores from Artemivsk 4.1 complex belong to the same or earlier period. All of them had no traces of secondary use, except that one of the cores had been subject to heat treatment due to which it became unsuitable for making biface blanks or tools. Let us stress that all arrowheads, tools and blanks in those kits were made of chalk flint concretions without any traces of use of implements produced in earlier periods of time for that purpose.

One of the ‘arrow-makers’ kits’ (Artemivsk 2.3) contained 76 fragments of several broken **concretions**. Such fragments were most commonly used for preparing cores for making flake blanks for arrowheads (see Chapter V).

II.3. ARTEFACTS WITHOUT SECONDARY MODIFICATION OF THE BABYNO CULTURAL – HISTORIC COMMUNITY BURIALS

II.3.1. CHEST BURIALS

In all, 26 burials of the Dnieper – Don culture in chests (including three in stone chests) contained 31 flakes (one of them of quartz). 14 of them were

Table 3

Flint implements without secondary modification in burials of Babyno culture

Burials \ Type	Flakes out of kits (amount of wares / amount of complexes)	Flakes in kits	Cores out of kits	Cores in kits	Concretion out of kits	Concretions in kits	Total
In blocks	31 / 26	-	2 / 2	-	1 / 1	1 / 1	35 / 30
In pits	71 / 55	22 / 3	1 / 1	-	1 / 1	-	95 / 60
In niches	5 / 3	57 / 1	-	-	-	-	62 / 4
Total	107 / 84	79 / 4	3 / 3	-	2 / 2	1 / 1	192 / 94

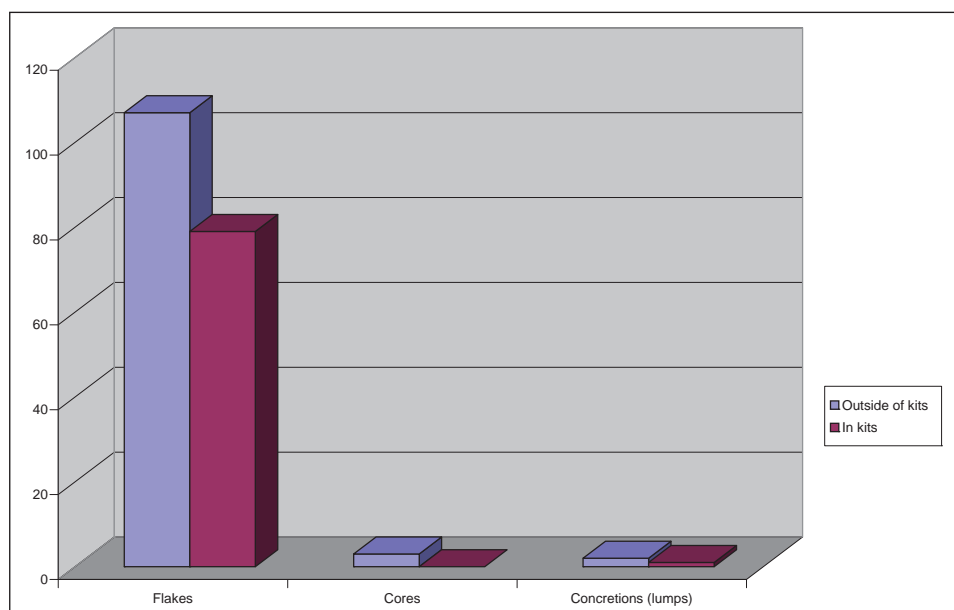


Diagram 3. Flint artefacts without retouch in the burials of the Babyno culture

primary burials (Tekstilshchik 4.19 in the mound that united two earlier barrows). 79 flakes were also found in 'manufacture kits' (Table 3; Diagram 3).

In three cases the flakes were placed in the funerary grounds near the graves, two in the chest lids, and three under their corners. In five burials the flakes were found next to the skulls, including two cases under the skulls and two in front of the face, one of them in a smear of ochre. Two burials contained flakes placed behind the back, two had them placed next to the pelvis, and two at the elbows; in four cases the flakes were placed at the feet of the skeletons. In one burial (Novoyavlenka 13.3, Donetsk Region), three unmodified flakes were found at the right hand of the dead. In four other cases the exact location of the finds is unknown. It should be noted that, the unmodified flakes were included in burials that contained rare grave goods, as for the Babyno culture: an axe –

hammer, a mace with shaped expanding bulbs, a bronze-clad wooden bowl, two graves containing ‘quiver sets’, five burials with bone buckles, two of them shaped clasps. Two burials contained re-deposited (relocated) human remains arranged as ‘packages’; two were double burials, in one of them a flake was found in the chest that served as a grave of an adolescent.

Cores were found in only two of the burials in chests. An odd single-sided single-platformed flat microcore (Fig. 10:1) lay on top of the chest lid of primary burial 1, barrow 3 of the ‘Udarnyk’ group (Donetsk Region). In a primary burial 13 of barrow 3 at the village of Novoyavlenka (Donetsk Region) a pre-core on a massive concretion fragment was placed at the feet of the skeleton.

A flint **concretion** was found on the chest lid of a primary burial of a child (Oleksnadrivka 1 4.3, Dnipropetrovsk Region). a concretion fragment was also in the ‘arrow-maker’s kit’ (Nyzhnia Baranykivka 5.10, Luhansk Region).

II.3.2. PIT BURIALS

A total of 55 burials contained the total of 71 **flakes** (Table 3), including one made of quartz and 5 covered with patina. 19 of the graves had roofs, in three cases those were made of stone. Of these, 11 of the graves with roofs were primary burials. One grave (No 13) belonged to a soil burial site Gura-Bykuluy (Republic of Moldova). In that grave, six unmodified flakes were located on the ribs of the buried man; according to the authors the flakes could have initially been placed in a small leather bag.

Furthermore, flakes were present in two ‘arrow-maker’s manufacture kits’ (20 flakes in one, placed at the knees, and one in the other, placed by the pelvis); and in a wood-working toolkit (Morokyne 8.1, Kharkiv Region) next to the skull, together with a bronze adze and a bone point. Massive flakes, one covered with patina, and the other made of quartz, were found next to the right shin of a child (a ‘kit’ of unidentified purpose).

Flakes were found next to the skull (in 11 graves), next to the hand (in 4 graves, including one with a flake clutched in the child’s left hand), next to the legs (in 13 graves, including two flakes in each of the two children’s graves, and one flake in each of the two women’s graves); behind the feet (3 graves), between the thighs (2 graves); near the human chest (3 graves), near the pelvis (3 graves, including one of an adolescent), and behind the back (3 graves, including a child’s one). Two of the graves were cenotaphs, one of them containing a string of bronze beads. In two other cases the human bones were arranged in ‘packages’. Twelve flakes were found on the roofs of eleven pits. One of them

was a child's grave (Gnarovske 1.6, Zaporizhya Region); alongside a flake it included a bronze pendant and a bronze twisted torque next to the skeleton. Another one (Veselovska 1 2.4, Rostov Region) included a drilled axe – hammer and a bronze knife of the Seima type. Both were primary burials. Finally, four graves included bone buckles (one, with dismembered human remains, contained two buckles).

A **core** was found next to the shoulders of an adolescent together with 4 cattle astragals in a primary burial 8 of barrow 1 near the village of Samoylove, Donetsk Region. The cover slabs displayed traces of a fire.

A **concretion** was found next to the skull of an individual buried in a pit covered with blocks (Astakhove 1 22.5, Luhansk Region).

II.3.3. NICHE BURIALS

Five **flakes** were found in three Babyno graves made in side wall niches: one and three flakes respectively by the skulls in two graves and one flake next to the pelvis. a total of 57 flakes – arrowhead blanks – were placed next to the human bones arranged as a ‘package’ comprising a part of the ‘arrow-maker’s manufacture kit’ in Aktove 2.2 (Mykolayiv Region). However, it should be noted that the presence of a biconical ‘korchaha’ amphora-like vessel and similarity of the stock of goods to relevant stocks found in chest and pit graves of the Dnieper – Don Babyno culture cause doubts about the accuracy of the reconstruction of that complex’s burial structure as a side-wall niche. Another ‘manufacture kit’ (Nova Odessa 4 1.15, Mykolayiv Region) contained seven flakes: two (one of them burnt) at the feet and five in front of the face in a smear of ochre.

Special attention should be paid to Voskresenka 1 2/1 complex (Kherson Region), in which 16 flint items: tools, blades, flakes and core fragments of the Mesolithic – Neolithic age, covered with patina, were placed as a pile next to the skull. The burial also contained two bronze pendants, a skull and legs of a horse.

Hence, the predominant majority of flint items in the Early and Middle Bronze-Age burial complexes constitute a variety of flakes and fragments. At the same time, while flakes serving as biface blanks within ‘manufacture kits’ are mostly standard, flakes outside the context of the kits may be of any morphology. The same applies to their location in burial constructions and in relation to the body: a wide variety of versions of such positioning is common for all Northern Pontic cultural entities of the Early and Middle Bronze Age. We should also note that most flakes outside the kits have no additional modification and

may not – according to our observations – be suitable for further production of any tools. This fact prevents us from regarding them as blanks, potential tools included as parts of grave goods.

It should be noted moreover, there is an insignificant number of cores in burial complexes, their absence in most of ‘manufacture kits’, even in those directly connected with flint-working. This could be caused by economic factors: the shortage of raw materials and the technology of receiving hammered flake blanks, when the nodule was completely utilized. However, this assumption is contradicted by the fact that many ‘manufacture kits’, although having no cores, contained a large number (up to several hundred) of selected flakes (blanks) suitable for making arrowheads. Most probably, the scarcity of cores, as well as of raw material represented by flint concretions, may be linked to such a characteristic of the predominant majority of ‘manufacture kits’ found in burial complexes as their initial incompleteness, i.e., the lack of a whole set of components (raw materials, blanks or instruments) necessary for a certain technological cycle. Therefore, that incompleteness, along with the presence of odd flakes, cores, and raw materials outside of the context of the kits, show the complexity and ambiguity of relations between real-life phenomena (social, economic, and technological) and their reflection in funerary rites.

III. FLINT TOOLS

Before analyzing various types of tools that originate from burial complexes of the Early and Middle Bronze-Age Northern Pontic area, we should clarify terminology. In archaeology, a 'type' denotes a 'system that varies and develops with time, features sustainable repetition of a combination of characteristics of items or objects that are part of it, and is regarded as distinct from others by makers and users of those items or objects' [Kamenetskiy 1972: 354-355]. According to this functional approach, a type of a working tool involves, primarily, the presence of a specific manufacture function of that tool, linked to characteristics of the object of labour activity and its kinematic qualities and, based on those, to certain differences in the degrees of thinning [Kileynikov, Pechenkin 1985: 31]. We already noted that the formal-typological approach to Bronze Age tools does not always produce results. For instance, one of the main criteria of classification of stone-age tools is the type of blank: flake-based or blade-based [Neprina 1975: 39]. This criterion does not work in our case, i.e., due to a very small number of blade-based artefacts. More acceptable is the classification of stone tools used by Kileynikov and Pechenkin for functional assessment of goods found in the multi-layered settlement Kopanyshche II in the Middle Don basin. The authors suggested dividing the tools into classes by branches of economy (agricultural, cattle-breeding, hunting, etc.), and further within the classes into groups, based on specific manufacture processes (cutting animal carcasses, stoneworking, etc.), and then groups into types based on particular functions (sickles, knives, etc.) [Kileynikov, Pechenkin 1985: 42]. A similar functional classification, based on trasological analysis, was used by Korobkova when analysing tools from Mykhaylivka settlement [Korobkova, Shaposhnikova 2005: 105].

We will apply similar scheme with some clarifications and additions. Specifically, certain types need to be split into sub-types based on the nature of blanks and morphology of the tool's working edge (blade). We should also note that inadequate quality of some reports and publications does not always allow for classification of a specific tool with a good degree of certainty.

Prior to addressing the working tools we should note that quantitative ratio of their various groups, as well as their territorial distribution, may not be regarded as direct indicators of those tools' roles in the economy of the Early

and Middle Bronze-Age cultural entities. At present we do not know why exactly some specific artefacts were (or were not) placed in the graves. Yet, items used in funerary practices also functioned in the 'living' culture (except for reused items from an earlier time) or were made especially for the burial but following the existing standards and common techniques. Hence the presence of certain tools in graves may indirectly speak for their common usage in various branches of the pre-historic economy.

III.1. TOOLS FOR HARVESTING

Type: sickle, reaping knife. Among flint implements of the Paleo-metal Age, only sickles can be certainly classed as agricultural tools. It should be noted, though, that reaping knives could be also used for cutting wild herbs for feeding cattle [Nekhaev 1990: 8]. The reaping of cultivated cereals is indicated by a characteristic polish of the blade [Shnirelman 1989: 47]. We should add that for the general Indo-European period linguists reconstruct the terms that denote exactly a flint sickle [Gamkrelidze, Ivanov 1984: 692].

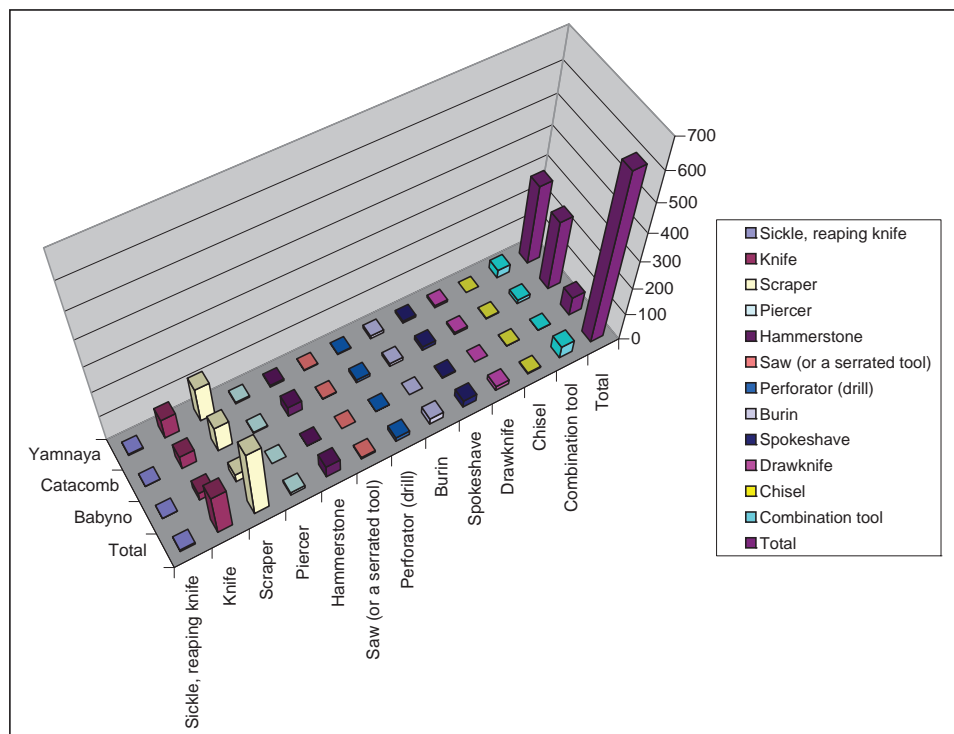
Meanwhile, practically no sickle cutting edges (inserts) were found in the Yamnaya burials (supine) positioned on the back (see Table 4; Diagram 4). There is only one item from the territory of Moldova, found in Gura-Bykuluy 5.4, made on a massive flake. In Rysove 1.19 burial in the Crimea, among the tools placed next to an adult's skull there was one interpreted by the authors of the excavation as a sickle insert. However, judging by the description and the drawing, we may rather speak about an insert for a reaping knife that was not used for reaping the cultivated cereals but for cutting grass for the cattle. For another such tool from Kholmske 2.8 (Odessa Region) we have a trasological definition that confirms its usage for that very purpose. A biface made on a slab (10 cm x 3.5 cm) was found next to the skull of a man aged 30-40 in a smear of ochre.

Only one flake-based inlay of a sickle in the Yamnaya burials on the side (contracted) was found in the Tetskany 1.7 complex (Republic of Moldova), where it lay behind the pelvis of a skeleton contracted on the left side, together with 13 unmodified flakes. One known reaping knife on a massive blade (Alkalia 5.6, Odessa Region) was found near the skull of a skeleton contracted on the left side, with a drilled axe-hammer at the right arm. However, in the latter case we do not exclude the secondary use of an earlier artefact. Hence for the whole Yamnaya culture graves of the Northern Pontic culture there are only two known cutting-edge inserts of the sickle and no more than three reaping knives. Importantly is the fact that four out of five finds occurred at the western boundary

Table 4

Flint tools in burials

Type \ Culture	Yamnaya	Catacomb	Babyno	Total	%
Sickle, reaping knife	5	1	1	7	1,15
Knife	76	51	29	156	25,65
Scraper	131	97	30	258	42,44
Piercer	6	4	-	10	1,64
Hammerstone	7	36	1	44	7,24
Saw	3	3	-	6	0,98
Perforator (drill)	3	11	1	15	2,46
Burin	11	11	-	22	3,64
Spokeshave	8	14	4	26	4,27
Drawknife	8	8	-	16	2,64
Chisel	-	3	1	4	0,65
Combination tools	29	14	1	44	7,24
Total	287	253	68	608	100
%	47,2	41,6	11,2	100	



Diag. 4. Working tools in burials from the Early and Middle Bronze Age

of proliferation of Yamnaya sites. This may be evidence of the influence of an agrarian population that belonged to a different culture. Yet, we should keep in mind that we are dealing with a burial rite that possibly did not involve placing such tools into a grave.

The only reaping knife or sickle known for burial complexes of the Northern Pontic Catacomb culture was found in a 'manufacture kit' unearthed from an Ingul culture grave in Shyroka Balka 1.5 (Kherson Region). Most probably, this is a flake-based inserted edge of a reaping knife with a working blade formed with denticulated retouch and characteristic polishing.

Two segment-like bifaces were found in a primary burial 1 (Bakhmut type) of barrow 8 near Svatove (Luhansk Region), in front of the bones of an adult (secondary inhumation, with a child at the feet) (Fig. 40:3,4). According to the author of the excavation, those bifaces could be sickle inserts [Bratchenko 1973: 35]. This would appear to be highly unlikely as there is no typical polishing on those artefacts. Of note, the double burial also included two wooden bowls, a mace, and metal ornamentals. Hence, in our view, these bifaces were asymmetric knife – daggers, which shall be discussed below in that respect.

We should also mention the find of a bifacial insert, possibly a reaping knife (Fig. 11:2) in a Babyno burial 1 (pit) of barrow 4 near the village of Olaneshty (Moldova) in the Lower Dniester area [Yarovoy 1990: 166]. In that sense there is a contrast between Babyno sites and synchronous settlement sites of the Kamyanka-Leventsovka group of the Crimea and the Lower Don (which researchers also attribute to the Babyno culture or the 'Babyno culture circle'). Numerous finds of sickle inserts [Kruglikova 1955: 81; Bratchenko 1985b: 461; Toshev 1999: 83] allowed Bratchenko to argue that their manufacture, alongside with making arrowheads, had become the key direction of flint knapping at the end of the Middle Bronze Age [Bratchenko 1995: 88].

Generally it should be noted that a small number of sickles in burials of the Early and Middle Bronze Age (1.15% of the total implements, even if taken together with reaping knives – Table 4) may serve as indirect evidence of their almost complete absence from the economic sphere. Probably, the reaping knives may be classed among cattle-breeding tools instead.

III.2. TOOLS FOR MANUFACTURING MEAT AND LEATHER

Types: knife and knife for cutting skins. It is rather difficult to separate meat-cutting knives from a mass of other flint implements. Although trasologists have long identified their characteristics, still the predominant majority of cutting

tools have not been studied properly. Naturally, here we are not talking about objective statistics. Hence we will address the cutting tools that may be interpreted as both flaying and meat-cutting tools, jointly. It is hard to distinguish between flaying knives from meat-cutting knives; moreover, both types could and should be used for both cutting the carcasses and taking off the skins. They can be separated only in two cases: (a) when there is a trasological definition, and (b) when there is a good reason to do so based on the context of the find (a ‘manufacture kit’).

Generally, 53 cutting tools (Table 4; Diagram 4) were found in 44 Yamnaya graves next to the skeletons contracted on the back, including five items in three ‘manufacture kits’. A trasological definition is available for only one tool from Nagirne 14.16 complex (Odessa Region): the tool was used as a meat knife. Yet, judging by the morphology and the nature of the retouch, we can argue that prior to being placed in the graves most of the other similar tools had been used for the same purpose. They were placed near the skulls; one of the tools was found near the right hand of the buried individual in a smear of ochre. In one of the complexes (Shyroke 1.1 (primary), Dnipropetrovsk Region) a knife made on a massive ribbed flake (possibly, a re-used Eneolithic artefact) was found to the left of the pelvis of an adult together with a bronze ‘awl’ and an item made of ochre. In another case a flake-based cutting tool was placed together with similar items next to the skull (Blyzniuky 1.9, Dnipropetrovsk Region). In our view, in that context the cutting tool was equal to certain bifacial knife – daggers and bronze knives, thus forming a semiotically connected pair ‘knife – awl’ that is typical for the Early and Middle Bronze Age graves (see below).

In 21 Yamnaya graves, the skeletons were contracted on the side and accompanied with 23 cutting tools based on flakes and hammered blades (Fig. 5: 5-7), including three tools in two ‘manufacture kits’. Outside the ‘kits’ those tools occurred only individually (in one case there were two such tools), and mostly were the only grave goods.

Generally, 65 Yamnaya graves contained 76 cutting tools, but only eight of them were included in five ‘manufacture kits’.

Cutting tools were known in five early Catacomb burials (Table 4), (Fig. 6: 5-6). In one case, a flake-based cutting tool in a ‘manufacture kit’ was accompanied with a bronze knife and an awl; in another case, four cutting tools belonged to an ‘arrow-maker’s kit’. Two flake-based tools were located behind a man’s skull. Two other cutting tools – one in each grave – represented massive ribbed blades over 9 cm long. In our opinion, they are equal to bifacial knife – daggers, which is confirmed by their location in the right hand of an old man (Kerchik 16.21, Rostov Region) and in front of the face of one of the three buried individuals (Novopokrovka 3 1.20, Dnipropetrovsk Region).

Flake-based cutting tools were found in 5 burials of the Donetsk culture (Table 4). One of them was included in the ‘arrow-maker’s kit’ (together with

a drilled axe – hammer); two belonged to a ‘carpenter’s kit’ (together with a bronze knife and an awl). The other three tools were placed individually by the skull, under the ribs, and in the filling of the chamber, respectively. Moreover, like in early Catacomb complexes, in two cases there were knives based on massive blades. The Svatove 3.6 complex (Luhansk Region) contained an Eneolithic pressure blade (9 cm long) found in the right hand of the skeleton, while in a primary burial 7 of barrow 3 near Hovorukha (Luhansk Region) it lay behind the skull of one of the two buried bodies together with a bronze awl. This latter fact proves that a bronze knife and an awl, a bifacial knife – dagger, and a knife based on a large blade (which often belonged to an earlier time) could substitute for each other in the Catacomb burial rite.

Flake-based cutting tools are present in 32 graves of the Ingul culture (Table 4) (Fig. 8:9-10), including in six ‘manufacture kits’ (three, two and one in the ‘arrow-maker’s kits’, two in a ‘bone-carver’s kit’, four in one in unidentified kits). In one of the ‘arrow-maker’s kits’ they represented re-plaster modelled Upper Palaeolithic tools. In 26 graves they were the only tools; four of those graves had two tools each (all placed near the skulls), others had one tool each. In nine cases the cutting tools were laid near hands, in five cases they were found under the skull or near them, in three cases near the feet, and in one case over the lower spondyls. In the cenotaph, cutting tools were placed in the middle of the chamber together with a drilled axe – hammer. Axe – hammers were found in five other graves containing cutting tools (one in an ‘arrow-maker’s kit’). In one grave the tool was placed directly under the bottom of an unbaked ritual vessel, and in another one – immediately next to it. One tool was also found under the bottom of a pot in a child’s burial. In the complex of Dumeny 1.9 (Moldova), next to the left shoulder of the buried individual there was an Upper Palaeolithic scraper on a massive blade, the latter replastered modelled into a knife. That tool can be compared with reused blade knives found in the Yamnaya, early Catacomb, and Donets burials.

Eleven cutting tools were found in ten Babyno burials in chests (including a stone one). It should be noted, the tools were positioned differently: three behind the backs of the skeletons contracted on the side (in three cases they were accompanied by quiver sets; two of the tools most probably represented reused Eneolithic artefacts based on massive blades). In one grave, which also contained an ‘arrow-maker’s kit’, an axe – hammer, and a bone clasp, the exact location of the cutting tool is unknown. Individual tools were found separately at the skull, thighs, and the feet of the buried. Of note, in three cases the cutting tools were placed outside the chests together with extremities and skulls (probably, remainders of animal dummies: horses and cattle). One of such burials was accompanied by a wooden bowl encircled with bronze casing, while another included a quiver set. In that very burial, like in another one, the cutting tool was placed on top of the lid of the chest. Generally, burials with such tools stand out

of the whole group of the Babyno burials due to the richness of their grave goods. In addition to the above bowl, they include two drilled axe – hammers (together with an ‘arrow-maker’s manufacture kit’ and a quiver set from Blyzniuky 1.1, respectively), four bone clasps (including a circular one and a shaped one in the complex of Mykolayivka 8.1, also containing a quiver set; a circular fibula in a complex with a quiver set at Beyeva Mohyla 3.1 (Fig. 25); and a circular one in a complex with an ‘arrow-maker’s kit’ at Biryukove 2.2).

Cutting tools were registered in 17 Babyno pit burials, including seven primary burials of which five still had remainders of timber roofs. In four of the complexes the cutting tools (one of them made on an apparently Eneolithic blade) were placed immediately next to the skulls (also next to a woman’s and a child’s skulls). In one case (Sokolove 2 4.2, Dnipropetrovsk Region) a flake-based cutting tool was placed on the right shoulder of the dead, at the same time a bowl-shaped vessel with a pictographic ornament stood on his hands. In two complexes knives were found at the elbows (one of them in a female burial, another accompanied by an axe – hammer and a bone fibula). Cutting tools were placed one by one at by the hands, knees, ribs, and feet of the buried individuals, and one (made on an archaic-looking blade) behind the back, and as part of an ‘Arrow-maker’s kit’ in Pryvillya 11.13 (Donetsk Region) (Fig. 65), among the bones of a secondary burial (arranged as a ‘package’). In two cases the knives were found in the roofs of the pits (one of them was an adolescent burial). One of the graves was actually a cenotaph. Finally, in one of the cases a flake-based cutting tool was left at the funerary ground adjacent to the barrow, together with fragments of ceramics. A jade axe – hammer of the Borodino type, an object unique for Babyno burials, was found next to the human remains in that complex (Balabyne 1.2 (primary), Zaporizhya Region).

A flake-based cutting tool was found at the feet of the skeleton in one Babyno burial in a side wall niche (Velyka Bilozerka 17.7, Zaporizhya Region).

Hence, 156 burials contained 181 cutting tools (Table 4; Diagram 4), which comprise 25.65% of the whole number of excavated implements. Considering their morphology, they can be generally divided into two groups. The first and the largest is represented by flake-based knives, or rather, sharp-edged flakes with traces of utilisation retouch on the edge. They are also present in ‘manufacture kits’. This fact is fully in accord with the finds made at settlements. Such simple cutting tools were made quickly and easily of raw materials of any quality but lost sharpness and were broken rapidly. Importantly, most of the cutting tools found among the grave goods were represented exactly by such kinds of worn-out knives that were hardly suitable for any further use. Possibly, that is why their location in the graves (when they did not belong to the ‘manufacture kits’ corresponded with the location of items bearing no traces of secondary modification, i.e., from the technological point of view, simply ‘waste’. The second group comprises knives made on large blades or ribbed flakes, which in a number of cases were definitely

reused items from the previous time. Such items were located in the hands or near the skulls of buried individuals, their positions fully in line with the position of knife – daggers; the same is true for the finds of accompanying metal ‘awls’ (see Chapters IV and VI).

Type: scraper. This is one of the most widespread and numerous categories of Bronze-Age flint tools (Table 4; Diagram 4). A large number of scrapers in a settlement’s cultural layer may indicate the following facts: first, cattle-breeding probably played an important role, and hence skin-processing was a major kind of manufacture; second, scrapers were worn out fast.

A ‘scraper’ is a rather conditional term to denote grave goods; it is mostly applied by authors to indicate flake-based tools with a sharp working edge formed with an abrupt retouch. Trasological investigation mostly confirms their use precisely in the function of scrapers, though exceptions are possible. Importantly, trasological studies showed that in the Early and Middle Bronze Age scrapers could be used even for skull trepanation [Nechitaylo 2005: 174].

Abruptly retouched items, mostly based on massive flakes and interpreted by researchers as scrapers, were found in 68 Yamnaya burials containing skeletons contracted on the back (Fig. 4). The number of such tools totalled 82, of which 16 were found in six ‘manufacture kits’. The latter, in our view, more likely served as racloirs or spokeshaves, rather than scrapers per se, though morphologically they are alike. Most of those tools were found in the burials individually; very rarely were they two at a time, usually placed close to the skull; the exceptions include five items found in grave roofs. Four scrapers were covered with patina and belonged to an earlier time. They displayed no traces of remodelling. One scraper was found at the ledges of grave 4 of barrow 1 in Kryvyi Rig (Novokryvorizhsky ore enrichment combine) together with four wheels and details of a cart. Several scrapers were included in burials that contained weapons, e.g., in a male burial 3 of barrow 3 near Oktyabrsk (Donetsk Region). Two items were found next to the skull together with a dart head (the haft was preserved); pieces of tag on the skull may be the evidence of scalping, which means deliberate murder. All the above allows for the assumption that the custom of placing scrapers in the grave was far from always designed to provide for the use of that tool in the world of the dead in its previous function.

Scrapers were found in 37 Yamnaya graves containing skeletons contracted on the side (Fig. 5:1-4). Together, there were 41 such tools, six of which were found in four ‘manufacture kits’. A scraper based on an older blade and covered with patina was found on top of the roof of grave 5 of barrow 1 near the village of Volodymyrivka (Zaporizhya Region). The primary child’s burial 9 in barrow 1 near the village of Nova Mayachka (Kherson Region) contained a scraper made of an Upper Palaeolithic flake and placed next to the skull. The barrow was located directly over an Upper Palaeolith settlement, hence it is possible that the tool was made during the burial rite. Another tool was found in a vessel placed

next to the human collarbone (Revova 3.7, Odessa Region). A round scraper was also found near the skull of skeleton (contracted on the right side) in burial 13 of barrow 8 near the village of Kalynivka (group 2) (Mykolayiv Region), blocked with an anthropomorphous stele with feet. The grave goods included a necklace with a hammer-shaped pin, a vessel with ochre, and 13 cattle hooves. It should be remembered that researchers link burials containing such necklaces to the cult sphere [Kovaleva 1987: 153]. Finally, two scrapers were found in graves containing fragments of carts (Upper Azov area and Lower Don).

A brief comment about tools originating from cenotaphs and ruined graves of the Yamnaya culture is necessary. Here there are eight flake-based scrapers (one covered with patina).

Each of the 14 early Catacomb burials contained one flake-based scraper (Fig. 6: 1-4; 7), except for an 'arrow-maker's kit' that contained two. In eight cases they were found under the skull or immediately next to it; in four other cases the scrapers lay near the hands, in one case behind the back, and in another within the filling of the chamber. Apart from the scrapers, the grave goods included a wooden ploughshare, a wheel, a cup with bronze scrapes, a bronze knife, and a bronze awl.

Flake-based scrapers were found in ten Donets burials (Table 4), including in an 'arrow-maker's kit', and a 'carpenter's kit' (one item in each) and a 'sawyer's kit' (two items). A double male burial with an anthropomorphous entrance shaft contained one scraper in the filling of the entrance and another one behind the pelvis of one of the skeletons. The other six burials contained a scraper each. The scrapers were located as follows: next to the skull (in two cases, one together with a bronze knife and a bronze awl, the other of an adolescent); at the feet (a child's burial); near the pelvis and at the bottom of the shaft (an adolescent's burial). In the complex of Shandrivka 3 2.4 (Dnipropetrovsk Region), a scraper was covered with half of a large shell on a special torus at an inner wall of the chamber.

In all, 69 scrapers were found in 56 burials of the Ingul culture (Fig. 8:1-8), including 20 scrapers in so-called 'manufacture kits' (two in each of the two 'arrow-maker's kits', one in a stone-knapping kit and two and another in a second stone-knapping kit, three and one tools respectively in two 'caster kits', one in a 'bone-carver's kit', and five and two more in unidentified kits). Outside of the context of the kits, two scrapers were found in each of the four complexes, in which two tools were located under the left armpit of the skeletons (in one of the cases – that of an adolescent), behind the skulls of an adult (with a plaster modelled face) and a child, and near an adult's shoulders. In one of the cases the scraper was placed on the bottom of a fire pan to the right of the skeleton of a child aged 3-5 (Terny 1 6.8, Dnipropetrovsk Region). One more scraper was found in a pile of fragments of a broken unbaked vessel. In the complex of Pelahiyivka 1.19 (Mykolayiv Region), a necklace of boar and wolf fangs and

molars was placed on a scraper made of a massive flake and located behind the skull. We counted 17 finds of scrapers near the skulls, 13 near the hands, 5 near the feet, 2 between the thighs, 2 near the pelvis (one of the cases was an adolescent burial), one behind the back, one in the filling of the shaft, and one in a cenotaph. The above burials were accompanied by four unbaked ritual vessels, three axe – hammers, two wooden bowls (cups), and one, a part of the wheel. In two of the cases, faces of the buried individuals had been modified.

A scraper and three flakes were found in a basket under the bottom of an alabaster vessel in a Catacomb complex of the Manych type, Zymohirya 1.9 (Luhansk Region).

Each of the seven Babyno cist burials contained a scraper. Their location in the burial construction was generally similar to that of flakes and cutting tools: behind the back in a woman's burial containing a faience necklace, next to the pelvis in a child's burial containing 12 astragals, near the elbows, and near the hands. One tool was found behind the wall of the chest together with animal bones; in two other cases the scrapers lay on the chest lids (one of the burials was accompanied by a quiver set and a circular fibula; another included two shaped fibulae).

Flake-based scrapers were found in 15 Babyno pit burials, including two pits that contained two scrapers each. Those included six primary burials; four of them had roofs. The scrapers were placed next to the skull (4 complexes), near the hands (2 complexes, including one with two scrapers at the right hand), at the elbows (2 complexes), at the pelvis (2 complexes), at the knees (1 complex), behind the back (1 complex), at the feet (2 complexes), among the bones of the secondary burial (1 complex), and on top of the roof of the pit (1 complex). The complexes with scrapers also contained a faience necklace, a circular bone fibula, and an 'arrow-maker's kit' (two tools).

A flake-based scraper was found next to the skull in a Babyno burial made in a side wall niche. The 'manufacture kit' of the complex of Nova Odessa 1 1.15 (Mykolayiv Region) included five flake-based tools with abrupt 'scraper-like' retouch: four under the skull and one in front of the face of the buried.

Generally, 250 tools defined as 'scrapers' (almost all of them flake based) (Table 4; Diagram 4) were found in 211 burials of the Early and Middle Bronze Age; this accounts for 42.44% of all the tools. Like flakes and cutting tools, scrapers were distributed relatively evenly in time and space. Hence in terms of numbers the burial complexes containing scrapers are second only to those containing items without any secondary modification. No doubt, this fact can be explained by the use of flake-based scrapers in the economy as tools for processing skins and, to a lesser extent, other materials, which corresponds with their large quantities in cultural layers of settlements. Like flake-based cutting tools, those items were worn out fast. Meanwhile, the location of some of the scrapers within the burial constructions may indicate that they were put into the graves for purposes different from those of the tools (see Chapter VI).

Type: piercer. A piercer is a flake-based tool with a natural or retouch sharp point designed to pierce soft materials (mainly skins). This function of the tool may be derived from its usual characteristic polishing and softened facets of the retouch.

There are only two known flake-based piercers among all the tools found in the Yamnaya burials with skeletons contracted on the back. One of the tools was included in a 'manufacture kit' and found under the skull in the Lysychansk oil refinery complex (Fig. 45). Another item comes from the Samara and Oril river valley (Chornyavshchyna 3.2).

Four flake-based piercers were found in four Yamnaya graves containing the skeletons contracted on the side, including one in a 'manufacture kit'.

One piercer was found in an 'arrow-maker's kit' of the Donets Catacomb culture. A flake-based piercer was found in each of three Ingul burials. In one of the cases, the tool belonged to an 'arrow-maker's kit'. In grave 32 of barrow 2 near Novokairy (Kherson Region) the piercer was found under a turned-over cup to the right of an adolescent's skull. In the third case (Chkalivka 4 3.10, Dnipropetrovsk Region) a similar tool was found between a man's ribs.

All in all, ten complexes produced ten flake-based piercers (Table 4; Diagram 4), i.e., only 1.64% of the discovered tools. Even given the peculiarities of the burial rite, we may notice that the tools of this type were rare. There are reasons to assume that more effective bone and metal pins were used to pierce skins in the Bronze Age.

III.3. TOOLS FOR MANUFACTURING STONE, WOOD AND BONE

Generally speaking, some tools of this class, namely ones for processing bone and horn, can also be regarded as cattle-breeding / hunting tools, just as the implements for skin-working discussed above can also serve as tools for domestic manufacture. The boundaries between the classes are unclear. Yet, since practically identical tools were used for processing of hard materials of animal (bone, horn) and other (wood, stone) origins, they were identified into a specific class.

Group: stone processing

Type: hammerstone. In the Bronze Age, splitting of raw materials with the aim of obtaining flakes was mostly done with the help of hard hammerstones of flint, quartzite, sandstone, granite, and others. It should be noted that implements identified as 'hammerstones' could in fact be also used for other purposes.

Hammer-stones are known in two Yamnaya burials containing skeletons contracted on the back. Three hammerstones – made on a concretion, a flint pebble and a quartzite pebble – were registered within a ‘manufacture kit’ of Prymorske 1.3 (Zaporizhya Region). One more item, based on a concretion, was found under the nape of the buried in the Tsilinne 13.22 complex (Crimea). Both were primary burials. Importantly, this does not mean that the above hammerstones were actually used in flint knapping. As far as the latter item is concerned, it is worth remembering a version that suggests the use of hammered concretions as sling stones (see below).

The hammers-tones were found in three Yamnaya burials on the side; in all the cases they were the only flint items. In one case (Revova 3.4, Odessa Region), a hammer-stone made of Kryvyi Rig flint pebble was placed instead of a missing skull of the buried child.

Hammer-stones were found in four graves of the Donets Catacomb culture, all outside the ‘manufacture kit’ context. There were five in one of the complexes (three had been also used as grinders, and one in each of the other three burials, including one of a child aged 6-7. The tool from the Mykolayivka 6.2 complex (Luhansk Region), defined as a retoucher hammerstone, was found near a female skeleton in the smear of ochre together with a bronze knife and a bronze awl. The burial also contained an incense cup on a solid base.

Hammerstones were found in 11 graves of the Ingul culture, including four ‘manufacture kits’ (7, 3 and 1 items respectively in three stone-working kits, and 1 in an unidentified kit). In six complexes the hammerstones were located near the skulls (in one case, three intact hammerstones and two fragments there of were found under the nape, in another case there were two items next to the skull and one next to a child’s skull). One tool was found under the left knee of the skeleton.

The total of four hammerstones based on fragmented concretions were found in three ‘arrow-maker’s kits’ from Bakhmut-type graves. A ‘caster kit’ from the Bakhmut-type Pokrovka 4.3. (Donetsk Region) contains a hammerstone (Fig. 61:10) made of a concretion and displaying traces of cinder. This fact proves that the tool was used as a blacksmith’s hammer.

A hammerstone made of a worn-out rough prismatic core was found in a Babyno child burial (pit) in the territory of Moldova (Kuzmin 7.13), where it had been placed close to the ribs of the body.

All in all, 25 complexes (including 9 ‘manufacture kits’) contain 44 items identified as hammerstones (Table 4; Diagram 4), which comprises 7.24% of the total number of tools.

Group: processing of wood, bone and horn

Type: saw. Actually, practically any cutting tool could be occasionally used for sawing, as the retouched cutting edge is denticulated from the very start.

However, only two tools identified specifically as saws have been found in Yamnaya burials with skeletons contracted on the back, both in the Crimea.

The saws were made of massive tabular concretions of the Crimean flint; one of them belonged to a ‘manufacture kit’ (Rysove 7.52), the other was found next to the skull buried in a wooden chest (Abdal 1.2) and the burial was also accompanied with a retouched flake, a drilled axe – hammers, a bronze knife and a bronze awl, and a bone item.

The saw for wood (Fig. 44) was identified trasologically in a ‘wheelman’s manufacture kit’ near the skull of a skeleton of a man (aged about 25), contracted on the left side (Vyshneve 14.47, Odessa Region).

A saw for wood belonged to an ‘arrow-maker’s kit’ from a Donets Catacomb burial Novomykolayivka 2. 2.1 (Dinetsk Region) (Fig. 50). The complex also contained a drilled axe – hammer and a wooden bowl.

Two flake-based saws for wood were trasologically identified by Korobkova within a wood-working ‘manufacture kit’ from an Ingul Catacomb complex of Taborivka 25.1 (Mykolayiv Region).

Hence, six flake-based saws are known in only five complexes, four of which contained ‘manufacture kits’ (Table 4; Diagram 4), which amounts to 0.98% of the whole number of tools. This small number can be explained by their low efficiency, which limited their sphere of use almost exclusively to making small wooden items.

Type: perforator (drill). A perforator (borer, reamer drill) is a flake-based tool with a retouched or natural sharp point designed to make holes in objects made of hard materials (stone, wood, bone, or horn). The evidence of use for this purpose is the circular wear of the working tip (point), typical fractures, and smoothed edges.

Notwithstanding a substantial number of drills – both hand-drills and bench-drills – identified trasologically by Korobkova among the materials of the Yamnaya horizons of the Mykhailivka settlement [Korobkova, Shaposhnikova 2005: 134, 232], they are almost unknown in the Yamnaya burials containing skeletons contracted on the back. We may refer to a flake-based drill from a ‘manufacture kit’ found in Leventsovka 7, 34.1. Three more tools from two other graves combined their function of drills with other functions (see below).

Two of such artefacts were found in Yamnaya graves with skeletons contracted on the side, including one perforator (borer) within a ‘manufacture kit’ (Bilozerka 9.8, Kherson Region).

The only borer from a burial of the Donets Catacomb culture also belonged to a ‘manufacture kit’.

Korobkova identified three wood-working drills in a ‘manufacture kit’ from an Ingul burial of Taborivka 25.1 (Mykolayiv Region). Three borers also belonged to a ‘bone-carver’s kit’ (Brylivka 16.21, Kherson Region), and one more to an ‘arrow-maker’s kit’. Individual flake-based borers (Fig. 8:11) were found in three graves: at the left elbow, at the lower jaw (in the mouth?), and close to the pelvis (with a wooden bowl) of the buried.

A Babyno pit grave contained a borer located under the right shin of the buried body (Dniprovka 2, 5.3, Zaporizhya Region). Importantly, for making some bone buckles Usachuk trasologically followed traces of usage exactly of a bow drill with a vast working selvage [2002: 163].

All in all, 11 burials (five of them with ‘manufacture kits’) contained 15 borers (Table 4; Diagram 4), i.e., 2.46% of all tools. Outside of the context of the kits they were located in the same way as flakes and other individual tools.

Type: burin. The function of cutting, had been performed with the use of cutters in the Stone Age; in the Paleo-metal Age those were replaced – alongside with metal tools – with chisels: retouched flakes (mostly, with utilisation retouch) on a protruding narrow working edge, often shaped as a thorn or a beak [Kukharchuk 2008: 61]. Trasologically a chisel may be identified by linear marks along its working edge. Flakes with chippage also occur, but their investigation has shown that either the chippage occurred accidentally and was not connected with the cutting function, or we were dealing with artefacts of earlier times enclosed in the grave.

Eight flake-based burins were found in seven burials with the skeletons contracted on the back. We should note a flake-based burin found on an overlay slab of grave 4 of barrow 1 in Kryvyi Rig (Novokryvorizkyi ore enrichment combine), which also contained remainders of a cart.

Each of the three Yamnaya burials, with skeletons contracted on the right side, produced one flake-based burin. In one of the cases it was a primary child’s burial (Khreshchenivka 1.1, Kherson Region). In a primary grave 1 of barrow 1 near the village of Balabanivka (Mykolayiv Region) a chisel lay between the knees of an adult; there was a wooden box with bronze braces at his feet; the box contained a bronze knife, an awl, and a piece of ochre. According to researchers, such collections of items, typical for a number of Yamnaya and, first of all, Catacomb burials, had a cult role. In the third case (Zakharivka 1.1, Kirovohrad Region), a chisel was accompanied with five flakes and a scraper – cutter, but those items did not form a set and were located one by one at the skull, the shoulders, and the feet of the buried body.

For early Catacomb complexes, a burin was found only in grave 10 of barrow 2 near the village of Kostyantynivka (Zaporizhya Region), in which it lay at the right elbow of a skeleton contracted on the back.

A flake-based burin was found within a ‘manufacture kit’ of the Donets Catacomb culture.

Flake-based burins (one of them on a hammered blade) were found in eight Ingul Catacomb graves, including one item in an ‘arrow-maker’s kit’. Outside of the kits, in three other graves the tools were found next to the skull (one together with an unbaked vessels; two in a leather bag with four astragals; there was a drilled axe – hammer next to them); in one complex individual items were located separately at the right hand and the right shoulder next to an unbaked vessel;

in another complex the item lay under the right thigh of the buried body, one in the filling of the chamber (a child's burial), and one in the filling of the entrance shaft.

Generally, 22 burins were found in 20 graves (Table 4; Diagram 4), which comprises 3.64% of the tools. A noticeable feature is the nearly complete absence of 'manufacture kits'.

Type: spokeshave. Those flake-based tools with a notched blade were widely used for processing wood and bone.

Tools with retouched notches are present in collections of flint from the Yamnaya culture settlements [Syvolap 1999: 72; Spitsina 2001: 69]. Only five flake-based spokeshaves are known for Yamnaya burials contracted on the back, one in each of the burials; two of them belonged to 'manufacture kits'. Yet, spokeshave notches were common for many combined tools, primarily in 'manufacture kits'.

Two tools, trasologically identified and wood spokeshaves, were found in two 'manufacture kits' of the Yamnaya graves that contained skeletons contracted on the side, in the territory of the Odessa Region [Subbotin 2002: 72]. Yet another spokeshave, made on a core trimming flake for making blades, was the only find in a child's burial 8 of barrow 2 near Balabanivka (Mykolayiv Region). In our view, that tool belonged to an earlier time.

Two flake-based spokeshaves are known in early Catacomb burials, one of them part of an 'arrow-maker's kit'.

A flake-based spokeshave was also found in a Donetsk culture complex of Malozakharyne 1 1.6 (Dnipropetrovsk Region), where it was located under the left armpit of a man aged 20-25 with a fragment of an arrowhead stuck in his cervical spondyl.

Two wood spokeshaves were trasologically identified in a woodworking 'manufacture kit' in a burial of the Ingul Catacomb culture, Taborivka 25.1. They also belonged to four 'arrow-maker's kits' (4, 2 and 1 items, respectively) and an unidentified kit (1 item). In one of the 'arrow-maker's kits' the spokeshave was initially an Upper Palaeolithic tool later reshaped with the help of a metal pressure tool (as identified trasologically by Korobkova). In two graves, flake-based spokeshaves were located near children's skulls (in one case, a double burial with a woman); in another grave the spokeshave was found next to the skull of an adolescent. One tool was found in a shaft of a burial containing a plaster modelled skull, an ornamented axe – hammer, and a ritual osteo-ceramic vessel (Kryvyi Rig, Ryadovi Mohyly 7.9, Dnipropetrovsk Region).

A 'caster kit' from the Bakhmut-type grave Pokrovka 4.3 (Donetsk Region) contained a spokeshave with two notches, as well as a combined tool: a spokeshave-knife based on a massive chopped blade (Fig. 61:9,11).

A flake-based spokeshave was found behind the pelvis of a buried man in a Babyno grave 2 (chest), barrow 1 near the village of Kripaky (Donetsk Region).

Spokeshaves were found in three Babyno pit burial complexes: near the shoulders (an adolescent), near the ribs and near the thighs of the buried bodies.

All in all, 24 graves (nine of them with ‘manufacture kits’) contained 29 flake-based spokeshaves (Table 4; Diagram 4), which comprises 4.27% of the tools.

Type: knife (drawknife). That was one of the principle tools for processing wood, bone and horn. Some of the items, identified by authors as ‘scrapers’, particularly those found in ‘manufacture kits’ together with other woodworking tools, could in fact be strickles.

For the Yamnaya burials with the skeletons contracted on the back, we counted four flake-based drawknives, one in each of the graves (in one of the cases, stuck in the overlay). Importantly, in all the cases they were the only flint tools in the complex. Within ‘manufacture tools’, drawknives were usually combined with other tools. To explain this, we may suggest that drawknives, as well as other individual tools, could be used in the process of making the burial construction and were dropped into the grave afterwards.

Only one such tool was trasologically identified in a Yamnaya burial with a skeleton contracted on the side, found within a ‘wheelman’s kit’ (Vyshneve 14.47, Odessa Region). One drawknife was found next to the right hand of the buried body in each of the three more graves. Importantly, there were three arrowheads between the bones in one of the graves (Maryinske 5.11, Dnipropetrovsk Region).

The Donets Catacomb culture complex of Vysoke 3.3 (primary) (Donetsk Region) contained a drawknife, based on a massive fraction of a concretion with a natural hole, was placed at the feet of an adolescent.

Two wood drawknives were trasologically identified in a woodworking ‘manufacture kit’ from the Ingul complex of Taborivka 25.1, and a drawknife for bone or horn was found next to the skull in Nova Dolyna 3.9 (Odessa Region). Four spokeshaves displaying no signs of being used were found in a ‘flint-knapping kit’ (Zaplavka 1 4.9, Dnipropetrovsk Region).

All in all, 12 complexes contained 16 drawknives (Table 4; Diagram 4), i.e., 2.64% of the tools, including eight tool in four ‘manufacture kits’.

Type: chisel (mortise chisel). Such tools, made on flakes, had a narrow blade with abrupt retouch and typical chippage. The butt of the tool either had impact marks made by a hammer (hammerstone or billet), or trimming for fastening in a haft. Their function was mainly making hollows in wood.

Two such tools were identified within a woodworking manufacture kit from a complex of the Donets Catacomb culture Krasna Zorya 1.3 (Luhansk Region) (Fig. 47).

A chisel was found between the ribs of a male burial of the Ingul culture (Chkalivka 4 3.10, Dnipropetrovsk Region) together with a flake-based piercer.

The only chisel-like tool for Babyno graves was registered at the knees of the skeleton in a primary burial 2 (pit) of barrow 2 near the village of Pisky (Donetsk Region).

Hence we know of only four artefacts of this type (Table 4; Diagram 4), which comprises 0.65% of the tools. It should be noted that efficiency of flake-based chisels was too low compared to their metal analogues.

Combination (composite) and insert tools. If morphology of a blank allowed it, one flake could often serve for forming several working edges for performing different functions. We refer to such tools as ‘combined’ ones. In a number of cases, burials also contained preserved remainders of casings, made of organic materials, which allowed interpretation of such tools as having inserts. Importantly, some of the tools described above might have inserts, but no sufficient evidence for this assumption could be found.

Altogether 25 such tools were found in 19 Yamnaya graves with skeletons contracted on the back, including within five ‘manufacture kits’. They usually occurred individually; only an arrow-maker’s ‘manufacture kit’ from Hannivka 1.10 contained five drawknives-chisels (the report refers to ‘scrapers’), and a ‘carpenter’s manufacture kit’ from Yuriyivka 1 3.2 there were two spokeshaves-drills (both in the Dnipropetrovsk Region).

Items found included five drawknives-chisels for hard materials, a spokeshave-cutter, a knife-cutter strickle, a knife-raclor and a piercer drawknife-chisel based on a fragment of a rough prism-shaped core. In most cases, these items were outside of the context of ‘manufacture kits’ and the only grave goods. Other finds included four inserts to cutting tools and two inserts for chisel-spokeshaves. It is necessary to specifically describe a composite tool (probably, a spokeshave-chisel) from a secondary burial 2 of barrow 3 near the village of Tarasovo-Hryhorivka (group 5) (Dnipropetrovsk Region). In this case an insert (3.5 cm x 1.5 cm x 0.3 cm) was placed directly in a 9-cm bone haft. No doubt, most of the hafts of such tools were made of wood. Though, sometimes the context of inserts found raises doubt whether they were placed in the burial together with their casing. Hence an elite burial Novoshandrivka 3.2 (Dnipropetrovsk Region), a burnt insert to a cutting tool lay at the left shoulder of the buried body without any traces of a casing. Another example of grave goods was represented by a bone point, a bronze winging of a whip, and a belt with bronze pendants. The skull was painted with ochre; tar plugs were placed inside the nostrils.

Only three combination tools have been known for Yamnaya graves with skeletons contracted on the side: two piercer-chisels (one within a ‘manufacture kit’) and a drawknife-chisel. A bone tool with an insert attached to an obliquely cut end of a tubular bone was found in a secondary child’s burial 10 of barrow 15 near the village of Vynohradne (Zaporizhya Region) in front of the face of the skeleton contracted on the right side. The polished shaft was 10 cm long and 1.7 cm in diameter. The insert was a retouched flake, 2.3 cm x 2.2 cm.

Similar tools have been found in four early Catacomb graves. A scraper – pressure tool and a scraper-knife belonged to ‘arrow-maker’s kits’; one scraper-knife was found in each of two other graves. In the complex of Terny 2, 4.8

(Dnipropetrovsk Region), a scraper-knife lay between the knees of a female skeleton contracted on the back (in a double burial of a man and a woman). A necklace of predators' fangs and seashells, including a mallet-like pin, lay at her left hand.

Two combination tools were found in the Donets complexes: a scraper-knife and a drawknife-saw (the latter in a woodworking 'manufacture kit' Chervona Zorya 3.1, Luhansk Region) (Fig. 47).

The following combination tools were found in the Ingul Catacomb graves: scrapers-chisels (2 graves), one within a 'manufacture kit', another at the ribs of a female skeleton; scrapers-spokeshaves (2 graves) at the right shoulder of a skeleton and in the filling of the chamber; scraper-knives (2 graves) in the filling of the chamber (flake-based) and to the left of the pelvis of the skeleton (based on a massive blade, probably an Eneolithic tool re-used as a knife). One chisel-spokeshave was included in an 'arrow-maker's kit'. An insert was found in one grave; it was a retouched medial fragment of a compression blade (Neolithic-Eneolithic), located at the right elbow of the skeleton in a smear of ochre. No traces of a casing of the tool were found.

A spokeshave-chisel was placed next to the skull of an adult in a Babyno cist burial (Dmukhailivka 14 2.4, Dnipropetrovsk Region).

Generally, 38 Early and Middle Bronze Age complexes contain 40 combination tools and 4 tools with inserts (Table 4; Diagram 4), which comprised 7.24% of the tools.

Hence for the Northern Pontic area's burial sites of the Early and Middle Bronze Age we know of 628 flint artefacts that were identified as tools (Table 4; Diagram 4). They were found in 509 complexes, which comprise over 1/3 of the total number of burials containing flint items. The analysis of this category of finds allows us to draw the following conclusions. First, most of the tools were spread reasonably evenly across various regions and cultural-chronological groups. This relates to the singular Northern Pontic steppe tradition of making and using flint tools in the economy and, probably, in the funerary rite. The origins of this tradition should probably be sought in earlier Eneolithic cultural entities, which requires a separate investigation.

Second, scrapers and flake-based knives comprise the predominant majority of tools both in the graves and in the settlements (42.44% and 25.65%, respectively, the total of 431 items in 367 graves – see Table 4; Diagram 4). Hence, tools for processing cattle-breeding products occur more than twice as frequently as tools designed for non-food manufacture. Therefore, based on the presence in burial complexes, the usage of flint tools in various branches of the economy of the Northern Pontic population of the Early and Middle Bronze Age was as follows: about 1% in agriculture, about 70% in processing of cattle products (and, possibly hunting), and up to 30% in making household items and weapons. Even taking into account requirements of funerary practices, we are inclined to view such proportions as reasonably in line with the correlation of types of flint tools

that were used in the 'living' material culture. This is also confirmed by analysis of finds from settlement sites. Moreover, it is impossible not to notice that tools outside of the context of 'manufacture complexes' are located differently in the space of burial constructions, similarly to items bearing no traces of secondary modification. This makes us assume that in such burials they were not regarded as tools, but obtained another meaning.

Third, the largest number of categories of tools were found within so-called 'manufacture kits', which is particularly typical of complexes of the Catacomb culture. Such kits, given due analysis of their components, represent a valuable source for reconstruction of a number of Bronze-age manufactures. Yet, a typical feature of the vast majority of 'manufacture kits' is their 'incompleteness', which makes us assume that only part of the tools were eventually included in burials. For instance, 'manufacture kits' do not contain metal tools, which, no doubt, were rather widely used in such manufactures.

IV. FLINT WEAPONRY: USE OF RITUAL ARTEFACTS

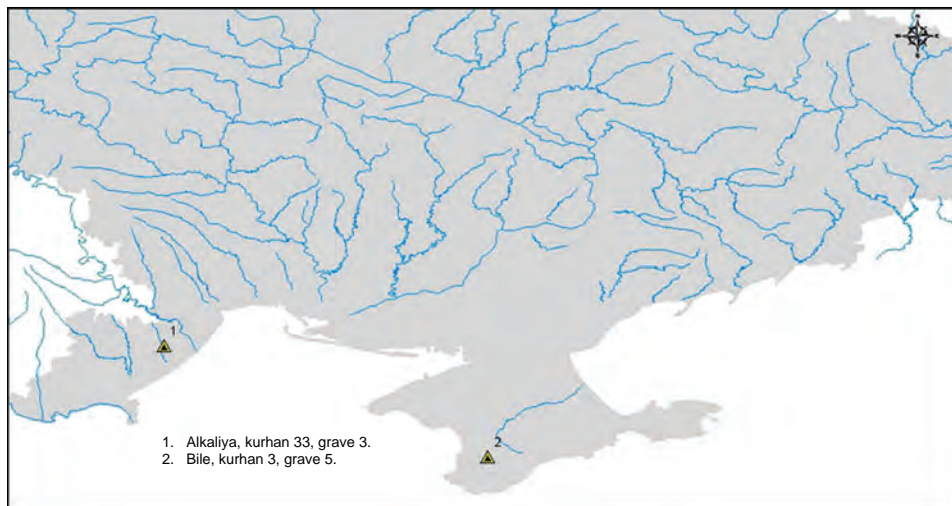
From the Paleo-metal Age onwards, war becomes one of the most important components of human history. Weaponry, as the material base of war, reflects the most advanced achievements of production technologies and material culture, as well as economy, social system, and ideology of a society. Moreover, ‘the high degree of sacralisation of all sides of military life is the reason why many samples of ancient weaponry are sites of spiritual culture and art’ [Gorelik 1993:3]. That is why we believe it is necessary to discuss in the same chapter both weaponry and artefacts which, in our opinion, had primarily a cult purpose, namely, bifacial knife-daggers (which, due to the use of the same manufacture technology, are often impossible to distinguish from dart-heads morphologically), and miniature flint sculpture. Let us note that some researchers tend to draw some parallels between the morphology of bifaces (in particular, arrowheads) and miniature flint sculpture, common in many cultures of the Neolithic – Bronze Age [Zamiatin 1948:85].

IV.1. WEAPONS

IV.1.1. TYPOLOGY OF ARROWHEADS

Starting from the Mesolithic, a bow and arrows occupied a key place in the system of weaponry. By the Neolithic, arrows with stone arrowheads processed at both sides dominate in most of areas of Eurasia [Anikovitch, Timofeev 1998:20]. In some areas they are used alongside stone arrowheads even in the Early Iron Age [Herodot VII, 69; Bratchenko 1989:76].

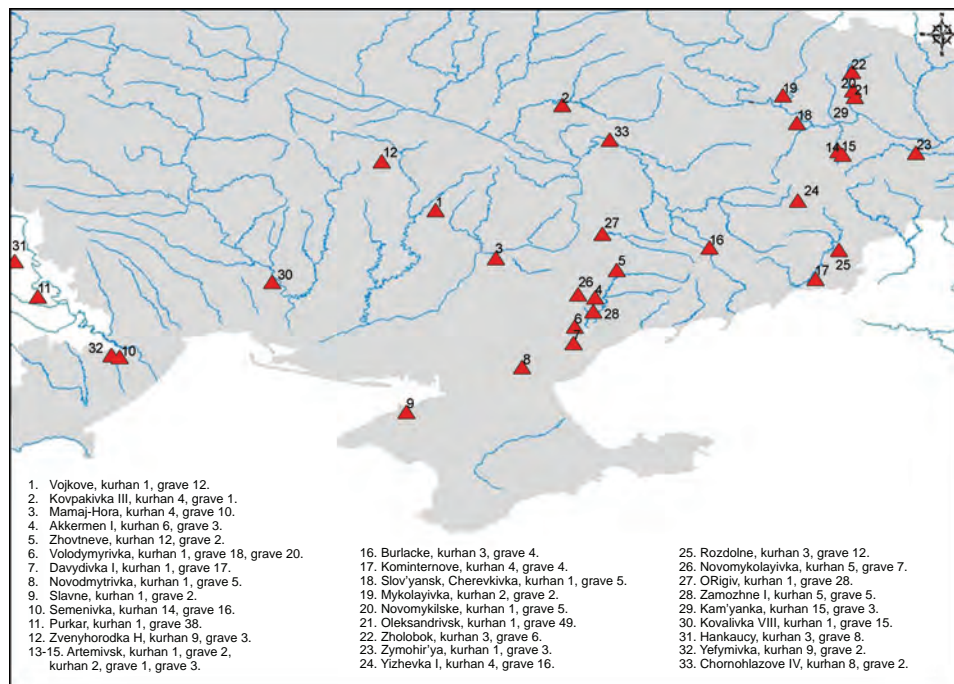
Prior to offering a typology of Early and Middle Bronze Age arrowheads, it is necessary to clarify some terminology. The term ‘quiver set’ is as conditional



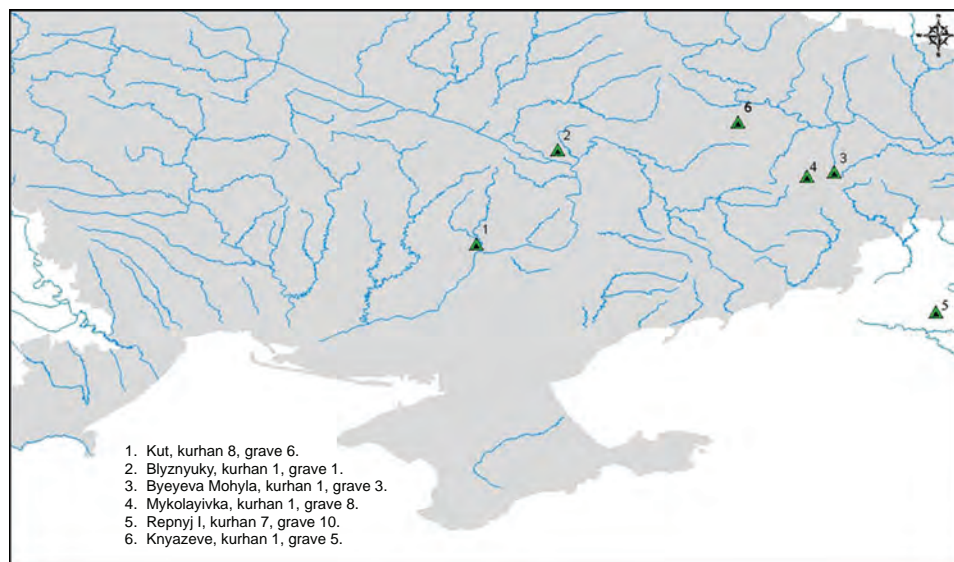
Map. 2. Burials with quiver sets of Yamnaya culture

as ‘manufacture kit’. In a number of cases, indeed, the finds included remainders of a leather or elm quiver [Bratchenko 2006:279], but more often the location of weapon heads indicate their absence. For instance, in the Donets Catacomb complex Izhevka 1 4.16 (Donetsk Region), studied in 2006, eight arrowheads (Fig. 19:1-8) were located behind the pelvis in a (probably leather) bag, without the shafts. Possibly, arrowheads were carried without shafts in a bag because due to their fragility they were actually disposable [Nuzhnyi 1999:19], while the shafts could be re-used several times by means of attaching new arrowheads. *Hence we suggest that the conditional term ‘quiver set’ be used to denote a compact assemblage of arrowheads (at least three) within a burial construction, which do not belong to a ‘manufacture kit’ and could not be the cause of wound of the buried individual (see Map 2-4).*

Also, we should in particular look at arrowheads that are covered with a layer of calcium. Reports and publications usually describe such items as ‘covered with patina’, ‘made of limestone nodule crust’, or simply ‘white colour’. There is even a proposition that arrowheads were made of chalk [Tkachev 2001:113], which is totally nonsense from the perspective of their practical usage. Direct investigation of a number of such arrowheads made us conclude that those items had been the cause of non-lethal wounds, after which the individual continued to live for a rather long time. Meanwhile, the arrowhead that stayed in muscle tissues – most probably because it was impossible to take it out safely – became covered with a layer of calcium, which is a natural reaction of the human body to an alien object (if for some reason an alien object is not thrust out – which was prevented by the nibs at the base of the arrowheads – a conjunctive tissue capsule is formed



Map 3. Burials with quiver sets of Catacomb culture



Map 4. Burials with quiver sets of Babyno culture

and deposition of calcium occurs). This hypothesis is confirmed by a shallow-notch arrowhead from the Yamanya (with a skeleton contracted on the back) grave 7 of barrow 2 near the village of Semenivka [Zaporizhya Region]. It was found between the ribs of the buried individual, where it had been covered with a callus, which indicated its long-term presence in a live human body, and a layer of calcium.

Here it is worth noting that the term generally used to describe arrowheads among the human bones, as the ‘cause of death’, is inaccurate. As can be seen from the above, a substantial number of wounds caused by arrows were not mortal. Moreover, the skeletons of individuals wounded with arrows often have marks indicating that the individuals were eventually killed with other weapons, e.g., axe-hammers [Klein 1961:105-109]. It should be taken into account that only a minority of arrowheads still stayed in the bodies by the time of burial, as arrows often either caused perforating wounds or were extracted from the wounds during or after battle. That is why we suggest a more neutral term to denote hurling weapon heads: ‘*cause of wound*’.

All existing typologies of arrowheads rely exclusively on their morphology, primarily the form of their fixing to the shaft. This approach is, no doubt, completely justified, for the method of attaching the arrowhead largely determined its combat qualities: whether or not it was meant for hurting the enemy protected by armour, for making vast surface wounds or for deep penetration, etc.

Hence, based on the morphology of the arrowhead base we divided the entire available sample of arrowheads (except fragments of points) from Early and Middle Bronze graves into three types (Illustrations 1-2; Diagram 5-7).

Type A – arrowheads with a notched base

Type A (Illustration 1) was divided into two Sub-types.

Sub-type I – the arrowhead’s sides form a relatively straight point-to-base line. Sub-type I, in turn, is represented by two Versions. **Version 1** – the notch at the base of the arrowhead is curve-like. **Version 2** – the notch at the base of the arrowhead is sub-triangular.

Sub-type II – the arrowhead’s sides form an oval; the arrowhead is widest at the base of the nibs. **Version 1** – the notch at the base of the arrowhead is curve-like. **Version 2** – the notch at the base of the arrowhead is arch-like (the sides of the notch are parallel and slightly touch each other at the top). Such arrowheads are sometimes described in the literature as ‘helmet-like’. **Version 3** – the notch at the base of the arrowhead is oval, end of the nibs are close to each other. Those are so-called ‘arrowheads with nibs’.

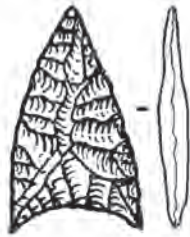
Type B – arrowheads with a straight base

Unlike other authors, here we include arrowheads with a slightly convex or a slightly concave base (the notch or a convex base does not exceed 10% of the total length of the arrowhead). Type B (Illustration 2) is divided into three Sub-types.

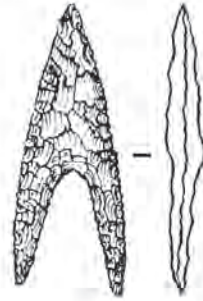
TYPE A

SUBTYPE I

VERSION 1

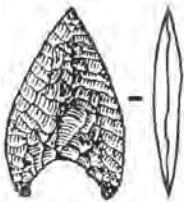


VERSION 2



SUBTYPE II

VERSION 1



VERSION 2



VERSION 3



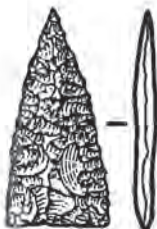
Illustration 1. Taxonomy of arrowheads

TYPE B

SUBTYPE I



SUBTYPE II

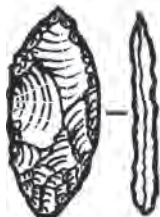


SUBTYPE III

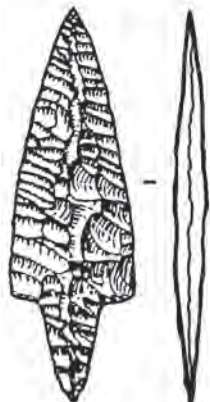


TYPE C

SUBTYPE I



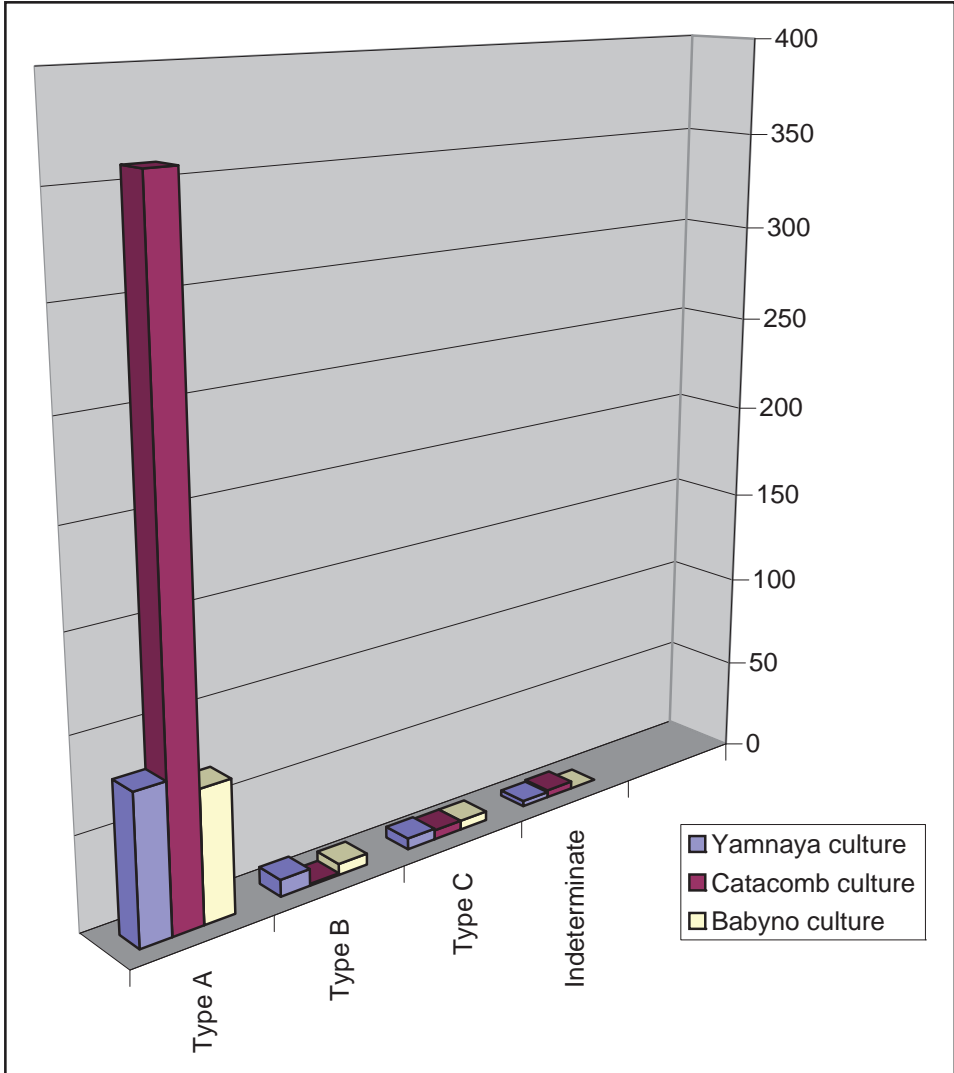
SUBTYPE II



SUBTYPE III



Illustration 2. Taxonomy of arrowheads



Diag. 5. Arrowhead types in Early and Middle Bronze Age burials

Sub-type I – triangular low-proportion feather (similar to an equilateral triangle).

Sub-type II – triangular feather of oblong proportions.

Sub-type III – the sides from the base to the middle of the arrowheads or higher are parallel, then joined at the top – so-called ‘tower-like’ arrowheads.

The three Sub-types can be divided into three versions. **Version 1** – with a straight base. **Version 2** – with a slightly concave base. **Version 3** – with a slightly convex base.

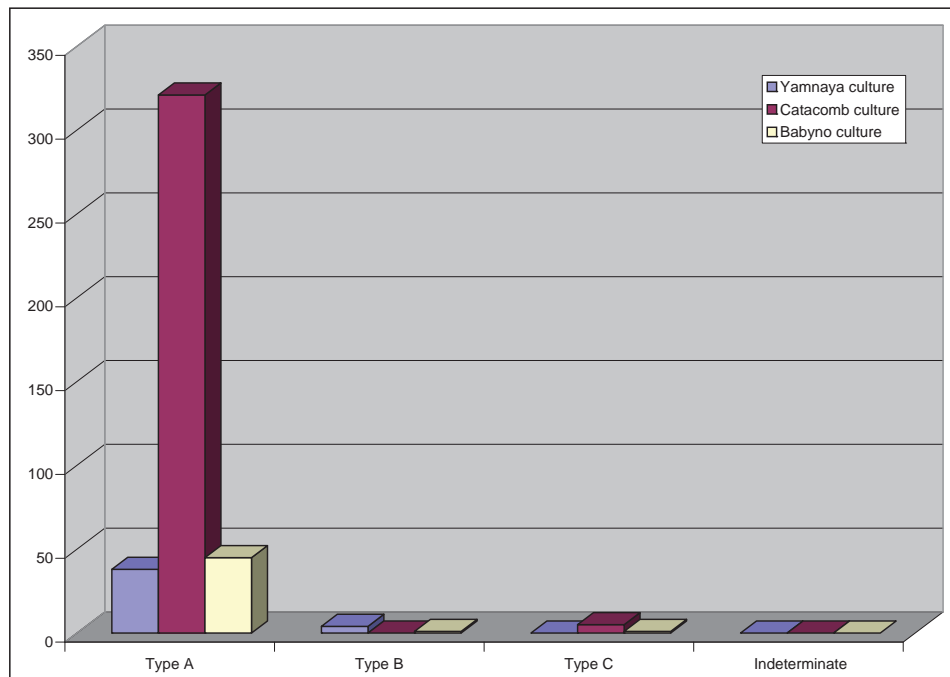


Diagram 6. Arrowhead types in archer sets (quivers) from the Early and Middle Bronze Age

Type C – arrowheads with a tang

Sub-type I – with an undistinguished tang (leaf-like).

Sub-type II – with a tang distinguished by ledges.

Sub-type III – with nibs at the sides of the tang.

The three Sub-types of Type C (Illustration 2) can be divided into two Versions. **Version 1** – with a cut-short tang. **Version 2** – with a sharp tang. Asymmetric arrowheads can also be considered within Sub-types II and III.

IV.1.2. ARROWHEADS FROM YAMNAYA CULTURE GRAVES

All in all, 68 flint arrowheads were found in Yamnaya culture graves that contained skeletons contracted on the back, and 24 more flint arrowheads were found in graves with skeletons contracted on the side. Five arrowheads were found in cenotaphs and ruined Yamnaya graves. Hence, here we analysed 97 arrowheads of the YC, which comprises 18% of the total number of arrowheads in our sample. At least 55 of the arrowheads were the cause of wounds (Table 5; Diagrams 5-7).

Table 5

Arrowheads in burials

Amount of arrowheads in burials	A			B			C			Type	Total	%			
	Type			I			II						III		
	I	2	3	I	1	2	3	I	1				2	3	I
Yamaya culture contracted on the back	41 (24-cause of wound)	7 (5)	-	1 (1)	8 (4)	-	1 (1)	1 (1)	1 (1)	1 (1)	3 (3)	3 (3)	68 (45)	12,45 (34,88)	
Yamaya culture contracted on the side	10 (7)	2 (2)	-	-	-	11	-	-	-	-	1 (1)	-	24 (10)	4,4 (7,75)	
Yamaya culture cenotafs, destroyed	5	-	-	-	-	-	-	-	-	-	-	-	5	0,9	
Yamaya culture sum	56 (31)	9 (7)	-	1 (1)	8 (4)	-	1 (1)	1 (1)	1 (1)	1 (1)	4 (4)	3 (3)	97 (55)	17,75 (42,6)	
Early Catacomb culture	1	10 (5)	-	-	1 (1)	-	-	-	-	-	-	-	17 (7)	3 (5,42)	
Donets Catacomb culture	4	89	-	-	-	48 (10)	-	-	-	-	1	-	143 (11)	26 (8,52)	
Ingul Catacomb culture	29 (6)	33 (8)	-	-	-	9 (2)	94 (4)	-	1	-	-	3 (3)	169 (23)	30,95 (17,82)	
Late Catacomb culture	-	33	-	-	-	-	3 (1)	-	-	-	-	-	39 (1)	7,14 (0,77)	
Catacomb culture sum	34 (6)	165 (13)	-	-	1 (1)	62 (13)	97 (5)	-	1	-	-	4 (4)	368 (42)	67,1 (32,55)	
Babyno culture in chests	18 (2)	-	-	-	11	4 (3)	-	-	-	-	-	-	34 (5)	6,2 (3,87)	
Babyno culture in pits	13 (6)	-	-	2 (1)	1 (1)	8 (7)	-	3 (3)	2 (2)	2 (2)	2 (2)	-	42 (23)	7,7 (17,82)	
Babyno culture in niches	-	-	-	-	3 (3)	2 (1)	-	-	-	-	1	-	6 (4)	1 (4,64)	
Babyno culture sum	31 (8)	-	-	2 (1)	1 (1)	14 (11)	-	-	2 (2)	3 (2)	3 (2)	-	81 (32)	14,78 (24,8)	
All cultures	121 (45)	174 (20)	97 (5)	3 (2)	10 (6)	90 (27)	97 (5)	3 (3)	4 (3)	8 (3)	4 (4)	7 (7)	546 (129)	100 (100)	
Total	22,16 (34,5)	31,86 (15,5)	17,76 (3,87)	0,55 (1,55)	1,83 (4,65)	16,5 (21)	17,76 (3,87)	0,55 (2,32)	0,73 (2,32)	1,46 (2,32)	0,73 (3,2)	1,3 (5,44)	100 (100)		

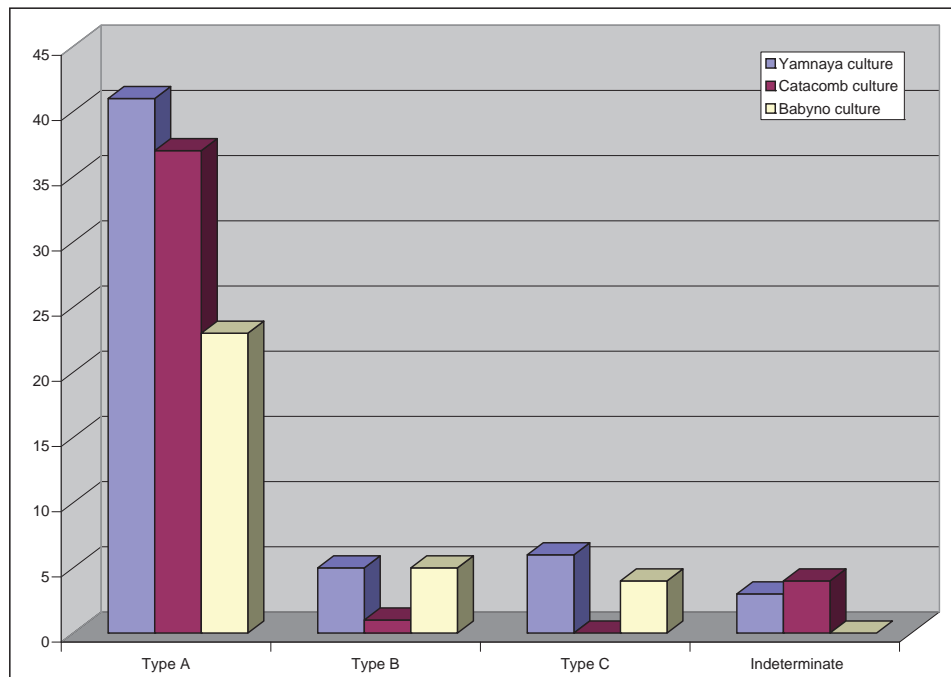


Diagram 7. Types of arrowheads, as the cause of wounds, from Early and Middle Bronze Age burials

Type A – arrowheads with a notched base (Fig. 12:1-11; 13:1-6,9,12).

Sub-type I – side edges of the arrowhead form a relatively straight point-to-base line.

Version 1 – the notch at the base of an arrowhead is curve-like. In total 41 such arrowheads were found in Yamnaya graves with skeletons contracted on the back; 24 of the arrowheads were located among the bones and could be the cause of wounds. The graves with skeletons contracted on the side contained 10 arrowheads of this type, including 7 among the bones (one of the arrowheads covered with a layer of calcium – see above), and one arrowhead was found within a ‘manufacture kit’. Finally, five arrowheads of A-I-1 were found in cenotaphs and ruined graves of the YC (one of the arrowheads had been the cause of a wound). Of the total of 56 arrowheads, 31 were the cause of wounds.

Version 2 – sub-triangular notch at the base of the arrowhead. 5 out of 7 such items in the graves with skeletons contracted on the back were the cause of wounds. Meanwhile, it should be noted that one arrowhead with a deep notch was found in an ‘arrow-maker’s manufacture kit’ from the territory between the Samara and the Oril rivers (Hannivka 1.10, Dnipropetrovsk Region). Only two of such arrowheads are known for Yamnaya graves with skeletons positioned on

the side; both of the arrowheads were located among the bones. Hence 7 out of 9 arrowheads of A-I-2 were the cause of wounds.

Sub-type II – side edges of the arrowhead form an oval, the arrowhead is the widest at the base of the nibs.

Version 2 – the notch at the base of the arrowhead is arch-shaped (the side edges of the notch are parallel or slightly touch each other). Three items in burials with skeletons contracted on the back (all found among the bones) had a sub-rectangular notch. The latter type has vast analogies in the Early and Middle Bronze-Age Northern Caucasus [Krupnov 1951:43-44; Kruglov 1958:23; Abibulaeva 1982:152]. Generally, such arrowheads are sometimes linked with Catacomb cultures. Yet, we should mention a quiver set found in a Yamnaya grave with the skeleton contracted on the side, Alkalia 33.3 (Odessa Region), which contained 11 arrowheads of this type (Fig. 14:3-12).

Type B – arrowheads with a straight base (Fig. 12:12-14; 13:7-8,11).

Sub-type I – triangular feather of low proportions (close to an equilateral triangle). One item was found in a grave containing a skeleton contracted on the back (the arrowhead had caused the wound).

Sub-type II – triangular feather of oblong proportions. Eight such arrowheads were found in graves with skeletons contracted on the back; four of the arrowheads were found among the bones.

Type C – arrowheads with a tang (Fig. 12:15-17; 13:10,13; 16:1).

Sub-type I – with an integrated tang (leaf-like). Leaf-like arrowheads are represented by a single damaged quartzite item (Verbky 4, 3.11, Dnipropetrovsk Region, next to the skull) that could be the cause of the wound. We had the opportunity to study direct analogies of such an arrowhead in Voronezh Region among the grave goods of five Early Bronze burials of a soil mound, Tereshkovskiy Val, located in the Middle Don basin. Most of the 76 arrowheads found there were large leaf-like items made of quartzite or flint. The flint knapping tools found alongside them allowed the author of the excavations to argue that the buried individuals had been arrow-makers. He explained the morphology of the arrowheads – unusual for the Steppe – by north-eastern connections, possibly the direct migration of a certain group [Siniuk 1983:168; 1996:57; 1999:59].

Sub-type II – with a tang distinguished by ledges. One arrowhead with a damaged tang was found in the Dnipropetrovsk Region (Maryivka 17 8.3) among the bones of a skeleton contracted on the back (Fig. 13:10).

Sub-type III – with nibs at both side edges. Four arrowheads of this type were found in three graves, two in the Western Azov area and one in the Luhansk Region, all located among the bones. Two arrowheads from Akkermen 2 17.10 complex (Zaporizhya Region) belong to Version 2 – with a sharpened tang (Fig. 12:16-17), tangs of two others are damaged. Generally, such artefacts are not typical of the Early Bronze Steppe population. The quality yellowish-grey material of the tanged arrowhead (Fig. 16:1) that had wounded the man in grave 1 of

barrow 1 near the village of Mala Ternivka (Zaporizhya Region), is reminiscent of the 'beige' flint from the North Caucasus [Sahrovskaya 1994:125].

Three graves contained fragments of three arrowheads, located among the bones; their types could not be identified.

At least 55 of the arrowheads (about 57%) had been the cause of wounds, i.e., were found among the bones. Let us stress that most of the arrowheads were found in the graves by themselves, some were damaged, and hence it is possible that they also had been the cause of wounds but later on were dislocated as a result of decomposition of human tissue, activities of predators, and other factors. The exceptions are the items from the 'manufacture kit' and three quiver sets mentioned above: Alkalia 33.3 in the Odessa Region (11 arrowheads), Bile 3.5 in the Crimea (Fig. 13:1-5; 15) (5 arrowheads), Veselovska 1 3.13 at the Lower Don (two A-I-2 arrowheads to the right of the skeleton, among the debris of a quiver; an arrowhead of the same kind was stuck in the thoracic vertebra); all in all, 18 out of 97 arrowheads definitely were not the cause of wounds.

Moreover, a vast majority of the arrowheads were found in the territory of the Lower Dnieper area and the west of the Northern Pontic Region. The latter was the western boundary of the Yamnaya area, while in the former clashes could occur due to fighting for floodplain pastures and fords. Here it is relevant to note the huge number of arrowheads of various types (103) that originate from the upper layer of the Mykhailivka settlement [Korobkova, Shaposhnikova 2005:268].

As far as types of arrowheads are concerned, their diversity demonstrates the whole complexity of the development of the Early Bronze warfare (Table 5). The finds included 79 Type A arrowheads (41 of them being the cause of wounds), 9 Type B arrowheads (6 of them being the cause of wounds), 6 Type C – 6 (all of them being the cause of wounds), and 3 fragments of unidentified types, all among the bones. Hence we should draw the conclusion that no single common arrowhead type existed on the entire areal of the YC.

In our view, the finds of a number of arrowheads with a deep notch at the base (Types A-I-2, A-II-2) not only among the bones but also in the function of grave goods, including within the 'arrow-maker's kit', prevents us from accepting a common version about them only being a proof of armed clashes with the people of the Catacomb cultures. Rather, the substantial domination of arrowheads with a shallow notch (of the 'Yamnaya type') as the cause of wounds indicate clashes between culturally related populations. Only individual arrowheads look alien: ones with a deep sub-rectangular notch at the base and with a tang, all of which were found in the bones (Diagram 7). Probably they show a far from cloudless relationship between the Yamnaya population and their culturally different neighbours. For instance, Type C arrowheads were found exclusively in the territory of the Left-bank Dnieper steppe.

IV.1.3. ARROWHEADS FROM CATACOMB CULTURE GRAVES

In total 368 found arrowheads of Catacomb cultures represent over 67% of all arrowheads in our sample (Table 5).

Type A – arrowheads with a notch at the base (Fig. 18-22).

Sub-type I – side edges of the arrowhead form a relatively straight point-to-base line.

Version 1 – the notch at the base of an arrowhead is curve-like. Such an arrowhead (Fig. 18:2) was found among the bones arranged as a ‘package’ in the centre of a chamber of Early Catacomb grave 2 of barrow 14 of the Kruhla Molyly group (Ordzhonikidze, Dnipropetrovsk Region).

In a grave of the Donets culture, four such arrowheads comprised a ‘quiver set’ (Fig. 19:34-37), being positioned to the left of the pelvis of an adult buried contracted on the back (Molyliov, Bryliuvata Mohyla, 1.14, Dnipropetrovsk Region). Let us keep in mind that 85 flakes were found under the skeleton’s knees in a bag or a basket (see above).

In sum, 29 of such arrowheads were found in 15 Ingul graves. In 6 of the graves they had been the cause of wounds (two of the graves contained two arrowheads each). We also know of four ‘quiver sets’ (5, 4, and 3 arrowheads twice, respectively). Five arrowheads contained in one of the ‘quiver sets’ were made of quartz, and the quality of the material probably made it impossible to make deep notches at the base. One arrowhead, and two arrowheads twice were found to the left of the skeletons, which in one case were accompanied with a wooden bowl, and in the other two cases with axe-hammers. One item was found under a woman’s skull (in a double burial with a man), but its location does not allow viewing it as the cause of the wound. Finally, one arrowhead was found in the filling of the chamber of a ruined grave.

One item (possibly, a blank of a deep-notched arrowhead) was found in an ‘arrow-maker’s kit’ of the Mine No 22, 3.3 group (Ordzhonikidze, Dnipropetrovsk Region) (Fig. 57). The authors of that publication believe that from the perspective of chronology and the burial rite that complex may be classed among the Bakhmut type burials [Nikolova, Bunyatyan 1991:128-136].

Out of 34 known items, 6 were the cause of wounds.

Version 2 – sub-triangular notch at the base of an arrowhead. Ten of such arrowheads were found in Early Catacomb complexes; five had been the cause of wounds. In the complex of Blahovka 1.7 (Luhansk Region), an arrowhead of this kind, with a broken nib (Fig. 18:11) was located under the left thigh of an adult (in a double burial of an adult and an adolescent) and was covered with a layer of calcium, which pointed to its long presence in a live human body (see above). It should be noted that the burial also contained a bronze knife and a bronze awl, a wooden bowl and a spoon, and a silver pendant. There was also a bowl in

another burial, in which an arrowhead was stuck between the ribs of the skeleton. The grave goods found alongside arrowheads of this type also included a drilled axe-hammer (one arrowhead), and a mace (two arrowheads behind the skull). One arrowhead was located at the right hand, and another at the right shoulder of the skeletons. In the complex of Vynohradnyky 1.8 (Mariupol, Donetsk Region), an arrowhead with the debris of a shaft was found under a slab that served as an entrance block. The chamber also contained a wheel and details of a cart, the face of the buried man had been plaster modelled.

The same kind of arrowheads – with a sub-triangular deep (up to 1/3 or 1/2 of the total length of the arrowhead) notch at the base – are the most typical of graves of the Donetsk culture (Table 5; Diagram 5) (Fig. 19:1-38). As many as 89 items are known in 19 burial complexes, including 54 items in 7 ‘quiver sets’ (one with 13 arrowheads, two others with 8 arrowheads each (Fig. 19:1-8), two others contained 7 arrowheads, one with 6 (located as a pile near one of 9 dismembered skeletons), and one with 5 arrowheads).

Arrowheads with a deep sub-triangular notch at the base were also found in six ‘arrow-maker’s kits’ (12, 4, three with 3, and 2 items, respectively). Meanwhile, there were 10 arrowheads among the grave goods and blanks placed on a wooden board in front of the skeleton in the complex of Zholobok 3.6 (Luhansk Region); two more items were found at the right shoulder, above the top of a mace (Fig. 19:9-20). In our view, those two arrowheads were equivalent in meaning to the ‘quiver sets’. This assumption is confirmed by two other burials, this time without any sets, where two arrowheads were located on the pelvis (in the same place as the debris of a bow; a bronze knife was placed next to the skull), and two more were found at the feet (in the same place as a bronze knife and a bronze awl). One complex contained both a ‘quiver set’ and an ‘arrow-maker’s kit’ (Mykolayivka 2.2, Donetsk Region). An arrowhead with a deep triangular notch, 4 cm x 1.7 cm with the shaft preserved, was found in a cenotaph together with a fire pan and a pot at the entrance in a chamber (Kindrativka 2.5, Donetsk Region). In the centre of the chamber there was an unbaked vessel, a bronze awl, a pounder, an ochre item, a chisel and drill, both flake-based (a ‘manufacture kit’). The floor of the chamber was ornamented with ochre. In two other graves, individual arrowheads were located at the right elbow (one of the nibs broken, accompanied with a mace and an incense cup) and to the right of the skeleton (accompanied with a bronze knife and a bronze hook). They could as well be the cause of the wounds, but their location (possibly, they had been displaced) does not allow making this argument with certainty.

The complexes with ‘quiver sets’ were accompanied with a mace, a bronze knife, and a bronze awl respectively (Artemivsk 1.2 and Voikove 1.12); a mace and a head-gear, decorated with metal plates (Izhevka 1 4.16); separately: an ‘arrow-maker’s kit’, an axe-hammer, and three octagonal playing bones (Mykolayivka 2.2); a bronze knife, a bronze awl, and a bronze hook, a dismembered

skeleton (Kamyanka 15.3). A complex with an 'arrow-maker's kit', Novomykolayivka 2 2.1 (Donetsk Region) features an intricate collection of grave goods (Fig. 50). In front of a skull (deliberately deformed) of a skeleton, contracted on the right side, there were two arrowheads with deep sub-triangular notches, a cutting tool and a saw based on flakes, crested blades, flakes, two cores, a wooden bowl, two fluted abrasives, two shells, a bronze rod with a wooden haft, and pieces of chalk. In front of the skeleton's chest there were an axe-hammer, an astragal, and a bird's wing bones under the skull. The floor of the chamber was decorated with ochre drawings of a line, a 'scraper', and two feet. The double burial 5 of barrow 1 near the village of Novomykilske (Luhansk Region) contained, in addition to an 'arrow-maker's kit' with five arrowheads (one of them tanged), a bronze knife, a bronze hook, a bronze awl with a bone haft, and a ceramic goblet.

Altogether, 33 items were found in 15 burials of the Ingul Catacomb culture. In five cases they were the cause of wounds; one of the complexes contained three arrowheads among the bones, while the other contained two. Three arrowheads belonged to an 'arrow-maker's kit' of Mala Ternivka 2.9 (Zaporizhya Region). One more item also came from an 'arrow-maker's kit'. Arrowheads with a deep sub-triangular notch at the base also belonged to four 'quiver sets': 10, 5 (together with a bow), and one in each in the remaining two sets, respectively. One arrowhead was found next to each of the skulls (the grave goods in both cases also contained axe-hammers) one more was located to the left of the left hand.

The largest – for the Catacomb graves – set of arrowheads (33 items) of this very type was found in a wooden case with an 'arrow-maker's kit' (Fig. 22:18-47; 59) by the skeleton in a Bakhmut-type complex of Artemivsk 2.3 (Donetsk Region).

Of the known 165 items in total, only 13 were the cause of wounds.

Sub-type II – side edges of the arrowhead form an oval, the arrowhead is the widest at the base of the nibs.

Version 2 – an arch-like notch at the base (edges of the notch are parallel to each other or lightly touch each other at the top). One item (Fig. 18:1) was found to the right of a child's skeleton in grave 17 of barrow 2 of the group of Mine No 22 (Ordzhonikidze, Dnipropetrovsk Region). This version also includes an Early Catacomb quiver set (Fig. 18:3-6) of four arrowheads Akkermen 1 6.3 (Zaporizhya Region).

In sum, 48 arrowheads of that type were found in 25 graves of the Donets Catacomb culture, two being the cause of wounds (one covered with a layer of calcium, in another case the skeleton was accompanied with a mace). Quiver sets are represented by five complexes (10, 6, two of 3, and one with 2 arrowheads of this type and the third Type-3 arrowhead, respectively). It should be noted that, none of the quiver sets was accompanied with a 'manufacture kit'. Yet, 1, 2 and 3 such arrowheads occurred separately in three 'arrow-maker's kits', and four

more were found among the items of a ‘caster kit’. Finally, three more burials contained two arrowheads each. Given the context (in two cases near the left hand, in one case behind the skull, one of the two more graves included a bronze knife and a bronze awl, a wheel, an axe-hammer, a bow and an unbaked vessel; the other included a mace), which we regard as equal to the ‘quiver sets’. In two more graves, an arrowhead was found in the filling of the chamber.

Such arrowheads are known in five Ingul complexes; in two cases they were the cause of wounds. Four and two arrowheads (together with three arrowheads of Type 4) belonged to ‘quiver sets’. Two more items came from a ruined grave.

Of the total known 62 items, 13 were the cause of wounds.

Version 3 – an oval notch at the base of the arrowhead, where the tops of the nibs meet. Such arrowheads (with a triangular feather and a deep – up to 3/4 of the total length of the arrowhead – notch at the base, which forms two thin ‘cornicles’ like an oval because the arrowhead is the widest at their base, where the ‘cornicles’ do not aim sideward but meet, making an oval notch) were designed to fight an enemy with weak defence weaponry. Obviously, when striking the body, the arrowhead was meant to break up and separate from the shaft, which made it extremely difficult to extract. Such an arrowhead, called ‘heart-like’, is well-known all over the territory of the North and Central Caucasus. The finds of such arrowheads is also one of the reasons for identifying the Catacomb horizons at multi-layered settlements [Tikhonov, Matveev 1981:84; Priakhin 1982:28]. It should be noted that, Sanzharov suggested a hypothesis about a purely ritual usage of arrowheads with ‘cornicles’ [Sanzharov 1991:78].

In total, 94 such arrowheads were found in only 12 graves of the Ingul culture (Fig. 20:1-41, 43-48), including four complexes in which they were found separately as the cause of wounds. Thus 8 and 6 items respectively were found in quiver sets, all located to the left of the skeletons, pointed to feet, which probably corresponds with the practice of positioning a quiver [Bratchenko 2006:279]. Finally, in all other (six) complexes such arrowheads also were included in quiver sets, also located to the left of the skeletons (17, 15, twice 13, and twice 9 items, respectively). They were distinguished by the presence of ‘arrow-maker’s manufacture kits’, placed separately from the quiver sets. In two cases the faces of the buried individuals had been plaster modelled; those burials also contained axe-hammers and wooden bowls.

Two such arrowheads (Fig. 22:1-2) were found behind the back of a child (an adult skeleton lay next to it) in a complex of the Manych type Hovorukha 1.3 (Luhansk Region). Most probably a calcinated (staying in a live human body for a long time) arrowheads with broken nibs also belongs to this type (Fig. 22:17). That arrowhead was found among the bones in the Bakhmut-type burial of Artemivsk IV.1.

All in all, we know of 97 items, five of which were the cause of wounds.

Type B – arrowheads with a straight base

Sub-type II – a triangular feather of oblong proportions. An Early Catacomb complex included one such arrowhead, the cause of a wound (stuck between the skeleton's ribs in grave 28 of barrow 3 of the Chorna Mohyla group) (Ordzhonikidze, Dnipropetrovsk Region).

Type C – arrowheads with a tang

Sub-type I – with an integrated tang (leaf-like). An arrowhead of this type was found next to the skull in an Ingul grave 27 of barrow 3 near the village of Sokolove (group 2, Dnipropetrovsk Region).

Sub-type II – with a tang, separated with ledges.

Version 1 – with a cut-short tang. A Late Catacomb complex of Ordzhonikidze, the group of Mine No 22 3.3 contained two arrowheads with sub-rectangular tangs, unique for Catacomb graves (Fig. 22:12-14). Analogies of those artefacts could be found among arrowheads of the Corded Ware cultures and post-Corded Ware cultural entities, including the ones located at the sites of Fatianovo, Middle Dnieper and Trzciniec cultures [Bondar 1974:117; Artemenko 1976:75; Lysenko, Razumov 2006:65-69]. Such arrowheads were also found in the Northern Caucasian Catacomb culture [Nechitailo 1979:48].

Version 2 – with a triangular tang. One such arrowhead, with a wide triangular tang (Fig. 19:44) belongs to an 'arrow-maker's manufacture kit' Novomykilske 1.5 (Luhansk Region) together with four arrowheads with a deep sub-triangular notch (see above). Morphologically they are close to tanged arrowheads from the 'arrow-maker's kit' Ordzhonikidze, Mine No 22 group, 3.3 [Dnipropetrovsk Region] – see above.

A fragment of an arrowhead (the point) of an unidentified type was stuck in a cervical vertebra of the skeleton of a man aged 20-25 in a Donets grave 6 of barrow 1 near Malozakharyne grave 1, [Dnipropetrovsk Region].

Moreover, fragments of arrowheads (one of them calcinated), found in three Ingul graves among the bones, were the cause of wounds. One of them was a double burial with a drilled axe-hammer and a 'stop' mark; the other contained a skeleton with a plaster modelled face, a 'stop' sign, and two holes in the frontal bone of the skull.

Arrowheads were found in 112 graves of the Catacomb culture. Unlike in the Yamnaya complexes, only 42 out of 368 Catacomb arrowheads (Table 5) were the cause of wounds (Early Catacomb graves: 7 out of 17; the Donets culture: 11 out of 143; the Ingul culture: 23 out of 169; the Bakhmut type: 1 out of 39). The predominant majority of the arrowheads (326) were found in 'quiver sets' or 'manufacture kits'. The absolutely dominating type is the arrowheads with a notch at the base (Type A); arrowheads with a sub-triangular base (Type A-I-2) are the most typical of the Donets culture and the post-Donets Bakhmut-type complexes, while arrowheads with 'cornices' (Type A-II-3) are the most common for the Ingul culture. It should be noted that, at least in 10 out of 25 Donets graves containing such arrowheads they were the cause of wounds (Table 5; Diagram 7).

IV.1.4. ARROWHEADS FROM BABYNO CULTURE GRAVES

We analyzed 81 arrowheads, which comprise about 15% of the total sample (Table 5; Diagram 4).

Type A – arrowheads with a notch at the base (Fig. 23).

Sub-type I – side edges of the arrowhead form a relatively straight point-to-base line.

Version 1 – the notch at the arrowhead base is curve-like. In Babyno cist burials such arrowheads were found inside two quiver sets (2 out of 7 arrowheads in each) (Mykolayivka 8.1 and Beyeva Mohyla 3.1, Donetsk Region, accompanied with three bone buckles, a bronze knife, and a wooden bowl). Arrowheads of that type were included in three more quiver sets (Map 4): all six in Knyazevo 1.5 (Kharkiv Region), all four in Ryepnyi 17.10 (Rostov Region), and two out of four in the complex of Blyzniuky 1.1 (Dnipropetrovsk Region). Those sets were also accompanied with axe-hammers. Each of the two graves from the Dnipropetrovsk Region contained one arrowhead that had been the cause of wounds: Novopidkryazh 6.11, an arrowhead at the left knee (accompanied with a wooden bowl with a bronze hoop, the chest covered with litter); Zelenyi Gai 6.3, a lower part of an arrowhead between the ribs (accompanied with a circular bone buckle).

Such arrowheads also occur in Babyno pit graves. In a quiver set at Barvynivka 7.15 (Zaporizhyya Region), three out of four arrowheads belonged to that type; two arrowheads were in a quiver set Kut 8.10. In the complex of Nikolske 8.19 (Moldova), one calcinated arrowhead was located at the thigh, and another at the ribs of the skeleton; four other burials contained one arrowheads each, all the cause of wounds. In the complex of Novooleksandrivka 1.1 (Kherson Region), two arrowheads were placed at the sides of the skull.

Out of 31 known items, 8 were the cause of wounds.

Sub-type II – side edges of the arrowhead form an oval; the arrowhead is the widest at the base of the nibs.

Version 1 – the notch at the base is curve-like. Arrowheads of this form are considered to be typically Babyno, though it should be noted that in individual cases they also occur in the Yamnaya, and – far more often – Catacomb burials (an example is an Early Catacomb quiver set of four arrowheads, Akkermen 1 6.3 (Zaporizhyya Region)). 5 out of 7 arrowheads of that type were present in 2 of 5 quiver sets found in cist burials (Mykolayivka 8.1 and Beyeva Mohyla 3.1, Donetsk Region). Probably, an arrowhead blank of that kind was registered within an ‘arrow-maker’s kit’ from Nyzhnia Baranykivka 5.10 (Luhansk Region).

It is worth remembering that burials with quiver sets that contain such arrowheads were linked to a ‘chariot aristocracy’ [Otroschenko 1998:116; Vasilenko, Suprun 1998:32-35; Vasylenko, 2001:112; 2005:97]. Without engaging in debate

[Razumov, 2006:156-159], let us note that a quiver set from a mine grave IV of burial circle A in Micenae contains obsidian arrowheads, forms of which are not typical for the Aegean world but very similar to type A-II-1 arrowheads of the BC [Goncharova 1999:346].

A quiver set with 8 arrowheads (6 of this type) was present in a rectangular pit, Kut 8.10 (Dnipropetrovsk Region). An arrowhead from one pit burial had been the cause of the wound; one was located in front of the face (point 'up') of the buried individual; in three other graves the initial location of the arrowheads is unknown.

As for Babyno burials in a side-wall niche, in three cases such arrowheads (one calcinated) were the cause of wounds.

In all, 4 out of 25 known items were the cause of wounds.

Version 2 – 4 arrowheads with an arch-like notch at the base (side edges are parallel or slightly inclined towards each other at the top) are known to occur in cist burials. One was found within a quiver set (Blyzniuky 1.1, Dnipropetrovsk Region); one at the knees of the skeleton (Pryadivka 6 1.1, Dnipropetrovsk Region, accompanied by a wooden bowl) – it is not excluded that it was the cause of the wound; one (damaged) within the ribs (Vilnohirsk 3 1.1, Dnipropetrovsk Region); a calcinated arrowhead was also found between the right shoulder blade and the neck of the skeleton (Molodohvardiysk 2.5, Luhansk Region). It should be noted that, this type of arrowhead occurred not only in Yamnaya and the Catacomb burials (see above), but also in 'quiver sets' (25 arrowheads piled behind the skull) of an elite burial 1 of the Kondrashevka barrow of the Don-Volga Abashevo culture [Prakhin *et al.* 1989:8].

Eight arrowheads of this type were found in pit burials, six of them the cause of wounds. In a primary pit burial Tekstilshchik 2.5 (Donetsk city) there were two damaged arrowheads of this kind near the bones (one of the arrowheads was split in halves, probably when it had stricken the bone or when efforts had been made to extract it from the body). An oblong calcinated arrowhead (described as 'quartzite' in the report) was found at the right thigh of the skeleton in the complex of Novopidkryazh 5 1.5 (Dnipropetrovsk Region). One item was stuck in the ledge of a cenotaph pit (?) 2, covered with slabs, which was part of a megalithic cult complex, 'Braharnya', at the Khortytsya island (Fig. 23:41). There was a bowl-like vessel nearby.

One item (Fig. 23:33) found under the right iliac wing of the pelvis of a man buried in a side-wall niche, could have been the cause of the wound (Velyka Znamyanka 15.70, Zaporizhyya Region). An unfinished item was found in an 'arrow-maker's kit' Aktove 2.2 (Mykolayiv Region) (Fig. 23:42; 62:9). Altogether, 11 of 14 known items were the cause of wounds.

We should note that A-II-3 arrowheads, most typical of the Ingul Catacomb culture, were completely absent from the Babyno complexes.

Type B – arrowheads with a straight base

Sub-type I – a triangular feather of low proportions (closest to an equilateral triangle). This kind of arrowhead was found in a quiver set in a pit burial Barvynivka 7.15; one more item was found in another burial among the bones and had been the cause of the wound.

Sub-type II – an oblong triangular feather, it was the cause of the wound in one pit burial (Fig. 24:6). It should be noted that, massive arrowheads with a straight base (Turbino type) are typical for quiver sets from Pokrovka and Don-Volga Abashevo graves [Tkachov 1999:112-117].

Sub-type III – side edges of the arrowhead are parallel from the base up to the middle or above, then they meet, the so-called ‘tower-like’ arrowheads. Three such items, all of them the cause of wounds, were found in the burial pits (Rakhmanivka 4.7, Dnipropetrovsk Region; Vysoke 1.1, Donetsk Region; Rostov-on-Don thermal power station 2, 5.3).

Type C – arrowheads with a fang

Sub-type I – with an integrated tang (leaf-like). In the pit burials, two of such arrowheads were the cause of wounds (Igren soil burial mound, grave 1, Dnipropetrovsk; Yasyrev 1 8.9 (Fig. 24:7), Rostov Region).

Sub-type II – with a tang, separated with ledges

Version 2 – with a sharpened tang. Only one arrowhead of this kind is known for cist burials; a part of the quiver set at Blyzniuky 1.1 (Fig. 24:1).

They were the cause of wounds in two pit burials (Popiv Yar 6.3, Donetsk Region, Rostov-on-Don West 5.3) (Fig. 24:3,5).

An arrowhead of this type (Fig. 24:2) was also found in the filling of a side-wall niche next to a male skull in a complex showing traces of a ‘caster kit’ (a nozzle and an astragal) Kalynivka 1.4 (Kherson Region). The presence of this arrowhead in the grave in the capacity of the cause of the wound was not confirmed. Above, we mentioned the presence of a similar arrowhead in a quiver set of what by all appearances is an early cist burial complex, Blyzniuky 1.1. as well as in a late Catacomb ‘arrow-maker’s kit’ of the Mine No 22, 3.3 group (Ordzhonikidze, Dnipropetrovsk Region) (see above).

As for arrowheads of Type B and Type C from the Babyno graves, we should recall an important site, the Leventsovka fortress at the Lower Don. Its ruins are literally bespangled with flint arrowheads (about 500). Bratchenko identified arrowheads of three types: (1) with a notched base, triangular or oblong – heart-like – 7 items; (2) with a rounded base, willow-leaf-like and rounded rhombus-shaped – 12 items; and (3) tanged – 358 items [Bratchenko, 1976:124]. The cultural affiliation of both the population of the fortress and the attackers is still unclear. According to the authors, arrowheads of the third type had vast analogies among weapons of the Don-Volga Abashevo or Pokrovka Srubnaya culture [Cherniakov 1985:21; Tsimidanov, Evglevskiy 1993:100; Litvinenko 1994:208; 2001:15; Rogudeev 2000:89]. Bratchenko, in his latest publication about the Leventsovka fortress, treated this issue with considerable care and refrained from making rad-

ical statements [2006:177, 295]. Likewise, we do not think that the 'Pokrovka' attribution of that type of arrowheads is a possibility, though the arrowheads were indeed found exclusively in the bones, and in no case did they clearly represent grave goods. It should be noted that such arrowheads as grave goods (by the way, this also refers to leaf-like arrowheads) were found within burial complexes of the Lola culture in the territory of the North Caucasus [Kalmykov, Mimokhod 2005:208].

Of 82 arrowheads found in the Babyno burials, about 32 could be the cause of wounds (Table 5; Diagram 7), while others mostly belonged to quiver sets and 'manufacture kits'. It should be noted that, although the composition of the Babyno grave goods containing those sets and 'kits' is more or less similar to the composition of Catacomb grave goods (though somewhat 'poorer'), their arrowheads mostly belong to different types. Yet, notwithstanding morphological changes, most of them are still light notched arrowheads, probably made for the use with simple bows meant to cause damage to an adversary wearing no protective armour. The argument that the weight and size of Babyno arrowheads grew as a result of using a composite bow and a chariot [Vasilenko 2005:97] mostly relies on finds of arrowheads of Type B and Type C, which in most cases were the cause of wounds (only one arrowhead was found in a quiver set) and could belong to a population of a different culture (see above).

IV.2. TYPOLOGY OF LARGE BIFACES

For the purpose of this publication, we use the conditional label of 'large bifaces' to denote flint artefacts made by means of bifacial knapping with the help of flattening chippage on concretions or massive flakes. Those artefacts were used as spear or dart heads or knife-daggers. Axe-adzes, which may also be regarded as large bifaces, are addressed separately. It is important to keep in mind that viewing such a category of flint artefacts as knife-daggers among items of weaponry may only be rather conditional [Razumov 2005a:105-110] though supported by many authors. They are too short (up to 15 cm together with the haft) and – as noted repeatedly in the literature – too fragile to be used efficiently in combat [Childe 1956:366; Klein 1961:109]. However, such artefacts became common in the cultures of Europe and the Middle East during the Eneolithic and Early Bronze Age. Given that, first, shafts (or handles made of organic materials) are very rarely preserved, and, second, there have been very few trasological studies of such artefacts, and that, finally, people of the Steppe cultures could have used the same objects for different purposes depending on the circumstances

(there is sample ethnographic evidence of this kind of poli-functionality of knife-daggers, and that poli-functionality is also well-known by trasological definitions as knives of weapon points with debris of shafts of the Middle Bronze Age – see below), when investigating them we may rely, first and foremost, on the context of the finds. On the rare occasions when the debris of pikestaffs were preserved, the weapon heads were usually found to the right of the skull, above the right shoulder, point ‘up’ (Fig. 30, 34). Hence we interpret bifaces found in the same position as hurling weapon heads (judging by the dimensions of the heads and the shafts, most of which were darts and not close-contact battle weapons). When the morphology of an artefact left practically no doubt that it was a knife-dagger (blunting retouch on longitudinal edges at the place of fastening the handle, which makes it practically impossible to stick that biface onto a shaft), they were usually located near the thighs and pelvis with the sharp edge facing the feet (sometimes directly in the hand) or under and behind the skull (Fig. 36). We will rely on this context when interpreting functions of large bifaces, which also refers to other cultural entities of the Bronze Age. Yet, a substantial number of bifaces, due to the their unclear position or fragmentation, may not be interpreted unambiguously.

The earliest bifacial flint knife-daggers were found in the North Caucasus and the Lower Don [Kondrashov, Rezepkin 1988:93; Gudimenko, Kyiashko 1997:103]. Particular attention should be paid to grave goods of an elite Maikop grave 5 of barrow 31 of the ‘Klady’ (‘Hoards’) cemetery (Krasnodar area). There a flint knife-dagger with the debris of a handle lay on top of a stone axe; a bronze dagger lay on top of a bronze axe-hammer, and another lay nearby [Rezepkin 1991:173]. Since the stone axe may be viewed in that case as an insignia of power, the position of the knife-dagger stresses its sacral meaning. Trasologically it was identified as a meat-cutting knife, though we have certain doubts about classing it in the category of ‘hunting’ tools [Korobkova, Sharovskaya 1983:88-94], given the presence of two more bronze daggers and the general context of a ‘prince’s’ burial (see Chapter VI).

Sub-triangular [Telegin 1970:13] and leaf-like [Patokova 1979:25; Derzhavin, Tikhonov 1980:79] knife-daggers, arrowheads and dart heads become common in the Late Eneolithic – Early Bronze cultures. The dart heads include occasional asymmetric (lancet-like) items [Bratchenko, Constantinescu 1987:26; Kiyashko 1994:44].

To describe large bifaces from burial complexes, we suggest a typology similar to the typology used to describe arrowheads, i.e., by the morphology of the fixing (though battle and working qualities of large bifaces were not as strongly determined by that morphology as those of arrowheads).

Type A – large bifaces with a notched base

Type B – large bifaces with a cut base

Type C – large bifaces with a tang

Sub-type I – with an integrated tang (‘leaf-like’)

Sub-type II – with a tang defined with horizontal ledges ('shoulders')

Sub-type III – with a tang defined with sub-triangular ledges ('rhombic')

Sub-type IV – asymmetric

There are two versions of all Sub-types. **Version 1** – with a cut tang, **Version 2** – with a sharpened tang.

IV.2.1. LARGE BIFACES FROM YAMNAYA CULTURE GRAVES

Type A – large bifaces with a notched base. Only one dart head of this type is known for the Yamnaya complexes (burial with a skeleton contracted on the back) (Fig. 26:1).

Type C – large bifaces with a tang.

Sub-type I – with an undefined tang ('leaf-like'). Based on the context, large bifaces from Yamnaya graves with the skeletons contracted on the back include ten artefacts (Fig. 26:2-7) identified as knife-daggers, six as dart heads, eight unidentified, three of them included in two 'manufacture kits'. It should be noted that a leaf-like knife-dagger in one case was placed on top of a bronze knife, and in another, on top of a bronze 'awl' (compare to the above Maikop complex, Klady 31.5).

Large bifaces from Yamnaya graves with the skeletons contracted on the side include one artefact identified as a knife-dagger, three as dart heads, and one unidentified (Fig:28-29).

Four large bifaces of this type were found in cenotaphs and ruined graves.

Hence the 33 'leaf-like' large bifaces included 11 knife-daggers, 9 dart heads, and 13 items of unidentified functions.

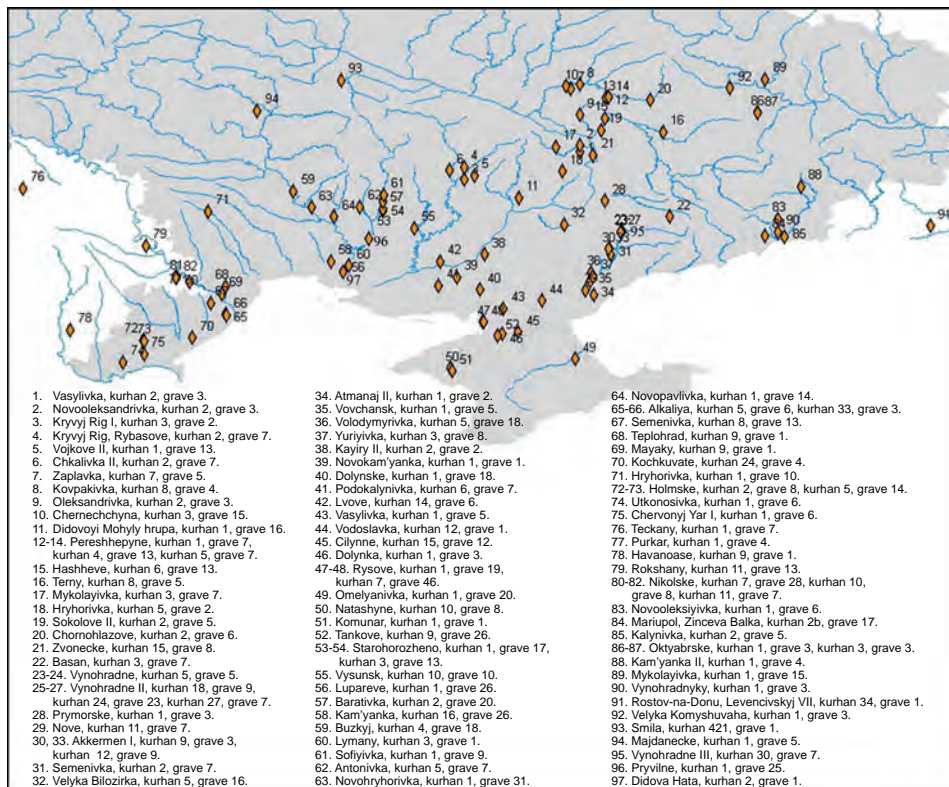
Sub-type II – with a tang defined with horizontal ledges ('shoulders'). The burials contracted on the back included two dart-heads; the burial contracted on the side included one dart head and one knife-dagger; there was also an unidentified large biface in a cenotaph (Fig. 27:1-3; 28:1-3).

Sub-type III – with a tang defined with sub-triangular ('rhombic') ledges (Fig. 27:4-7; 28:4-9). Graves with the skeletons contracted on the back included 7 knife-daggers and 8 dart heads (including one in a child's burial; one more was found between the vertebrae and could be the cause of the wound). Graves with the skeletons contracted on the side included 5 knife-daggers, 5 dart heads, and 2 unidentified bifaces. One unidentified item was found in a ruined grave.

Hence the total of 67 large bifaces were found in Yamnaya burials (Map 5): 24 knife-daggers, 24 dart-heads, and 11 large bifaces of unidentified functions. The finds also included 8 fragments of such bifaces, which in two cases could have been the cause of wounds (Table 6).

Table 6

Large bifaces in burials	A		B		C						Fragments			Total			
	Type				Subtype I			II			III				IV		
	KNIFE-DAGGER	DARTHEAD	KNIFE-DAGGER	DARTHEAD	KNIFE-DAGGER	DARTHEAD	USE UNKNOWN	KNIFE-DAGGER	DARTHEAD	USE UNKNOWN	KNIFE-DAGGER	DARTHEAD	USE UNKNOWN		KNIFE-DAGGER	DARTHEAD	USE UNKNOWN
Amount of large bifaces in burials																	
Using																	
Yamnaya culture contracted on the back	-	1	-	-	10	6	8	-	2	-	7	8 (1 -cause of wound)	-	-	-	-	42
Yamnaya culture contracted on the side	-	-	-	-	1	3	1	1	1	-	5	5	2	-	-	8 (2)	27
Yamnaya culture cenotafs, destroyed	-	-	-	-	-	-	4	-	-	1	-	-	1	-	-	-	6
Yamnaya culture sum	-	1	-	-	11	9	13	1	3	1	12	13	3	-	-	8	75
Early Catacomb culture	-	-	-	-	3	5	-	3	1	1	-	-	-	-	-	-	13
Donets Catacomb culture	-	-	-	-	1	2	5	-	-	4	1	-	-	1	-	-	14
Ingul Catacomb culture	-	-	1	1	8	7	4	1	1	-	9	3	2	-	-	1	38
Late Catacomb culture	1	-	-	-	3	5	-	3	1	1	-	-	-	-	-	2	14
Catacomb culture sum	1	-	1	1	15	19	9	7	3	2	13	4	2	1	-	3	81
Babyno culture in chests	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1
Babyno culture in pits	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1
Babyno culture sum	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	2
Total	1	1	1	1	27	28	23	8	6	3	25	17	5	1	-	3	158



Map. 5. Burials of Yamnaya culture with large bifaces

IV.2.2. LARGE BIFACES FROM CATAOMB CULTURE GRAVES

Type A – large bifaces with a notched base. A triangular item with a deep notch at the base that had probably been used as a dart-head was found in an ‘arrow-maker’s kit’ Artemivsk 2.3 (Donetsk Region) (Fig. 40:1). Morphologically it was absolutely similar to arrowheads of the same kit but stood out due to its ‘double’ size (5.3 cm x 2.3 cm).

Type B – large bifaces with a cut base. Two items of this type were found in burials of the Ingul culture: a dart-head (above the left shoulder, point up) and a knife-dagger (under the right elbow bone, point down to the feet).

Type C – large bifaces with a tang

Sub-type I – with an undefined tang (‘leaf-like’). Based on the context, the large bifaces from the Early Catacomb graves included 3 items (Fig. 35:1-3) identified as knife-daggers, and 5 items identified as dart-heads. One of the lat-

ter, included into a ‘carpenter’s manufacture kit’ Oleksandrivsk 9.25 (Luhansk Region) (Fig. 46:4), was trasologically identified by Korobkova as a meat-cutting knife, though it lay above the right shoulder of the skeleton with its point up, which is typical of dart-heads. The author of the excavations also regarded that item as a dart-head, while noting that both dart-heads and arrowheads, judging by trasological data, had been occasionally used as cutting tools [Bratchenko, 2006:290]. Hence, when using trasological data the context of the find should also be kept in mind. In one case (Preobrazhenne 1.6, Luhansk Region) spear-staff debris were preserved (130 cm x 4 cm); the spear had been placed along the eastern wall of the chamber. The dimensions of the head – 11.8 cm x 3.8 cm – also support the interpretation of that item as a spear, not a dart. The burial also included a drilled axe-hammer.

In three other burials, dart-heads of spearheads were located at the right shoulder with their points up. We identified two bifaces as knife-daggers, which in two cases were located behind the skulls and in the smears of ochre (in one case, behind a female skull together with a bronze ‘awl’, and in the other at the thighs, with the point down). One more burial was a cenotaph (Kerchik 16.15, Rostov Region) and contained an ‘arrow-maker’s manufacture kit’ located in the middle of the chamber in a smear of ochre. It also contained a large leaf-like biface, but its function could not be identified from the context. Yet, given that the composition of the grave goods (28 flakes, 2 arrowhead blanks, 3 vessels, a fire pan, an astragal, 2 shells, 2 bronze ‘awls’, 2 abrasives, a small pestle, 2 fluted abrasives, 2 wooden items, a wooden bowl, a bone piercer, 2 cattle skulls, wing and leg bones of a bustard, a horn cylinder, and 15 jerboa tails covered with an animal shoulder blade), is connected, in our view, with attributes of a cult individual (probably a kind of shaman), we interpret that item as a ritual knife-dagger.

One item was identified as a knife-dagger (located next to the skull in a smear of ochre), and two as dart-heads (at the right shoulder with their points up) in complexes of the Donets culture. One leaf-like biface comes from a ruined grave, four others belong to three ‘arrow-maker’s kits’, including two leaf-like bifaces (Fig. 49:6-7) on a board with grave goods, blanks, and 10 arrowheads in the complex of Zholobok 3.6 (Luhansk Region) (see above).

Eight artefacts of this type from the Ingul graves were identified – based on the context – as knife-daggers, and seven as dart-heads. In two cases left-like bifaces belonged to ‘manufacture kits’, in two other cases they came from ruined graves.

One biface of that kind was found in an ‘arrow-maker’s kit’ in each of the burials of Artemivsk (Donetsk Region, the Bakhmut type) and Oleksandrivsk 1.49 (Luhansk Region, the Manych type).

Sub-type II – with a tang defined with horizontal ledges (‘shoulders’). In Early Catacomb complexes, bifaces of this type (Fig. 35:2) include three knife-

daggers, one dart-head, and one unidentified biface from a ruined grave. One such item, located under the left arm of the skeleton with the point down to the feet (Novooleksiyivka 2.6, Donetsk Region), has a trasological definition due to which that tool could have been used as a meat-cutting knife. The burial also contained a drilled axe-hammer.

Two bifaces of this kind were found in Ingul Catacomb graves: one knife-dagger (clutched in the left hand) and one dart-head (over the right shoulder).

Sub-type III – with a tang defined with sub-triangular ('rhombic') ledges. The Donets complexes produced four knife-daggers and one dart-head (in front of the skull with the point up). One item was located near the hands (Oleksiyivka 26 5.10, Dnipropetrovsk Region), another directly in the left hand of a skeleton placed on the right wing bone of the pelvis (Bulakhivka 1 3.8, Dnipropetrovsk Region). One more knife-dagger was found at the thighs with the point down to the feet, yet another lay near the right arm with the point down to the feet (Stupky 1.3, Donetsk Region) (Fig. 36:1); the tang also displayed the debris of ochre-painted leather wrapping of the handle. Let us note that Kiyashko also pointed to the presence of bifacial knife-daggers with typical catches at the sides in the Lower Don catacombs, synchronous with the Donets Catacomb culture [Kiyashko 1990:21].

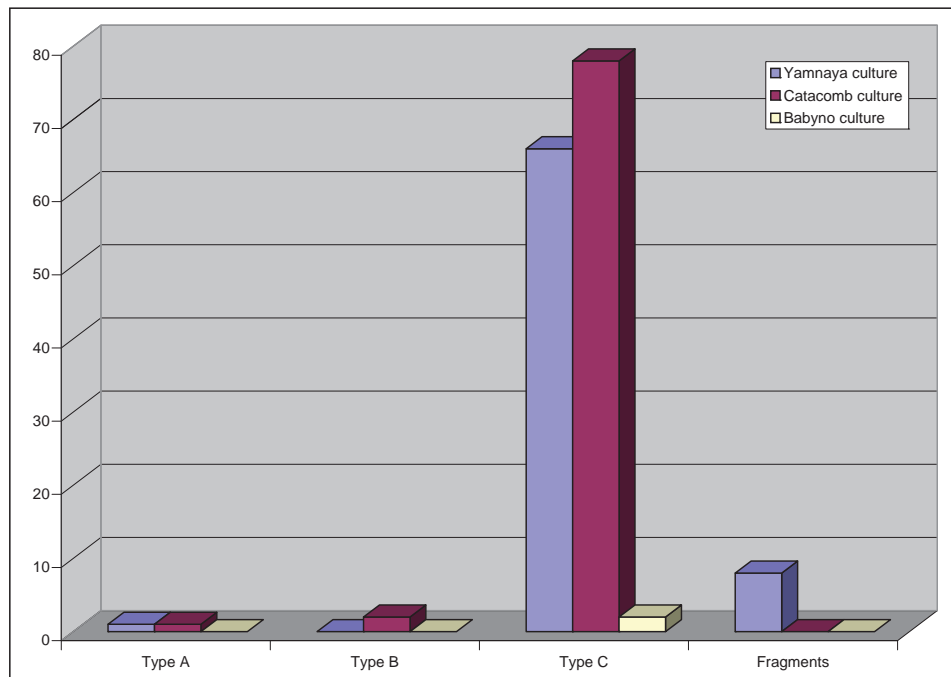
Nine knife-daggers (twice in a left hand, twice at the left thigh, once behind the skull and once next to the shin) and three dart heads (one over the right shoulder, the debris of the shaft 80 cm long) were found in Ingul burials (Fig. 38:1-7). One biface belonged to a 'manufacture kit', another was found in a cenotaph.

Sub-type IV – asymmetric. A one-blade bifacial knife (10.7 cm x 6.8 cm) with a tang was found at the knees of a skeleton contracted on the right side in a complex of the Donets Catacomb culture, Borovske 1.2 (Kharkiv Region). Two boar fangs and two grinders were also found on the site.

A segment-like biface (15 cm x 4 cm), probably a knife, was placed in front of a skeleton of a child no older than 3, in the Ingul complex of Pryrichne 1.13 (the Crimea).

Two similar bifaces (Fig. 40:3-4) were found in a complex of the Bakhmut type, Svatove 8.1 (Luhansk Region).

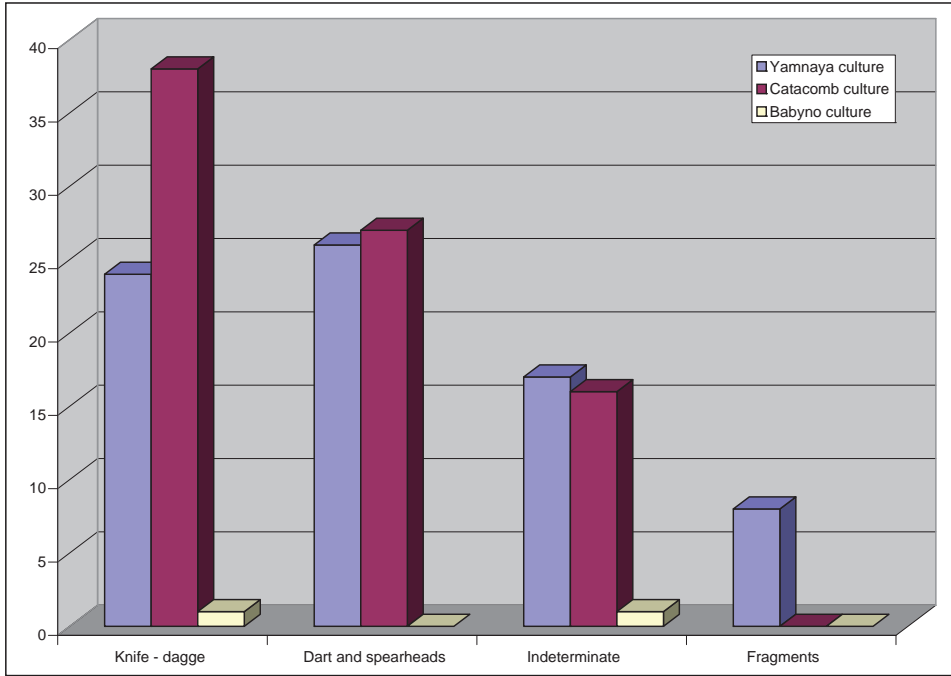
Hence, judging by their morphology and context, the 71 large bifaces from the CC burials included 34 knife-daggers and 22 dart heads; the exact functions of 15 more large bifaces remains unknown (Table 6; Diagram 8-9; Map 6). It should be noted that, there were more knife-daggers than dart-heads. Let us recall that although the morphology and technology of making both groups of the items are mostly the same (in both cases, Type C-1 and Type C-2 dominate), we do not think that the knife-daggers from the burial complexes were actually weapons.



Diag. 8. Types of large bifacial artefacts in Early and Middle Bronze Age burials

IV.2.3. LARGE BIFACES FROM BABYNO CULTURE GRAVES

We know of a small number of large bifaces from Babyno burials (Table 6; Map 7). A damaged leaf-like biface (Type C-I) (Fig. 64:1) was present in a ‘manufacture kit for making adornments’ found in a Babyno pit burial, Velyka Bilozerka 4 4.4 (Zaporizhya Region). In a primary burial in a frame, Blyzniuky 1.1 (Dnipropetrovsk Region), alongside a quiver set there was an artefact about 10 cm long, which could be either a large biface (Type C-I) or a knife made on a massive blade [Krylova 1967:16, 84]. Unfortunately, the poor quality of the illustration prevents us from regarding that item without doubt as a large biface. In our view, the fragment, identified by the author of the excavation as a piece of a dart-head (the Igren soil mound, grave 1) was actually an arrowhead (see above). A fragment that could be a part of a large biface was found in a cenotaph at Chortomlyk 1.3 (Dnipropetrovsk Region). This situation can be compared with settlement materials. We know of one item from the filling of a pit of the eponymic settlement of Babyno III, initially described as a ‘dagger or knife’ [Berezanskaya 1960:30; 1986:29]. A semi-finished version of a similar biface was also found in

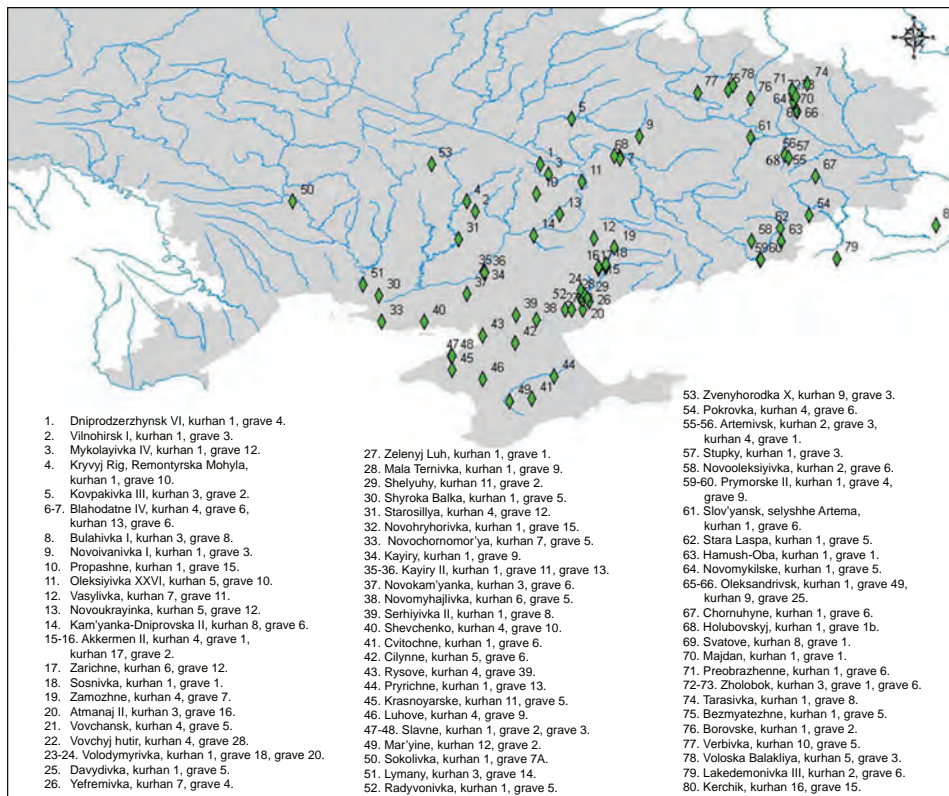


Diag. 9. Functions of large bifacial artefacts in Early and Middle Bronze Age burials

a late Babyno horizon of the Kozacha Prystan settlement [Razumov 1999a:15]. Other finds of this kind were impossible to attribute to a specific culture due to the mixed layers of the sites. We know of several flint dart-heads (or knives) from the settlements of the Kamyanka-Leventsovka group [Rybalova 1966:179; Bratchenko 1985b:461; Toshev 1999:81]. In terms of general morphology some are close to the Babyno III head. Hence it is possible to argue that large bifaces – particularly ones that could be regarded as spearheads or dart-heads, which probably had been replaced with metal ones – were practically non-represented in Babyno complexes.

IV.3. BIFACIAL AXES (ADZES) FROM YAMNAYA AND CATACOMB CULTURE GRAVES

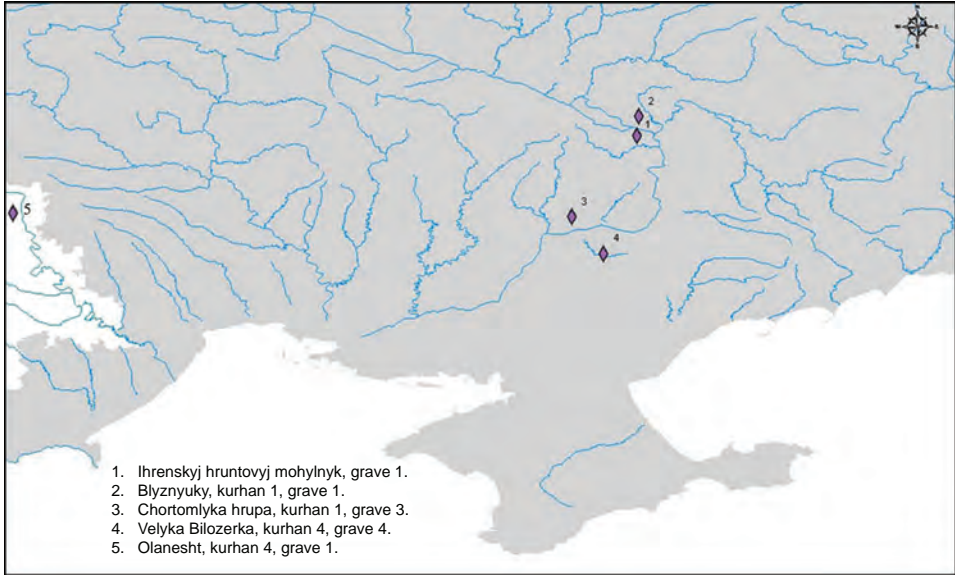
Axes and adzes are striking-and-chopping implements. Their typical forms for the Eneolithic – Early Bronze Age were trapeze-like, lens-like in section, flint tools with a profiled cutting edge (blade) and a sharpening angle of up to 300.



Map. 6. Burials with large bifaces of Catacomb culture

Tsimidanov and Ivanova tend to interpret all axe-adzes from the Yamnaya graves as weapons, arguing that such items occur in graves of men aged 40-50, twice in combination with arrows (in one of the cases, with a bone arrowhead), but never with a wood-working tool [Ivanova, Tsimidanov 1999:6]. This view is shared by Klochko [Klochko 2001:82]. We also know of stone drilled axe-hammers of the Yamnaya time [Ivanova 2000:13; Teslenko 2000:152]. While we generally agree with the researchers' opinion about the identification of ground axe-adzes as weapons, we cannot completely exclude the possibility that some could have been also used in farming activity.

Flint ground axe-adzes in YC graves have been found exclusively in the 'borderland' territories of the Yamnaya Region, mostly in the western part of the Northern Pontic area [Yarovoy 1985:80; Dergachev *et al.* 1989:68; Ivanova, Subbotin 2000:62]. There, five such items were found in five graves with skeletons contracted on the back. Particular attention should be paid to the complex of Gavanoase 9.1 (Republic of Moldova), where a burial of a man aged 40-60 contained fragments of a trapeze-like grinding adze, broken in the ancient time



Map. 7. Burials with large bifaces of Babyno culture

and arranged around the skull. The complex of Rokshan 11.3 (Moldova) contained an adze placed at the feet of a man aged 35-45; there was also an unmodified flake under the lower jaw (initially placed in the mouth?). The burial also contained a bone arrowhead and a bronze bracelet.

One more axe (adze) was found in the Yamnaya grave, with the skeleton contracted on the back, in a barrow located at the Trypillya settlement of Maidanetske in the Cherkassy Region [Shmaglii, Videyko 1988:134]. The tool lay vertically at the ribs of the skeleton on the side flank, which could be evidence that it had been fixed perpendicularly to the longitudinal axis of the handle and, therefore, had been used as an adze. The proportions and nature of modification of the tool (Fig. 41:11) had analogies among chopping implements of the Corded Ware culture.

Ground axe-adzes were found in six burials with skeletons contracted on the side in the western territory of the Northern Pontic Region (four on the left side, two on the right side). According to anthropological investigation, the five buried individuals were men aged 40 to 60. One of the burials (Alkalia 33.3, Odessa Region) also contained a bow, a quiver with 11 arrows, the top of a mace, and a bronze knife (Fig. 14).

All in all, 12 bifacial axe-adzes were found in the Yamnaya complexes (Fig. 41), 11 (including a fragmented one) in the territory of the Odessa Region and the Republic of Moldova.

The only adze known for the Donets Catacomb culture – a quartzite wedge-shaped item with a broken-off point (11.7 cm x 3.8 cm x 3.2 cm) – was found

within an 'arrow-maker's manufacture kit' in the primary burial 2 of barrow 2 near the village of Mykolayivka (Donetsk Region). The grave goods also included a drilled axe-hammer, a bronze knife, a bronze awl, and three octagonal playing bones. Yet, given the condition of the tool and its unusual type, we may assume that it was a re-used item of an earlier time.

A unique Ingul burial 3 of barrow 1 of the Serhiyivka (Odessa Region) contained three wedge-shaped flint axes with ground sharp-edge margins, located at the left knee of the skeleton. Another wedge-shaped adze with a ground sharp-edge margin came from the Kryvyi Rih area (Heikivska 2 1.17), where it had been found in a grave at the right wing of a pelvis of a buried adult. A fragment of a adze made of Dobrudzha flint was found in an Ingul 'arrow-maker's kit' in the territory of Moldova (Nikolske 8.11) (Fig. 42). A fragment of a ground chopping tool was also present in a stone-working 'manufacture kit' at Shyroka Balka 1.3 (Kherson Region).

Hence, bifacial ground axe-adzes are not typical of the system of weaponry of the Yamnaya and Catacomb cultures and may be regarded as the evidence of contacts with Corded Ware cultures, which is also indicated by the territorial division of the finds (see Chapter VII).

IV.4. RARE CATEGORIES OF WEAPONRY

A unique artefact was found in an early Catacomb grave 30 of barrow 1 of the Donskoy mound in the Rostov Region. Along the bones of the left arm of the skeleton there was a chain of 2-3 rows of 22 small flakes-scales about 21 cm long. Probably, a hurling or cutting tool consisting of a wooden base and flint inserts had been left on the floor of the burial chamber [Iliukov 1993:20; 1999:75]. Such tools were used during the Stone Age. Australian aborigines called them 'death spears' and used them in armed clashes [Semenov, 1968:96; Matiushin 1996:170].

In this connection we should recall that bone spearheads with flint inserts were widely used in the territory of South-Eastern Europe in the Upper Paleolith. In the Mesolithic they were used as combat weapons: one of the individuals buried in the Third Vasylivsky mound in the Nadporizhya (middle Dnieper) area had been killed with a spear that had had a bone spearhead strengthened with inserted blades [Telegin 1989:123]. Special attention should be paid to the elite complex of Dzhurdzhuleshti that comes from an Eneolithic barrow burial located in the area between the rivers of Prut and Danube. The burial included copper bracelets (19 items), a needle, an awl, earrings, a string of geshire (gagate) beads, fossil

shells, and deer teeth; flint blades, a conical core, five boar-fang bladelets, two spiral golden rings, a copper stiletto, a fortune-telling bone on a mutton shoulder-blade, fish bones, a composite baton made of bone and gold, and a weapon that has practically no analogies. The latter is a 50-cm item of wood and bone, fastened with special rivets and covered with densely stuck sharp flint bladelets that are arranged to form two blades. The authors of the publication conditionally referred to that item as a 'dart' [Haheu, Kurceatov 1993:106].

In our view, the closest analogies to this include a composite dagger from the Oleniy Ostrov burial mound, as well as swords, strengthened with inserts, used by the aborigines of Meso-America and Oceania [Semenov 1968:25, 100, 301]. In the Paleo-metal Age such composite 'swords' occurred, for instance, among Irish antiquities [Berton 2004:84-90]. Klochko considers that object to be a particular 'sword-spear' on a long shaft [Klochko 2001:63]. Most probably that 'sword' was a personal weapon of an individual of a top social rank. In terms of time that burial corresponds with the steppe complexes of the Nova Danylivka type. We may also recall a unique Yamnaya-Catacomb complex of Nova Kvasnikovka 4.5 in the Volgograd Region. The burial contained about 200 flint items, abrasives (including the ones made of stone axes), bronze and bone tools. The skeleton lay on top of a wooden sledge; dismembered human and ox bones (remainders of a sacrifice) were found on a ledge of the pit near the burnt timber roof.

Other items found near the skeleton included a bone harpoon-head with a flint insert that looked like a flag-like arrow-head. Next to it there were several similar items that had been probably fastened to the wooden base. By all appearances, the buried individual had belonged to the elite of society [Yudin, Lopatin 1989:131-140]. Yet, we cannot agree with Ilyukov who tends to regard most of the unmodified flakes from the Catacomb burials as inserts of such weapons, because they are found in a different context (see above). Individual finds of bone harpoons of the Catacomb period may be classed among fishing implements [Rassamakin 1990:100]. It should be noted that some of the bronze 'awls' from the Catacomb complexes are regarded as dart-heads and gads. The single known bronze leaf-like dart-head of the Catacomb culture was found in Storozhevka 1.3 in the Saratov Region [Bratchenko, Sanzharov 2001:80].

No weapons with inserts have been known for later periods.

IV.5. FLINT MINIATURE SCULPTURE

This category of the Early and Middle Bronze Age grave goods was identified in earlier investigations. In fact, a 'scepter' from the Vasylivka barrow (see below)

was the only studied item. Meanwhile, there is no doubt that both siteal (anthropomorphic stelae) and miniature sculptures made of other materials existed in the Bronze Age [Kubyshev, Nechitaylo 1988:107-118].

IV.5.1. MINIATURE SCULPTURE FROM YAMNAYA CULTURE GRAVES

Let us look at a unique bifacial flint artefact that was not a weapon but was made in a technique typical for the Early Bronze Age spearheads and knife-daggers. The artefact was found in Yamnaya grave 5 of the Vasylivka barrow (Kherson Region). Made of Crimean flint, grey with light inclusions, it was heavily styled and shaped as a trident (Fig. 43:1). The surface at both sides was fashioned with large flat faces, its top was shaped into three dents, finished at the margins with double-sided retouch. The edge of the back displayed marks left by a handle. Trasological analysis showed no signs of wear at the dents. Having made analogies with similar items made of other kinds of stone, the authors concluded that the artefact had been an emblem of power, i.e., a scepter [Kubyshev, Nechytailo 1988:116]. The researchers link such scepters to a bull cult [Otroschenko 2000:41]. Without engaging in debate, let us only note that the lower (Catacomb) layer of the Middle Bronze settlement of Planerske -1 in the Crimea contained a flint artefact that was interpreted by the author of the publication as an amulet representing a bull head [Toshev 1999:81].

We found an artefact morphologically similar to the Vasylivka ‘scepter’ among the grave goods of Yamnaya burial 13 of barrow 4 near the village of Pereshchepyne (the area between the Oril and Samara rivers, Dnipropetrovsk Region). The flake, split from a pebble of a local alluvial flint, has two symmetric notches without any traces of wearing (Fig. 43:2), which allows an assumption that it was used as a miniature sculpture, an amulet.

We provisionally identified another probable sculpture when processing materials of the Kherson expedition of the *Institute of Archaeology of the National Academy of Sciences of Ukraine*. It came from grave 1 of barrow 1 near Mala Ternivka (Zaporizhyya Region). An ornamented vessel and a hammer-like pin were located at the skeleton of an adult; a tanged arrowhead (see above) was found among the bones. A figurine (a bucranium?) found near the right shoulder (referred to as a ‘scraper-chisel’ in the report) had been made on a fragment of a massive flake; in the distal part there were five small symmetric semi-circular bulges made by the four notches; the distal part formed a right angle. No traces of wearing were found on the item. Dimensions: 4.1 cm x 4.1 cm x 1.2 cm (Fig. 43:3).

In our view, it is necessary to proactively seek opportunities to identify samples of miniature sculpture among the mass of 'flakes' and 'scrapers' found in burial complexes of the Paleo-metal Age. Let us quote the interpretation of a 'knife-dagger' from a ruined burial (Eneolithic or Yamnaya) in a stone chest near the village of Petrivka (Luhansk Region), by Brytiuk. We agree with the author's conclusion that the item was actually a zoomorphic image, probably of a horse head, as was the case with the known stone 'scepters' [Britiuk 2002:70-73].

IV.5.2. MINIATURE SCULPTURE FROM CATACOMB CULTURE GRAVES

A peculiar natural sculpture, a concretion of a fanciful shape, with holes and bulges (looking like a human 'mask') was found on the floor of an entrance shaft of an early Catacomb complex of Shandrivka 1 1.10 (primary burial) (Dnipropetrovsk Region). The concretion was flaked in several places (probably to make it look more like a 'mask') its dimensions were 22 cm x 18 cm x 5 cm. An ornament made by stripes of ochre was made on the floor of the chamber, next to the skeleton contracted on the back.

A secondary Donets culture burial 4 of barrow 1 near the village of Kindrativka (Donetsk Region) contained a rhombus-like concretion, found in a smear of ochre at the right elbow of an adolescent, contracted on the right side. According to the author of the excavation [Kulbaka, 1988:10] the item resembled a 'snake's head' with two eyes, 6.3 cm long. There was also a massive primary flake of chalk flint (7.4 cm x 2.4 cm), a ceramic 'boat' (a model of a cradle or a wagon?), two shells, and an abrasive. There was a pot next to the skull.

For the Ingul culture we initially identified three artefacts that we investigated personally and, using analogies in materials of other cultures [Zamiatin 1948:85; Popova 1980:220-223; Rawlik 2006:545-561], referred them to miniature sculpture. The first item was a 'double spokeshave on a primary flake' (3 x 3 cm), found between the thighs of a skeleton outstretched on the back (Mayachka 20.1, Kherson Region), and a 'flake with two symmetric notches', resembling the first item by the regular shape and the absence of wear marks, located at the left shoulder of the skeleton (Taborivka 37.2, Mykolayiv Region). In the latter case, there was a truncated granite cone, an 'altar', placed next to the skull on top of a 'foot' of ochre. A clear example of miniature flint sculpture was found in grave 6 of barrow 31 near Ordzhonikidze (Dnipropetrovsk Region, studied in 2007 with participation of the author; the expedition was led by Serhij Polin). The artefact was a massive flake of black flint (probably of Crimean origin), modified along the perimeter with abrupt 'scraper' retouch, which resulted in an anthropomor-

phous stele with an oblong sub-triangular base and a ledge of a 'head' formed by two notches (Fig. 43:4). The item was located below the lower jaw of the skeleton and, judging by the characteristic polish on the ventral side, had been subjected to rubbing against the skin or clothes, i.e., most probably, had been worn on the neck (possibly, in a leather bag).

Hence, we provisionally identify eight flint artefacts of the Yamnaya and Catacomb cultures that may be viewed as miniature sculptures. In our opinion, there are more such objects, but their identification in a mass of flakes and tools is difficult due to the abstract nature of the Bronze Age art. Possibly, microstratological analysis will be useful for addressing this issue in future.

Summing up, we can argue that (1) burials containing arrowheads – both within quiver sets and as the cause of wounds – prove that a bow and arrows with flint arrowheads remained the foundation of the system of weaponry of the Northern Pontic population throughout the entire Early and Middle Bronze Age. Dimensions of the absolute majority of the arrowheads (with a notch at the base, Type A) suggest the predominant usage of a simple bow. Individual heavy arrowheads with a straight base or a tang (Types B and C) were mostly the cause of wounds sustained by the buried individuals (Diagrams 6-7). This fact allows viewing them primarily as weapons of a population of a different culture. However, it should be emphasized that the predominant majority of arrowheads in the bones of the buried individuals was represented by the types that were characteristic of the same culture to which the burials belonged.

This fact could indicate that clashes occurred between groups of a culturally related population, probably for the division of resources. (2) Most of the large bifaces from graves of the Yamnaya and Catacomb cultures, whose function was identified with the help of the method we proposed, turned out to be knife-daggers, and not heads of combat weapons. Given that we do not think that knife-daggers were used as weapons, it is important to analyze reasons for which they were placed into the graves (see Chapter VI). In their turn, dimensions of dart-heads and their shafts leave no doubt that we are dealing with hurling weapons and, in fact, exclude the use of the spear as a close combat weapon in the system of the Early and Middle Age weaponry. At the same time, it should be noted that the number of large bifaces identified as dart-heads is about the same in the Yamnaya and Catacomb (particularly, Ingul) graves (Table 6; Diagrams 8-9). This fact challenges the conclusion, repeatedly made in publications, suggesting that unlike the 'Catacomb army', the 'Yamnaya army' had been armed almost exclusively with darts [Klochko, Pustovalov 1992:132]. (3) Occasional ground axe-adzes from the Yamnaya and Catacomb graves should be regarded, first and foremost, as evidence of contacts with western and north-western neighbours. (4) Miniature flint sculpture should be distinguished as a separate category of grave goods of the Early and Middle Bronze Age.

V. FLINT PROCESSING: BASIC ASPECTS IN THE EARLY AND MIDDLE BRONZE AGE

This chapter describes the flint knapping manufacture as a technological process (for sources and extraction of raw materials, their primary and secondary processing, labour tools and weaponry manufacturing techniques, see V.1, V.2). In our view, the available source base does not allow substantially complete reconstruction, based on burial sites alone, of the social and economic organisation of flint knapping manufacture within the Early and Middle Bronze-Age economy. However, given that some researchers build their general conclusions on burial complexes containing ‘manufacture kits’ (mostly connected with flint knapping), we believe it is necessary to specifically discuss social and economic aspects of this issue (see Chapter VI).

V.1. IDENTIFICATION OF RAW MATERIAL SOURCES

The Paleo-metal Age base of raw materials used in flint industries remained practically unchanged since the Stone Age. Numerous deposits had been explored for a very long time. Yet, due to the development of the food-manufacture economy and metallurgy, the strategy of extraction of raw materials had gradually changed, and so had the correlation between its various kinds.

Various types of stone may be used for making working parts of implements, blades, and weapon heads. Apart from flint, we can mention obsidian (vulcanic glass), chalcedony, fine-grain quartzites and jaspers, flint shales and limestones. The literature also contains information about Bronze-Age arrowheads made of rock crystal [Razzokov 1994:152] and even of chalk [Tkachev 2001:113]. Possibly, they had a cult meaning.

Practically all of the above fragile isotropic rocks can be split following the same laws of physics. Naturally, each individual piece of a certain material splits in its own way. It may contain mechanical inclusions and have cracks, and its different zones may have different degrees of isotropism. Meanwhile, a flake

emerges and develops within any isotropic body in accordance with a general model [Giria 1997:40]. Having 'calculated' that model empirically, prehistoric artisans used a common technique of knapping all isotropic rocks, with the priority given to flint, due to its broad occurrence and relatively easy availability of the raw material.

As a result of the region's geology, deposits of isotropic rocks used in the Paleo-metal Age are located unevenly throughout the territory of South-Eastern Europe (steppe and, partially, forest-steppe areas). The best quality of raw materials was provided by the deposits of the Dniester and Prut, Western Volhynia, Desna, Middle Dnieper (Kaniv deposit), Crimean and Donets flints, Caucasian flint and obsidian, the Middle Don (Kostyonki coloured), Azov, Dobrudzha flint (the title 'Dobrudzha' has been established in the literature, but is incorrect, as it is used to denote high-quality upper chalk flint from deposits of North-Eastern Bulgaria, i.e., the so-called 'Ludogorec flint', while Dobrudzha only served as a transit territory for its dissemination in the Eneolithic-Bronze Age) [Kovnurko 1963:234-240; Gurina 1976:101-108; Zalizniak 1998:18].

Part of those raw materials can be rather easily identified by experts based on their visual features, without any additional petrographic analyses. For instance, this refers to the flint from Kaniv with its typical yellowish sub-crust, or spotted Desna flint. However, identification of the exact source of raw materials used for making the majority of finds is a serious challenge. In addition to the above deposits, there are many secondary sources on the territory of Eastern Europe: first of all, moraine deposits of flint and rocks with similar physical properties, as well as the flint relocated by water currents. As of today there is no substantially complete lithoteque; therefore, even special analyses are unable to identify precisely the origin of a find.

Hence this study defines, with a certain degree of probability and based on the general context, the areas of origin of the raw materials used to make the items found in burial complexes. For instance, arrowheads from Catacomb graves of different periods, located in the middle current of the Siversky Donets and the neighbouring territories (Lower Dnieper area, the Northern Azov area) were made almost exclusively of high-quality chalk flint – dark grey or yellowish, semi-translucent (the Turon horizon). In terms of colour and physical qualities that rock is practically identical to Western Volhynia flint, but because the deposits of the Donets flint were located much nearer, the raw material of those arrowheads and other items was identified by researchers as 'Donets' [Petrun 1969:78]. To an even greater extent this applies to alluvial flint, which – due to its low quality – was suitable mostly for the simplest tools like scrapers and could not serve as means of exchange in distant areas and, therefore, was defined as 'local'.

Various kinds of raw materials can be found within one deposit. For instance, Donets chalk flint of the Turon horizon can be divided into several groups: (1) dark grey, almost black, translucent top-quality Turon flint; (2) grey, spotted

Turon flint of lower quality than the first group; (3) yellowish, with a wax hue, translucent flint of the Cognac horizon, of lower quality than the previous two groups; (4) light-grey, opaque flint of the upper Cognac horizon, of low quality, very fragile [Petrun 1969:78; Pislariy *et al.* 1976:22, 26].

Generally, open deposits of raw materials in the Donets area are connected to the upper chalk outcrops of geological deposits in the zones of tectonic ruptures. Major deposits of high-quality Donets chalk flint are located in the north-western area of the upper chalk deposits of the Donets basin, the so-called Bakhmut-Torets hollow. Those deposits are located in the vicinity of Kramatorsk, Slovyansk, Zakotne, Kryva Luka, Izyum, etc. [Krimgolts 1974:19-23]. In those places flint comes to the surface as a result of erosion at the slopes of ravines and mountains, and has the 'bowl nodule' look. Hence, collecting necessary raw materials requires no special effort. The exploration of deep layers began already in the Neolithic [Tsveybel 1970:227-233; Kolesnik, Koval 1999:19-20]. Efforts to dig deeper into the layer aim at reaching raw materials that have not suffered long-lasting effects of fluctuation of temperatures and remain more plastic. This very sort of flint can be processed with enhanced compression and split into blades of up to 20 cm long, as typical, for instance, of the Sredniy Stog sites [Telegin 1973:5], and the Nova Danylivka type of burials [Pislariy *et al.* 1976:28-30; Telegin *et al.* 2001:8].

Judging by the large number of artisan 'workshops', the most intensive exploration of the Donets chalk flint deposits occurred in the Late Neolithic – Eneolithic [Kolesnik *et al.* 1993:13-15]. Its decay was probably connected with the development of bronze metallurgy. A similar situation occurred in practically all areas of extraction of flint. However, during the Early and Middle Bronze Age the exploration of deposits of high-quality flint materials continued and spread to significant distances beyond the location of the deposits (see below). Most probably, concretions were collected on screes and extracted on slopes. As of today, the existence of flint mines in the Early and Middle Bronze Age has not been proved. Given the limited demand for high-quality chalk flint at that time (for making weapons only) there was simply no need to have such mines.

As we already noted, flint and quartzite pebbles occurred in the open practically everywhere in river valleys and at the sea-side. Usually that was the raw material of the lowest quality. Under the influence of fluctuations of temperature, erosion, and mechanical damage, pebble nodules had cracks, their limestone crust was diffuse and wind-blown [Semenov 1968:11-17]. Therefore, that kind of raw material was the least suitable for knapping, particularly for making bifaces (knives, knife-daggers, arrowheads, and dart heads), or for obtaining major knife-like blades. However, in the eyes of cattle-breeding populations of the Bronze Age steppe cultures it had its unquestionable advantages: it occurred everywhere and was easy to find. Such a raw material could fully satisfy the demand for labour tools for home manufactures: scrapers, strickles, chisels, piercers, ham-

merstones, etc. Hence with the development of metallurgy and the beginning of using metal for manufacture of most cutting and chopping tools, the need to obtain high-quality flint raw materials gradually disappeared. Accordingly, the knapping technology gradually faded away.

Hence within the Eneolithic – Bronze Age the strategy of extraction of raw materials showed changes towards increasing trends towards using less quality but more accessible isotropic rocks.

The raw materials used by societies of the Paleo-metal Age will now be discussed. In the late Trypillya burial mounds of the Sofiyivka type, the predominant majority of items were made of local – moraine or the Kaniv deposit – flint. It should be noted that, alongside with large blades the grave goods include occasional characteristic cores for rough hammered flakes, as well as items made on such flakes, which have analogies in the flint industry of the lower and middle layers of the Mykhailivka settlement [Budziszewski 1995:188-189]. The Usatovo population of the north-western part of the Northern Pontic Region continued the Trypillya flint knapping tradition with its rather high index of blades, though used exclusively pebble raw materials: grey, dark-grey, and white Dniester [Patakova 1979:20]. Even more noticeable a change of the raw material base and knapping techniques can be seen in the steppe cultures of the Late Eneolithic – Early Bronze Age. Due to a significant increase in the volume of flake-based tools, researchers note a rather low quality of the raw materials used in settlements of the Repino and Konstantinovka cultures [Poplevko 1990:92; 1994:175; Spitsina 2000:54]. Local river flint pebbles were the most commonly used material. Meanwhile, implements made of hard-to-find but very high-quality obsidian almost disappear from material complexes of synchronous Caucasian cultures; like the best flint, obsidian became the material for making arrowheads and ritual knife-daggers [Abibulaeva 1982:152; Rezepkin 1991:173].

Items from burial and settlement complexes of the YC were mostly made of average or low-quality grey or black flint [Berezanskaya 1994:15]. The raw materials included river pebbles, slabs, and small concretions. Yet, the finds include a very small number of artefacts made of high-quality Crimean or Donets flint. For instance, light-grey Donets chalk flint was used to make knife-daggers, arrowheads and dart heads found in Yamnaya graves in the area between the Samara and Oril rivers [Kovaleva 1984:90; Teslenko 2000:152]. The famous flint scepter from the Vasylivka barrow (Kherson Region) was probably made of a slab concretion of the Crimean origin [Kubyshev, Nechitaylo 1988:113].

Particular attention should be paid to the raw material base used by dwellers of Mykhailivka, where over 2,000 items were found in the middle and upper layers. The raw material used in the settlement was relatively low-quality grey and black local alluvial flint: slabs, small concretions and pebbles. Still, there was also a small series of items made of imported flint. According to the authors, light-grey, brown, and reddish-yellow flint came from the Donets deposits,

while grey flint with white and black inclusion lines came from Western Volhynia [Lahodovska *et al.* 1962:113, 127; Spitsina 2001:69]. In her most recent monography on Mykhailivka's economic system, Korobkova, having performed a thorough trasological and technological analysis of the flint artefacts, also supported the opinion that the raw material used for making many of them had come from Volhynia (the study quoted 722 items of the local alluvial material for the upper, Late Yamnaya, layer; 77 items were made of black-smokey 'Volhynia' flint, and 16 items of the yellowish semi-translucent 'Dobrudzha' flint). The researcher linked the latter two groups to 'certain exchange circumstances' [Korobkova, Shaposhnikova 2005:129]. The same applies to the two lower layers (Lower Mykhailivka and Early Yamnaya).

As already mentioned, it is now difficult to identify sources of high-quality chalk flint raw materials based only on their appearance. Indeed, in the process of processing of collections that came from burial and settlement sites of the Lower Dnieper area (Zaporizhya and Kherson Regions) we noted a significant proportion of items made of high-quality dark-grey (almost black) and yellowish semi-translucent flint. However, we identified its probable origin as the Donets or the Crimea (at some point the author had an opportunity to study the Donets, the Crimea and Western Volhynia raw material deposits personally). Hence, without rejecting completely the possibility that some of the items had been brought to the Mykhailivske settlement from distant areas, we insist that most of imported raw materials (since the settlement also displayed flint knapping debris) had come from relatively close deposits of the middle Donets area and the Crimea. Furthermore, unlike in Western Volhynia, the Early Bronze population of those Regions had a culture related to that of the dwellers of Mykhailivka.

Kovaleva also pointed to the use of raw materials, imported from the middle Siverskiy Donets basin, by the CC of the Left-Bank Ukraine. Judging from the Catacomb grave goods containing 'manufacture kits', the imports were mostly blanks and concretions, not functional products [Kovaleva 1983b:40-47]. In the burials of 'artisans' from the Samara – Oril river area the raw materials were represented by pebble and chalk flint nodules, and semi-fabricated products. As the same time, functional arrowheads found in those graves had been made of high-quality semi-translucent flint and milk-grey chalcedony flint [Kovaleva 1983b:41-44]. The researchers also noted the combination of high-quality chalk flint and low-quality pebble raw material in burial complexes found in other territories of the Catacomb area [Melnik 1991:16; Andrukh, Toshev 1999:39; Iliukov, Kazakova 1988:37]. As for the settlement materials, the information is scarce. For the Catacomb period, raw materials of the Starchyky settlement in the steppe Kuban area were analyzed [Sharovskaya 1994:125]. The author noted that most of the items found in the Middle Bronze horizons had been made of brown and beige opaque flint. All the items found in the upper (Late Bronze) layer had been

made of brown semi-translucent flint. Hence the quality of raw material became a chronological criterion for dating the finds.

The population of the Babyno culture generally followed the flint knapping traditions of their predecessors. The low-quality local pebble flint remained the principle raw material for tool-making [Berezanskaya 1994:29]. The best-quality raw material was used for making arrowheads, as indicated by graves containing quiver sets and 'manufacture kits' [Pustovalov 1995b:211-221; Bratchenko 1995:88-89; Litvinenko 1998a:46-52]. The flint raw material of the late Babyno settlement of Kozacha Prystan in the Siverskiy Donets basin was mainly represented by black and dark-grey Donets flint, which had been probably gathered at the nearby chalk screes. A small part of the collection consists of brown and reddish-yellow concretion flint [Razumov 1999a:14-15]. In the settlement of the Kamyanka-Leventsovka group, the raw material was represented by low-quality Crimean and Lower Don flint [Bratchenko 1985:461; Toshev 1999:81-83].

It should be noted that, re-using flint items of earlier times is typical of all cultures of the Paleo-metal Age. Yet, it is important to distinguish between two aspects of such usage: (a) technological (possibly, connected with the shortage of raw materials) and (b) sacralisation of ancient objects [Serikov 2001:56-57].

V.2. FLINT KNAPPING TECHNIQUES

Any study of real life activity in any sphere should inevitably involve, first of all, the study of technology of that activity [Gening 1989:196]. Comparing and assessing various types of tools is only possible while taking into account their primary and secondary modification techniques, productivity and consumption of materials by stone knapping systems. All of the above fully applies to flint items of the Early and Middle Bronze Age.

A preliminary review of so-called burial 'flint flakes' alone allows identifying three groups as follows:

(1) debitage, which, in turn, may be divided into several subgroups (e.g., a flake from Yamnaya grave 3 of barrow 1), group 1 near the village of Sursko-Lytovske (Dnipropetrovsk Region) is in fact a flake of a thin biface that was received in the process of making an arrowhead-like object [Teslenko 2000:149]

(2) blanks for making working tools and hurling weapon heads, particularly numerous in the Early and Middle Bronze Age burials that contain 'manufacture kits'

(3) flake-based tools that have not been identified by researchers as generally amorphous and lacking maintenance; and negative flake scars at the back

(5) items of previous epochs that got into the grave filling accidentally from the cultural layer of an earlier settlement or an earlier ruined burial

(6) fragments of flint heads of throwing weapons, broken when hitting the body or being pulled out of a wound

(7) fragments of large pieces of flint or tools that were specially broken before being placed into the grave

Typically, most flakes that come from graves and cultural layers of settlements were not knapped from cores but obtained as a result of breaking nodules, practically without any special preparation. The resulting specific flakes had 'arch-like' transversal sections that we conditionally define as 'cross-section nodule flakes' (see below). Such arch-like chunks had convenient backs; the opposite side was a natural blade that made such flakes practically functional tools. Several transversal flakes could be obtained from a single nodule within a few seconds; hence in the areas rich in raw materials such tools were never treasured and were thrown away as soon as the working edge became blunt. The simple manufacture ensured that transversal flake tools existed throughout the Bronze Age [Fomenko *et al.* 1988:46; Razumov 1999a:14-15; Kolotukhin, Toshev 2000:215].

The process of making certain shapes by means of splitting (knapping) is a controlled creation of individual cracks within an object. Every knapping surface is formed in accordance with the rules of splitting fragile isotropical rocks. Those rules are 'physical laws of splitting isotropical bodies given to the artisan as properties of materials, and rules of the 3D space arranged artificially within a technological process. Various types of such organization represent different technologies' [Giria 1997:51]. Some forms of products of knapping may only be obtained through stringently determined technological processes: making every individual type of items out of a piece of raw material requires observing specific technological actions to transform an initial form into a final one.

From at least the early phase of the Upper Paleolith and until the end of the Bronze Age, two knapping technologies had co-existed and developed in parallel in the territory of the Northern Pontic area:

(1) the technology of manufacture of flakes – blanks of a certain kind (flakes, blades)

(2) the technology of manufacture of bifaces

The first kind of knapping underwent radical transformation in the Paleometal Age: while the blade-making technique flourished unprecedentedly in the Eneolithic, it practically disappeared by the Middle Bronze Age. The flaking knapping technique became the most significant. However, that was not an indicator of decay of flint knapping manufacture as such, but its peculiar adaptation to changing conditions. Naturally, such changes occurred gradually, and archaeological sources enable us to trace them.

The blade-making technique fully dominated the southern steppes of Eastern Europe until about the end of 4000 BC [Zbenovich 1976:59; Telegin *et al.*

2001:54]. The Nova Danylivka sites contain blades that have a length-to-thickness ratio less than 60:1. The sizes of those blades, their shapes, the flat cross-sections, and stability of the acute (less than 25 degrees) angle of sharpening the longitudinal edge margins, their cut and proportions prove, according to Giria they could be obtained with the help of enhanced pressure flaking [1997:87]. There are reasons to believe that in the Eneolithic time such items were prestigious and could serve as means of exchange [Britiuk 2001:68].

According to researchers, flint blades and items made on their basis were rare in YC sites; they had almost completely disappeared in the late complexes [Lahodovska *et al.* 1962:129; Merpert 1979:67; Kovaleva 1984:88; Spitsina 2001:73; Korobkova, Shaposhnikova 2005:101].

Blades are relatively rare in the Catacomb period; moreover, it is not unlikely that some had been re-used or found their way to the cultural layer or a burial construction accidentally. Although the Catacomb artisans could obtain rough blades, there was a different dominating technology, based on obtaining flakes to be used as blanks.

The blade-making technique faded away completely in the BC. The settlement materials prove the domination of a flaking technique, while 'manufacture kits' included in 'arrow-maker' graves are designed to obtain thick bifaces [Bratchenko 1995:86-89]. Still, we may refer to several cases of finding blades and items on their basis in Babyno graves [Polidovich 1993:51] (Fig. 25). In our view, those finds may be explained either by re-using earlier objects for ritual purposes, or by researchers' mistake in identification of the item's type.

It should be borne in mind that a blade is a flake that is twice or more times as long as wide, and also wider than thick. Naturally, an object of knapping, of which such a flake may be obtained, should have a convex surface with a bulging relief of a relevant shape, and a certain shape of the knapping zone that is sufficiently large to allow removing that part of the relief. Hence, individual blades of different types can be obtained both in the process of making bifaces and when removing natural pieces of raw materials of a suitable form. Probably, many blades from the Catacomb and Babyno complexes have exactly this origin. *Therefore, the term 'blade industry' is used to denote a flint processing technique 'which involves products of knapping that indicate deliberate manufacture of a maximum number of blade-like slices as a certain type of flakes-blanks made from a single piece of raw material'* [Giria 1997:77].

This technology is inevitably connected with the manufacture of a whole complex of other forms: pre-cores, cores, core trimming flakes and maintenance flakes. We do not have this kind of a complex not only for the Babyno and Catacomb, but also for early Yamnaya sites [Korobkova, Shaposhnikova 2005:101]. Hence, the technology of knapping aimed at making blades ebb away in the pre-Yamnaya period. Rare finds of blades in the Late Bronze and Early Iron complexes are probably connected to their re-use. Therefore, the flake-blank production tech-

nology was re-focused to obtaining primitive flakes already in the Early Bronze Age. This technology dominates in the Late Eneolithic complexes of the Konstantinovka and Repin cultures, and in all layers of Mykhailivka settlement, including the Eneolithic horizon [Korobkova, Shaposhnikova 2005:101].

Hence there are two independent technological blocks: (1) production of primitive flakes; and (2) manufacture of bifaces.

The analysis of settlement materials proves that the first block sustained practically no qualitative change throughout the Bronze Age. Its most detailed investigation was performed by Korobkova for Mykhailivka settlement [Korobkova, Shaposhnikova 2005:266-268], as well as by Kolesnik, based on the Srubnaya and post-Srubnaya settlement materials from the Middle Donets [Kolesnik, Gershkovich 1996:8-13; 2001:97-118]. Remarkably, notwithstanding the significant chronological and spacial distance between Mykhailivka's Eneolithic – Early Bronze horizons and the late and final Bronze layers of the settlements of the Donets area, the researchers independently reconstructed a practically identical flint knapping technology. This fact allows for making a conclusion that the decisive factor for the emergence of that specific technology in the south of Eastern Europe was the rapid development of copper-bronze metallurgy in late 4000 – early 3000 BC [Razumov 2004:21]; subsequently it did not undergo any qualitative change up until the Early Iron Age.

Morphology of cores is characteristic for the flint knapping technology of the Paleo-metal Age. Among the settlement materials, researchers identify primitive prismatic single-, double- and multi-platformed cores for making flakes. Maintenance of flaked surfaces is practically absent, their average level angle is 80-90°, flanks have not been removed, there are no traces of compression at the bottom ends, the flaking surface is one-sided [Korobkova, Shaposhnikova 2005:129]. The cores from settlements of the Middle and Late Bronze are also classed among the primitive varieties: rough and massive radial ('disk-like') and cubic shapes [Kolesnik, Gershkovich 1996:8-13; 2001:97-118; Razumov 1999a:14; 2000:68]. Many represent residual forms. No special preparation of the knapping surface was done the result produced short massive flakes with 'chaotic' cutting of the back. Primitive blade-cutting technique is extremely rare. According to Kolesnik, core-like chopping (knapping) was the means of making bifacial tools: cutters, sickle inserts [Kolesnik, Gershkovich 2001:99]. Instead, we believe that 'bifacial' cores also represented a specific form of cores of the Paleo-metal Age (see below).

A simple percussion knapping technique was used. Judging by the relief of the bulbs of force and the conical beginning of the flake, it was made with a tough hammerstone, probably a flint one. Such hammerstones are rather common in the materials of the Bronze-Age settlements. Soft billets were mostly used for obtaining biface blanks and removing the flattening flakes.

No intended preliminary preparation of knapping surfaces was done. This technology may be described as 'permanent non-stadial knapping' [Korobkova,

Shaposhnikova 2005:101]. In most of the cases the flakes were removed from an unprepared surface, thus often making specific cross-sectional blades with arch-like crust surfaces ('plateaus'). Such items have complete analogies in the Lower and Middle Paleolith technology of primary flint knapping, applying a 'chunking (slicing) technique' [Gladilin, Sitlivyi 1990:8].

A 'slice' is a blade made of a pebble or a spherical concretion that has a natural bulb, normally covered with a crust (the back), from the one side, and a sharp longitudinal edge margin from the other side. It can be of a segment-like, semi-segment-like, sub-rectangular, or sub-triangular shape. No previous modification of a piece of raw material, no core-shaping is done. Knapping may start from any point, successively, flake by flake. That is why the complexes containing a high proportion of 'slices' had only occasional undistinguished cores. Hence the purpose of the 'slicing' technique is to save as much raw material as possible but obtain blades of specific shapes and with expected properties: a long sharp blade and a natural back [Gladilin, Sitlivyi 1990:8-9]. Such items usually required no secondary modification and were used mostly as cutting tools. It should be noted that, the Corded Ware people of the Sub-Carpathian Region and Volhynia also used the 'slicing' technique [Voynarovskiy, Konoplia, Fylypchuk 2005:17-20].

Hence, in terms of focus on obtaining primitive flake-based blanks for making labour tools, within the Bronze Age the technology of primary flint knapping moves towards the Middle Paleolith standards. The main reason of that, in our opinion, was the dissemination of metal tools that were far more efficient for cutting and chopping operations than flint tools.

Simultaneously, a different kind of knapping, the manufacture of bifaces, experienced a veritable golden age. The biface technique was used to make axes, knives, sickle inserts, knife-daggers, arrowheads and dart heads. Flint heads of hurling weapons comprised the basis of weaponry of most steppe cultures of the Early and Middle Bronze Age [Gorelik 1993:62-72]. Their long existence in the territory of the Eurasian steppes is connected with several factors: the absence of strong protective armour; relatively easily available raw material; fragility of a weaponhead combined with its hardness, which strengthened combat qualities of the weapon.

The principle disadvantage of raw quartz, its excessive fragility, could be balanced only with the help of retouch that was used to optimise the shape of the head's sides and create stiffness ribs that strengthened the head. This could be done in one of the two ways: (1) making a weapon head with flat sharpening retouch on a blade blank; or (2) making a flake-based biface [Nuzhnyi 1992:157]. Though, it should be noted that, first, retouching a blade-based head increases the risk of damaging the item, and, second, due to the natural curve of the blade it is very difficult to obtain a sufficiently long head (5-20 cm) with the help of that method [Semenov 1968:56]. That is why from the Late Neolithic

onwards practically all throwing weapon heads were made with the help of a thin biface technique [Anikovich, Timofeev 1998:20; Haskevych 2001:16; Razumov 2001a:30-31]. Yet, researchers often make the same mistake when describing arrowheads, dart heads, and knife-daggers from the Early and Middle Bronze Age burials as ‘made on blades’. The authors are probably misled by the regular shape and think cross-section of the items. Meanwhile, the manufacture of bifaces is an absolutely different kind of flint knapping technology, and such mistakes should be excluded from future publications about the relevant complexes.

The predominant majority of Bronze Age artefacts, made with the help of double-side modification, are thin bifaces: the ratio of their thickness and width is less than 1:5. The technology of obtaining such bifaces is rather complex and is based on a special flaking technique that requires an elastic billet and special preparation of the surfaces (isolation and release) [Callahan 1979:33].

Controlled thinning of a bifacial blank is impossible to achieve without clearly understanding the importance of the knapping zones and of the cause-and-consequence relation between the initial shape (a biface before the thinning flake removal) and secondary shapes (the biface and the obtained thinning flake) [Giria 1997:154]. A biface that is more than five times thinner than its width cannot be produced with simple knapping. For that there is a need to produce a primary (stadial) shape. That shape (a thin biface blank) should have two surfaces with an even relief (with no bulbs or depressions) and a rib between them along the entire perimeter. This may be a slightly trimmed flake with a lense-like section, as well as objects having a different morphology. What matters is the form, not the morphology that reflects the method through which it was made. That very form allows to duly locate and prepare the knapping zones for the future controlled manufacture of flakes.

The surfaces for biface thinning flake removal are located on its rib. The necessary condition for obtaining each such flake in maximally parallel planes is that the rib may not be bent in several directions; it should be positioned within the single plane of the biface. As Giria comments:

Making biface thinning flakes for the manufacture of items of initially determined shapes requires that an artisan has certain intellectual and professional skills, the knowledge of properties of knapping different types of raw materials, physical capacity, as well as perfect tools [1997:154].

Such tools must include abrasives, elastic billets and pressure tools made of soft stone, wood, bone, horn, and metal. Such implements, alongside with raw materials, blanks, and functional products, were found in many ‘arrow-maker’s manufacture kits’ in the Yamnaya, Catacomb, and Babyno burial complexes [Smirnov 1983:164-187].

A discussion shall follow on the technology of thin biface manufacture of the Early and Middle Bronze Age, confirmed by our experiments with the technological analysis of one of the most complete ‘manufacture kits’ found in a grave of

the Ingul Catacomb culture, Davydivka 1.17 (right bank of the Utlyutski estuary, north-western part of the Northern Azov Region). A quiver set was present in the complex alongside with the ‘manufacture kit’.

It should be emphasized that bifacial artefacts (first and foremost, arrowheads) of the Catacomb cultures may be rightly described as a sign of the highest flourishing of bifacial technology in the Northern Pontic territory. Hence the reconstruction presented below may be also applied – with some reservations – to bifaces from the Yamnaya and Babyno cultures, as well as other cultural entities of the Bronze Age.

The most complex and refined manufacture technology is demonstrated by flint arrowheads that serve as a peculiar ‘visiting card’ of the Ingul Catacomb culture: the so-called ‘heart-like’ arrowheads with a deep (up to 3/4 of the total length of the item) oval notch at the base and inward-looking ribs-‘tendrils’ (Type A-II-3 – see Chapter IV).

Notwithstanding the large number of both quiver sets and ‘manufacture kits’ (which often occur together in the same burial), the literature almost entirely lacks investigations into the technology of Catacomb culture arrowhead manufacture. Descriptions of raw materials, cores, flint knapping tools, initial blank flakes and pre-forms of the heads at different stages of their manufacture are extremely scarce and not always correct. Usually authors of reports and publications confine themselves to general phrases like ‘the finds also included 36 flakes, some with retouch’. The available definitions of blanks and tools are not supported with experimental data and, therefore, are purely superficial. No efforts have been made to perform macro- and micro-trasological analysis or refitting of items from the ‘arrow-maker’s manufacture kits’. Hence reconstructions of both socio-economic and belief-system phenomena of the Middle Bronze Age, based, among other factors, on materials of such kits, may be regarded as having an insufficient research basis.

Grave 17 (secondary burial) of barrow 1 near the village of Davydivka (Yakymivka District, Zaporizhya Region) was studied by the Kherson expedition of the Institute of Archeology, Academy of Sciences of the Ukrainian SSR in 1986 (expedition chairman Kubyshev; barrow excavation head Kovalev).⁷ The grave was located 6 m south and 10 m north of the fixed zero-point at the depth of 3.1 m. The burial construction consisted of an entrance pit and a catacomb located along the north-south axis. The entrance pit was round in projection, 1.3 m in diameter, and the floor 2 m deep. The catacomb was oval, 2.65 x 1.8 m. The skeleton lay outstretched on the back, head southwards; there was a pile of ochre at the right shoulder. Further down, next to the thigh, there was a plaster modelled bowl. Over the left arm there was a long curved wooden staff, a bow. Next to it there was a pile of 9 arrowheads with the debris of shafts. The grave

⁷ The author is grateful to Mykola V. Kovalev for his permission to use his excavation materials.

also contained a selection of stone and flint items (flakes and blanks), a bone blade, and a fragment of a tubular bone. There were traces of a chalk 'bedding' under the skeleton (Fig. 51A).

First of all, we should note that all the flakes included in the 'manufacture kit' were knapped from one or maximin two chalk flake concretions. The raw material used for making 7 out of 9 arrowheads from the quiver set is visually also very close to them. Nevertheless, in the process of refitting we managed to link only 4 flakes into pairs (Fig. 51:1-2). The sub-crust layer of the concretion was represented with brown-grey semi-translucent flint; its 'core' was of less high-quality light-grey opaque flint. When making the blanks, the preferred material was the flint from under the crust layer.

It should be noted that, the nearest deposits of such raw material are located in the Middle Donets area, over 300 km away from the Utlyutsky estuary. Probably, the flint was not transported in the form of flakes – blanks, but as whole concretions with 'testing' flaking (to check the quality of the material). Similar concretions were repeatedly found in 'manufacture kits' in the Ingul graves of the Lower Dnieper area [Kovaleva 1983b:40-47]. High-quality raw material for making bifaces could be disseminated both by means of exchange and with the help of specially organized collecting expeditions. Judging by the blanks included in the 'arrow-maker's kits', the manufacture of arrowheads was a rather material-consuming process: only a small part of the total volume of flakes obtained from a single piece of material was actually used. This was also proved by the refitting results. The preferred flakes were 3-5 cm long, 2-3 cm wide, and no more than 0.3 – 0.5 cm thin, lense-like in section, with a feather-like distal margin of the flake (see Fig. 51).

Our experiments confirmed that the above characteristics of the blank flakes were the best for making arrowheads with a deep notch at the base (average dimensions of an arrowhead were 1.5-3 cm x 1-1.5 cm x 0.2-0.15 cm). They allowed shaping the point and side edges of the item without risking to break the blank and, simultaneously, when removing thinning flakes from both sides, to avoid edges, that would render impossible any further work on the biface.

The conclusion is that various flakes and flake-based items present in 'manufacture kits' and significantly different in sizes from the above, may not be interpreted as arrowhead blanks. Normally they are debitage, natural fragments of flint or specially collected items of earlier times. Therefore, the 'kits' containing mostly such items may not be regarded as real 'manufacture kits' (see below).

One of the least studied flint knapping techniques is thermal processing of flint stones. The raw material, meant for pressure retouching, not too tough-grain, had been baked for a rather long time in specially created conditions (a heat-insulating layer under the fire). The baking of silica grains resulted in the increase of monolith and isotropical properties of flint, and the surfaces obtained a specific

shine [Giria 1994:168]. When processing the materials of Davydivka 1.17, we also noted that some of the blanks had a matt shine. We assumed that they had been subject to thermal processing in order to increase the plastic properties of the raw material. To verify the hypothesis, we collected the raw material that corresponds to the material present in the complex of Davydivka 1.17. Large fragments of concretions and flakes of a variety of dimensions were subject to heating in a muffle furnace. Within 3 hours the temperature was increased to 450°C. Some of the flakes cracked apart, the flint adopted a typical reddish hue, but a matt shine was not observed, including on the surfaces of the flakes made after the heat treatment.⁸

Hence, so far the assumption has not been confirmed. Possibly, the shine was the result of rubbing the flint items against fabric or leather bags or quivers during the long transportation. Yet we do not exclude that thermal treatment was used in the Early and Middle Bronze Age for making arrowheads from lower-quality raw materials. As an example, we may refer to two arrowheads from an arrow-maker's 'manufacture kit' of the Donets Catacomb culture of Mohyliov (Brylyuvata Mohyla) 1.14 (Dnipropetrovsk Region), produced of low-quality alluvial raw material. The arrowhead surface, as well as surfaces of some flakes from the complex, had reddish hue and characteristic shine.

Particular attention should be paid to the cores meant for obtaining arrowhead blanks. Unfortunately, they were not represented in that set, but their dimensions may be derived from negative flake scars at the dorsal side of available flakes, as well as from individual items found in burial and settlement complexes (see above). 'Bifacial' cores should be regarded as the most numerous type, according to our calculations. The name is rather conditional but it reflects specific features of the items. At first, such a core was prepared in a way almost identical to the preparation of a 'classic' core for making blades, following a scheme known since the Upper Paleolith. In particular, the necessary element of a core blank for making blades is a longitudinal rib, with the removal of which the flaking of blades begins. This rib is also typical of the Bronze-Age pre-cores, but because obtaining of regular blades was not the purpose of knapping, the rib actually served as the core 'plateau' surface. Usually there were two or more such 'ribs', and the core, depending on their configuration, became similar either to a disk-like core of the Early and Middle Paleolith [Kolesnik, Gershovich 2001:99; Razumov 2004:21], or a massive biface like an axe or an adz.

In our view, it was this peculiar feature that prompted researchers to conclude that the numerous flakes found in graves should be identified as 'large biface preparation flakes' [Koval, Klimenko 2005:48], while such bifaces from the Early and Middle Bronze Age are practically unknown in the Northern Pontic area (probably, chopping tools of that period were already made mostly of

⁸ The author is grateful to dr Tetyana Y. Goshko for her support for the experiment.

metal). It should be noted that, the most characteristic core of the ‘bifacial type’ (Fig. 2) was actually found within a ‘manufacture kit’ of an arrow-maker buried in a late Catacomb grave 3 of barrow 3 of Mine No 22 group (Ordzhonikidze, Dnipropetrovsk Region).

Therefore, the example of cores provides even more obvious traces of parallels in the development of the two different kinds of flint knapping: the technology of biface manufacture, and the technology of obtaining flakes-blanks of a certain kind.

Prior to flaking, the beating surface of the future blank was subject to abrasive processing (‘isolation’). Such flakes were removed with a strike of a soft sandstone or horn billet, as indicated by the flanges at the beating surfaces. Most frequently the strike was aimed along the rib made by the negative of a previous flake, and dimensions of flakes-blanks were often close to those of paleolithic percussion blades.

Then the contour of a future head was marked with the help of a billet and (or) an abrasive that formed the blank in a ‘drop-like’ shape with an emergent point made in the distal part. While doing so, the artisan broke fragile edges of the flake and prepared surfaces for thinning flakes. At the same time, one or two side notches were formed in the proximal part. With the help of those notches the proximal part of the flake was split away with a single strike of a billet; simultaneously the dorsal part, on which the arrowhead was made, could be fastened in a primitive wooden clamp.

After that, the item was covered with streaky retouch, beginning with the point. There are different opinions about the tools used to do that. Reports and publications speak about ‘pressure implements’ when describing various bone, horn, wooden, and stone (including flint) rods and blades that belong to ‘manufacture kits’ [Sanzharov 1985:17-18]. There was a view about the use of shells as pressure tools. We should note that halves of large shells (mostly fossil) are typical of the Catacomb and Babyno burials containing ‘manufacture kits’. Instead, Sanzharov argued that the shells found in the Catacomb burials of ‘artisans’ had served for soaking flint flakes in order to make them more plastic [Sanzharov 1985:17-18]. However, so far we do not have sufficient arguments in support of this assumption. Meanwhile, Smirnov regards those shells as wood-working instruments [1983:171]. His opinion is confirmed by the fact of using a shell for making a detail of a cart included in the Catacomb grave 9 of barrow 11 near the village of Kamyanka-Dniprovsk [Chernykh 1991:139]. Generally, the investigation of a number of such items coming from graves of ‘artisans’ of the Ingul Catacomb culture demonstrated complete absence of traces that would suggest their use as pressure tools [Razumov, Shevchenko 2007:116].

Most probably, streaky retouch with the facets 0.05-0.2 cm wide was made with metal ‘awls’ on wooden or bone handles, known in many complexes [Smirnov 1983:170-174]. In our experiments, it was a copper pressure tool (section diame-

ter 0.5 cm; working part diameter 0.1 cm) that allowed us to obtain facets of that size, while the use of horn as a pressure tool would have resulted in noticeably wider and shorter facets). We may assume that horn pressure tools were used for making larger arrowheads, like the ones known to occur in the Donets Catacomb culture complexes, as well as in the Yamnaya and Babyno cultures. It should be borne in mind that both metal and horn pressure tools constantly required maintenance of the working edge margin, for which abrasives were used. This very usage of pressure rods and abrasives can be also traced through ethnographic data [Kreber 1970:43].

Shaping the notch at the base of an arrowhead and its nibs ('tendrils') was the finishing act (Fig. 66), and the risk of breaking the item was particularly high at that stage. Judging from our experimental data, an artisan would carefully choose the surface (in order to make sure that the impuls was directed along the rib from left by the previous flaking negative) and, if necessary, would trim it with an abrasive. Also, it was necessary to keep sharpening the tip of the pressure tool.

Probably, such excessive diligence in making arrowheads may be explained not only by the desire to improve their combat properties, but also with a certain 'aesthetic' standard, possibly linked to the belief systems of Catacomb peoples (see Chapter VI). In that case we may draw certain parallels between such arrowheads and the miniature flint sculpture, common for many cultures of the Eneolithic – Bronze Age.

The above also fully applies to the technology of making large Early and Middle Bronze-Age bifaces: spearheads, dart heads, and knife-daggers [Razumov 2001a:30-31; 2005a:108]. Their blanks were represented mostly by massive flakes, fragments of nodules, and slab concretions. A soft billet was used to remove roughnesses, the blanks were given an oblong-ovan shape with a lense-like section (such pre-forms are known, for instance, among the materials of the upper Late Yamnaya layer of the Mykhailivka settlement, and from the Babyno layer of the Kozacha Prystan settlement [Korobkova, Shaposhnikova 2005: Fig. 73:10; Razumov 1999a:15]). After removing a series of flattening flakes with a soft billet, further finer modification of the item's edge margins was done with the help of pressure, as described above. The use of abrasion was practically necessary for the preparation of 'plateau' surfaces. In a number of knife-daggers, sharp edge margins were specially blunted with the help of an abrasive for making a tang, i.e., the place for attaching the handle. This fact confirms, in our view, that large bifaces were often made for one purpose (a spearhead) but then used for another (a knife-dagger). The most demonstrative for the reconstruction of the process of making large bifaces is the complex of Yamnaya grave 13 in barrow 4 near the village of Pereshchepyne (Dnipropetrovsk Region). An adult and a child lay in contracted positions on the right sides, heads towards south-west. In all, 206 flakes were located as a compact group along the left shoulder bone of the

adult by the wall. A knife-dagger with a stopper (catch) (12.8 cm x 2.7 cm) lay directly on the flakes (Fig. 32:3). There was also a bronze 'awl' near the adult – over the left shoulder among the flakes – which in our view was actually a metal pressure tool once used to retouch the knife-dagger included in that set.

The investigation of flint items from that grave showed that 205 flakes had been made from a single nodule of a high-quality chalk flint (the nearest deposits of which were located in the middle area of the Siverskiy Donets basin), and, most probably, were the debitage from making the above knife-dagger. Only 16 flakes could be refitted into pairs. This fact proves that the biface had been produced elsewhere, and only some of the flakes were later placed into the grave – ones that had not been scattered too far from the artisan. Hence, the process of manufacture of a large biface looked as follows: first, a rib was made with the help of a billet along the perimeter on a flat slab concretion of chalk flint; after that the biface thinning flakes were removed, first with the billet, and finally with a metal pressure tool. That tool was also used to cover the blade edge of the item with lamellar retouch. An argument in favour of identifying this find as a knife-dagger is the presence of blunted butt edges in the place for attaching a handle.

Generally, the technologies of producing flake-based tools and bifaces may serve as evidence that the level of flint knapping technologies used by the Northern Pontic populations in the Early and Middle Bronze Age was optimal for meeting certain needs of society. Flint-processing skills were not lost completely with the development of metallurgy; instead they developed in the sphere of manufacture, in which they were the most demanded at the time, i.e., the manufacture of combat weapon heads and knife-daggers.

Hence we have traced the main changes in the flint knapping manufacture technology of the Early and Middle Bronze Age. Such important elements of that organisation as the development of a strategy of extraction and use of raw materials, technological aspects of flint knapping and its role in the socio-economic sphere had undergone significant transformations due to the development of copper – bronze metallurgy. The results included (1) re-orientation to other, lower-quality raw materials, (2) the transition from the blade-based to the flake-based flint knapping techniques; and (3) the dissemination of specialized manufacture complexes aiming, for instance, at making thin bifaces. Meanwhile, the technological analysis of such complexes demonstrated the ambiguity of artefacts they included, related to specifics of burial rites of the Early and Middle Bronze Age.

VI. FLINT ARTEFACTS: BRONZE AGE RITUAL PRACTICES

VI.1. ARCHEOLOGICAL DATA

Summing up the previous chapters, we may conclude that the whole range of analyzed items, made of flint and other rocks with similar properties and contained in burial complexes of the Early and Middle Bronze Age, can be divided into several major categories based not only on their technological, morphological, and functional characteristics (in terms of which they were discussed above), but also on their meaning in funerary practices.

In our view, contextual interpretation of the location of flint items in burial structures should play a decisive role in the efforts of semantic (or rather, in this case, semiotic) analysis of flint as a part of the 'text' of ancient burial and funerary rites. It is the archeological context (which is but a distorted fragment of the initial one) that we will base upon, while building a model of inclusion of flint in particular rites, and in ideology as a whole.

First of all, the entire material should be split into two groups according to the evidence of their 'deliberate' inclusion in the burial complex. Conditionally, we can refer to them as 'goods' and 'non-goods'.

'**Non-goods**'. A few comments need to be made with regard to this group. First, 'non-goods' may be generally divided into two categories:

(1) Items of earlier periods of time that reached the complex either from an earlier cultural layer (either located at the barrow site or brought together with the soil to be used for making the mound), or from an earlier burial. Such items should be present in large numbers in the mound or buried soil, which is usually noted by authors of relevant reports and publications [Krotova 1976:3; Parusimov, Tsybriy 2000:71], hence we tried not to count irrelevant data. Possibly, individual items from earlier cultural layers could be included in the catalogue, but they do not influence the general picture. We should add that such cases are rather exceptional, for barrows tend to be located at high areas of land, while the predominant majority of Mesolithic-Eneolithic settlement sites are located on primary terraces over the flood plains. Most of the objects of the Stone and Eneolithic Age found in the Early and Middle Bronze (as well as later) graves had been specially collected for secondary use.

(2) A more numerous category are hurling-weapon heads and their fragments that had caused wounds sustained by buried individuals, which may not be regarded as grave goods (Table 5). For instance, out of 96 arrowheads found in the Yamnaya graves, about 60 were the cause of wounds, and so were fragments of at least 2 arrowheads. Altogether, 42 out of 368 Catacomb arrowheads were the cause of wounds, including 7 out of 17 in early Catacomb graves, 11 out of 143 in Donets culture graves, 23 out of 169 of the Ingul culture, and 1 out of 39 arrowheads of Bakhmut-type graves. About 30 out of 78 arrowheads found in the Babyno graves could have been the cause of wounds. As grave goods, arrowheads were found in relatively scarce quiver sets and ‘manufacture kits’, i.e., in many more graves the arrowheads were the cause of wounds. However, some burials contain other flint items, included deliberately. It should also be noted that the corpse could have been hit with weapons during the burial ceremony in order to render it ‘innocuous’.⁹ However, the available sources as yet do not provide sufficient evidence in support of such an assumption.

Hence, in about 8% of the total Early and Middle Bronze Age burials flint items are not grave goods, for they were not included into the burial constructions directly as a result of burial or funerary rites.

Following Smirnov [1996:31-32], we divide ‘**grave goods**’, i.e., objects *deliberately* included in the burial complex, into the following groups: (1) items found within the confines of the chamber in immediate proximity of the buried individual as *accompanying goods*, with two versions: (a) ‘contact’ understood as immediately touching the human remains and (b) ‘contact-free’, and (2) items found outside the ‘grave’ chamber) but within the complex burial construction (on top of the timber roof or at the sub-mound site) *as attendant goods*.

Accompanying goods (both ‘contact’ and ‘contact-free’), in their turn, may be divided into the following categories:

(1) *Objects that were expected to retain their functions in the world of the dead* – we refer to this category, provisionally, as ‘**functional goods**’. These are mostly objects of weaponry: a quiver set, or less often, one or two arrows, which probably symbolized it; a dart placed together with a staff; possibly, ground ax-adzes. They were located exclusively within the chamber but almost never directly on the bones or under them. Bifacial knife-daggers (sometimes worn-out badly or deliberately damaged) and knives based on massive blades and flakes, placed next to a hand or near the skull, sometimes together with a bronze ‘awl’ (three such items were found in Yamnaya burials with skeletons contracted on the back, one in an early Catacomb burial, and one in a burial of the Donets culture), and, likewise, bronze knives¹⁰ – all are mostly ‘contact’ accompanying goods. Raw materials, blanks, tools and functional products included in ‘manufacture kits’,

⁹ For ethnographic analogies see Smirnov [1997:54-67].

¹⁰ For more on the special semantic meaning of a knife- ‘awl’ pair in a burial, see Kovaleva [1987:296]; Bratchenko [2001:22].

as well as quiver sets, were usually located to the side from the human remains, behind the skull, at the feet, or along the body (in two cases – a Yamnaya burial contracted on the back and an Ingul Catacomb burial – ‘manufacture kits’ were located under the skulls).

‘Manufacture kits’ as a category of functional goods deserve to be discussed separately. Graves containing manufacture goods are the most important sources for the reconstruction of socio-economic forms of crafts practiced by the Early and Middle Bronze Age steppe culture populations. Such complexes have stirred ongoing debates. According to Chernykh, many authors interpret various grave goods – without substantially good reason – as an indicator of productive specialisation [Chernykh 1996:16; 1997b:5]. The list of such ‘professions’ as smiths, casters, carpenters- wheel-makers, skinner-furriers, weavers, bone-carvers, arrow-makers and stone tool-makers, etc. – even served as an important argument for describing the CC as an early-class or pre-class society [Pustovalov 1990:97; 1992:29; 1995a:32; 1995b:211-221; 2000:95-105].

In that case, due to the ambiguity of the term ‘craft’, the researchers without the necessary evidence interpreted *craft as a technological method of manufacture* (based on the use of manual tools but lacking a technological division of labour), and *craft as an independent economic branch of societal (public) manufacture* (mostly meaning the presence of ‘artisan-craftsmen’ among the populations of the Early and Middle Bronze Age South-Eastern Europe, who worked to meet the demand for their products or made them for exchange, and were excluded from the sphere of food manufacture). According to Chernykh, the emergence of craft as a technological method of manufacture should be correlated with the emergence of public manufacture per se, i.e., by archeological periodisation, viewed at least from the Upper Paleolith onwards [Chernykh 1997a:51-52; Gening 1989:9-10]. Hence, from a technological perspective it is fair to refer (with some reservations) to most of the ‘manufacture kits’ found in the Yamnaya, Catacomb, and Babyno graves as those of ‘craftsmen’.

As far as specific forms of crafts are concerned, it should be noted that the presence or absence of ‘manufacture kits’ in burial complexes may in no way be used to prove the presence or absence of ‘artisan-professionals’ or ‘clans of craftsmenetc’, in the societies being studied.¹¹

It should be noted that items from the most numerous ‘manufacture kits’, the so-called ‘arrow-maker kits’, have not been studied for the most part with the use of methods of functional, technological, micro-, and macro-trasological analysis. This fact does not allow for a complete understanding of the nature of such ‘kits’ and makes socio-economic reconstructions with the use of such complexes totally conditional. The very statement that all of were meant for producing arrows is made *a priori*. Earlier in this publication we discussed a technological analysis of

¹¹ For a detailed review of all opinions on the issues of primitive crafts see Chernykh [1997c:12-45].

components of such a 'kit', which confirmed this assumption. However, in no way does this allow for extrapolating those conclusions in respect to all other 'kits'. In order to show how inadequate are the direct reconstructions of the Early and Middle Bronze Age craft forms with the help of insufficiently studied sources, let us quote the results of a typological and technological analysis of items from yet another complex of the Ingul Catacomb culture, located in the north-western part of the Northern Azov area, which lies very close territorially and chronologically to the complex of Davydivka 1.17 (it also included a quiver set alongside with a 'manufacture kit').

That 'arrow-maker kit' was found in the course of an investigation performed by the Kherson archeological expedition led by Kubyshev (excavation head Shevchenko) of the 'Velykyi' ('Great') barrow near the village of Volodymyrivka of the Yakymivka District, Zaporizhya Region. Grave 20 was located 24 m south and 9 m east of the zero-point. The entrance shaft of the catacomb was round, 1.4 m in diameter, 6.05 m deep (from the zero-level), traced from the level of 5.65 m. The entrance to the chamber, 0.8 m wide, was located under the north-western wall. The bean-shaped chamber, 2.4 m x 1.3 m, 6.45 m deep, was oriented south-west to north-east (Fig. 52).

On the floor of the chamber, there were extended skeletons of an adult and an adolescent, heads towards south-west. The adolescent was positioned to the left of the adult along the north-western wall. The adult's arms were stretched along the body; the adolescent's right arm was stretched, while only the shoulder bone remained of the left arm. The adult's feet were sprinkled with bright-red ochre; a smear of ochre was also found at the place of the missing right hand of the adolescent.

To the right of the adult skeleton there used to be (judging by the impression on the floor) a wooden bow; a pile of 13 flint arrowheads (Type A-II-3), points down towards the feet, with debris of shafts (probably initially placed in a leather or elm quiver), including 2 bone arrowheads, which lay between the body and the right arm. A wing of a fossil shell lay at the north-western wall at the level of the adolescent's thigh bones. Behind the skulls, at the north-western wall of the chamber, there was a wooden chest (Fig. 52), which included 2 flint darthead blanks, a four-faceted bronze rod (a pressure tool tip?), a horn 'grinder', a wooden item inlaid with metal, a fossil shell wing, 3-4 wooden sticks, possibly arrow shafts, 6 abrasives, a grinder, a sandstone pebble, 32 flint items, and a horse tooth [Razumov, Shevchenko 2007:110-118].

Having reviewed in detail the objects included in the wooden chest, we may draw a rather paradoxical conclusion: there were no traces of an 'arrow-maker kit'. It should be borne in mind that researchers identify those 'kits' exactly because they contain clearly defined elements, i.e., raw materials, special instruments (first of all, stone fluted abrasives), blanks, and functional products [Smirnov 1983:171; Nikolova, Buniatian 1991:133-135]. Let us review those elements one by one.

The arrowheads, as well as darthead blanks, were made of high-quality reddish-grey or grey semi-translucent chalk flint that originated from Middle Donets deposits [Krimgols 1974:19]. About one-third of the cores, their fragments and tools were also made from the same raw material. However, we should stress that those items may not be referred to the Catacomb period. That kind of 'kit' – prismatic cores for making pressure blades, blunt-edged micro-blades, flake-based chisels with flat cutting flakes, butt-edged scrapers and the like – were typical of Mesolithic and Neolithic cultures of that territory, more specifically, the Kukrek and the Surskyi-Dnieper cultures [Zalizniak 1998:175-182; Haskevych 2005:24].

Some of the items made of dark-grey Crimean and alluvial yellow and light-grey local flint also belong to those cultures. A major part of Meso-Neolithic items was already smoothed and covered with patina. This proves they were washed out of cultural layers of settlements and collected during the Middle Bronze Age (Fig. 52B-52D). They bear no traces of secondary use, and could not be used for obtaining flakes (arrowhead blanks) because of their unsuitable dimensions. Other kinds of 'cores', with chaotic flakes removed with a hammerstone, could in fact belong to the Bronze Age [Razumov 2004:20-22], but all were worn-out and unsuitable for obtaining biface blanks. Hence, instead of raw material for making arrowheads, the 'kit' contained only debitage and 'excavated material' unsuitable for further use.

The stone abrasives and the bronze rod from the chest could have been used for making weapon heads, but such tools ('awls') are also rather common in the Catacomb complexes outside of the context of 'manufacture kits'. The same is true for shells [one of which was found outside of the 'kit']. The horn tool was probably for skinning (Fig. 52E:15). It should be noted that, there were no fluted abrasives, typically determining objects of 'arrow-maker kits', among the finds.

The only semi-finished products we can speak of were darthead blanks (Fig. 52E:15), though it would be more appropriate to regard them as 'manufacture waste', since all of them were broken in the process of manufacture and displayed no traces of further modification or use.

Functional products, or actual arrows, were found in a quiver next to the bow, outside of the chest (Fig. 52E:1-11). Quiver sets of that kind are rather common for graves of Catacomb cultures, and it is certainly not always the case that they appear in combination with 'manufacture kits' [Bratchenko 1989:75-80].

Judging by their dimensions, the wooden rods found in the chest over other goods could in fact have been arrow-shaft blanks. Though, there is a different interpretation. According to an opinion recently expressed in the archeological literature, 'manufacture kits' in wooden cases in fact could have been meant for manufacture of 'sacred sticks', i.e., ritual rods made of certain kinds of wood, which were presumably used by the Indo-Iranian peoples [Kiyashko, Yatsenko

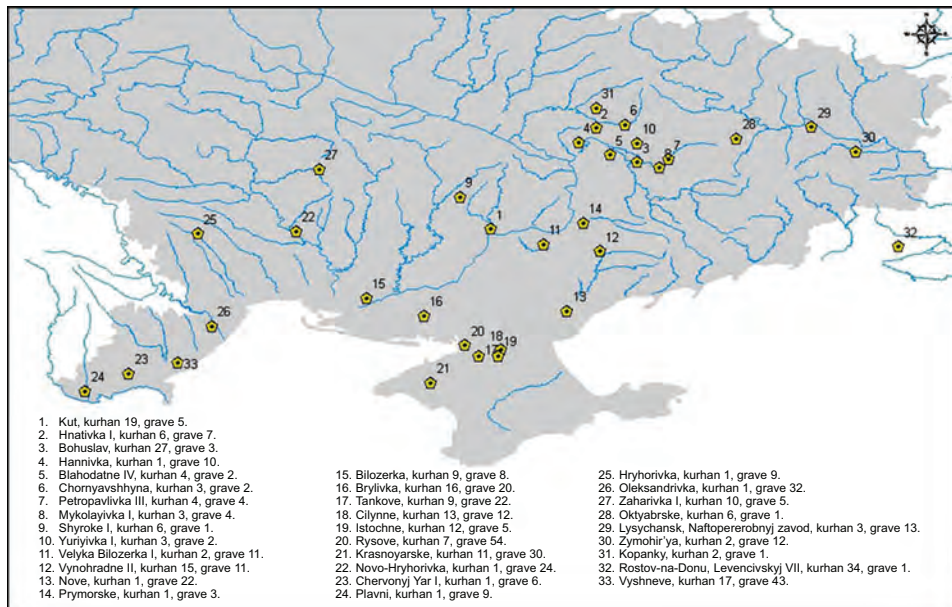
2001:284]. This hypothesis appears to be supported by the presence of ‘manufacture kits’ in burials of individuals of a high social status, including women and children. Let us note though that the ‘kits’ referred to by the authors (for instance, the one found by Gorodtsov in a Catacomb grave 1 of barrow 5 near Cherevkivka on the territory of Slovyansk, Donetsk Region) contained a large number (up to 300) of specially selected flakes and bifaces at different stages of modification, which proves them to be intended precisely for making arrows. Naturally, this fact does not preclude the existence of a close connection between ‘arrow-maker kits’ and the sacral sphere. Some of these ‘kits’ were indeed meant – both in terms of the composition of instruments and of specially selected and prepared raw materials and blanks – for making arrows and other weapons. Meanwhile, that fact may not serve as proof of a weapon-making craft existing in the Middle Bronze Age separately from the sphere of food manufacture, as some authors maintain [Skakun 1992:18; Pustovalov 1995b:216].

In some territories, graves with ‘manufacture kits’ emerged as early as in Mesolithic [Chernykh 1996:18]. Ethnographical data suggest, on the one hand, that in pre-class societies warriors usually made their weapons themselves [Kalitovskaya, Markov 1992:148]; on the other hand, they speak about the sacralisation of manufacture processes even in undeveloped societies [Berezkin 1984:14; Toporkov 1984:41-44; Avilova 2005:40-45]. Some of the ‘kits’, like the one we analyzed, were in fact a kind of imitation ‘manufacture kits’, probably made according to the requirements of a burial rite.

Let us briefly review some other Early and Middle Bronze Age burials, which contain ‘manufacture kits’ that allegedly indicate their specialisation in flint knapping.

Manufacture instruments were found in Nova Danylivka and Usatove graves [Haheu, Kurceatov 1993:101-104; Telegin *et al.* 2001:152]. Those graves had features of belonging to individuals of the highest social rank: they had auxiliary burials, the insignia of power, golden and silver adornments, etc.

The same can be observed in many YC complexes containing ‘manufacture kits’ (Map 8). All in all, we counted as many as 33 ‘manufacture kits’ of the YC, which included flint items (19 graves with skeletons contracted on the back, 14 with skeletons contracted on the side: 7 on the right side, and 7 on the left side; of them two were graves of ‘arrow-makers’ (both with the skeletons contracted on the back)). Burials containing carts, which, according to researchers, belonged to representatives of the top social rank of Yamnaya society, contained assemblages of flint raw material and tools [Ivanova, Tsimidanov 1993:30]. A primary early Yamnaya grave of barrow 34 of Liventsovka VII burial mound at the Lower Don contained a set of goods linked to flint-working. Interestingly, the flint tools were covered with patina, hence we may assume their secondary use. In some places, the patina crust on scrapers, a sharp-edged tool, flakes and a blade-based knife had been chiseled off. On top of an assemblage of flint tools, there was

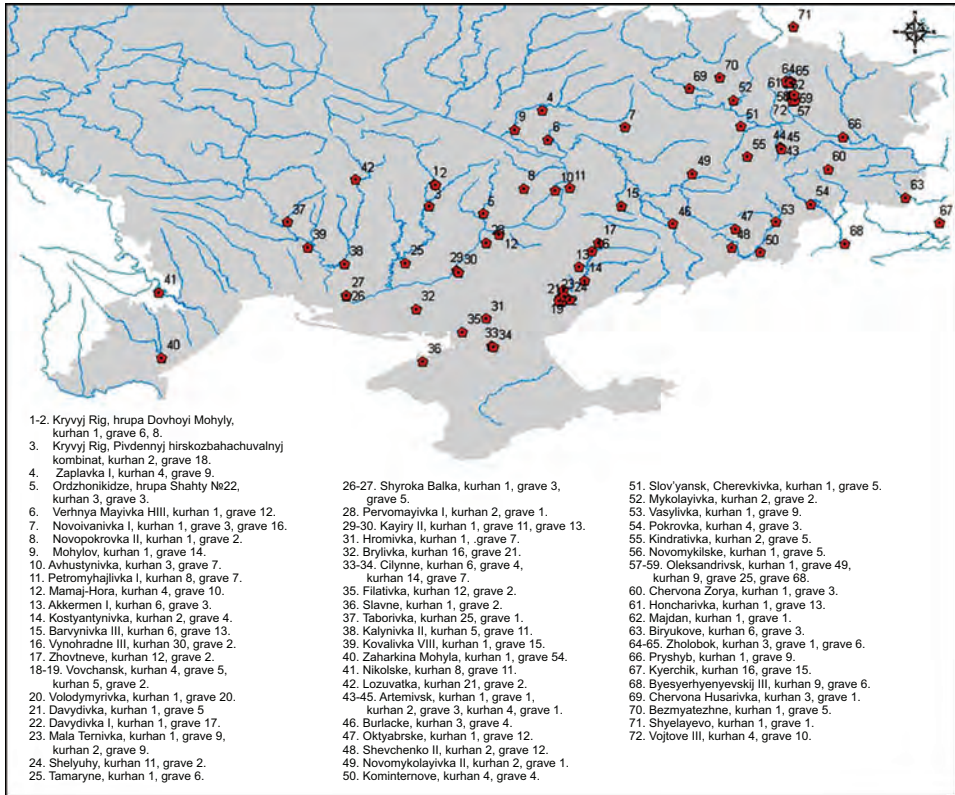


Map 8. Burials with 'manufacture kits' of Yamnaya culture

a sandstone slab, two shells and a split beaver incisor, which possibly had been used as a retouching tool [Iliukov 1997:24].

The YC burials with 'manufacture kits' contain noticeably fewer instruments and blanks than Catacomb burials. We may recall the Yamnaya grave 1 of barrow 6 in a burial mound near the village of Oktyabrskie, Donetsk Region, which contained an 'arrow-maker's kit' [Constantinescu *et al.* 1992:10]. We should also mention a ruined grave near Orlivka, Zaporizhyya Region [Ohulchanskyi 1950:137], which contained a flint knife-dagger, a tanged darthead, and 5 bifacial blanks. However, since that grave could be dated to belonging to a later time, we have not included it in the catalogue. Yamnaya grave 'manufacture kits', connected with other kinds of activity – wood-working, bone-carving, and leather-processing – practically always included flint tools [Borziyak *et al.* 1983:20; Gamayunov 1987:13; Marina 1995:64-71; Bratchenko 1996:34-40].

The CC cultures have the largest number of 'manufacture kits' with flint items: 74 burial complexes (Map 9). Early Catacomb 'kits' were represented by two 'arrow-maker's kits', one 'stone-knapper's kit', two 'caster kits', and three kits that remain functionally unidentified. The Donetsk Catacomb graves are known to contain 11 'arrow-maker's kits', one 'caster kit', one 'clothes-making kit', one 'wood-working kit', and one unidentified 'kit'. Among the Ingul Catacomb burials, 21 contained 'arrow-maker manufacture kits', 2 'flint-knapping kits', 4 'stone-working kit', 3 'caster kits', one 'kit' of a bone-carver, one for wood-working, and

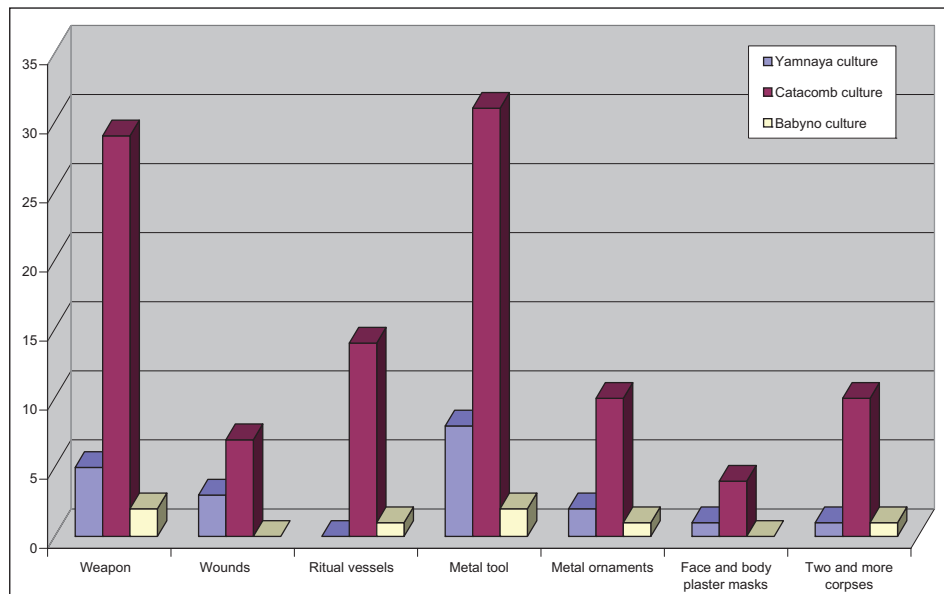


Map 9. Burials with 'manufacture kits' of Catacomb culture

11 'kits' without clearly identified functions (Illustration 1). There is one known 'arrow-makerkit' found in a Manych-type grave; 5 such 'kits' and 2 'caster kits' were found in Bakhmut-type graves.

Many burials containing manufacture stocks have indicators of belonging to the elite: cenotaphs, dismembered human remains, the insignia of power, incense cups, bronze hooks, and pendants made of precious metals [Derzhavin 1984:94; Zhitnikov 1990:16; Rassamakin 1990:100; Melnik 1991:16-21, 71; Rogudeev 2000:78; Dremov 2007:107] (Diagram 10). Usually such complexes contain raw materials: flint nodules, pebbles, cores, and blanks; instruments, including fluted abrasives ('arrow strengtheners'), abrasives, piercers, hammerstones and anvils of sandstone, bone and horn, bronze pressure tools ('awls'), possibly, also made of horn, fangs, and shells; and functional products (arrowheads) [Smirnov 1983:172].

A number of burials containing manufacture-related stocks confirm the idea of a weak differentiation of a vast majority of primitive manufactures, as they combine the tools used by a variety of 'professions': 'arrow-makers', carpenters,

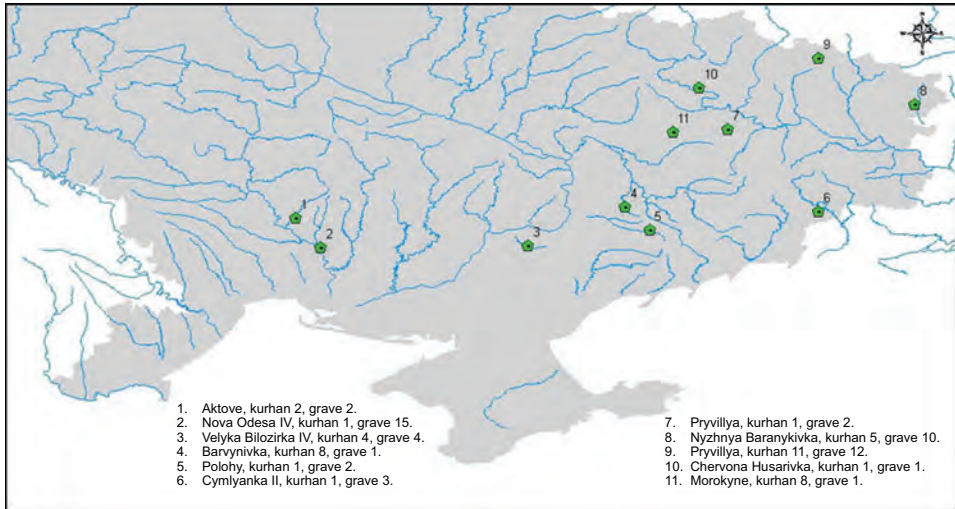


Diag. 10. Peculiarities of burial complexes with 'Manufacture kits'

skimmers, bone-carvers, etc. [Kovaleva 1983a:40-44; Kovaleva *et al.* 1983:14; Nikolova, Buniatian 1991:128-136; Evdokimov 1998:12, 13].

Unlike in Catacomb burials, manufacture complexes are rather rare in the BC, and are mostly concentrated in a certain local-chronological group of sites (Map 10). All the known graves of 'arrow-makers' (except on the territory of the Mykolayiv Region) are located in a rather limited area between the Dnieper, the Siverskyi Donets, and the Azov Sea. According to Litvinenko, this area coincides with the territory where the primary core of the BC emerged and developed [Litvinenko 1998a:102]. There are 7 complexes that contain fluted abrasives. Flint blanks in the form of blade-based flakes, often of a sub-triangular shape, probably used for making arrowheads, are practically compulsory elements in the above 'kits'. One of the finds (Nyzhnia Baranykivka 5.10, Luhansk Region) was an arrowhead, retouched from one side only (Fig. 23:36). The composition of other grave goods differ from one complex to another: blade-shaped or bar-shaped abrasives, horn pressure tool – retouchers, pressure tools made of boar fangs, fossil shells [Litvinenko 1998b:98].

The most complete sets include a complex from Barvynivka 8.1 (Zaporizhya Region) [Pustovalov 1995a:211-221; 2001:119]. That was a primary burial in a barrow in a wooden frame, oriented toward the west. The body had been dismembered. The grave contained 83 items, including a vessel, a collection of fluted abrasives (5 pairs), several individual abrasives, a bone tool, a tool made of



Map 10. Burials with 'manufacture kits' of Babyno culture

animal fangs, and a bag (impressions of the tissue were preserved at the bottom of the grave) containing abrasives and blanks for making arrowheads (53 items). Between the frame and the northern wall of the grave, there was a flint flake (which probably had some ritual meaning). The time and effort spent on building burial constructions, dismembered human remains, and prolific grave goods is in sharp contrast to ordinary Babyno graves and indicate that the buried individuals belonged to the elite of the society. Hence we have yet another example of sacralisation of manufacture processes in the Bronze Age, which requires a careful attitude to straight-line reconstruction of the organization of crafts, based on the available burial sites.

In addition to 7 probable arrow-making complexes, one 'kit' for making adornments and three 'kits' for unidentified purposes (Diagram 10) may also be referred to the Babyno graves group with 'manufacture kits'.

With certain reservations, scarce samples of miniature flint sculpture (Fig. 43), including two items in Yamnaya graves contracted on the back, one in an early Catacomb grave, one in a Donetsk grave, and three in Ingul graves, may be also classed among functional Early and Middle Bronze grave goods. Judging from the ornamentation of vessels and morphology of stone stelae, the Bronze-Age cultures demonstrated a high level of abstract thinking and a tendency towards maximum stylisation of real objects in images; therefore, we will probably never know how many of the items interpreted as tools or flakes were actually sculptured images or had been perceived as such in the context of the burial rite.

2) *Objects that obtained a meaning different from their routine use in the context of the burial rite and funerary practices*, are discussed below as the

category of **‘non-functional grave goods’**. According to our estimates, this was the most prolific category of accompanying flint grave goods in the Early and Middle Bronze graves. It comprised flakes, concretions and their fragments, cores, rather primitive flake-based tools (knives, chisels, scrapers and the like), and items of earlier periods of time. Those items were hardly meant for use in the world of the dead in their primary daily functions (and many were not suitable for routine use at all), which is proved by their location within the burial construction and in relation to the buried human remains: various but always standard for all the individual categories of grave goods. It should be stressed that even in graves that contain ‘manufacture kits’ flake-based blanks and tools are clearly separated from non-functional grave goods. A substantial number of those grave goods were found in out-of-the-ordinary complexes that have been interpreted by researchers as graves of ‘lords’, ‘servants of the cult’, ‘military aristocracy’ and the like. Those graves stood out due to the massive use of labour spent on building the burial constructions, their complexity, the presence of metal items, cult vessels, weapons, parts of wagons, dismembered human remains, embalming and plaster modelling the body, etc.

In this sense, it is particularly interesting to view the ‘contact’ version. In many cases the non-functional grave goods were located under the skull or immediately next to it (flakes in 98 Yamnaya graves with skeletons contracted on the back, 47 in graves with skeletons contracted on the side, in 1 Early Catacomb, 19 Donets, 53 Ingul, 5 Babyno chest burials, 11 pit burials, 2 in side wall niches; cutting tools in 21 Yamnaya burials contracted on the back, 8 on the side, 1 in Early Catacomb, 3 Donets, 9 Ingul, 1 Babyno chest graves, and 4 pit graves; scrapers in 59 Yamnaya burials on the back, 28 on the side, 8 Early Catacomb, 2 Donets, 17 Ingul, 4 Babyno pit graves, and 1 in a side wall niche; other tools were found in 3 Yamnaya burials on the back, 1 on the side (a hammerstone had been placed instead of a missing child’s skull), 1 Donets, 11 Ingul, and 1 Babyno chest burial). In other cases, non-functional grave goods were located between the jaws (2 flakes and 1 perforator, respectively, in 3 Ingul graves), between the ribs (a cutting tool in a Donets burial, 12 flakes, a cutting tool, and a piercer and a chisel together in Ingul burials) – judging by the latter location, it is not unlikely that initially the items had been placed within the entrails.

The Bronze-Age pre-burial manipulations with the body were very complex and diverse, which is particularly typical of Catacomb cultures. Also remarkable is the location of items in the hands (mostly in the right hand) and in the arm-pits of the buried bodies. Individual objects were found over and under all parts of the body; in some cases the objects appeared to ‘mark’ the bodily parts, being placed at the shoulders, elbows, knees, and feet of the buried individuals (in graves of the Ingul Catacomb culture). In a series of burials, grave goods were located between the thighs of the buried body. Finally, such items were found between the bones of ‘dismembered’ (mostly re-inhumated) human remains.

Unlike functional grave goods, non-functional items were relatively scarce and located at a distance from the bodies (except in cenotaphs and ruined graves). Particular attention should be paid to the items located at the entrance to catacombs: they could have been initially placed among the blocks and, therefore, belonged to the category of *attendant non-functional grave goods*. The ‘contact-free’ accompanying grave goods also include a series of items found in smears of ochre, charcoal, or chalk, under the bottom of a vessel or inside it, sometimes together with a human shoulder blade bone (a Yamnaya burial on the side) or an arm bone (an Ingul burial).

Attendant grave goods are represented almost entirely by non-functional objects. An exception is a ‘flint-knapper’s manufacture kit’ found at the bottom of the shaft of an Ingul complex, Zaplavka 1 4.9 (Dnipropetrovsk Region), which contained 16 nodules, 29 flakes, 4 rancloirs, and 2 scraper blanks, initially placed in a bag or a basket, of a total weight of 3.75 kilograms. It should be noted that there was a wooden bowl next to the skull. Many authors link the presence of such bowls to the performance of functions of a ‘master of the cult’ [Kovaleva 1981:64-66; Otroshchenko 1984:92; 1990:13; Tsimidanov 2004:75]. Hence, the ‘functionality’ of flint found at the bottom of the shaft remains questionable. We should also note an arrowhead with debris of a shaft, found under the stela-like block in an Early Catacomb complex, Vynohradnyky 1.8 (Donetsk Region). Next to it, at the bottom of the shaft, there were human hand bones, sprinkled with ochre; there were parts of a wagon in the chamber; the face of the buried had been modelled with tar. Therefore, the encased arrow could hardly have had the function of a mere piece of weaponry.

Generally, non-functional attendant grave goods represented by flakes, concretions, working tools, and items from earlier periods of time were located mainly on the pit roof and ledges. Those locations were observed in the Yamnaya and Babyno cultures: 12 items in the Yamnaya burials contracted on the back (two of the graves also contained parts of a wagon), 4 in burials contracted on the side, 1 on top of a roof of a Donets pit burial, 6 in Babyno chest burials, and 14 in pits), on the steps, within the blocks, and in the filling of the shafts (for the Catacomb cultures, such objects were found in 4 Early Catacomb, 20 Donets, and 10 Ingul graves). The attendant grave goods of the latter also include the flakes in the filling of the chambers that had either reached there during the ruination of the filling or had been stuck in the roof over the buried body (see Chapter II). It should be noted that, our observations suggest that the predominant majority of flint items found in the filling of the pits had initially been placed in the roofs. The items found outside of the BC chests but within the pits (7 complexes) should also be regarded as attendant grave goods.

It is also necessary to point to the connection between flint and funerary sites. As early as in the Usatove period, flakes occurred, alongside ceramics and ochre, in the timber roofs (covers) of burial mounds, cromlechs, and cult

pits [Patokova 1979:56-131]. The same kind of finds come from mounds of the Yamnaya barrows and ditches around them. Occasionally, flakes could be traced in ritual sub-barrow sites, sprinkled with ochre [Pleshivenko 1998:35].

Apparently, the bottom of the entrance shaft to a catacomb was used as a site for funerary practices in the Middle Bronze Age. That is where flakes are occasionally found; and in some cases 'manufacture kits' were located at the bottom and at the steps of the shaft. Grave 8 of barrow 115 of the 'Tsarskyi' (Tsar's) burial mound in the Lower Don contained a stone slab, placed on the step of an entrance shaft, with a bull skull on top of it, and a fragment of a flint blade inside the skull bones. It should be noted that the grave was a cenotaph [Potapov 1990:33]. We should also note the presence of flakes, including the ones painted with ochre, in offering and funerary catacomb complexes in the barrow mounds.

The Catacomb tradition of funerary practices continued through the BC. Special places, so-called 'funerary sites', were allocated for those purposes. Sometimes, even special funerary barrows, memorials, were built [Rogudeev 1989:73].

The sites were located near the graves in an ancient horizon, extracted soil, or on the surface of an earlier mound (for a secondary burial). They were separated areas paved with stone, wooden planks, reed, turf, ash, or clayey soil. Pits with bones of offered animals were occasionally located nearby. On some of the sites, e.g. a site of wooden planks made under barrow 1 near the village of Mykolayivka (Donetsk Region), wooden beams were dug vertically into the soil (possibly, representing anthropomorphic statues) [Polidovich 1993:51]. Stone and combined stone-wooden paved areas, located at a distance from graves, should probably also be regarded as funerary sites [Litvinenko 2000:18].

In some cases there were several funerary sites, located one above the other and connected with a single burial. After the rite was performed, a mound was made over the site; then the rite was repeated after a certain period of time, and then again and again.

Such post-mortem honours were given to the dead of high social status. This is proved not only by the complex burial constructions, but also by accompanying grave goods: ceramics, carved bone buckles, quiver sets, bronze knives [Polidovich 1993:51, 81; Samar, Antonov 1998:88], and a Borodino-type jade axe [Antonov 1998:105-108].

After the rites, charcoal, ochre, shells, fragments of vessels, animal bones, and flint flakes were usually left at the funerary sites (3 complexes in chests, and 1 in a pit).

In our view, pieces of flint found in the roofs (covers) or behind the wooden frame walls of Babyno graves were also linked to burial and funerary rites. We already looked at the unusual grave 1 of barrow 8 at the village of Barvynivka (Zaporizhya Region). Its rich 'manufacture kit' included over 50 flake-based blanks assembled in a bag, next to a package of human bones (Fig. 63). Another flake

was found between the frame and the northern wall of the grave [Pustovalov 2001:119].

Let us consider known analogies from sites of other cultural entities. Importantly, the steppe cultures display evident continuity throughout the Bronze Age. That continuity is manifested in the burial rite by the positions of the human remains, the presence of cenotaphs, the cult of fire, ochre, the custom of placing animal bones into the grave and next to it, and astragals [Samoylenko 1990:104], and, what is particularly important, the inclusion of flakes and other flint items.

Based on the available data, it may be argued that the custom emerged as early as in the Eneolithic. Flint flakes and pebbles without utilitarian functions were found both in the Northern Caucasus [Batchaev, Korenevskiy 1980:79; Trifonov 1991:100; Rezepkin 1991:167], and the Northern Pontic steppes [Khlobystina 1982:13-14; Korenevskiy *et al.* 1986:53; Rassamakin 1987:36-40; Bratchenko, Constantinescu 1987:17-31; Klimenko *et al.* 1994:41], notably, most often in unusual burial complexes. Late Eneolithic – Early Bronze sub-barrow ‘hoards’ are also of interest, as they probably are specific cult complexes, representing votive offerings of various goods, including flint [Gudimenko, Kiyashko 1997:102-112; Andrukh, Toshchev, Shakhrov 1995:26].

We should also mention a complex with two stela on a barrow near the village of Ust-Mechetinska. There, a ‘scraper on a large flake of chalk flint’ was found under the base of one of the stelae. A knife was carved on the stela next to an image of a bull’s head; due to the knife’s specific proportions the author argued it was actually a flint dagger that had served as an ‘offering tool’ [Koziumenko 1993:44-45].

As a matter of comparison, it is appropriate to quote the data on the use of flint in ritual practices, based on the Bronze-age settlement materials. We may also note the presence of a massive flint tool on the slabs and several flakes on an altar made of cattle and horse bones in the layer of the Middle Don Catacomb culture of the settlement of Kozacha Prystan [Kravchenko *et al.* 1998:47]. In the same way, two flint knives (one on a blade, re-used) were placed on an altar in a Srubnaya settlement of Urove Ozero [Berezanskaya 1990:39]. It should be noted that, a vast number of flint items in the Middle and Late Bronze settlements were charred [Tsymidanov 1991:52; 1995:486; Razumov 1999a:15]. This may not be explained by accidental circumstances. In this connection we should observe the presence of charred flint in burial complexes ranging in time from the Eneolithic to the Early Iron Age.

The issue of secondary use of flint items in the Bronze Age should be specifically addressed. Such items stand out due to their archaic manufacture technique and sometimes the presence of patina, which indicates that they were subjected to the influence of atmospheric factors for a very long period. Like flint, other items – e.g., pottery – could also be re-used [Litvinenko 1994:133]. As noted

above, such usage has two aspects: utilitarian and sacral. The most demonstrative examples shall be outlined.

The Ingul Catacomb grave 9 of barrow 1 near the village of Dumeny (Moldova) contained a former Upper Paleolith blade-based edge scraper, later re-made into a knife; the item was located next to the right shoulder of the skeleton [Demchenko 1983:63].

The primary Babyno grave 8 of barrow 1 near the village of Mykolayivka (Donetsk Region) contained a knife on a clearly Eleolith-like massive blade, placed on a piece of sulfur (Fig. 25); a bronze knife lay nearby. The burial chamber and the rich grave goods indicated a high social status of the buried individual [Polidovich 1983:51]. A knife-like blade was found together with a stone mace in a Babyno grave at the Lower Don [Sharafutdinova 1987:36]. Patinated flakes and blades were also found in the Srubnaya graves, where they served as identifiers of the burial complexes of ‘masters of the cult’, together with cult vessels, astragals, ‘sealing the grave’, and the like [Tsymidanov 2004:54].

A substantial number of flint items were found in Cymmerian graves of both Chornohorivka and Novocherkassk groups [Terenzhkin 1976:95, 99; Maksimenko 1983:23; Dubovskaya 1993:142]. At least two graves of that time contained knives based on massive knife-like blades [Beliaev *et al.* 1976:18; Shevchenko 1987:141].

Flint flakes, including patinated and charred ones, were repeatedly found in mounds, ditches, and cromlechs of Scythian barrows, as well as among the grave goods [Skifskie 1986:178-335; Bessonova *et al.* 1988:35; Iliukov 1993:81, 84]. They are usually seen by researchers as ‘steels’ (or ‘flints’), though they practically never occur in combination with iron steels. By the way, there is the proposition – based on trasological analysis – that the so-called ‘honing-stones’ from Scythian and Sarmatian graves are, first and foremost, stone amulets [Griaznov 1961:139-144].

It should be noted that a flint bladelet, located on the cervical vertebrae and probably intended to serve as a ward, was found in a Scythian burial [Andrukh, Toshchev 1999:142]. Interestingly, flakes and pebbles were also present in graves of the tsar’s Mausoleum of the Scythian Neapolis. The idea that they could have been used for lighting a fire is rejected due to the initial location of those objects on the lids of wooden sarcophag. One of the burials in the Mausoleum contained a unique find of 32 minor flakes together with a piece of sulphur [Pogrebova 1961:192-213]. It should be noted that, flints in combination with sulphur were found in Sarmatian burials at the Lower Don, where they never occurred together with iron steels [Maksimenko 1983:44, 59].

Generally, the tradition of using flint and similar minerals in burial and funerary rites had existed for millenia, which indicates the remarkable strength and proliferation of related belief systems. Yet, both those views and their material representation, reflected in archeological sources, could not but undergo certain

transformations. This fact seriously complicates any attempts to create an explanatory model by means of retrospect and comparative analysis models. However, based on the available source base, below we suggest a review of reconstructions of some ritual actions and related concepts of the Paleo-metal Age, which included flint (and other rocks of similar qualities) and items made out of them.

VI.2. INTERPRETATION OF BURIALS CONTAINING FLINT

When tracing the process of development of a material culture, sometimes one may observe some of its elements losing their utilitary functions in favour of obtaining a sacral meaning. With the development of metallurgy, flint, the main material for making implements for hundreds of thousands of years, had been removed, gradually but steadily, from the manufacture sphere. Yet, as researchers noted long ago, the Paleo-Metal Age saw the growing significance of flint items used in the cult sphere [Zamiatin 1948:113]. To name just a few demonstrative examples, these included flint amulets and offering knives in pre-dynasty Egypt, the Far East, Aztecs and Maya, and miniature flint sculptures of North-Eastern Europe.

The burial rite, as part of a traditional culture, contains traces of a very old perception of the world, which is preserved throughout a long time and passed on from generation to generation without undergoing any major change. The tradition of using flint in burial rites and funerary practices also has ancient roots and probably originates from the Stone Age. The sacral meaning of stone in general, and flint in particular, is confirmed by the data of mythology of many peoples of the Old and New Worlds [Mifologicheskiy slovar 1991:129, 201, 257, 255, 521, 553, 582, 599, 648; Lévi-Strauss *et al.* 1994:144, 207]. There is data that proves the existence of tales and traditions, related to flint, in the Indo-European language family.

According to linguists, the Indo-European language community disintegrated ca. 4000 BC, which in terms of archeological periodisation corresponds with the Eneolithic Age [Zalizniak 1999:99], which some researchers believe occurred in the Eastern European steppes. Yet, this is still an open question to be addressed. In any case, the idea of an Indo-European identity of the Yamnaya culture is not seriously challenged by practically any researcher nowadays [Otroschenko 2000:31]. The issue of the CC is far more complex. Yet, there is no doubt that it was involved in shaping a major Yamnaya substrate in the Northern Pontic Region. Researchers regard the Indo-Iranian component as the core of the BC [Kovaleva 1981a:37; Berezanska, Otroschenko 1999:37]. Probably, Abashevo,

Sintashta-Petrovka, Srubnaya and Andronovo cultures were left by Indo-Iranian and Iranian ethnic entities. Finally, in the Early Iron Age the territory of South-Eastern Europe was populated by Iranian tribes of Scythians and Sarmatians. According to linguist Trubachev, at that time the Crimea, the Lower Don, and the Northern Kuban areas were populated by Indo-Aryans [1999:47].

The Iranians' dominance of the steppe came to an end only ca. 400 AD, with the invasion of the Huns. However, the Alani component was well represented in the Left-bank Dnieper area up until the end of the 10th century AD, when the Khazar Khaganate was destroyed. Hence, as a result of close contacts and mutual assimilation of Iranians and Slavs on the territory of South-Eastern Europe, up until now a part of Eastern Slavic population, including Ukrainians, they carry Iranian anthropological types [Gumilev 2002:77; Bubenok 1997:77; Zalizniak 1999:170; Kuzmina 2008:12-13].

Based on the above, we conclude that our reconstruction effort requires that we include relevant Indo-European sources, particularly of Indo-Iranian, origin.

First of all, **functional accompanying grave goods** shall be discussed. We already have addressed some aspects of the problem of burials with 'manufacture kits'. Most such burials contain weapons (including ceremonial-ritual tops of ornamented axe-hammers and maces) and items believed to be connected to practicing certain rituals (ritual vessels, 'knife-and-awl' sets, bundles of 'brasman' rods, etc.) (Diagram 10). As far as 'arrow-maker kits' are concerned, we should emphasize that a number of sources, particularly those of Indo-Iranian mythology and ethnography, point to the close connection between the manufacture and usage of a bow and arrows and the sacral power of a chief (king), including the ability to influence in that way the re-manufacture of natural goods [Bessonova 1983:22-23; Kulakovskiy 1996:274; Elizarenkova, Toporov 1999:516; Kyzlasov 1999:37-51].

Therefore, based on the facts of sacralisation of certain kinds of manufacture activity in the archaic society [Tsymidanov 2004:81; Avilova 2005:40-45], we believe that complexes containing 'manufacture kits' are more likely to represent social and belief system phenomena of the Early and Middle Bronze Age, than economic activity. Yet, no doubt, a certain part of the items included in those complexes had been really used in manufacture, prior to being placed in the graves. With some reservations, those items may be used for the purpose of reconstruction of ancient technologies.

As for knife-daggers as a category of functional grave goods, we believe that in a number of cases they were placed into graves both because of their material (more sacral than metal) and their 'ancientness', when items of an earlier period of time were used.

Some issues connected to **non-functional grave goods** (both accompanying and attendant ones) shall now be discussed. According to many authors, flint is 'the symbol of a fire ritual' in burials of the steppe cultures, as well as the

Corded Ware cultures [Bader 1963:174; Kraynov 1964:28; Artemenko 1976:89; Kraynov, Gadziatskaya 1987:33; Iliukov, Kazakova 1988:90]. Almost no proof of that 'obvious' claim has been given. For instance, the only argument used by Kraynov in support of his claim is the fact that some Fatyanovo burials contained pieces of flint placed under the bottoms of the vessels [Kraynov 1964:28]. However, many more pieces of flint were found inside the vessels, next to human hands, under the skull, on cervical vertebrae, or on top of the roofs, etc.

Furthermore, we have no convincing facts in favour of an assumption that flint was used for making fire in the Bronze Age. Quite the opposite, experiments by Semenov demonstrated that it is practically impossible to light a fire by means of striking a piece of flint against another piece of flint. The experiments aiming at lighting a fire by means of striking a piece of flint against ore minerals: pyrite, marcasite, halkopyrite, and sphalerite, produced slightly better results [Semenov 1968:176]. However, we have no evidence that those minerals were used in the Bronze Age. Instead, from the Rig Veda hymns to Agni the god, we know of a method used by ancient Indo-Aryans for making fire. They would rub the hard outer and soft inner pieces of wood against each other [Rigveda, I, 127, II, 1, III, 1, 23, 29 *et al.*; Elizarenkova, Toporov 1999:507-508]. Therefore, without totally denying sacral links between flint and fire, we still have to reject the hypothesis of flint exclusively as the 'symbol of fire'.

In order to understand the meaning of a ritual we need to know the myth connected with it, as the ritual itself often served as the primary form of the myth [Svetlov 1993:6]. The 'Rig Veda' and 'Avesta' represent the most important sources of Indo-Iranian mythology.

Having noticed the sacral meaning of the custom to include flint into burials of the BC, Kovaleva used the 'Avesta' materials for interpreting these. In particular, she noted that 'in the Indo-Iranian mythology, stone (stone hard matter) it identified with the world mountain Khara-Birzaiti, the support for the sky' [Kovaleva 1981a:45].

The evidence gathered from available sources and versions put forward by researchers about the ritual usage of flint and similar rocks may be roughly divided into three closely intertwined groups. The first group correlates with the data indicating the existence of the 'cult of stone'. This opinion was expressed by Shilov about Sarmatian graves of the Kalinovka burial mound [Shilov 1959:430]. Worshiping stone, connected with the Thunder God cult, is known from Hittite sources [Luna 1977:120, 126, 284]. The links with the cult of stone (in particular, flint) are well visible in the Caucasian peoples' Narty epic, which originates from Old Iranian roots [Dumezil 1976:10; Alieva *et al.* 1974:18]. Interestingly, the epic includes references to magic touchstones (sharpening bars), that could supposedly heal wounds sustained in battle. No wonder some researchers expressed an opinion based, among other things, on trasological analysis, that touchstones had been enclosed in burials primarily for cult functions [Griaznov 1961:139-144;

Bessonova *et al.* 1988:66]. Russian linguist Trubachev argued that the ‘alaty-stone’ from the Slavic folklore was also an image dating back to the Indo-Iranian times [1999:129-135].

The second, most common view, links the presence of flint in burials to the cult of fire. Indeed, some of the flakes could have been used for lighting a fire, but far from all. The Rig Veda hymns sometimes refer to stone as a possible birth-place of Agni the god [Rigveda, I, 67, 70, II, 12], although far more often they mention lighting the fire for making offerings with the help of rubbing [Rigveda, I, 127, II, 1, III, 1 etc.]. Probably, the fire born from stone was associated, first and foremost, with the ‘sky fire’, i.e., lightning and the god of thunderstorms, Indra [Rigveda, VII, 104, 274, etc.]. It was stone (in some sources, directly identified as flint), only later transformed into ‘thunder arrows’ and an axe (hammer), the main weapon of Indo-European thunderstorm deities [Rigveda, I, 7, II, 12, III, 30, etc.; Elizarenkova, Toporov 1999:518; Luna 1977:120, 284; Dumézil 1976:10, 62; Graves 1992:99 *et al.*]. Up until the Middle Ages it served as the attribute of Thor, Percunas, and Perun [Frazer 1980:185-187; Mifologicheskii slovar 1991:64, 436, 438, 545, 578]. Let us also recall the use of pebbles and ‘thunder arrows’ in the cult of Olympian Zeus, including also in antique Northern Pontic cities [Rusiaeva 1979:24]. A Roman historian of c. 100 AD, Titus Livius, while reciting the legend of a battle between the Horatii and Curiatii, talks about making a sacrifice to Jupiter with a flint knife in the process of taking an oath, of which the priest announced that an oath-breaker’s death would be caused by the lightning, and linked it to the offering being made [Titus Livius I, 24].

The third group of concepts relating to the issue under discussion is based on interpreting a burial rite as one of the transition rituals. One’s attention is drawn to the fact that the Rig Veda describes the boundary between different worlds, i.e., between the Sky and the Earth, as a ‘pied stone’ that ‘guards the two limits of the space’ [Rigveda, V, 47, VII, 35; Elizarenkova, Toporov 1999:518], while the Avesta describes it as a mountain (a rock) [Kovaleva 1981a:45]. In this sense, the important fact is that the very first sacrifice, the separation of the Earth from the Sky, was made – both in the Hittite – Hurrian and Ancient Greek mythologies – with a stone (flint) knife (sickle), having thus created an organized Cosmos from the initial Chaos [Luna 1977:139; Hook 1991:85; Graves 1992:99]. This can be compared to the dismemberment of Purusha in the Rig Veda [Rigveda, I, 90].

As the ritual had to constantly recreate the initial mythological times, the finds of flint cutting tools in the Bronze and Early Iron burials may be connected with offering. In this connection, it is worth noting the widely-known finds of cult daggers and flint sculptures in the Middle East, the Old and Middle Kingdoms of Egypt, the west and south of Europe [Childe 1952:267, 327, 359; 1956:114, 366; Clarke 1953:186-187; Beuker, Drenth 2006:285-300; Rawlik 2006:545-561].

As for the role of flakes and pebbles in the process of crossing the boundary between the world of the living and the world of the dead, very important analo-

gies have been quoted by Mandelshtam. In order to interpret details of a burial rite practiced on Indo-Iranian burial mounds of Southern Tajikistan, which the author dated to ca. 1900-1300 BC, he referred to Hinduist burial rites and the Rig Veda.

Specifically, there were pebbles, including some coated with red paint, at the entrance to some of the graves, or near the skulls or the hands. As a parallel, the author quoted a description of an ancient Indian burial rite: ‘On the tenth day after burning the corpse, a number of actions were performed in the area between the pyre site and the settlement, aiming at shielding the living from the influence of the death. One of them was ‘placing the stone’, which is even seen in some schools as a centerpiece moment of the entire cycle of rites. Judging from the verses recited during the stone-placing procedure, such a stone was perceived as a mountain that would create a block on the way of death and evil... Possibly, at the beginning the rite was connected with disposing of the corpse [Mandelshtam 1968:123-125]. Let us look at the relevant lines of the Rig Veda’s ‘Burial Hymn’: (English translation by Ralph T.H. Griffith 1896):

Here I erect this rampant for the living;
 Let none of these, none of other, reach this limit.
 May they survive a hundred lengthened autumns,
 And may they bury Death beneath this mountain.
 [Rig Veda, Book X, Hymn XVIII, Verse 4].

In this connection we should note that up to now, present-day Kurds and Tajiks (the western Iranian linguistic group) have a custom of placing a piece of stone onto the chest of a dead person if for some reason it is impossible to bury him or her on the day of the death [Menteshashvili 1984:36]. Some groups of Armenians, when taking the deceased out of the house, would put a stone on the place where the coffin used to be, to make sure the death did not return to that house [Tekhov 1977:66]. There are certain parallels related to the location of a piece of flint or pebble on top of the roof or in the filling of Northern Pontic graves in the Bronze and the early Iron Age (non-functional attendant goods).

Publications by Tsimidanov about the meaning of flint flakes in Srubnaya graves are of particular interest in that sense. According to the author, a major part of flint-containing burials of the Srubnaya cultural-historical community had indicators that they had belonged to ‘masters of the cult’. This means that the buried individuals had been linked to the ritual sphere during their lifetimes. When looking for ‘bi-linguas’ (evidence of relevant rituals), Tsimidanov studied tales of Indo-European and, more specifically, Indo-Iranian peoples (Kurds, Kafirs, and others) that supposedly reflected ancient mythological ideas about the transition to the other world. Many of those tales contain a description of a ‘magical escape’, during which the hero throws various magical objects – including

a stone – behind his back, while crossing the boundary between the world of the dead and the world of the living [Propp 1996:324-351]. The existence of such a boundary, according to ideas of traditional societies, is a necessary condition for stability of the socium. That is why rituals meant to restore the boundary between ‘our’ and ‘alien’ worlds were of extremely high importance. Tsimidanov believes that the presence of flint flakes in the Srubnaya burials is connected with those very rituals. To support his argument, he refers to the fact that about one-third of the burials displayed indicators of belonging to ‘masters of the cult’: they contained wooden bowls, astragals, pots with ‘scriptures’, and / or a ‘sealed’ grave. Hence, he concludes that on the way to the world of the dead those individuals were supposed to ‘throw the flint’ in order to restore the boundary between the world of their socium and the world of ancestors [Tsimidanov 1995:486-488; 2004:54-56].

In our view, the conclusions drawn by Tsimidanov may be extrapolated, to a certain extent, on flint-containing burials of other steppe cultures of the Bronze and early Iron Age, particularly if they are compared with Vedical rituals.

The Narty epic, which preserves many features of Ancient Iranian mythology, states that the entrance to the ‘country of *donbetres*’ [water deities, ancestors of the Narty people] is guarded by pieces of flint and crystal that strike sparks [Abaev *et al.* 1957:10].

The use of flint for the purpose of transition to the other world was registered in the Scandinavian folklore [Silman 1974:5]. The theme of throwing stones over one’s shoulder is present in an Ancient Greek myth about Deucalion’s flood, which is the way to create a new humankind [Mifologicheskii slovar 1991:487].

The fables of making angels and demons from two halves of the same piece of flint were still preserved among Ukrainian, Russian, and Bulgarian peasants in early 1900s [Mifologicheskii slovar 1991:487].

Hence, the constant association of flint with the transition to the other world, traceable throughout millenia in a number of sources, allows suggesting that it was given this very ‘transitional’ meaning in the Bronze-Age burial rites.

Archeological sources, discussed in this publication, convince us that the Bronze-Age Northern Pontic population had a rather common custom of including pieces of flint and similar rocks into graves as non-functional accompanying or attendant grave goods. According to mythological, folklore, and ethnographical sources this tradition may be linked to closely intertwined cults of stone, fire, thunder gods and, first and foremost, ideas about crossing the boundary between the world of the living and the world of the dead, and probably with immolations (offerings), to which we link such functional grave goods as flint cutting tools. Apparently, in the Bronze Age, flint and similar rocks were attributed with magical powers to restore the boundary between the world of the living and the world of the dead, broken by the death of a member of the socium [Razumov 2002:95]. Possibly, this custom was connected with certain personal qualities of

the deceased individual, his or her social status or rank, or circumstances of his death. Those ideas gradually transformed with time. However, given the particularly conservative nature of burial rites in traditional societies, we assume that such ideas could still be present in the Iranian-language Northern Pontic population of the Early Iron Age. It is possible that remainders of such ideas could exist beyond that period of time.

Hence, individual flakes, fragments and even certain tools and their fragments within burial constructions should not be regarded as 'grave goods' in the general meaning of the term, but rather as ritual matter, believed to possess certain supranatural qualities. What mattered in the rite was the mere presence of that matter, while its morphology was something secondary. In this sense flint is by no means unique. The closest analogies of ritual matters from Bronze Age burial complexes include ochre, chalk, charcoal, and some other materials.

The 'manufacture kits' stand somewhat aside, but given the sacralisation of artisanry in primitive and early class societies, and particularly given the connection between arrow- and bow-making with sacralisation of the king's power in Indo-Iranian societies, it is not possible to interpret them simply as 'artisan graves'. More probably, consideration should be given to sacralisation of some kinds of manufacture, due to which burial rituals required 'manufacture kits' (and their imitations) to be included in burials of individuals of a certain social status and/or rank.

VII. FLINT ARTEFACTS: NORTHERN PONTIC CONTACTS WITH CORDED WARE PEOPLES OF EASTERN AND CENTRAL EUROPE

This chapter focuses on flint artefacts of the Early and Middle Bronze Age, which may serve as evidence of contacts between the steppe tribes and peoples of the Corded Ware cultures (CWC) of Eastern and Central Europe. The relevance of such a study is beyond doubt, for it is with the influence of the Northern Pontic culture groups that researchers connect the genesis and development of the CWC [Ecsedy 1979:5-11; Gimbutas 1979:129-131; Koško 2000:337-346; Włodarczak 2006:156-163; Klochko, Koško 2009:269-301; Włodarczak 2010:299-325].

Mutual influences can be seen in various aspects – first and foremost, in features of burial rites, in ceramic pottery, and in metal objects. Tracing those contacts by flint items is more difficult due to the general similarity of changes in flint knapping techniques in the conditions of development of copper-bronze metallurgy; however, we still can make some observations that relate to the use of flint in the burial rite. First, they refer to items of weaponry from burials (arrowheads, ground axes, spear- and dart-heads, and knife-daggers), which are believed by a number of researchers to indicate the presence of both armed clashes and peaceful interaction (exchange, borrowing of technologies, prestigious economics, marital ties, migrations etc.) of various cultural groups of the Paleo-metal Age [Subbotin 1982:102; 2002:76; Dzyhovskiy, Subbotin 1997:188; Ivanova 2001:81; Szmyt 2002:112; Klochko, 2006:52-124]. The occurrence of such contacts may be suggested by the dissemination of the custom to enclose so-called ‘arrow-maker kits’ into burials of eastern groups of the Corded Ware and the Bell Beaker cultures, as well as the finds of knives on massive percussion blades in Early and Middle Bronze graves in the Northern Pontic Region.

VII.1. OBJECTS OF WEAPONRY

VII.1.1. ARROWHEADS

As noted above, the cultural attribution of Early and Middle Bronze arrowheads – ones that had caused wounds as well as ones found in quiver sets and manufacture kits – remains a matter of further discussion [Bratchenko 2006; Klochko 2006]. Numerous analogies of practically all types of arrowheads found in the Northern Pontic area may be also found to belong to the neighbouring populations farther north, west, and east of the region. The predominant majority of arrowheads from burials of the Corded Ware cultures also belong to Type A: an arrowhead with a notch at the base [Kryvaltsevich 2006:94; Włodarczak 2006:28-30]. Usually these are sub-triangular arrowheads of low proportions with a relatively shallow semi-circular or triangular notch at the base.

On the contrary, individual ‘tanged’ arrowheads of the Corded Ware cultures can be interpreted as evidence of contacts with the Neolithic population of Eastern Europe’s forest areas or, through steppe cultures as intermediaries, with the population of the Caucasus. It should be noted that all 6 tanged arrowheads (all causes of wounds) from burials of the YC were found in the steppe Left-bank Dnieper area. The closest analogies of such arrowheads have been found in the Caucasus, where such types were wide-spread at least from the Eneolithic up until the Late Bronze Age [Nechitaylo 1979:47]. Therefore, they can hardly be viewed as evidence of war conflicts between the Yamnaya and the Corded Ware populations.

Similarly, all Type C tanged arrowheads from the Catacomb graves were found in the east of the Northern Pontic Region, including in two manufacture kits (Mines No 22 3.3 in the Dnipropetrovsk Region and Novomykilske 1.5 in the Luhansk Region). Finally, tanged arrowheads (most commonly, causes of wounds) from Babyno culture burials were unanimously referred by a number of authors to farther eastern cultural groups [Cherniakov 1985:21; Litvinenko 1994:208; 2001:15; Rogudeev 2000:89].

The issue involving Type A arrowheads is more complex. Generally, arrowheads from Yamnaya and early Catacomb graves bear morphological and technological resemblance of the finds of CWC quiver sets, though somewhat larger in size. However, some complexes found in the north-western Northern Pontic Region contain arrows that can be directly connected with CWC influence.

For instance, a quiver set of four arrowheads was found in a Late Yamnaya or rather, a Catacomb complex (burial in a rectangular pit, the body slightly

contracted on the left side) Purkari (Purkar) 1.38 in Moldova [Yarovoy 1990:84, Fig. 37] (Fig. 67:6-9). According to Victor I. Klochko:

Two triangular arrowheads with deep angular notches have analogies among arrowheads of the late stage of the Podillya group of the Pre-Carpathian Corded Ware culture, as well as early and classical phases of the Mezhanowice culture, while the other two leaf-shaped arrowheads – with shallow sickle-shaped notches – are analogies to arrows of the Chlopice – Vesele culture (Type Pochapy, according to Sveshnikov) and those of the classic and late phases of the Mierzanowice culture of Poland. [2006:67]

The same grave also contained a stone hammer-axe with an oval butt-end, typical for CWC sites of Upper Dniester and Małopolska area, and a knife on a massive beating plate with two convergent sharp edges (see below). Given the inventory, it is possible that the complex in question could be regarded directly as a CWC grave located in the territory of the Ingul Catacomb culture. Several similar arrowheads found in the Lower Dniester area had been the cause of wounds of those buried in the Yamnaya and Catacomb complexes. For the Northern Pontic areas further east, there have been practically no finds of arrowheads that could be linked to the CWC; the only likely examples are one or two items found in the forest-steppe Yamnaya graves that possibly belong to the Middle Dnieper culture [Klochko 2006:62].

Another open question is the issue concerning the causes of the similarity of arrowhead morphology from early Dnieper – Don culture complexes (Fig. 23), with arrowheads that are typical for the late stage of the Mierzanowice culture (the Epicorded horizon) in the territory of south-eastern Poland, which, by modern dating, is approximately synchronous with sites of the Babyno culture (circa 2000 – 1700 BC) [Kadrow, Machnik 1997:90-91, Fig. 36; 39]. At present, given the geographic distance and the lack of other parallels in the two cultures' material complexes, we believe it is premature to make assumptions about their mutual influences.

VII.1.2. DAGGER – KNIVES, SPEARHEADS AND DARTHEADS

Generally, knife-daggers, spearheads and dart heads, modified from both face sides, are not typical of Corded Ware culture complexes as known in the territories neighbouring on the Northern Pontic area. For instance, only two large bifaces, found in relevant graves, can be attributed to the Sub-Carpathian Corded Ware culture [Klochko 2006:82-86]. Large bifaces are also practically unknown in the Kraków-Sandomierz Corded Ware graves [Włodarczak 2006], or in the

Schneckenberg-Glina culture, or in the Middle Dnieper culture (while none have been found in the territory of present-day Ukraine, individual finds have occurred further north, on the territory of Belarus).

However, a vast number of large bifaces – daggers, spearheads, sickle cutting pieces (inserts) – occur in complexes of Epicord cultural entities that date back to early 2000 BC: Mierzanowice, Gorodok – Zdowbytsia and Strzyżów cultures [Libera 2001:77-100]. It should be noted that the tradition of making large bifaces was gradually coming at an end in the Northern Pontic territory at the time of the final Catacomb sites and the Babyno culture (see Chapter IV). In our view, the noticeable similarity between the morphology and technology of manufacture of some kinds of knife-daggers and spearheads (in particular, ones with triangular and rectangular tangs) of the Yamnaya and Catacomb cultures, and relevant artefacts of the Epicord cultures (Fig. 68) cannot be explained exclusively by imports and borrowings. The argument against such an explanation is a centuries-long chronological gap between the predominant majority of similar bifaces [Libera 2001:110]. The resemblance of those artefacts is explained, first of all, by the factors of functionality (easiness of manufacture and use), which is most noticeable in leaf-shaped objects, but also by the efforts to make flint artefacts as alike as possible to their metal equivalents (this is mostly relevant for carefully made knife-daggers with a distinguished tang). This last feature of large bifaces of the Paleo-metal Age has been repeatedly emphasized by researchers in a number of European cultural groups [Apel 2001:250; Budziszewski, Włodarczak 2010:54; Razumov *et al.* 2011:82-84].

Separate attention should be paid to the possible occurrence of imports and replicas of flint daggers of the Bell Beaker culture of central and northern Europe in the Northern Pontic area (with the CWC as an intermediary). Certain ties between eastern groups of the Beaker, Yamnaya and Catacomb cultures can be traced in ceramics, metal objects and even in burial rites [Bátora 2006:55-120]. From this perspective attention should be paid to a dagger found in the late Yamnaya layer of the Mykhailivka settlement (Kherson Region). Made of light-grey flint, it has a rather small triangular blade and a haft, widening to the top [Lahodovska *et al.* 1962:127]. Having practically no equivalents among objects found in burial complexes, that artefact, instead, is similar to daggers that were common for the southern shore of the Baltic Sea in the second half of 3000 BC (Fig. 68:8-10) [Apel 2001; Czebreszuk, Kozłowska-Skoczka 2008]. However, given the singularity of that find in the Northern Pontic area and the above factors (functionality and copying of shapes of metal objects), its connection with the Bell Beaker culture so far is only hypothetical.

Flat flint adze-axes with ground blades represent one of the most common categories of finds in complexes of the Corded Ware cultures [Buchvaldek, Havel, Kovarik 1991:178-196; Cvrková, Koutecký, Brus 1991:25-38; Buchvaldek 1998:47-60; Włodarczak 2006:20-28; Klochko 2006:85; Machnik, Bagińska, Koman 2009:184]. At the same time, only very few single finds of such objects are known to occur in Yamnaya and Catacomb graves, which emphasizes their foreign origin (see Chapter IV). Researchers tend to interpret all adze-axes from Yamnaya graves as weapons [Ivanova, Tsimidanov 1999:6; Klochko 2006:85]. Furthermore, Ivanova also regards flint axes as imports from the territory of the Corded Ware cultures, where such types were widespread [Ivanova 2001:81]. Subbotin, instead, links those objects to an earlier period of time, regarding them as manifestations of connections between the Yamnaya culture and the Globular Amphora culture (GAC) of central Europe [Subbotin 1982:102; 2002:76]. To challenge this view, we refer to the opinion of Szmyt about a major typological difference between the majority of flint wedge-shaped axes from the Yamnaya graves and axes of the Globular Amphora culture [2002:112].

Moreover, Libera has studied a whole series of Corded Ware graves that had contained both typically ‘corded ware’ and classical ‘amphora’ ground axes [Libera 2009:169-179]. Belarusian researcher Kryvaltsevich, challenging the above versions, argued in his monograph that ground flint axes had been borrowed by the Middle Dnieper population of the Corded Ware culture from the steppe population of the late Eneolithic – early Bronze Age [Kryvaltsevich 2006:94]. It is hard to agree with these conclusions: we believe that most probably those items had been borrowed from the Globular Amphora population or from the other groups CWC.

Flint ground adze-axes in Yamnaya culture graves (with the bodies positioned both contracted on the back or on the side) have been known exclusively in the ‘borderland’ territories of the Yamnaya area, mostly in the territory of the north-western Northern Pontic Region [Yarovoy 1985:80; Dergachev *et al.* 1989:68; Ivanova, Subbotin 2000:62]. Five such objects were found in the graves containing skeletons positioned on the back, and six more were found in the graves with skeletons contracted on the side. Judging by anthropological data, five of the skeletons belonged to men aged between 40 and 60. One of the burials (Alkalia 33.3, Odessa Region) contained a bow, a quiver with 11 arrows, a mace head, and a bronze knife (Fig. 14).

Another axe (adze) was found in the Yamnaya grave that contained a skeleton contracted on the back in a barrow of the Trypillya settlement of Maidanetske in the Cherkassy Region [Shmaglii, Videyko 1988:134]. The proportions and type of processing of the tool have similarities among chopping tools of the Corded Ware cultures, e.g., in the Middle Dnieper culture (Fig. 70).

All in all, 12 bifacial adze-axes (Fig. 41) were found in the Yamnaya complexes, including 11 (one of them fragmented) in the territories of the Odessa Region and the Republic of Moldova.

The unique Ingul Catacomb grave 3 of barrow 1 of the Serhiyivka (Odessa Region) three wedge-shaped flint axes with ground blades (one of them possibly a blank) were found at the left knee of the buried body (Fig. 69:2-4). The authors believe them to be an import from the territory of the Middle Dnieper culture [Dzyhovskyi, Subbotin, 1997:188]. In our view, judging by their typology, those axes could also be imports from territories of other Corded Ware cultures, for instance, from the Upper Dniester area. Yet another find of a wedge-shaped adze with a slightly ground blade comes from the Kryvyi Rih area (Heykivska 2 1.17), where it was located at the right wing of an adult's pelvis. In the territory of Moldova (Nikolske 8.11) a fragment of ground adze made of Dobrudzha flint was found in the Ingul 'arrow-maker kit'. Hence, only three complexes of the Ingul Catacomb culture are known to contain adze-axes, two of them located in the north-western Northern Pontic area, as well as most of the Yamnaya ones. Therefore, the flint ground adze-axes that were found in 13 graves in that contact area should be regarded as imports from the territory of the Corded Ware culture – or their local replicas.

The morphology of all the fifteen well-preserved axes (from eleven Yamnaya and one Catacomb complexes) fully corresponds with the most common types from Corded Ware graves (Fig. 70): trapezoid in projection and wedge-shaped in section, of low (4 objects) or high (9) proportions, some of the objects have asymmetric blades (2).

VII.2. BLADE – BASED KNIVES

A category of flint items that, in our view, points out to contacts between populations of the steppe and the Corded Ware culture, is represented by retouched single- or double-blade knives on massive percussion blades. They occur rather often in graves of various Corded Ware cultures of central and eastern Europe [Buchvaldek, Havel, Kovarik 1991:178-196; Cvrková, Koutecký, Brus 1991:25-38; Buchvaldek 1998:47-60; Kryvaltsevich 2006; Machnik, Bagińska, Koman 2009] (Fig. 71:6-10). For instance, 23 such artefacts were found in 270 graves of the Kraków-Sandomierz Corded Ware culture in the territory of Małopolska [Włodarczak 2006:36]. By comparison, only about 20 such artefacts were recorded as finds in over 7,000 graves of the YC in the Northern Pontic area. It should be noted that over half of the blade-based knives were found in the

borderlands between the Yamnaya culture and the CWC: nine objects in the north-western Northern Pontic area (Fig. 71:1-3) and two in the territory of the Right-bank Forest-steppe (Fig. 71:4). The material in at least four of the artefacts was identified as Volhynia chalk flint. Other knives were spread more or less evenly from the Dniester to the Don. Only single finds of blade-based knives occur in the Catacomb and Babyno cultures. It should be noted that in two cases the blade-based knives found in the north-west of the Northern Pontic area are combined with other artefacts linked to the Corded Ware culture, namely a ground-edged adze-axe (Nikolske 11.7, Fig. 42); arrowheads and a stone axe-hammer of the Corded Ware type (Purkari 1.38, Fig. 67). A knife on a massive blade of the Volhynia flint (Fig. 71: 4) was found in a Yamnaya secondary burial near the village of Porohy (3.15; Vinnytsia Region). It should be noted that three Thuringia type of the Corded Ware amphorae were found in that very barrow, as well as in a neighbouring burial mound [Klochko, Koško 2009:269-301]. Therefore, we can argue that flint knives on massive percussion blades – particularly those originating from Yamnaya culture western borderlands – also represent evidence of contacts.

VII.3. 'ARROWMAKERS TOOLKITS'

While the above discussion was mainly concerned with imports and replicas of Corded Ware flint artefacts in the Yamnaya and Catacomb cultures of the Northern Pontic area, the focus should now shift to other aspects of contacts. The issue here is the possible influence of the steppe population's burial ritual on the emergence of the custom to place so-called 'arrow-maker kits' or, more broadly, 'manufacture toolkits' into burials of the Corded Ware and Beaker cultures. The term 'manufacture toolkit' is used here to denote a more or less compact location of burial ritual objects within a burial construction, with all or the majority of the components possibly linked to a certain technological process (raw materials, tools, semi-finished products, debitage, and functional objects).

In this work there shall be a specific focus on 'arrow-maker kits', as they are the most closely connected with flint knapping. Apparently, the oldest such kits in central Europe appear in graves of the Kraków-Sandomierz Corded Ware culture in the territory of Małopolska, which date back mainly to the 2nd half of 2000 BC: Żukuw, grave 2, Złota II, grave 15, Mierzanowice I, grave 80, 100, 199, Koniusza, grave 3 (Fig. 72), Żerniki Górne I, grave 141 [Włodarczak 2006]. Those sets, as well as the Yamnaya and Catacomb ones, contain raw materials, semi-finished products, functional objects, retouchers and blade abrasives, etc. [Budziszewski,

Tunia 2000:101-135]. Meanwhile, fluted abrasives ('strengtheners'), typical of the Northern Pontic complexes, are practically absent in the above complexes. Further, it should be noted in this respect that some of the graves display traces of catacomb-like burial constructions (Fig. 72).

A Corded Ware grave with an 'arrow-maker kit' was also found in the Czech Republic (Hoštice-Heroltic, grave 1) [Bátora 2006:101]. Individual burials of the Bell Beaker culture containing 'arrow-maker kits' were studied in Southern Poland, the Czech Republic (Radovesice 116/78) (Fig. 73), Eastern Germany, and Southern England. A similar set was found in England in two graves of the Wessex culture and one such set was found in each of the Košťany and Nitra cultures of the Danube area [Bátora 2006:101].

Given the existing base of sources, the issue of the emergence of the custom to enclose a 'manufacture toolkit' – in particular, an 'arrow-maker kit' or a 'caster kit' – into a Bronze-Age central and western Europe burial, so far cannot be determined. Meanwhile, it should be borne in mind that Yamnaya, Catacomb, and Babino sites of the Northern Pontic area contain about 50 known 'arrow-maker kits', and the ritual of their placement in the grave had existed there for over a thousand years, since the time of the Eneolithic [Razumov 2010:5]. The oldest known 'arrow-maker kits' in central Europe Corded Ware cultures emerged exactly in the areas where people of those cultures had contacts with the steppe population. Those contacts, as we argued above, are clearly visible both in imports and replicas of objects made of different materials, and in features of the burial rite (in particular, the emergence of sub-mound burials, skeletons contracted on the back, etc.). Therefore, it is possible to assume that the custom to mark representatives of a certain social group by means of placing an arrow-making toolkit into the grave could be spread to the west of the Carpathians from the Northern Pontic area.

CONCLUSIONS

The study resulted in a detailed description and analysis of the key aspects of flint artefact usage in Northern Pontic burial rites in the Early and Middle Bronze Age.

The issues raised in this study have been addressed in a large number of publications that touch upon related various aspects. The historiography of the main issue is inseparable from the general historiography of Eastern Europe's Bronze Age; individual issues within our research focus are parts of more general problems.

The source base on the issue has been accumulated since the end of the 19th century; at the same time, individual researchers started using flint artefacts in their publications. From the 1950s – 1960s, the number of archaeological sources has been growing significantly as a result of massive explorations. Hence, the authors have made a special effort to analyze these sources. The past half century of research advances has been characterised by an accumulation of sources, the emergence of new methods of tool study, the formation of new archaeological research objectives, the need for the fullest possible description of relevant materials, socio-economic (including the issue of primitive crafts) and ethno-cultural reconstructions. Consequently there has been a gradual increase in the number of academic papers, which were dedicated, partially or completely, to various aspects of so-called production and use of flint artefacts by South-Eastern Europe populations in the Paleo-Metal Age.

The key directions of research, often closely intertwined, include: (1) formal typological and technological descriptions of flint artefacts as an important component of the material culture of individual sites, various regions and periods; (2) study of ancient manufacture with the help of the experimental – trasological method; (3) study of Bronze Age weaponry typology and related attempts of reconstruction of the warfare and the nature of armed conflicts between the various ethnic groups; (4) analysis of the social aspects of primitive manufacture (mainly in connection with 'manufacture kits' from Early and Middle Bronze burials); (5) ways of interpreting the semantic meaning of flint artefacts in burial, funerary, and other cult complexes.

At the same time, given the substantial proliferation of academic publications, two circumstances are particularly noteworthy. First, there is almost no significant academic debate in this particular context (except for the issue of ‘manufacture kits’). Second, there is a lack of publications based on significant material that discuss all five directions. We hope this study has partially filled that lacuna.

Analysis of the source base proves it to be fully suitable for addressing the above objectives; one based on archaeological sources: 1,520 burial complexes of the Early and Middle Bronze Age. Specific objectives were met with the help of ethnographic, mythological, linguistic, and creative arts sources, as well as natural sciences data.

Finally, the methodology used in this work can be divided into the traditional for any archaeological study and the innovatory, aiming at a complex investigation of flint artefacts as systemic objects. The complex approach allowed systematizing and analyzing flint artefacts of different periods of the Early and Middle Bronze Age in a variety of territories and ethno-cultural environments.

The use of typological – analysis of 1,520 burial complexes made it possible to study and compare flint implements, as well as various cultures and their territorial groups. The items produced by the Yamnaya population can be said to generally continue traditions of the previous period (‘Steppe Eneolith’ societies), but new forms were also produced. In particular, the ratio of blade-based and flake-based items as compared to bifaces changed significantly. Complexes containing ‘manufacture kits’ became more common.

Flint implements attained maximum specialisation and division of functions in the complexes of Catacomb communities. The most noticeable development was the proliferation of a thin biface technique. Finally, the peoples of the Babino cultures still had the flint knapping traditions of the previous times, but these gradually disappeared at later stages of that culture. This phenomenon can be traced by means of comparing it with a broad variety of categories of implements in Catacomb complexes.

It should be noted that all three communities (YC, BC, CC) display major similarities in flint knapping techniques. The majority of implements are relatively evenly spread throughout the various regions and cultural – chronological groups. Here of relevance is the single Northern Pontic steppe tradition of making and using flint working tools in households and, evidently, in funerary practices. The origins of that tradition should probably be sought in earlier Eneolithic cultures, which requires a separate investigation. The predominant majority of working tools both in burial sites and settlements are scrapers and flake-based knives (totalling 431 items in 367 burials). This fact may indicate that the proportion of tools used in the household is indirectly reflected in the burial rite.

Meanwhile, it is impossible not to note that outside the ‘manufacture kits’ context these tools are located in a variety of ways within the burial construction (grave), similarly to items that bear no secondary modification. This allows us to

assume that in the burial rite context they were not regarded as tools, but received a different meaning. The largest number of categories of tools were included into specialized 'manufacture kits', which is particularly typical of Catacomb complexes. Such kits, provided due analysis of their components, represent a valuable source for reconstruction of a number of Bronze-Age manufacture types.

Hence, based on their occurrence in burial complexes, the usage of flint working tools in various branches of the Northern Pontic economy in the Early and Middle Bronze Age was as follows: about 1% in agriculture, about 70% in processing cattle products (and possibly, hunting), and up to 30% in the sphere of making household items and weapons. Even taking into account the requirements of the funerary rite, we consider such proportions more or less in line with the correlation of flint implement types that functioned in a 'living' material culture. This is also confirmed by an analysis of finds in settlement sites. Probably, to a certain extent, such a correlation of tools for various spheres reflects the correlation of those spheres themselves in the structure of the economy at that time.

Generally, in terms of materials of the Early and Middle Bronze-Age burial complexes, flint implements are far more numerous than bronze tools both in terms of their numbers and variety of categories. It was only before the end of the era that changes in the economy, primarily the progress in metallurgy, saw most of the advantages of flint tools.

A more in-depth investigation of flint weapons allowed drawing the conclusion that due to a variety of reasons they comprised the core of the contemporary weaponry complex. The parameters of the absolute majority of arrowheads (with a notch at the base – type A) indicate the use of a simple bow. Individual heavy heads with a straight base or a tang (types B and C) in most cases were the cause of wounds sustained by the buried individuals. Hence, they can be considered primarily as weapons used by bearers of a different culture. It should be stressed that a predominant majority of arrowheads in the bones of the buried, however, is represented by types characteristic of the very same culture to which the burials belong. This may be the evidence of clashes between groupings of a culturally related population, probably, for the division of resources. Most of the large bifaces from Yamnaya and Catacomb burials, the function of which was determined with the help of our suggested method, proved to be knife – daggers (most probably, for non-military use), and not the so-called heads of combat weapons. At the same time, the dimensions of darts and their shafts leave no doubt that we are dealing with hurling weapons, which for all intents and purposes excludes the spear as a short-range combat weapon from the system of Early and Middle Bronze Age weaponry.

We also proposed that miniature flint figurines be viewed as a separate category of Early and Middle Bronze Age grave goods.

Further, we traced the processes taking place in Early and Middle Bronze Age flint knapping. Within the period addressed by this study, flint knapping

was undergoing constant transformation, which finally resulted in exhausting its capacities and – in the circumstances of proliferation of bronze goods – also led to a radical decline in flint knapping volumes. The strategy of excavation and use of raw materials depended on a number of factors: natural (availability of deposits), economic (cattle-breeding economy, exchange connections, development of metallurgy) and ethno-cultural (relations with the population that controlled supplies of raw materials, the adoption of new techniques).

In connection with their complex impact, already in the Early Bronze Age the related usage shifted to low-quality but easily accessible raw materials. Hence the radical change of flint knapping techniques from the blading to the flaking technique, based on using primitive blanks that sustained almost no secondary modification. Simultaneously, the technology of making thin bifaces, mainly objects of weaponry, is on the rise. This proliferation is marked by the emergence – in the Early and particularly the Middle Bronze Age – of specialized manufacture kits for making arrows, which in certain circumstances appear in burial complexes and become a source for investigation of not only technological, but also social and ‘ideological’ phenomena. Yet, the analysis of burials with such ‘manufacture kits’ allowed drawing the conclusion on the lack of grounds for an identification of a special social group, expert craftsmen, in the Early and Middle Bronze Age, as argued by some researchers. The available source base in this respect provides no grounds for objective reconstructions of the social organization of craft based on ‘manufacture kits’ materials. These are, first and foremost, a valuable source for investigating the organization of technological processes of a number of the Early and Middle Bronze-Age manufacture types.

Finally, flint items were used in burial, funerary and other ritual practices. We divided all the items classed among grave goods (including heads of hurling weapons in the bones of the buried, which caused the wounds) into groups as follows: ‘functional goods’ (items of weaponry, ‘manufacture kits’, knife-daggers) and ‘non-functional goods’ (individual flakes, tools, etc.). It was determined that for the first group an item’s daily function matched its function in the burial rite regardless of the material of which it was made. Hence, knife-daggers, flake-based and blade-based knives have a symbolic meaning close to bronze knives, if found together with a bronze ‘awl’.

We also considered the belief-system aspects of including ‘manufacture kits’, in particular, ‘arrow-makers kits’, into burials. Presumably, at least part of those kits belonged to certain ranks of military elites of the Early and Middle Bronze-Age peoples. For the second group (‘non-functional goods’), widely represented not only by accompanying (within the burial chamber) but attendant (on top of roofs, on ritual sites) goods, it was the material of the item, and not its household purpose, that mattered most. In those cases, flint and similar isotropic rocks were probably attributed with some magical properties: the power to restore the border

between the world of the living and the world of the dead that had been disturbed with the death of a member of society.

Hence, individual flakes, fragments and even some functional tools within the confines of the burial construction (grave) should be viewed not as 'goods' in the general meaning of the term, but rather as a ritual substance that was believed to possess supernatural powers. It was the presence of that substance that mattered for the rite, while the morphology of its piece was secondary. In that sense flint is not at all unique. As the closest analogies of ritual substances from the Early and Middle Bronze-Age burial complexes we can name ochre, chalk, charcoal, and others.

This publication also pays attention to the close connection between flint items and the cult of the general Indo-European deity of the thunderstorm. Also, for the first time for the Northern Pontic area, the study identified a separate category of flint items, miniature sculptures, which probably could serve the function of protective tokens (wards), like items made of other materials.

Based on flint artefacts, the study also analyzed contacts between the Early and Middle Bronze-Age Northern Pontic populations with the peoples of the Corded Ware cultures. The evidence of such contacts may be seen in the proliferation of the custom to place so-called 'arrow-makers kits' into the graves of eastern Corded Ware communities and the Bell Beaker culture, as well as the finds of knives on massive percussion blades and ground axes in Northern Pontic area graves.

Hence, flint implements represent an important type of source, without which it is impossible to create reasonably objective reconstructions of the economy, lifestyle, warfare, religious beliefs, and inter-cultural relations of the ancient population. The study therefore outlined further recommendations for investigation into these issues such as an in-depth research of various aspects of flint implement use by the ancient populations of South-Eastern Europe, aiming at an identification of general trends and local characteristics that emerged during the Paleo-Metal Age.

LIST OF SOURCES

This list of features (catalogue) in which flint artefacts are recorded (broadly-speaking lithic), documents the main research sources of the monograph. The presented sources are listed according to their cultural identification (cultural-historic communities/cultures: Yamnaya, Catacomb and Babyno) and correspondingly, according to region and location name.

In descriptions of features the following data has been provided: location, district, kurhan, grave, source inventory (artefact names documented according to meaning), bibliography and references to figures presented in the study (choice of feature and its analysis in relation to a given research project).

Finally, the monograph catalogue uses abbreviations, numerical identifiers of features and their call numbers, which are applied in the text and illustrations (see Figs. 1-73, Maps 1-10).

I. Yamnaya culture

Crimea

1. *Abdal* Simferopol District k.1 g.2. 1.Flake. 2.Saw. Toshev 2002a:101.
2. *Bile* Simferopol District k.3 g.5. 1-5.Arrowheads with a shallow coulisse. Quiver set. Koltukhov, Toshev 1998:35 (Fig. 17:3).
3. *Bobovycha estate* Simferopol District k.1 g.2, two skeletons. Blade. Schepinskiy 2002:98.
4. *Bohachovka* Krasnoperekopsk District k.10 g.14. Scraper. Korpusova et al. 1978:93 (Fig. 77:4).
5. *Bohachovka* Krasnoperekopsk District k.3 g.1. Blade. Korpusova et al. 1978:62.
6. *Bohachovka* Krasnoperekopsk District k.9 g.6. 1-2.Burin on a flake. 3.Flake. 4.Fragment of blade with a retouch. Korpusova et al. 1978:78 (Fig. 66).
7. *Chervona Zorka* Saki District k.1 g.5. Four skeleton. Flake. Koltukhov, Toshev 1998:152.
8. *Chervona Zorka* Simferopol District k.1 g.14. Cutting tool on a flake. Koltukhov, Toshev 1998:59 (Fig. 30:2).
9. *Chokurcha* Simferopol District k.1 g.1. Arrowhead with a shallow coulisse. Toshev 2002:25 (Fig. 18, 25).
10. *Chornozemne* Sovyetskij District k.1 g.11. 1-5.Flakes. Kopeva-Kolotukhina 2004:72 (Fig. 3:4).
11. *Chornozemne* Sovyetskij District k.1 g.2. Flake. Kopeva-Kolotukhina 2004:72.
12. *Chystenke* Simferopol District k.1 g.7. Flake. Koltukhov, Toshev 1998:44 (Fig. 24:3).
13. *Dolynka* Krasnoperekopsk District k.1 g.3. Spearhead (?). Schepinskiy, 2002:128.
14. *Dozorne* Bilohirsk District Kemi-Oba k.1 g.2, two skeletons. 1-5.Flake. Schepinskiy, Toshev 2001:55.
15. *Dyatlivka* Sovyetskij District k.1 g.1, four skeleton. 1-3.Flakes. Schepinskiy 2002:133.
16. *Illicheve* Lenino District k.1 g.8. Flake. Schepinskiy 2002:113.
17. *Illicheve* Sovyetskij District k.11 g.16. 1-3.Flakes. Korpusova, Leskov 1964-65:36.
18. *Istochne* Krasnoperekopsk District k.12 g.5. 1.Fragment of blade. 2-6.Flakes. Production kit. Korpusova et al. 1978:105 (Fig. 85).
19. *Istochne* Krasnoperekopsk District k.14 g.1. Flake. Korpusova et al. 1978:116.
20. *Istochne* Krasnoperekopsk District k.15 g.2. Flake. Korpusova et al. 1978:132.
21. *Kolosky* Krasnoperekopsk District k.6 g.1. Flake. Schepinskiy, Cherepanova 1969:286 (Fig. 109:11).
22. *Kolosky* Saki District k.3 g.11. Flake. Olkhovskiy 1977:13 (Fig. 39).
23. *Komintern* Bakhchisarai District k.1 g.7. Arrowhead with a coulisse. Schepinskiy 2002:81.
24. *Komunar* Simferopol District k.1 g.1. Spearhead leaved. Schepinskiy 2002:96.
25. *Krasnoperekopsk* k.15 g.9. Flake. Schepinskiy 2002:128.
26. *Krasnoyarske* Saki District k.11 g.18. 1-2.Flakes. Koltukhov, Toshev 1998:152 (Fig. 83:4).
27. *Krasnoyarske* Saki District k.11 g.30. 1.Arrowhead with a shallow coulisse. 2.Cutting tool on a flake. 3.Cutting tool on a blade. 4.Flake. Production kit. Koltukhov, Toshev 1998:157.
28. *Krasnoyarske* Saki District k.11 g.7. Cutting tool on a flake. Koltukhov, Toshev 1998:157 (Fig. 81:3).
29. *Krylovka* Saki District k.14 g.7. 1-2.Flakes. Kolotukhin, Toshev 2000:178.
30. *Krylovka* Saki District k.9 g.9. Flake. Kolotukhin, Toshev 2000:154 (Fig. 106:2).
31. *Lomonosov* Nyzhnohirsk District k.1 g.20. 1.Concretion. 2.Flake. Koltukhov, Toshev 1998:82.
32. *Martynivka* Krasnoperekopsk District k.1 g.11. 1.Scraper on a flake. 2-6.Flakes. Schepinskiy, Cherepanova 1969:243 (Fig. 94:13-20).
33. *Martynivka* Krasnoperekopsk District k.2 g.23. Cutting tool on a flake. Schepinskiy, Cherepanova 1969:260 (Fig. 99:19).
34. *Martynivka* Krasnoperekopsk District k.2 g.43. Flake. Schepinskiy, Cherepanova 1969:266 (Fig. 101:14).
35. *Mar'yine* Simferopol District k.1 g.17, two skeletons. Flake. Shults, Stoliar 1958:54.
36. *Mar'yine* Simferopol District k.1 g.19. Flake. Shults, Stoliar 1958:54.
37. *Mar'yine* Simferopol District k.12 g.1. 1-2.Flakes. Shults, Stoliar 1958:61.
38. *Myrne* Saki District k.1 g.1. 1-2.Flakes. Schepinskiy 2002:95.
39. *Natashyne* Saki District k.10 g.8, two skeletons. Knife-dagger. Kolotukhin, Toshev 2000:197 (Fig. 132:2).
40. *NovoMykolaivka* Krasnoperekopsk District k.1 g.6. Flake. Schepinskiy 2002:104.
41. *Omelyanivka* Nyzhnohirsk District k.1 g.20, four skeleton. 1.Darthead. 2.Flake. Koltukhov, Toshev 1998:71 (Fig. 36:6).
42. *Orlyanka* Saki District k.1 g.12. Arrowhead with a shallow coulisse. Kolotukhin, Toshev 2000:13.
43. *Orlyanka* Saki District k.1 g.4. 1-3.Flakes. Kolotukhin, Toshev 2000:10.
44. *Orlyanka* Saki District k.4 g.3. Flake. Kolotukhin, Toshev 2000:25.
45. *Pionerske* Simferopol District k.2 g.1. 1-2.Flakes. Toshev 2001:186 (Fig. 4:7).
46. *Popivka* Saki District k.1 g.11. 1-2.Flakes. Dashevskaya 1969:62.
47. *Poshtove* Bakhchisarai District k.1 g.1. 1-2.Flakes. Toshev 2001:188.
48. *Pryrichne* Nyzhnohirsk District k.1 g.12. Flake. Gavrillov et al. 2002:98.
49. *Pryrichne* Nyzhnohirsk District k.1 g.3. Flake. Gavrillov et al. 2002:96.
50. *Rysove* Krasnoperekopsk District k.1 g.10. Flake. Schepinskiy, Cherepanova 1969:116.
51. *Rysove* Krasnoperekopsk District k.1 g.19. 1.Scraper on a flake. 2.Knife-dagger(?) leaved. 3.Sickle insert(?). Schepinskiy, Cherepanova 1969:119 (Fig. 42:11-13).
52. *Rysove* Krasnoperekopsk District k.1 g.41. Insert tool (?). Schepinskiy, Cherepanova 1969:122 (Fig. 48:10).
53. *Rysove* Krasnoperekopsk District k.7 g.46. 1.Flake. 2.Fragment of biface. Schepinskiy, Cherepanova 1969:183.
54. *Rysove* Krasnoperekopsk District k.7 g.54. 1.Saw, 9x2,5 cm. 2-4.Scrapers on flakes. 5-10.Flakes. Production kit. Schepinskiy, Cherepanova 1969:185 (Fig. 68:14-23).
55. *Simferopol* k.5 g.4. Flake. Schepinskiy 2002:79.
56. *Skelya* Sevastopol k.1 g.1. 1.Core prismatic. 2-9.Flakes. Schepinskiy 2002:66.

57. *Suvorivske* Saki District k.17 g.1. 1-3.Flakes, Kolutukhin, Toshev 2000:135.
58. *Synycyne* Kirove District k.1 g.50. Flake. Schepinskiy 2002:133.
59. *Tankove* Krasnoperekopsk District k.14 g.22, two skeletons. Flake. Schepinskiy, Cherepanova 1969:227.
60. *Tankove* Krasnoperekopsk District k.14 g.24. Arrow head with a shallow coulisse. Wound(?). Schepinskiy, Cherepanova 1969:229 (Fig. 86:13).
61. *Tankove* Krasnoperekopsk District k.15 g.1, two skeletons. Flake. Schepinskiy, Cherepanova 1969:231.
62. *Tankove* Krasnoperekopsk District k.9 g.13. Blake. Schepinskiy, Cherepanova 1969:198 (Fig. 74:26).
63. *Tankove* Krasnoperekopsk District k.9 g.14. 1-2.Flakes. Schepinskiy, Cherepanova 1969:198.
64. *Tankove* Krasnoperekopsk District k.9 g.17. 1-2.Flakes. Schepinskiy, Cherepanova 1969:199.
65. *Tankove* Krasnoperekopsk District k.9 g.22. 1-2.Scrapers on flakes, 3-5.Flakes, 6.Concretion, 7.Tool on a flake. Production kit. Schepinskiy, Cherepanova 1969:203 (Fig. 75).
66. *Tankove* Krasnoperekopsk District k.9 g.24. Arrow-head with a shallow coulisse. Wound(?). Schepinskiy, Cherepanova 1969:204.
67. *Tankove* Krasnoperekopsk District k.9 g.26. Darthead. Schepinskiy, Cherepanova 1969:204.
68. *Tsilynne* Dzhankoj District k.1 g.23. Flake. Korpusova et al. 1978:20 (Fig. 21:3).
69. *Tsilynne* Dzhankoj District k.1 g.3. Flake. Korpusova et al. 1978:3.
70. *Tsilynne* Dzhankoj District k.13 g.1. Flake. Korpusova et al. 1977:79.
71. *Tsilynne* Dzhankoj District k.13 g.10. Flake. Korpusova et al. 1977:85.
72. *Tsilynne* Dzhankoj District k.13 g.12. 1-6.Flakes, 7.Blade. Production kit. Korpusova et al. 1977:86 (Fig. 55:8-15).
73. *Tsilynne* Dzhankoj District k.13 g.22. 1.Cutting tool on a flake, 2.Hammerstone. Korpusova et al. 1977:91 (Fig. 57:5).
74. *Tsilynne* Dzhankoj District k.13 g.5. Flake. Korpusova et al. 1977:81.
75. *Tsilynne* Dzhankoj District k.14 g.3. Flake. Korpusova et al. 1977:98 (Fig. 59:6).
76. *Tsilynne* Dzhankoj District k.15 g.12. 1.Cutting tool on a flake, 2.Darthead, 5,3 cm. Korpusova et al. 1977:108 (Fig. 63:7,8).
77. *Tsilynne* Dzhankoj District k.16 g.17. Flake. Korpusova et al. 1977:129.
78. *Tsilynne* Dzhankoj District k.16 g.39. Flake. Korpusova et al. 1977:137.
79. *Tsilynne* Dzhankoj District k.6 g.13, two skeletons. 1-2.Flakes. Korpusova et al. 1978:52 (Fig. 47:3).
80. *Uvarove* Lenino District k.1 g.9. 1.Cutting tool on a flake, 2.Flake. Schepinskiy 2002:111.
81. *Vladyslavivka* Kirove District k.7 g.4. 1-2.Flakes Schepinskiy 2002:133.
82. *Zelenyj Yar* Lenino District k.1 g.16. Flake. Schepinskiy 2002:116.
83. **Dnepropetrovsk Region**
83. *Auly* I Solone District k.1 g.2. Flake. Kovaleva et al. 1990:129.
84. *Avrora* Nikol District k.2 g.10. Scraper on a flake. Churilova, Nor 1986:27 (Fig. 34:2).
85. *Blagodatne* IV Pavlohrad District k.3 g.11. Fragment of arrowhead. Wound. Marina et al. 1986:16.
86. *Blagodatne* IV Pavlohrad District k.4 g.2. 1-3.Scrapers on flakes, 4-5.Flakes. Production kit. Marina 1995:64 (Fig. 1:11-15).
87. *Blyznyuky* Dnepropetrovsk District k.1 g.9. Cutting tool on a flake. Krylova 1967:19.
88. *Blyznyuky* Kryvyj Rig District k.5 g.5. Flake. Melnik 1983:101 (Fig. 299).
89. *Blyznyuky* Kryvyj Rig District k.6 g.1. Flake. Melnik 1983:106 (Fig. 22:15).
90. *Bohuslav* k.27 g.3. 1.Combined tool on a flake. 2-4.Cutting tools on flakes, 5.Tool on a flake. Marina 1995:71 (Fig. 4).
91. *Borovkivka* Verhnyodniprosk District k.1 g.7. Arrow-head with a coulisse. Kovaleva et al. 1991:35 (Fig. 85).
92. *Borysivka* I Nikol District k.6 g.1. Scraper on a flake. Kovaleva et al. 1992:47 (Fig. 93).
93. *Bulahivka* II Pavlohrad District k.3 g.13, two skeletons. Scraper on a flake. Kovaleva, Peretiatio 1973:164.
94. *Buzivka* XXIV Magdalynivka District k.2 g.2. Flake. Kovaleva et al. 1980:28.
95. *Chaplinka* Pavlohrad District k.1 g.5. Flake. Kovaleva 1983c:61.
96. *Chermechyna* XX Magdalynivka District k.3 g.15, three skeletons. Knife-dagger(?) rhombic. Kovaleva et al. 1979:162 (Fig. 533).
97. *Chernoglavove* II Pavlohrad District k.2 g.6. Spear-head. Kovaleva, Shalobudov 1985:22 (Fig. 69).
98. *Chernoglavove* II Pavlohrad District k.3 g.1. Flake. Kovaleva, Shalobudov 1985:22 (Fig. 72).
99. *Chernoglavove* II Pavlohrad District k.4 g.17. Flake. Kovaleva, Shalobudov 1985:36 (Fig. 115).
100. *Chervonokam'iane* Solone District k.2 g.8. Blade. Kovaleva et al. 1992:30 (Fig. 53).
101. *Chkalivka* IV Kryvyj Rig District k.3 g.2. Flake. Kovaleva et al. 1991:6 (Fig. 4).
102. *Chkalivka* IV Kryvyj Rig District k.6 g.11. Burin on a flake. Kovaleva et al. 1991:23 (Fig. 61).
103. *Chkalivka* IV Kryvyj Rig District k.6 g.12. 1.Scraper on a flake, 2.Hammerstone. Kovaleva et al. 1991:24 (Fig. 63:65).
104. *Chkalivka* II Kryvyj Rig District k.1 g.2. Arrowhead with a deep coulisse. Wound. Kovaleva et al. 1990:157 (Fig. 451).
105. *Chkalivka* II Kryvyj Rig District k.2 g.4. 1-2.Flakes. Kovaleva et al. 1990:160 (Fig. 465).
106. *Chkalivka* II Kryvyj Rig District k.2 g.7, two skeletons. Bifacial insert cutting tool. Kovaleva et al. 1990:157 (Fig. 469).
107. *Chkalivka* II Kryvyj Rig District k.2 g.8. Arrowhead with a coulisse. Wound. Kovaleva et al. 1990:157 (Fig. 471).
108. *Chornyavshchina* Pavlohrad District k.1 g.13. Scraper on a flake. Telegin et al. 1974:54. *Chornyavshchina* Pavlohrad District k.1 g.6. Flake. Telegin et al. 1974:54.
109. *Chornyavshchina* Pavlohrad District k.2 g.10. Blade. Telegin et al. 1974:54.
110. *Chornyavshchina* Pavlohrad District k.2 g.6. Flake. Telegin et al. 1974:54.

111. *Chornyvavshchina* Pavlohrad District k.3 g.2. 1-10. Flakes. 11. Piercer on a flake. Production kit. Telegin *et al.* 1974:56.
112. *Didova Mohyla group* Nikopol District k.1 g.16. Dart-head. Mozolevskiy *et al.* 1980:34 (Fig. 17:2).
113. *Gnativka* I Novomoskovsk District k.6 g.7. Scraper on a flake. Production kit. Kovaleva, Marina 1982:97 (Fig. 223).
114. *Grygorivka* Solone District k.5 g.2. Knife or spear-head. 4,5x2 cm. Kovaleva *et al.* 1987:78 (Fig. 150).
115. *Hannivka* Novomoskovsk District k.1 g.10. 1-5. Scrapers-Burins, on flakes. 6-16. Flakes with on tracks the use. 17. Arrowhead with a deep coulisse. Production kit of arrowmaker. Kovaleva, Shalobudov 1986:55 (Fig. 153).
116. *Hashcheve* Novomoskovsk District k.2 g.4. Flake. Kovaleva *et al.* 1978:5.
117. *Hashcheve* Novomoskovsk District k.2 g.5. Flake. Kovaleva *et al.* 1978:5 (Fig. 14).
118. *Hashcheve* Novomoskovsk District k.3 g.6. Scraper on a flake. Kovaleva *et al.* 1978:16 (Fig. 54).
119. *Hashcheve* Novomoskovsk District k.6 g.13. Knife-dagger(?) rhombic. 11x2, 8 cm. Kovaleva *et al.* 1978:46 (Fig. 156).
120. *Heikivska* ?? Kryvyj Rig District k.1 g.5. Scraper on a flake. Melnik 1990:17 (Fig. 42).
121. *Jemchujne* Pavlohrad District k.6 g.7. Blade. Kovaleva, Shalobudov 1986:44 (Fig. 122).
122. *Kirovka* I Solone District k.1 g.4. Arrowhead with a deep coulisse. Wound. Kovaleva, Shalobudov 1988:71 (Fig. 162).
123. *Kirovka* I Solone District k.1 g.8, two skeletons. Fragment of blade with a retouch. Kovaleva, Shalobudov 1988:71 (Fig. 162).
124. *Kirovskiy* Dnepropetrovsk District k.2 g.10. Skraper-Burin on a flake. Holubchuk *et al.* 1992:18 (Fig. 26:3).
125. *Kirovskiy* Dnepropetrovsk District k.2 g.8. Fragment of blade. Holubchuk *et al.* 1992:17.
126. *Kotovka* Magdalynivka District k.1 g.1. 1-2. Flakes. Kovaleva 1981b:175.
127. *Kovpakivka* I Magdalynivka District k.2 g.5. Flake. Kovaleva 1981b:89.
128. *Kovpakivka* III Magdalynivka District k.8 g.11. Flake. Kovaleva 1981a:89.
129. *Kovpakivka* III Magdalynivka District k.8 g.4. Dart-head rhombic. 7,5x2,1 cm. Kovaleva 1981a:129 (Fig. 375).
130. *Kravtsi* Shiroke District k.4 g.11, two skeletons. 1-2. Flakes. Romashko *et al.* 1988:87 (Fig. 286).
131. *Kravtsi* Shiroke District k.4 g.9. Flake. Romashko *et al.* 1988:86 (Fig. 280).
132. *Krugla Mohyla group* Nikopol District k.7 g.1. Flake. Mozolevskiy *et al.* 1983:19 (Fig. 9:7).
133. *Kryvyj Rig* I k.3 g.2. Knife-dagger with a petiole. 11x3, 5 cm. Kovaleva *et al.* 1989:108 (Fig. 338).
134. *Kryvyj Rig* I k.3 g.4. Arrowhead with a shallow coulisse. Kovaleva *et al.* 1989:109 (Fig. 343).
135. *Kryvyj Rig, NHZK* k.1 g.4. 1. Burin on a flake. 2. Scraper on a flake. Melnik 1982:32 (Fig. 12).
136. *Kryvyj Rig, Ryadovi Mohyly* k.2 g.1. Arrowhead with a shallow coulisse. Wound. Melnik 1990:5 (Fig. 7:3).
137. *Kryvyj Rig, Rybasove* II k.2 g.7. Darthead. Melnik 1986:57 (Fig. 49).
138. *Kryvyj Rig, Try Braty group* k.1 g.12. Scraper on a flake. Melnik 1989:18 (Fig. 67:3).
139. *Kut* Apostolovo District k.19 g.5. 1-6. Flakes. 7. Scraper on a flake. Berezovets 1960:66.
140. *Kyslychuvata* III Tomakivka District k.2 g.8. Flake. Kovaleva, Shalobudov 1986:83 (Fig. 330).
141. *Lychkove* III Novomoskovsk District k.3 g.3. Flake. Kovaleva, Marina 1982:57.
142. *Lychkove* III Novomoskovsk District k.6 g.2. Scraper on a flake. Kovaleva, Marina 1982:61.
143. *Mala Kozyrshchyna* Novomoskovsk District k.1 g.10. 1-2. Scrapers on flakes. Kovaleva, Marina, 1982:8 (Fig. 15).
144. *Malozaharyne* I Solone District k.1 g.4. Scraper on a flake. Kovaleva, Shalobudov 1988:75 (Fig. 170).
145. *Mar'yivka* Apostolovo District k.1 g.15, two skeletons. Scraper on a flake. Berezovets 1960:106.
146. *Mar'yanske* Apostolovo District k.5 g.11, two skeletons. 1. Scraper on a flake. 2-4. Arrowheads with a shallow coulisse. Berezovets 1960:123.
147. *Mar'yanske* Apostolovo District k.6 g.17. A flake. Berezovets 1960:125.
148. *Mar'yanske* Apostolovo District k.6 g.9, three skeletons. 1-2. Flakes. Berezovets 1960:124.
149. *Mar'yivka* III Magdalynivka District k.2 g.7. Cenotaf. 1-2. Arrowheads with a coulisse. Kovaleva *et al.* 1978:90.
150. *Mar'yivka* XVI Sofivka District k.6 g.6. Scraper on a blade. Bondar *et al.* 1976:31 (Fig. 140).
151. *Mar'yivka* ?VI? Sofivka District k.8 g.3. Arrowhead with a petiole. Wound. Bondar *et al.* 1976:36 (Fig. 178).
152. *Mogilyov* Tsarychanka District k.1 g.7. Scraper on a flake. Telegin *et al.* 1972:7.
153. *Mohyly Gurskogo* a group Nikopol District k.1 g.19. Arrowhead with a shallow coulisse. Wound. Mozolevskiy, Nikolova 1980:24 (Fig. 13:1).
154. *Mykolaivka* I Petropavlivka District k.3 g.4, two skeletons. 1. Scraper on a flake. 2. Cutting tool on a blade. 3. Flake. Production kit. Marina 1995:64 (Fig. 1:8-10).
155. *Mykolaivka* I Petropavlivka District k.3 g.7. Spear-head. 16x4 cm. Marina, Romashko 1999:42 (Fig. 2:3).
156. *Mykolaivka* IV Dnepropetrovsk District k.3 g.3. Perforator on a flake. Kovaleva, Shalobudov 1985:18 (Fig. 40).
157. *Mykolaivka* IV Dnepropetrovsk District k.3 g.7. Flake. Kovaleva, Shalobudov 1985:20.
158. *Novo-Ivanivka* I Pavlohrad District k.1 g.15. Flake. Kovaleva 1983c:110.
159. *Novo-Ivanivka* II Pavlohrad District k.2 g.3. Cenotaf. Scraper on a flake. Kovaleva, Shalobudov 1986:12 (Fig. 10).
160. *Novomoskovsk* k.1 g.4. Arrowhead with a coulisse. Wound. Kovaleva *et al.* 1990:186 (Fig. 547).
161. *NovoMykolaivka* I Dnepropetrovsk District k.2 g.3, two skeletons. Burin on a flake. Kovaleva *et al.* 1990:13 (Fig. 16).
162. *NovoMykolaivka* I Dnepropetrovsk District k.7 g.9. Arrowhead. Kovaleva *et al.* 1990:31. (Fig. 67).
163. *NovoOleksandrivka* Dnepropetrovsk District III k.1 g.7. Combined tool. Kovaleva *et al.* 1989:33. (Fig. 111).
164. *NovoOleksandrivka* ?? Dnepropetrovsk District k.2 g.3. 1. Knife-dagger. 2. Scraper on a flake. 3. Insert tool. Kovaleva *et al.* 1989:28.

165. *NovoShandrivka* I Pavlohrad District k.2 g.3. Cutting tool on a flake. Kovaleva *et al.* 1987:160 (Fig. 404).
166. *NovoShandrivka* I Pavlohrad District k.3 g.1. Cutting tool on a flake. Kovaleva *et al.* 1987:160 (Fig. 409).
167. *NovoShandrivka* I Pavlohrad District k.3 g.2. Cutting tool on a flake. Kovaleva *et al.* 1987:162 (Fig. 412).
168. *Novoukrainka* Kryvyj Rig District k.1 g.3. Arrowhead with a shallow coulisse. Wound. Melnik 1981:4 (Fig. 15).
169. *Novyi Svit* II Tomakivka District k.2 g.2. Cutting tool on a flake. Kovaleva, Shalobudov 1985:26.
170. *Oleksandrivka* I Novomoskovsk District k.9 g.2. 1. Cutting tool. 2. Burin on a flake. Kovaleva *et al.* 1977:44 (Fig. 130).
171. *Oleksandrivka* I Novomoskovsk District k.9 g.3. Arrowhead with a coulisse. Wound. Kovaleva *et al.* 1977:44 (Fig. 135).
172. *Oleksandrivka* I Novomoskovsk District k.9 g.5. Flake. Kovaleva *et al.* 1977:47.
173. *Oleksandrivka* XVII Magdalynivka District k.2 g.3. Knife-dagger 7x2, 5x0, 6 cm. Kovaleva 1975:112 (Fig. 122:1).
174. *Oleksandrivskii career* Nikopol District k.1 g.2. 1. Flake. 2-3. Arrowheads with direct bases. Mozolevskiy *et al.* 1991:29 (Fig. 20:10-12).
175. *Pereshchepyne* Novomoskovsk District k.1 g.12. Flake touched. Bratchenko 1970:6.
176. *Pereshchepyne* Novomoskovsk District k.1 g.7. 1. Spearhead. 2. Fragment of blade. Telegin *et al.* 1971:8 (Fig. 17).
177. *Pereshchepyne* Novomoskovsk District k.4 g.13, two skeletons. 1. Knife-dagger, 12,8x2, 7 cm. 2-206. Flakes. 207. Flake with two coulissses – possibly, miniature sculpture. Telegin *et al.* 1973:30 (Fig. 24).
178. *Pereshchepyne* Novomoskovsk District k.5 g.7. Fragment of biface. Telegin *et al.* 1973:36.
179. *Petropavlivka* III k.4 g.4, two skeletons. Scraper on a flake. Production kit. Marina 1995:64 (Fig. 1:3).
180. *Pishchanka* Novomoskovsk District k.1 g.2. Flake. Kovaleva 1981b:208.
181. *Pryvorotna Balka* Kryvyj Rig District k. Luk'yanivka g.22. Burin on a flake. Melnik 1981:96.
182. *Rahmanivka* Kryvyj Rig District k.4 g.15. Flake. Krylova 1966:3.
183. *Rodionivka Kamova Mohyla* Kryvyj Rig District k.1 g.13. Flake. Melnik 1986:39.
184. *Rodionivka* Kryvyj Rig District k.10 g.3. Scraper on a flake. Melnik 1984:56 (Fig. 170).
185. *Rodionivka* Kryvyj Rig District k.7 g.2. Arrowhead with a shallow coulisse. Wound. Melnik 1984:39.
186. *Rodionivka* Kryvyj Rig District k.7 g.3. Scraper on a flake. Melnik 1984:40.
187. *Shandrivka* I Pavlohrad District k.1 g.11. 1. Scraper on a flake. 2. Flake. Kovaleva 1983c:11 (Fig. 33).
188. *Shandrivka* I Pavlohrad District k.2 g.2. Scraper. Kovaleva 1983c:14 (Fig. 37).
189. *Shandrivka* I Pavlohrad District k.5 g.11. 1. Scraper on a flake. 2-5. Flakes. Kovaleva 1983c:29 (Fig. 83).
190. *Shandrivka* III Pavlohrad District k.1 g.2. Scraper on a flake. Kovaleva 1983c:43 (Fig. 127).
191. *Shevchenko* Kryvyj Rig District k.4 g.7. Core prismatic. Melnik 1981:44.
192. *Shevchenko* Nikopol District k.28 g.14 1-5. Flakes. Polin *et al.* 2004:260.
193. *Sholohove* Nikopol District k.7 g.2. Flake. Kovaleva *et al.* 1976:25.
194. *Shyroke* I Solone District k.6 g.1. 1-3. Flakes. Production kit(?). Kovaleva, Shalobudov 1986:83 (Fig. 234).
195. *Shyroke* Kryvyj Rig District k.1 g.31. Knife on flake 12,5x2, 2x0, 8 cm. Krylova 1965:31.
196. *Shyroke* Kryvyj Rig District k.3 g.7. Arrowhead with the shallow coulisse. Wound. Krylova 1965:45.
197. *Shyroke* Kryvyj Rig District k.5 g.1, two skeletons 1-2. Flakes. Krylova 1965:52.
198. *Shyroke* III Solone District k.2 g.4. Flake. Kovaleva *et al.* 1987:39.
199. *Sokolove* I Novomoskovsk District k.11 g.5. Arrowhead with a coulisse. Wound. Kovaleva 1976:63 (Fig. 264).
200. *Sokolove* I Novomoskovsk District k.4 g.5. Flake. Kovaleva 1976:38 (Fig. 151).
201. *Sokolove* II Novomoskovsk District k.2 g.5. 1. Flake. 2. Knife-dagger(?). 8,4x2, 3 cm. Kovaleva 1974:109 (Fig. 431:1).
202. *Sokolove* II Novomoskovsk District k.2 g.9. Scraper on a flake. Kovaleva 1976:84 (Fig. 342).
203. *Sokolove* II Novomoskovsk District k.3 g.1. 1-2. Flakes. Kovaleva *et al.* 1977:31 (Fig. 75,76).
204. *Sokolove* II Novomoskovsk District k.3 g.25. Flake. Kovaleva *et al.* 1977:45 (Fig. 40).
205. *Sokolove* II Novomoskovsk District k.3 g.29. 1-2. Knives on blades. Kovaleva *et al.* 1977:47 (Fig. 153, 154).
206. *Sokolove* III Novomoskovsk District k.3 g.14, two skeletons. Scraper on a flake. Kovaleva *et al.* 1977:86 (Fig. 269).
207. *Sokolove* III Novomoskovsk District k.3 g.6. Scraper on a flake. Kovaleva *et al.* 1977:79 (Fig. 247).
208. *Spaske* V Magdalynivka District k.7 g.4. Flake. Kovaleva, Peretiatio 1973:32.
209. *Spaske* XI Novomoskovsk District k.2 g.16. Flake. Kovaleva, 1974:61 (Fig. 200:1).
210. *Sursko-Litovske* I Dnepropetrovsk District k.1 g.3. Flake. Kovaleva *et al.* 1990:39.
211. *Taraso-Hryhorivka* V Apostolovo District k.3 g.2. 1. Knife on a flake. 2. Insert tool. 3. Arrowhead with a shallow coulisse. Mukhopad, Androsov 1986:100 (Fig. 412,413).
212. *Taraso-Hryhorivka* V Apostolovo District k.4 g.5. 1. Cutting tool on a flake. 2. Flake with on tracks of work. 3. Arrowhead with a shallow coulisse. Mukhopad, Androsov 1986:104 (Fig. 432).
213. *Terny* Pavlohrad District k.1 g.11. Flake. Kovaleva, Shalobudov 1985:68 (Fig. 248).
214. *Terny* Pavlohrad District k.1 g.12. Flake. Kovaleva, Shalobudov 1985:68 (Fig. 250).
215. *Terny* Pavlohrad District k.1 g.9. 1-6. Flakes. Kovaleva, Shalobudov 1985:68.
216. *Terny* Pavlohrad District k.2 g.12. Scraper on a flake. Kovaleva, Marina, Shalobudov 1984:22 (Fig. 37).
217. *Terny* Pavlohrad District k.4 g.15. Flake. Kovaleva, Marina, Shalobudov 1984:37.
218. *Terny* Pavlohrad District k.8 g.5. Spearhead, rhombic, 11x3, 5 cm. Kovaleva, Marina, Shalobudov 1984:57 (Fig. 135).

219. *Terny* IV Pavlohrad District k.1 g.1. 1. Scraper on a flake. 2. Arrowhead. Wound. Kovaleva, Marina, Shalobudov 1984:85 (Fig. 225,227).
220. *Terny* III Pavlohrad District k.1 g.4. Scraper on a flake. 4x2, 5x0, 6 cm. Kovaleva, Marina, Shalobudov 1984:72 (Fig. 182).
221. *Terny* III Pavlohrad District k.1 g.5. Flake. Kovaleva, Marina, Shalobudov 1984:72 (Fig. 182).
222. *Terny* III Pavlohrad District k.1 g.7. Flake. Kovaleva *et al.* 1984:72 (Fig. 185).
223. *Vasylyvka* Dnepropetrovsk District k.2 g.3. 1. Knife - dagger 10,3x3, 9 cm. 2. Arrowhead with a deep coulisse. Kovaleva *et al.* 1989:53 (Fig. 172,173).
224. *Vasylyvka* II Dnepropetrovsk District k.5 g.7. Burin on a flake. Kovaleva *et al.* 1989:79 (Fig. 255).
225. *VelykoMychajlivka* IV Pokrovka District k.1 g.1. Flake. Kovaleva, Marina, Shalobudov 1984:176 (Fig. 476).
226. *Verbky* IV Pavlohrad District k.3 g.11. Fragment of the quartzitic arrowhead. Kovaleva *et al.* 1982:30.
227. *Verbky* V Pavlohrad District k.7 g.4. Flake. Kovaleva *et al.* 1982:50 (Fig. 160).
228. *Verhnyia Maivka* XIV Magdalynivka District k.1 g.16. 1-3. Flakes. Kovaleva, Marina 1976:82 (Fig. 329).
229. *Verhnyia Maivka* XIV Magdalynivka District k.5 g.3. Cenotaf. Arrowhead with a coulisse. Kovaleva 1974:124 (Fig. 513:1).
230. *Verhnyia Maivka* XII Magdalynivka District k.1 g.13. Flake. Kovaleva 1974:72 (Fig. 244:1).
231. *Verhnyia Maivka* XVIII Magdalynivka District k.1 g.7a. Flake. Kovaleva 1975:52.
232. *Vilnohirsk* I k.1 g.25. Arrowhead with a deep coulisse. Churilova, Nor 1987:46 (Fig. 39:2).
233. *Voikove* I Kryvyj Rig District k.1 g.13. Darthead rhombic, 4,8x1,1x0,9 cm. Krylova 1967:12.
234. *Voikove* II Kryvyj Rig District k.1 g.17. Arrowhead with a shallow coulisse. Wound. Krylova 1968:26.
235. *Voloske* II Dnepropetrovsk District k.2 g.10. Flake retouched. Kovaleva 1983c:173.
236. *Yuriivka* I k.3 g.2. 1-5. Scrapers on flakes. 6-7. Scrapers -drills on flakes. 8-9. Flakes. Production kit. Kovaleva, Marina 1982:8 (Fig. 174).
237. *Zaplavka* I Magdalynivka District k.7 g.5. Fragment of biface. Kovaleva 1981b:175 (Fig. 487).
238. *Zlatoustivka* I Kryvyj Rig District k.1 g.4. Flake. Romashko *et al.* 1988:41 (Fig. 132).
239. *Zvonetske* Solone District k.15 g.8. 1. Spearhead rhombic. 2. Flake. Kovaleva *et al.* 1990:80 (Fig. 217).
240. *Zvonetske* Solone District k.17 g.4. 1-2. Flakes. Kovaleva *et al.* 1990:85.
241. *Zvonetske* III Solone District k.2 g.7. 1. Flake. 2. Insert tool. Kovaleva *et al.* 1990:116 (Fig. 329,330).
242. *Kremenivka* Volodarske District k.3 g.4. Cutting tool on a flake. Constantinescu 1988:94 (Fig. 3:4).
247. *Kremenivka* Volodarske District k.6 g.4, three skeletons. Flake. Constantinescu 1988:98.
248. *Kremenivka* Volodarske District k.8 g.3. Flake. Constantinescu 1988:99.
249. *Kuibysheve* Volodarske District k.1 g.13. 1-2. Flakes. Moruzhenko *et al.* 1988:20 (Fig. 16:5,6).
250. *Mariupol Vynogradnyky* k.1 g.3. Knife-dagger. Kulbaka 1984:7.
251. *Mariupol Zinceva Balka* k.2B g.17. Knife-dagger. [excavated in 2006 by Usachuk A.N., Polidovich Y.B.].
252. *Mykolaivka* Krasnoarmiisk District k.1 g.15. 1. Cutting tool on a flake. 2. Fragment of spearhead (?). Polidovich 1993:53.
253. *Novooleksiivka* Volnovaha District k.1 g.6. Spearhead with a petiole, 16,6x5, 8x0, 8 cm. Moruzhenko *et al.* 1988:9 (Fig. 7:3).
254. *Novoselivka* Telmanove District k.6 g.7. 1-2. Cutting tool on flakes. Bratchenko *et al.* 1976:102 (Fig. 104:7).
255. *Ohorodne* Pershotravneve District k.3 g.8. Flake. Posrednikov, Zarayskaya 1993:148 (Fig. 32:4).
256. *Oktyabrsk* Slovyansk District k.1 g.2. Flake. Sanzharov, Posrednikov 1985:46 (Fig. 25:4).
257. *Oktyabrsk* Slovyansk District k.1 g.3, four skeleton. 1. Darthead, rhombic, 8,8x2, 7x0, 9 cm. 2. Flake. Sanzharov, Posrednikov 1985:48 (Fig. 25:6,7).
258. *Oktyabrsk* Slovyansk District k.2 g.3. 1. Scraper on a flake. 2-4. Flakes. Sanzharov, Posrednikov 1985:51 (Fig. 28:2-5).
259. *Oktyabrsk* Slovyansk District k.3 g.3. 1. Darthead 10,5x3,1 cm. 2. Fragment of scraper on a flake. 3. Scraper on a flake. Sanzharov, Posrednikov 1985:53 (Fig. 28:7,8,10).
260. *Oktyabrsk* Slovyansk District k.5 g.1. Flake. Sanzharov, Posrednikov 1985:68 (Fig. 37:2).
261. *Oktyabrsk* Slovyansk District k.6 g.1. Flake. Production kit. Sanzharov, Posrednikov 1985:73 (Fig. 36:6).
262. *Pokrovka* Amvroisiivka District k.4 g.2. Flake. Shapovalov *et al.* 1987:54 (Fig. 40:3).
263. *Prymorske* I Novoazovsk District k.1 g.5. Flake. Beliaev *et al.* 1976:6.
264. *Prymorske* I Novoazovsk District k.3 g.8. Scraper. Beliaev *et al.* 1976:46.
265. *Prymorske* I Novoazovsk District k.4 g.1. 1. Scraper on a flake. 2. Flake. Beliaev *et al.* 1976:47.
266. *Prymorske* I Novoazovsk District k.4 g.5. Flake. Beliaev *et al.* 1976:51.
267. *Prymorske* Novoazovsk District k.1 g.3. Flake. Kulbaka *et al.* 1991:20 (Fig. 42:13).
268. *Prymorske* Novoazovsk District k.1 g.5. Knife on a flake. Kulbaka *et al.* 1991:20 (Fig. 42:14).
269. *Styla* Starobesheve District k.1 g.4. Flake. Shapovalov *et al.* 1987:71 (Fig. 56:7).

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242. *Dibrovka* Shahtarsk District k.4 g.12, four skeleton. Flake. Moruzhenko *et al.* 1989:47 (Fig. 83:5).
243. *Kalynivka* Novoazovsk District k.2 g.5. Darthead 9,5x4,7 cm. Kulbaka 1985:9.
244. *Kam'yanka* II Starobesheve District k. k.1 g.4. 1. Flake. 2. Spearhead. Kosikov 1977:311.
245. *Kindrativka* Kostyantynivka District k.2 g.3. Cenotaf. 1. Cutting tool. 2. Scraper on a flake. Kulbaka, Kachur 2000:49.

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270. *Kopanky* Krasnohrad District k.1 g.3. Flake. Berestnev 2001:71.
271. *Kopanky* Krasnohrad District k.2 g.1. 1. Arrowhead with a shallow coulisse. 2-63. Flakes. Production kit. Berestnev 2001:71.
272. *Lyubivka* B Krasnokutsk District k.1 g.1. Scraper on a flake. Berestnev 2001:71.

273. *Petrivske Lozova District k.1 g.2. 1-2. Flakes*. Telegin *et al.* 1973:72.
274. *Petrivske Lozova District k.1 g.8. 1-8. Flakes, 8.Flake*. Telegin *et al.* 1973:72.
275. *Rozhdestvenka Zolochiv District k.2 g.1, two skeletons. 1-2.Scrapers on flakes*. Telegin *et al.* 1974:53.
276. *Velyka Komyshevaha Izyum District k.1 g.3. Spearhead*(?). Kolenchenko 1975:115 (Fig. 1:2).
277. *Vovchansk k.4 g.1. Flake*. Berestnev 2001:71.
278. *Vyla Izyum District k.1 g.13. 1-3.Flakes*. Tsimidanov, Kravchenko 2001:76 (Fig. 4).
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279. *Antonivka Novotroitske District k.1 g.4. Flake*. Kubyshv *et al.* 1976:150.
280. *Babenkove Kalanchak District k.1 g.21. Arrowhead with a coulisse*. Wound. Schepinskiy, Cherepanova 1969:87 (Fig. 28:8).
281. *Babenkove Kalanchak District k.2 g.8, two skeletons. Flake*. Schepinskiy, Cherepanova 1969:96.
282. *Babenkove Kalanchak District k.4 g.8. Scraper on a blade*. Schepinskiy, Cherepanova 1969:109 (Fig. 43:15).
283. *Bilozerka k.8 g.23. Flake*. Evdokimov *et al.* 1984:18.
284. *Bilozerka k.9 g.8. 1.Cutting tool on a flake, 2.Perforator on a flake, 3.Flake*. Production kit. Evdokimov *et al.* 1984:28 (Fig. 12).
285. *Bohdanivka Kahovka District k.2 g.14. Flake*. Kubyshv *et al.* 1974:9.
286. *Brylivka Tsyurupinsk District k.16 g.20. 1-2.Cutting tool*. Production kit. Evdokimov *et al.* 1984:134 (Fig. 74:8).
287. *Brylivka Tsyurupinsk District k.17 g.8. Blade*. Evdokimov *et al.* 1985:49.
288. *Burhunka Beryslav District k.1 g.11, two skeletons. Scraper on a flake*. Evdokimov *et al.* 1981:111 (Fig. 103:5).
289. *Chehovka Nyzhni Sirohozy District k.4 g.14. Flake quartzitic*. Evdokimov *et al.* 1986:28.
290. *Chornyanka I Kahovka District k.2 g.2. Fragment of arrowhead*. Wound. Kubyshv *et al.* 1979:75.
291. *Dolmativka Hola Prystan District k.1 g.16. Cutting tool*. Evdokimov *et al.* 1979:25.
292. *Dolynske Chaplynskyj District k.1 g.18. 1.Flake, 2.Fragment of biface*. Kubyshv *et al.* 1983:159 (Fig. 87).
293. *Dolynske Chaplynskyj District k.1 g.27. 1-2.Pieces of obsydian, 3.Scraper on a flake*. Kubyshv *et al.* 1983:161.
294. *Hreschenivka Novovoroncove District k.1 g.1. Burin on a flake*. Kubyshv *et al.* 1979:127 (Fig. 32).
295. *Kalanchak k.2 g.3. Scraper on a flake*. Evdokimov *et al.* 1986:40 (Fig. 32:7).
296. *Kalanchak k.2 g.5. 1.Burin on a flake, 2.Flake*. Simonenko, Olgovskiy 1981:45.
297. *Kalanchak k.3 g.9, two skeletons. Cutting tool on a flake*. Evdokimov *et al.* 1980:38.
298. *Kayiry II Hornostayivka District k.2 g.2. Spearhead* 12,5x4 cm. Kubyshv *et al.* 1989:37 (Fig. 21:5).
299. *Komyshevka Kahovka District k.3 g.2. Scraper on the fragment of blade*. Evdokimov *et al.* 1989:5 (Fig. 4:4).
300. *Lvove Beryslav District k.1 g.10. Flake*. Terenozhkin *et al.* 1973:34.
301. *Lvove Beryslav District k.14 g.6. Knife-dagger* 15,7 x 4 x 1,1 cm. Terenozhkin *et al.* 1973:77.
302. *Lvove Beryslav District k.14 g.7. Knife on a blade* 8x2,1 cm. Terenozhkin *et al.* 1973:78 (Fig. 36:2).
303. *Lvove Beryslav District k.8 g.4. Flake*. Terenozhkin *et al.* 1973:42.
304. *Lvove III Beryslav District k.6 g.2. Cenotaf. Flake*. Evdokimov *et al.* 1983:31 (Fig. 18).
305. *Nova Mayachka Tsyurupinsk District k.1 g.9. Scraper on paleolithic flake*. Evdokimov *et al.* 1979:74.
306. *Novochornomor'ya Hola Prystan District k.12 g.8. Scraper on a flake*. Kovpanenko, Sharafutdinova 1963:57.
307. *Novochornomor'ya Hola Prystan District k.5 g.7, three skeletons. Flake*. Kovpanenko, Sharafutdinova 1963:29.
308. *Novochornomor'ya Hola Prystan District k.9 g.4. Flake*. Kovpanenko, Sharafutdinova 1963:49.
309. *Novodmyrivka Henichesk District k.1 g.9. 1.Scraper on a flake, 2.Cutting tool on a flake*. Kubyshv *et al.* 1983:131 (Fig. 60:1).
310. *Novokam'yanka Kahovka District k.1 g.1. Spearhead* 11x3,4x0,6 cm. Kubyshv *et al.* 1974:36.
311. *Novokam'yanka Kahovka District k.1 g.14. Scraper on a flake*. Kubyshv *et al.* 1974:40.
312. *Novokam'yanka Kahovka District k.1 g.18. 1-5.Flakes*. Kubyshv *et al.* 1974:41 (Fig. 49).
313. *Novokam'yanka Kahovka District k.2 g.14, two skeletons. Flake*. Kubyshv *et al.* 1974:60.
314. *Novokayiry Beryslav District k.2 g.17. 1-2.Cutting tool on flakes*. Toshev *et al.* 1988:22 (Fig. 29:1).
315. *Novokayiry Beryslav District k.2 g.39. Flake*. Toshev *et al.* 1988:33 (Fig. 48:2).
316. *Oleksandrivka Bilozerka District k.1 g.2. Arrowhead with a coulisse*. Wound(?). Evdokimov, Kupriy 1991:5 (Fig. 7:2).
317. *Oleksandrivka Velyka Oleksandrivka had District k.3 g.2. Scraper on a flake*. Evdokimov *et al.* 1989:113 (Fig. 115:3).
318. *Pervomayivka I Verhni Rohachyk District k.1 g.4. Cutting tool on a flake*. Evdokimov *et al.* 1981:4 (Fig. 4:4).
319. *Pervomayivka I Verhni Rohachyk District k.3 g.1, two skeletons. 1.Piercer on a flake, 2.Scraper on the fragment of blade*. Evdokimov *et al.* 1981:20 (Fig. 17:4).
320. *Podokalynivka Tsyurupinsk District k.1 g.6. Scraper on a flake*. Evdokimov *et al.* 1979:64 (Fig. 54:1).
321. *Podokalynivka Tsyurupinsk District k.1 g.8, two skeletons. Cutting tool on a flake*. Evdokimov *et al.* 1979:64 (Fig. 54:4).
322. *Podokalynivka Tsyurupinsk District k.6 g.10. 1-2.Flakes*. Evdokimov *et al.* 1979:45.
323. *Podokalynivka Tsyurupinsk District k.6 g.33. Scraper on a flake*. Evdokimov *et al.* 1979:56.
324. *Podokalynivka Tsyurupinsk District k.6 g.7. Spearhead* with a petiole, 12x3,4 cm. Evdokimov *et al.* 1979:44 (Fig. 27:5).
325. *Pryozerne Bilozerka District k.1 g.16. Flake*. Evdokimov *et al.* 1986:7 (Fig. 6:4).
326. *Radyanske Bilozerka District k.1 g.4. Flake*. Evdokimov *et al.* 1989:33.
327. *Sadove Bilozerka District k.2 g.7. Scraper on a flake*. Evdokimov *et al.* 1988:49 (Fig. 45:5).
328. *Serhiyivka I Novotroitske District k.1 g.1. Cutting tool on a flake*. Kubyshv *et al.* 1984:122.

329. *Serhiyivka* II Novotroitske District k.1 g.4. Scraper on a flake. Kubyshev *et al.* 1984:134.
330. *Serhiyivka* II Novotroitske District k.4 g.5, two skeletons. Scraper on a flake. Kubyshev *et al.* 1984:150.
331. *Skadovsk* k.1 g.17, two skeletons. Flake. Evdokimov *et al.* 1984:18.
332. *Skadovsk* k.2 g.2. Flake. Chernenko *et al.* 1975:12.
333. *Sofiivka* I Kahovka District k.23 g.23. Scraper on a flake. Terenozhkin *et al.* 1973:11.
334. *Sofiivka* Kahovka District k.1 g.2, two skeletons. Flake. Leskov *et al.* 1972:3.
335. *Sofiivka* Kahovka District k.12 g.5. 1-2.Flakes. Leskov *et al.* 1972:37.
336. *Sofiivka* Kahovka District k.14 g.6. Arrowhead with a deep coulisse. Wound(?). Leskov *et al.* 1972:46.
337. *Sofiivka* Kahovka District k.21 g.11. Flake. Leskov *et al.* 1972:55.
338. *Sofiivka* Kahovka District k.4 g.1. Flake. Leskov *et al.* 1972:10.
339. *Sofiivka* Kahovka District k.4 g.2. Flake. Leskov *et al.* 1972:10.
340. *Sofiivka* Kahovka District k.9 g.11. 1-2.Flakes. Leskov *et al.* 1972:28.
341. *Starosillya* Velyka Oleksandrivka District k.3 g.20, two skeletons. Arrowhead with a shallow coulisse. Wound (?). Boldin 1972:12.
342. *Starosillya* Velyka Oleksandrivka District k.3 g.8. Flake. Boldin 1972:6.
343. *Starosillya* Velyka Oleksandrivka District k.4 g.10. Flake. Shilov 1977:64 (Fig. 6:10).
344. *Tamaryne* Beryslav District k.13 g.6. Arrowhead with a shallow coulisse. Wound. Evdokimov *et al.* 1989:87 (Fig. 86:4).
345. *Vasylivka* Novotroitske District k.1 g.5. Sculpture-sceptre as a trident. Kubyshev *et al.* 1984:43.
346. *Vasylivka* Novotroitske District k.4 g.4. Scraper on a flake. Kubyshev *et al.* 1984:43.
347. *Verhniy Rohachyk* III k.2 g.3. Flake. Terenozhkin, Ilnskaya 1968:41.
348. *Vidradokam'yanka* Beryslav District k.1 g.1. 1-3.Flakes. Kubyshev *et al.* 1989:82 (Fig. 44).
349. *Vilna Druzhyna* Hola Prystan District k.1 g.3. Core. Evdokimov *et al.* 1979:3.
350. *Vodoslavka* Novotroitske District k.12 g.1. Knife-dagger 6x2,7 cm. Kubyshev *et al.* 1983:93.
351. *Vodoslavka* Novotroitske District k.12 g.10. Cutting tool on a flake. Kubyshev *et al.* 1983:101.
352. *Vodoslavka* Novotroitske District k.12 g.3, two skeletons. 1.Scraper on a flake. 2.Flake. Kubyshev *et al.* 1983:96.
353. *Volodymyrivka* Skadovsk District k.1 g.22, two skeletons. 1.Cutting tool on a flake. 2.Scraper on a flake. Evdokimov *et al.* 1986:68 (Fig. 60:5,6).
354. *Voskresenka* II Novotroitske District k.1 g.1. 1-2.Scrapers on flakes. Kubyshev *et al.* 1987:86 (Fig. 64).
355. *Voskresenka* II Novotroitske District k.2 g.1. Flake. Kubyshev *et al.* 1987:92 (Fig. 68).
356. *Voskresenka* II Novotroitske District k.2 g.2. Flake. Kubyshev *et al.* 1987:92.
357. *Yuvilein* Tsyurupinsk District k.1 g.7. 1-2.Flakes.
358. *Zmiyivka* Beryslav District k.1 g.17. Arrowhead with a deep coulisse. Wound. Evdokimov *et al.* 1986:51 (Fig. 47:4).
359. *Zmiyivka* Beryslav District k.2 g.6. Scraper on a flake. Evdokimov, Gershkovich 1987:8.

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360. *Kirovohrad Suhoklijskyj* k.1 g.16. Flake. Boltryk, Nikolova, Razumov 2005:69.
361. *Lozuvatka* Kompaniivtsy District k.21 g.7. Flake. Tupchienko 1989:40.
362. *Lozuvatka* Kompaniivtsy k.20 g.7. Flake. Tupchienko 1989:12 (Fig. 3:2).
363. *Lystopadove* Kirovohrad District k.10 g.4. Scraper on a flake. Boki 1969:4.
364. *Pidvysoke* Novoarhanhelsk District k.6 g.1. Arrowhead with a shallow coulisse. Wound(?). Boki 1975:5 (Fig. 2:6).
365. *Pokazove* I Dobrovelychivka District k.8 g.1. Burin on a flake. Boki 1968:5.
366. *Pomichna* Novoukrainka District k.1 g.48. Flake quartzitic. Tupchienko 1989:117.
367. *Zaharivka* I Novoukrainka District k.10 g.5. Flake quartzitic. Production kit of seamstress. Tupchienko 1989:150.
368. *Zaharivka* I Novoukrainka District k.9 g.9. 1-5.Flakes. 6.Burin on a flake. 7.Scraper-Burin on a flake. Tupchienko 1989:141.
369. *Zashhyta* Novomyrhorod k.10 g.4. Scraper on a flake. Boki 1967:8 (Fig. 6:2).

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370. *Myronivka* k.8 g.9. Arrowhead with a coulisse. Wound (?). Klochko 2001:73.
371. *Zhuravlyha* Stavyshe District k.3 g.2. Flake. Kovpanenko, Rychkov 2004:60.

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372. *Antsyfyrivka* Svatove District k.1 g.2. Flake. Antonenko *et al.* 1986:16 (Fig. 37).
373. *Babycheve* Troyickij District k.1 g.2. Scraper on a flake. Bondar *et al.* 1982:7 (Fig. 19).
374. *Biryukove* Sverdlovsk District k.1 g.5. Arrowhead petioled. Wound. Pislariy 1979:45 (Fig. 36).
375. *Chervona Zorya* Perevalsk District k.5 g.3. Flake. Sanzharov *et al.* 1989:17 (Fig. 8:16).
376. *Govoruha* Slov'yanoserbsk District k.5 g.4. Flake. Krotova 1976:46 (Fig. 33).
377. *Luhansk, Zelena Roshha* k.1 g.7. Flake. Krasilnikov *et al.* 1988:8 (Fig. 12:3).
378. *Lysychansk, LNPZ* k.3 g.13. 1-13.Flakes, piercer on a flake. Production kit. Koval, Klimenko 2005:46-49 (Fig. 1,2).
379. *Oleksandrivsk* k.1 g.45. Flake. Bratchenko 1972:33 (Fig. 30:3).
380. *Preobrazhenne* Svatove District k.1 g.3. Flake. Pislariy *et al.* 1977:9.
381. *Pryvillya* Troyickij District k.1 g.8. Flake. Pislariy *et al.* 1975:18 (Fig. 18).
382. *Svatove* k.1 g.1. Flake. Bratchenko 1973:2.
383. *Zymohir'ya* Slov'yanoserbsk District k.1 g.14. 1-2.Flakes. 3.Cutting tool on a flake. Pislariy *et al.* 1977:64.
384. *Zymohir'ya* Slov'yanoserbsk District k.2 g.12, two skeletons. 1.Scraper on the fragment of blade. 2.Scraper on a flake. 3-5.Flakes. Production kit. Pislariy *et al.* 1980:59 (Fig. 42).

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385. *Balaban* Rokshany District k.13 g.16. Flake. Chebotarenko *et al.* 1989:61 (Fig. 26:4).
386. *Bravichen* Orhej District k.16 g.11. 1.Cutting tool on a flake, 2.Flake. Ivanova 2001:211.
387. *Bychok* Tyraspolskyj District k.1 g.6. Knife on a blade. Ivanova 2001:211.
388. *Dubasary* k.1 g.18. Flake. Ivanova 2001:212.
389. *Hadzhilar* Shtefan-voda District k.2 g.12. Flake. Agulnikov *et al.* 2001:105 (Fig. 7:4).
390. *Hadzhymus* Rokshany District k.2 g.13. Scraper on a flake. Chebotarenko *et al.* 1989:154 (Fig. 72:6).
391. *Havanoase* Kahul District k.9 g.1. Adz with the polished blade, broken. Ivanova 2001:81.
392. *Hradishite* II Chimishlij k.1 g.2. Arrowhead with a coulisse. Wound. Ivanova 2001:222.
393. *Hura-Bykuluj* Slobodziya District k.5 g.4. Sickle insert. Subbotin 2002:73.
394. *Kam'yanka* k.1 g.8. Flake. Ivanova 2001:220.
395. *Kam'yanka* k.3 g.15. Flake. Ivanova 2001:220.
396. *Kam'yanka* k.6 g.8. 1.Scraper on a flake, 2.Burin on a flake. Ivanova 2001:211.
397. *Kam'yanka* k.7 g.8. 1-4.Flakes. Ivanova 2001:211.
398. *Kaplan* Shtefan-voda District k.1 g.3. Arrowhead with a shallow coulisse. Wound. Klochko 2001:73.
399. *Korpach* Yedinets District k.2 g.16. Flake. Ivanova 2001:220.
400. *Korpach* Yedinets District k.3 g.1. Arrowhead. Ivanova 2001:222.
401. *Korpach* Yedinets District k.3 g.5. Flake. Ivanova 2001:220.
402. *Korpach* Yedinets District k.3 g.6. Flake. Ivanova 2001:220.
403. *Korzevo* Dubasary District k.8 g.13. 1.Core, 2.Flake. Ivanova 2001:211.
404. *Krasnoye* Slobodziya District k.9 g.19. 1.Scraper on a flake, 2.Flake. Subbotin 2002:67 (Fig. 2:4).
405. *Krasnoye* Slobodziya District k.9 g.23. Spokeshave for a wood on a flake. Ivanova 2001:221.
406. *Kuzmin* Kam'yanka District k.7 g.11. Flake. Manzura *et al.* 1992:76 (Fig. 29:9).
407. *Kuzmin* Kam'yanka District k.7 g.8. 1-2.Scrapers on flakes, 3-4.Flakes. Manzura *et al.* 1992:51 (Fig. 22:2).
408. *Kuzmyn* Kam'yanka District k.1 g.2. 1.Cutting tool on a blade, 2.Scraped on a flake. Bubulich, Khakheu 2002:131 (Fig. 10).
409. *Nikolske* Slobodziya District k.1 g.1. 1-2.Scrapers lateral on flakes, 3-4.Cutting tool on flakes, 5-6.Flakes. Agulnikov, Sava 2004:9 (Fig. 3).
410. *Nikolske* Slobodziya District k.1 g.6. Flake. Agulnikov, Sava 2004:11 (Fig. 4:9).
411. *Nikolske* Slobodziya District k.10 g.8. Adz. Agulnikov, Sava 2004:106 (Fig. 52:4).
412. *Nikolske* Slobodziya District k.11 g.3. Flake. Agulnikov, Sava 2004:108 (Fig. 4:5).
413. *Nikolske* Slobodziya District k.11 g.7. 1.Adz with the polished blade, 2.Knife on a blade. Agulnikov, Sava 2004:112 (Fig. 55:4,5).
414. *Nikolske* Slobodziya District k.13 g.1, three skeletons. Arrowhead with a shallow coulisse. Wound. Agulnikov, Sava 2004:121 (Fig. 59:6).
415. *Nikolske* Slobodziya District k.16 g.16. Scraper on a flake. Agulnikov, Sava 2004:144 (Fig. 72:1).
416. *Nikolske* Slobodziya District k.16 g.17. Cutting tool on a blade. Agulnikov, Sava 2004:145 (Fig. 72:2).
417. *Nikolske* Slobodziya District k.7 g.28. Spearhead 11,5x3x0,7 cm. Agulnikov, Sava 2004:60 (Fig. 29:2).
418. *Nikolske* Slobodziya District k.7 g.33. 1-33.Flakes. Agulnikov, Sava 2004:2.
419. *Nikolske* Slobodziya District k.7 g.44. 1-3.Flakes. Agulnikov, Sava 2004:68.
420. *Nikolske* Slobodziya District k.7 g.6. Flake. Agulnikov, Sava 2004:11 (Fig. 4:9).
421. *Nikolske* Slobodziya District k.7 g.7. 1-2.Flakes. Agulnikov, Sava 2004:54.
422. *Nikolske* Slobodziya District k.8 g.13. Flake. Agulnikov, Sava 2004:90 (Fig. 40:4).
423. *Oknitsa* Kam'yanka District k.1 g.1. 1-2.Flakes. Manzura *et al.* 1992:7 (Fig. 3:2,3).
424. *Oknitsa* Kam'yanka District k.1 g.4. 1-3.Flakes. Manzura *et al.* 1992:7 (Fig. 3:7-9).
425. *Oknitsa* Kam'yanka District k.1 g.8. 1.Tool on flake, 2.Flake. Manzura *et al.* 1992:11 (Fig. 4:5,6).
426. *Oknitsa* Kam'yanka District k.3 g.13. 1-2.Flakes. Manzura *et al.* 1992:28 (Fig. 12:3,4).
427. *Oknitsa* Kam'yanka District k.4 g.1. 1-3.Flakes. Manzura *et al.* 1992:33 (Fig. 14:2-4).
428. *Oknitsa* Kam'yanka District k.5 g.8. Flake. Manzura *et al.* 1992:44.
429. *Oknitsa* Kam'yanka District k.5 g.8. Flake. Manzura *et al.* 1992:63.
430. *Oknitsa* Kam'yanka District k.6 g.18. Arrowhead with a coulisse. Manzura *et al.* 1992:58 (Fig. 25:2).
431. *Oknitsa* Kam'yanka District k.6 g.8. 1.Scraper on a flake, 2.Cutting tool on a flake. Manzura *et al.* 1992:50 (Fig. 21:10,11).
432. *Oknitsa* Kam'yanka District k.6 g.9. Cutting tool on a flake. Manzura *et al.* 1992:51 (Fig. 22:2).
433. *Podojma* Kam'yanka District k.3 g.7, two skeletons. Scraper on a flake. Bubulich, Khakheu 2002:126 (Fig. 7:1).
434. *Purkar* Rokshany District k.1 g.4. Adz with the polished blade. Yarovoy 1990:30.
435. *Rokshany* k.11 g.13. 1.Adz with the polished blade, 2.Flake. Dergachev 1989:68 (Fig. 23:16).
436. *Rokshany* k.3 g.6. Scraper on a flake. Dergachev 1989:30.
437. *Rokshany* k.4 g.16. Arrowhead with a shallow coulisse. Dergachev 1989:44 (Fig. 15:5).
438. *Rokshany* k.4 g.6. Scraper on a flake. Dergachev 1989:38 (Fig. 13:4).
439. *Tarakliya* II Kaushen District k.1 g.2. 1-2.Flakes. Ivanova 2001:220.
440. *Teckany* Yedinets District k.1 g.11. 1.Arrowhead, 2.Flake. Wound. Glazov, Kurchatov 2005:308 (Fig. 5:5,6).
441. *Teckany* Yedinets District k.1 g.2. 1-3.Flakes. Glazov, Kurchatov 2005:303.
442. *Teckany* Yedinets District k.1 g.7. 1.Sickle insert, 7,8 cm. long. 2-14.Flakes. Glazov, Kurchatov 2005:305 (Fig. 4).
443. *Teckany* Yedinets District k.1 g.9. Arrowhead with a coulisse. Glazov, Kurchatov 2005:305 (Fig. 4:12).
444. *Ursoaya* Rokshany District k.3 g.2. Scraper on a flake. Chebotarenko *et al.* 1989:115 (Fig. 4).

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445. *Aktove* Voznesensk District k.1 g.13. Flake. Shaposhnikova *et al.* 1987:65 (Fig. 411:3).
446. *Antonivka* Nova Odesa District k.5 g.6. Flake. Shaposhnikova *et al.* 1986:93.
447. *Balabanivka* Nova Odesa District k.5 g.7. Knife-dagger 15,5x4 cm. Shaposhnikova *et al.* 1975:354 (Fig. 136:3).
448. *Balabanivka* Zhovtneve District k.1 g.1. Burin on a flake. Shaposhnikova *et al.* 1985:86 (Fig. 54:5).
449. *Balabanivka* Zhovtneve District k.2 g.8. Spokeshave. Shaposhnikova *et al.* 1985:98 (Fig. 59:6).
450. *Barativka* Novyi Bug District k.2 g.20. Knife-dagger 12x3 cm. Shaposhnikova *et al.* 1986:47.
451. *Buhskyy* Arbusyn District k.1 g.9. 1-3. Flakes. Shaposhnikova *et al.* 1986:71.
452. *Buhskyy* Arbusyn District k.2 g.9. 1-3. Flakes. Shaposhnikova *et al.* 1977:175 (Fig. 98).
453. *Buhskyy* Arbusyn District k.3 g.17. Flake. Shaposhnikova *et al.* 1980:100.
454. *Buhskyy* Arbusyn District k.3 g.21. Flake. Shaposhnikova *et al.* 1977:208.
455. *Buhskyy* Arbusyn District k.3 g.5, two skeletons. Flake. Shaposhnikova *et al.* 1977:200.
456. *Buhskyy* Arbusyn District k.4 g.18. Darthead rhombic 5x2,5 cm. Shaposhnikova *et al.* 1977:243.
457. *Didova* Hata Mykolaiv District k.2 g.1. Fragment of biface. Shaposhnikova *et al.* 1986:47.
458. *Ivanivka* I Mykolaiv District k.4 g.17. Scraper on a flake. Shaposhnikova *et al.* 1986:132.
459. *Kalynivka* II Zhovtneve District k.8 g.13. Scraper on a flake. Nikitin 1983:69 (Fig. 229).
460. *Kam'yanka* Otchakiv District k.13 g.6. Flake. Shaposhnikova *et al.* 1986:134.
461. *Kam'yanka* Otchakiv District k.16 g.12. Flake. Shaposhnikova *et al.* 1986:136.
462. *Kam'yanka* Otchakiv District k.16 g.26. Darthead with a coulisse. Wound(?). Shaposhnikova *et al.* 1986:135.
463. *Kapustyne* Zhovtneve District k.1 g.2. Flake. Shaposhnikova *et al.* 1984:33.
464. *Kostyantynivka* Bashtanka District k.12 g.1. Flake. Shaposhnikova *et al.* 1986:95.
465. *Kostyantynivka* Bashtanka District k.12 g.4. Flake. Shaposhnikova *et al.* 1986:95.
466. *Kovalivka* II Mykolaiv District k.6 g.8. Flake. Kovpanenko 1969:28.
467. *Kovalivka* III Mykolaiv District k.1 g.10. Flake. Kovpanenko, Evdokimov 1971:6.
468. *Kovalivka* III Mykolaiv District k.1 g.9. Flake. Shaposhnikova *et al.* 1986:113.
469. *Kovalivka* IV Mykolaiv District k.1 g.17. Flake. Kovpanenko, Evdokimov 1971:17.
470. *Kovalivka* IV Mykolaiv District k.1 g.7. Flake. Kovpanenko, Evdokimov 1971:21.
471. *Kovalivka* IV Mykolaiv District k.3 g.1. Flake. Kovpanenko, Evdokimov 1971:34.
472. *Kovalivka* VI Mykolaiv District k.1 g.3. Flake. Kovpanenko *et al.* 1974:3.
473. *Kovalivka* VI Mykolaiv District k.2 g.7. Scraper on a flake. Kovpanenko *et al.* 1974:10.
474. *Kovalivka* VII Mykolaiv District k.4 g.4. Flake. Kovpanenko *et al.* 1974:51 (Fig. 58:2).
475. *Lupareve* Zhovtneve District k.1 g.26. Knife-dagger. Petrenko, Elagina 1969:26 (Fig. 153).
476. *Lymany* Zhovtneve District k.3 g.1. Knife-dagger. Petrenko, Elagina 1969:53 (Fig. 211).
477. *Majorivka* Novyi Bug District k.3 g.9. Flake. Shaposhnikova *et al.* 1986:87.
478. *Nova Odesa* k.1 g.5. Flake. Shaposhnikova *et al.* 1974:47.
479. *NovoGrygorivka* Mykolaiv District k.2 g.10. Scraper. Ivanova *et al.* 2005:81.
480. *Novo-Grygorivka* Nova Odesa District k.1 g.24. 1. Flake. 2. Cutting tool on a flake. 3. Knife-piercer on a flake. Production kit. Shaposhnikova *et al.* 1974:237.
481. *Novo-Grygorivka* Nova Odesa District k.1 g.31. Fragment of petiole of spearhead (?). Shaposhnikova *et al.* 1974:242.
482. *Novo-Grygorivka* Nova Odesa District k.2 g.7. 1-4. Flakes. Shaposhnikova *et al.* 1974:267.
483. *Novo-Grygorivka* Nova Odesa District k.9 g.8. Flake. Shaposhnikova *et al.* 1974:98.
484. *Novogrygorivka* Voznesensk District k.1 g.15. Flake. Shaposhnikova *et al.* 1986:105.
485. *Novogrygorivka* Voznesensk District k.2 g.14. Scraper on a flake. Shaposhnikova *et al.* 1986:105.
486. *Novogrygorivka* Voznesensk District k.2 g.18. Flake. Shaposhnikova *et al.* 1986:105.
487. *Novogrygorivka* Voznesensk District k.2 g.7. Arrowhead with a shallow coulisse. Wound. Shaposhnikova *et al.* 1986:128.
488. *Novogrygorivka* Voznesensk District k.3 g.7. 1-3. Flakes. Shaposhnikova *et al.* 1986:106.
489. *Novopavlivka* Snihuri District k.1 g.14. Knife-dagger 10,9x3,4 cm. Nikitin, Nikolenko 1988:13 (Fig. 55).
490. *Novopavlivka* Snihuri District k.1 g.18. Flake. Nikitin, Nikolenko 1988:15.
491. *Novopavlivka* Snihuri District k.1 g.8. Flake. Nikitin, Nikolenko 1988:8 (Fig. 31).
492. *Novopetrivka* II Bratske District k.1 g.7. Arrowhead with a deep coulisse. Wound. Shaposhnikova *et al.* 1975:289 (Fig. 114:2).
493. *Novopetrivka* II Bratske District k.1 g.4. Cutting tool on a flake. Shaposhnikova *et al.* 1975:287 (Fig. 113).
494. *Novopetrivske* III Nova Odesa District k.1 g.9. Knife on a blade(?). Shaposhnikova *et al.* 1988:48 (Fig. 36).
495. *Novorozanivka* Novyi Bug District k.2 g.13. Flake. Shaposhnikova *et al.* 1986:87.
496. *Novorozanivka* Pervomajsk District k.2 g.13. Flake. Shaposhnikova *et al.* 1967:70.
497. *Novo-Vasylivka* Snihuri District k.46 g.2, two skeletons. Cutting tool on a flake. Shaposhnikova *et al.* 1975:163 (Fig. 74).
498. *Pankratove* Nova Odesa District k.1 g.3. Flake. Shaposhnikova *et al.* 1988:95 (Fig. 59).
499. *Pisky* Bashtanka District k.8 g.3. Flake. Shaposhnikova *et al.* 1986:97.
500. *Pisky* Bashtanka District k.8 g.4. Scraper on a flake. Shaposhnikova, Bochkarev 1972:47.
501. *Plyushhivka* Bashtanka District k.1 g.48. Flake. Nikitin, Snytko 1985:27.
502. *Pryshyb* Berezhneuvate District k.4 g.23. Knife on flake. Shaposhnikova *et al.* 1984:37 (Fig. 27:3).
503. *Pryshyb* Berezhneuvate District k.47 g.9. Cutting tool on a flake 3x1,7 cm. Shaposhnikova *et al.* 1984:156 (Fig. 94:8)

504. *Pryvilne* Bashtanka District k.1 g.25. Knife-dagger. Shaposhnikova, Bochkarev 1970:12.
505. *Sofiivka* k.1 g.9. Darthead. Shaposhnikova *et al.* 1980:140.
506. *Sokolivka* Bashtanka District k.3 g.20. Flake. Shaposhnikova *et al.* 1986:120.
507. *Starohorozheno* Bashtanka District k.1 g.17. Darthead. Wound(?). Shaposhnikova *et al.* 1986:47.
508. *Starohorozheno* Bashtanka District k.2 g.12. Flake. Shaposhnikova *et al.* 1986:89.
509. *Starohorozheno* Bashtanka District k.2 g.3. Flake. Shaposhnikova *et al.* 1986:89.
510. *Starohorozheno* Bashtanka District k.3 g.10. Flake. Shaposhnikova *et al.* 1986:89.
511. *Starohorozheno* Bashtanka District k.3 g.13. Fragment of biface. Shaposhnikova *et al.* 1986:141.
512. *Taborivka* Voznesensk District k.37 g.15. Cutting tool on a flake. Shaposhnikova *et al.* 1984:29.
513. *Tamaryne* II Voznesensk District k.1 g.6. Scraper on a flake. Shaposhnikova *et al.* 1987:95 (Fig. 71).
514. *Vidradnyj* Bashtanka District k.1 g.5. Flake. Shaposhnikova 1971:7.
515. *Vidradnyj* Bashtanka District k.22 g.10. Flake. Shaposhnikova 1971:32.
516. *Voskresensk* Zhovtneve District k.1 g.2. Scraper. Nikitin, Snytko 1984:33 (Fig. 137).
517. *Vynogradnyj Sad* Domanivka District k.1 g.1. Flake. Shaposhnikova *et al.* 1986:44.
518. *Vynogradnyj Sad* Domanivka District k.1 g.4, two skeletons. Flake. Shaposhnikova *et al.* 1986:48.
519. *Vynogradnyj Sad* Domanivka District k.4 g.9. Cutting tool on a flake. Shaposhnikova *et al.* 1984:65 (Fig. 192:2).
520. *Vynogradnyj Sad* V Domanivka District k.5 g.4, three skeletons. 1-2. Flakes. Shaposhnikova *et al.* 1986:80.
521. *Vynohradivka* Bashtanka District k.1 g.4. Flake. Shaposhnikova *et al.* 1986:46.
522. *Vysunsk* Bereznehuvate District k.10 g.10. Darthead. Shaposhnikova *et al.* 1977:107 (Fig. 59:2).
523. *Vysunsk* Bereznehuvate District k.14 g.14. Flake quartzitic. Shaposhnikova *et al.* 1977:145 (Fig. 82).
- Odesa Region**
524. *Alkaliya* Artsyz District k.33 g.3. 1-2. Flakes for arrowheads. 3-13. Arrowheads with a shallow coulisse. 14. Adz with the polished blade. Quiver set. Ivanova 2001:211.
525. *Alkaliya* Bilhorod-Dntrovsky District k.5 g.6. Sickle insert. Ivanova 2001:77.
526. *Bashtanivka* Tatarbunary District k.4 g.12. Arrowhead with a shallow coulisse. Ivanova 2001:222.
527. *Borysivka* Tatarbunary District k.8 g.12. 1-4. Flakes. Ivanova, 2001:211.
528. *Borysivka* Tatarbunary District k.8 g.9. Flake. Ivanova 2001:220.
529. *Chaus* group Kiliya District k.20 g.2. Skrapper-Burin on a flake. Gudkova *et al.* 1981:78.
530. *Chervonyj Yar* I Izmayil District k.1 g.6. 1. Arrowhead with a deep coulisse. 2. Darthead. Production kit. Wound. Ivanova 2001:222.
531. *Chervonyj Yar* I Izmayil District k.1 g.8. Scraper on a flake. Ivanova 2001:221.
532. *Chervonyj Yar* II Izmayil District k.1 g.2. Flake. Ivanova 2001:220.
533. *Dubynove* Savran District k.1 g.5, two skeletons. Blade chalcedonic. Ivanova *et al.* 2005:89 (Fig. 57:5).
534. *Grygorivka* Shyryayevo District k.1 g.10. 1. Adz with the polished blade. 2. Cutting tool on a flake. Subbotin 1982:102.
535. *Grygorivka* Shyryayevo District k.1 g.9. 1-5. Flakes. 6. Scraper on a flake. 7. Piercer on a flake. Production kit. Subbotin 1982:102.
536. *Hadzhyder* Tatarbunary District k. 3 g.18. Fragment of arrowhead. Wound. Subbotin *et al.* 1981:28 (Fig. 21:5:6).
537. *Hadzhyder* Tatarbunary District k.1 g.22. Scraper on a flake. Subbotin *et al.* 1981:13 (Fig. 11).
538. *Hadzhyder* Tatarbunary District k.3 g.6, two skeletons. Flake. Subbotin *et al.* 1981:23.
539. *Holmske* Artsyz District k.1 g.15. Flake. Cherniakov *et al.* 1986:59.
540. *Holmske* Artsyz District k.2 g.8. Sickle insert. 10x3.5 cm. Cherniakov *et al.* 1986:71 (Fig. 7:7).
541. *Holmske* Artsyz District k.5 g.14. Adz with the polished blade. Cherniakov *et al.* 1986:88 (Fig. 11:5).
542. *Katarzhnye* Ivanivka k.1 g.16. Flake. Ivanova *et al.* 2005:41 (Fig. 25:2).
543. *Kochkuvate* Tatarbunary District k.24 g.4. Fragment of darthead. Wound(?). Ivanova 2001:221.
544. *Kubej* Bolhrad District k.21 g.16. Flake. Ivanova 2001:212.
545. *Kubej* Bolhrad District k.23 g.18. Flake. Ivanova 2001:212.
546. *Kyslytsya* Izmayil District k.8 g.1. Flake. Gudkova *et al.* 1995:103.
547. *Mayaki* Ovidiopol District k.9 g.1. Adz. Ivanova 2001:81.
548. *Moloha* Artsyz District k.2 g.60. Flake. Maliukevich, Agulnikov 2005:200.
549. *Mykolaivka* Belyayevo District k.4 g.9, two skeletons. Concretion. Shmaglii, Cherniakov 1985:123.
550. *Myrne* Kiliya District k.1 g.53. Arrowhead with a deep coulisse. Wound. Toshev 1978:158 (Fig. 1:2).
551. *Nadlymanske* Ovidiopol District k.1 g.2. Flake. Ivanova 2001:220.
552. *Nagirne* Reni District k.14 g.16. Knife on a flake. Gudkova *et al.* 1982:35.
553. *Nagirne* Reni District k.14 g.8. Flake. Gudkova *et al.* 1982:31 (Fig. 37:5).
554. *Nagirne* Reni District k.15 g.8. Flake. Gudkova *et al.* 1982:39.
555. *Oleksandrivka* Artsyz District k.1 g.32. 1. Core. 2. Skrapper-Burin on a flake. 3-13. Flakes. Production kit. Subbotin 2002:67 (Fig. 2:2).
556. *Parapory* Izmayil District k.2 g.2. Flake. Ivanova 2001:220.
557. *Plavni* Kiliya District k.1 g.9. 1-5. Flakes. Production kit. Gudkova *et al.* 1979:68 (Fig. 48:6-8).
558. *Plavni* Kiliya District k.10 g.3. Flake. Gudkova *et al.* 1980:10. (Fig. 7:28).
559. *Polyove Turlaky* Artsyz District k.2 g.6, four skeleton. Arrowhead with a shallow coulisse. Wound(?). Cherniakov *et al.* 1983:6.
560. *Polyove Turlaky* Artsyz District k.2 g.7. Flake. Cherniakov *et al.* 1983:7 (Fig. 7:6).

561. *Prymorske* Tatarbunary District k.1 g.25, two skeletons. 1.Core, 2.Scraper on a flake. Ivanova 2001:221.
562. *Revova* Shyryayev District k.3 g.4. Hammerstone. Ivanova *et al.* 2005:62 (Fig. 39:2).
563. *Sadove* Shyryayev District k.3 g.7. Scraper on a flake. Ivanova *et al.* 2005:62 (Fig. 40:1).
564. *Sadove* Izmayil District k.1 g.7. 1.Flake. 2.Burin-scraper-knife on a flake. Ivanova 2001:212.
565. *Semenivka* Artsyz District k.3 g.5. Cutting tool on a flake. Subbotin 1985:75 (Fig. 9:10).
566. *Semenivka* Artsyz District k.11 g.16. 1-2.Flakes. Subbotin 1985:70.
567. *Semenivka* Artsyz District k.14 g.24. Arrowhead with a shallow coulisse. Wound (?). Subbotin 1985:55 (Fig. 3:14).
568. *Semenivka* Artsyz District k.2 g.2. Flake. Ivanova 2001:220.
569. *Semenivka* Artsyz District k.8 g.13. Adz with the polished blade. Subbotin 1985:67 (Fig. 8:7).
570. *Shevchenkove* Kiliya District k.3 g.2. Flake. Ivanova 2001:220.
571. *Shevchenkove* Kiliya District k.3 g.9. 1-2.Flakes. Ivanova 2001:37 (Fig. 27).
572. *Strumok* Tatarbunary District k.5 g.3. Knife on a flake. Gudkova *et al.* 1979:19.
573. *Suvorove* II Izmayil District k.5 g.1. Flake. Ivanova 2001:220.
574. *Teplohrad* Belyayevo District k.9 g.1. Adz. Cherniakov *et al.* 1983:22 (Fig. 31:1).
575. *Trapivka* Tatarbunary District k.6 g.20, two skeletons. Spokeshave on a flake. Ivanova 2001:37 (Fig. 27:13).
576. *Tymkove* Kodyma District k.1 g.2. 1.Flake. 2.Blade. Ivanova 2001:212.
577. *Utkonosivka* Izmayil District k.1 g.6. Knife-dagger. Ivanova 2001:221.
578. *Vynohradivka* Artsyz District k.7 g.7. Cutting tool on a blade. Alekseeva *et al.* 1972:10.
579. *Vyshneve* Tatarbunary District k.17 g.43. 1.Knife. 2.Saw for wood. 3.A spokeshave for wood. Production kit. Dvorianinov *et al.* 1985:163 (Fig. 10:2-4).
580. *Yasky* Belyayevo District k.1 g.30. Arrowhead with a deep coulisse. Wound. Ivanova 2001:223 (Fig. 27:6).
581. *Yasky* Belyayevo District k.5 g.8. 1.Scraper on a flake. 2.Flake. Alekseeva 1976:26.
582. *Yasky* Belyayevo District k.6 g.16. 1.Scraper on a flake. 2.Flake. Alekseeva 1976:38.
583. *Yasky* Belyayevo District k.6. 18. Flake. Alekseeva 1976:39.
584. *Yefymivka* Belyayevo District k.2 g.21. Flake. Shmagliy, Cherniakov 1985:99.
- Poltava Region**
585. *Klymivka* II Karlivka District k.1 g.2. Flake. Suprunenko 1990:19.
586. *Klymivka* II Karlivka District k.1 g.3. Scraper on a flake. Suprunenko 1990:19.
587. *Klymivka* II Karlivka District k.2 g.2. Fragment of blade. Suprunenko 1990:21.
588. *Voloshyne* III Kremenchuk District k.4 g.9. Scraped on a flake. Suprunenko *et al.* 2005:74 (Fig. 28:1).
- Rostov Region (Russian Federation)**
589. *Kudinov* Bahayevskiy District k.1 g.6. Hammerstone. Iliukov 1997:24.
590. *Novocherkassk* k.7 g.6. Flake. Iliukov 1997:24.
591. *Novolakedemonovka* III Neklinovo District k.3 g.1. Flake. Iliukov, Kazakova 1988:16.
592. *Rostov-na-Donu* *Levencivskiy* VII k.34 g.1. 1-2.Scrapers on flakes, 3.Drill on a flake, 4.Cutting tool on a blade. 5.Biface. 6.Flake. Production kit. Iliukov 1997:24.
593. *Rostov-na-Donu*, *Komintern street* k.1 g.7.1.Flake. 2.Scraper on a flake. Kulbaka, Kachur2000:18.
594. *Rostov-na-Donu*, TEC II k.2 g.3. Flake. Iliukov, Kazakova 1988:16.
595. *Veselovska* I Bahayevskiy District k.3 g.13. 1-3.Arrowheads with a shallow coulisse. Wound. Iliukov 1997:24.
- Cherkasy Region**
596. *Klishenci* Chornobayivka District k.4 g.7. Scraper on a flake. Syvolap 1989:22.
597. *Kovtuny* Zolotonosha District k.1 g.1. 1-2.Flakes. Bratchenko *et al.* 1983:11.
598. *Majdanecke* Talne District k.1 g.5. Ax with the polished blade. Shmagliy, Videyko 1988:134 (Fig. 2:3).
599. *Matusiv* Shpola District k.1 g.1. Flake. Kovpanenko *et al.* 1986:5.
600. *Smila* k.421 g.1. Darthead with a petiole, 6x2 cm. Wound(?). Bobrinskiy 1913:96.
- Zaporizhzhya Region**
601. *Akkermen* I Melitopol District k.12 g.4. Flake. Viazmitina *et al.* 1960:8.
602. *Akkermen* I Melitopol District k.12 g.9. Knife-dagger 13,5x2,5x0,5 cm. Viazmitina *et al.* 1960:59 (Fig. 40:4).
603. *Akkermen* I Melitopol District k.5 g.7. Flake. Viazmitina *et al.* 1960:48.
604. *Akkermen* I Melitopol District k.9 g.3. Knife-dagger(?) with a petiole, 8x3 cm. Viazmitina *et al.* 1960:54 (Fig. 40:3).
605. *Akkermen* II Melitopol District k.11 g.3. Scraper on a flake. Viazmitina *et al.* 1960:114.
606. *Akkermen* II Melitopol District k.17 g.10. 1-2.Arrowheads with a petiole. Wound. Viazmitina *et al.* 1960:124 (Fig. 74).
607. *Akkermen* II Melitopol District k.4 g.9. Flake. Viazmitina *et al.* 1960:108.
608. *Atmanaj* II Yakymivka District k.1 g.2. Knife-dagger with the petiole 12,3x3, 7 cm. Kubyshev *et al.* 1981:60.
609. *Atmanaj* II Yakymivka District k.1 g.5, two skeletons. Cutting tool on a flake. Kubyshev *et al.* 1981:60.
610. *Atmanaj* II Yakymivka District k.3 g.1. Burin on a flake. Kubyshev *et al.* 1981:70.
611. *Atmanaj* II Yakymivka District k.3 g.18. Scraper on a flake. Kubyshev *et al.* 1981:77.
612. *Atmanaj* II Yakymivka District k.3 g.19. Flake. Kubyshev *et al.* 1981:77.
613. *Atmanaj* II Yakymivka District k.3 g.25. Fragment of blade. Kubyshev *et al.* 1981:79.
614. *Atmanaj* II Yakymivka District k.4 g.8. Scraped on a flake. Kubyshev *et al.* 1981:96.
615. *Avhustynivka* Vilnyanka District k.3 g.6. 1-3. Flakes. Otroschenko *et al.* 1975:179.
616. *Avhustynivka* Vilnyanka District k.7 g.8. 1-3.Flakes. Otroschenko *et al.* 1975:193.
617. *Balky* Vasylivka District k.1 g.20, two skeletons. Flake. Bidzilia *et al.* 1973:35.

618. *Balky* Vasylivka District k.1 g.38. Fragment of re-touching blade. Bidzilia *et al.* 1973:40 (Fig. 22).
619. *Balky* Vasylivka District k.1 g.57. Flake retouches. Bidzilia *et al.* 1973:49 (Fig. 29).
620. *Barvynivka* Myhailivka District k.7 g.14. Arrowhead fragmented. Wound. Otruschenko *et al.* 1988:10.
621. *Basan* I Polohy District k.2 g.4. Cutting tool on a flake. Pleshivenko 1988:7 (Fig. 1:2).
622. *Basan* I Polohy District k.3 g.7. Cenotaf. Knife biface 5x3, 5 cm. Pleshivenko 1988:16 (Fig. 5:3).
623. *Basan* I Polohy District k.4 g.5. Flake. Pleshivenko 1988:21 (Fig. 6:6).
624. *Bilenke* Zaporizhzhya District k.2 g.17. Flake. Popandopulo 1995:140 (Fig. 8:8).
625. *Borysivka* Prymorske District k.1 g.19. Scraper on a flake. Pleshivenko, Popandopulo 1986:13 (Fig. 8:1).
626. *Davydivka* Yakymivka District k.1 g.3. Scraper on a flake. Kubyshev *et al.* 1986:15 (Fig. 3).
627. *Davydivka* Yakymivka District k.1 g.4. Flake. Kubyshev *et al.* 1986:103.
628. *Davydivka* Yakymivka District k.18 g.2. Combined tool. Kubyshev *et al.* 1986:68.
629. *Davydivka* Yakymivka District k.2 g.5. Cutting tool on a flake. Kubyshev *et al.* 1986:103.
630. *Davydivka* Yakymivka District k.2 g.6. 1-2. Flakes. Kubyshev *et al.* 1986:28.
631. *Dniprorudnyy* Vasylivka District k.8 g.18. Fragment of scraper. Bidzilia *et al.* 1974:16 (Fig. 9:2).
632. *Dniprovka* III Vilnyanka District k.7 g.9. Knife-scraper on a flake. Liashko *et al.* 1979:58.
633. *Dolyna* Melitopol District k.1 g.9. Flake. Furmanska 1960:139.
634. *Kam'yanka-Dniprovska* I k.4 g.3. Scraper on a flake. Otruschenko *et al.* 1986:73 (Fig. 25:3).
635. *Kam'yanka-Dniprovska* II k.11 g.2. Flake. Otruschenko *et al.* 1986:98.
636. *Mala Ternivka* Yakymivka District k.1 g.1. 1. Sculpture(?) on a flake, 4,1x4, 1x1, 2 cm. 2. Arrowhead petioled. Kubyshev *et al.* 1981:158.
637. *Mala Ternivka* Yakymivka District k.2 g.2. 1. Scraper on a flake. 2. Flake. 3. Fragment of blade. Kubyshev *et al.* 1981:170 (Fig. 114).
638. *Menchykury* Vesele District k.1 g.26. 1. Scraper on a flake. 2. Scraped on a flake. Otruschenko *et al.* 1976:64 (Fig. 50:1,2).
639. *Nove* Melitopol District k.11 g.7. Knife-dagger with a petiole, 6x2, 3 cm. Boltrik *et al.* 1983:36 (Fig. 46:1).
640. *Nove* Yakymivka District k.1 g.12. Flake. Kubyshev *et al.* 1982:121.
641. *Nove* Yakymivka District k.1 g.22. 1-4. Flakes. Production kit. Kubyshev *et al.* 1982:138.
642. *Novopylypivka* Melitopol District k.1 g.9. Flake. Viazmitina *et al.* 1960:24.
643. *Novopylypivka* Melitopol District k.2 g.5. Flake. Viazmitina *et al.* 1960:29.
644. *Novopylypivka* Melitopol District k.2 g.7, two skeletons. Scraper on a flake. Viazmitina *et al.* 1960:30.
645. *Novopylypivka* Melitopol District k.3 g.4, two skeletons. Flake. Viazmitina *et al.* 1960:32.
646. *Novopylypivka* Melitopol District k.3 g.9. Flake. Viazmitina *et al.* 1960:33.
647. *Novo-Zaporizhzhya* Zaporizhzhya District k.14 g.4. Arrowhead with a coulisse. Wound. Pleshivenko, Popandopulo 1986:57 (Fig. 33).
648. *Novo-Zaporizhzhya* Zaporizhzhya District k.16 g.3. 1-2. Flakes with a retouch. Pleshivenko, Popandopulo 1986:65 (Fig. 38).
649. *Orihiv* k.1 g.18. Flake. Samar *et al.* 1992:14 (Fig. 22:2).
650. *Orihiv* k.1 g.19. Flake with a retouch. Samar *et al.* 1992:18 (Fig. 29:4).
651. *Orlyanka* III Vasylivka District k.3 g.1. 1. Scraper on a flake. 2. Cutting tool. Bidzilia *et al.* 1973:7 (Fig. 5).
652. *Petro-Mychajlivka* I Vilnyanka District k.8 g.3. Cutting tool on a flake. Otruschenko *et al.* 1981:188 (Fig. 117:4).
653. *Prymorske* Vasylivka District k.1 g.1. 1-4. Flakes. Mikhailov 1976:77.
654. *Prymorske* Vasylivka District k.1 g.3. 1-26. Flakes (6 paleolithic). 27-28. Scrapers on flakes. 29. Hammerstone on concrete. 30. Darthead(?) 6,9x2,2 cm. 31. Knife-dagger(?) 11x3,5 cm. 32. Hammerstone on pebble. 33. Hammerstone on quartzitic pebble. Production kit. Berezanska, Liashko 1989:22 (Fig. 2).
655. *Semenivka* Melitopol District k.2 g.7. 1. Arrowhead with a coulisse. 2. Spearhead with a petiole, 13x3, 2 cm. Wound. Mikhailov 1990:111 (Fig. 4:1,8).
656. *Semenivka* Melitopol District k.2 g.8. Cenotaf. Blade. Mikhailov 1990:111.
657. *Sosnivka* Melitopol District k.1 g.3. 1-2. Cutting tool on a flake. Mikhailov 1990:109 (Fig. 4:7).
658. *Tavriya* Tokmak District k.8 g.2. Cenotaf. Flake. Otruschenko *et al.* 1980:81.
659. *Troyicke* Melitopol District k.3 g.33. Arrowhead three-cornered. Wound(?). Klein 1960:157 (Fig. 115).
660. *Troyicke* Melitopol District k.3 g.5. Flake. Klein 1960:150.
661. *Udachne* Melitopol District k.4 g.6. 1-2. Cutting tool on flakes. 3-5. Flakes. Boltrik *et al.* 1985:49 (Fig. 25:6).
662. *Vasylivka* II k.1 g.10. Flake. Kravchenko, Tuboltsev 1990:103 (Fig. 2:10).
663. *Vasylivka* II k.1 g.15. Flake. Kravchenko, Tuboltsev 1990:105.
664. *Vasylivka* II k.1 g.16, two skeletons. Flake. Kravchenko, Tuboltsev 1990:105.
665. *Vasylivka* k.7 g.4. Arrowhead with a shallow coulisse. Wound(?). Pleshivenko 1990:3 (Fig. 3:4).
666. *Velyka Bilozirka* I k.2 g.11 1. Flake. 2. Core. Production kit. Otruschenko *et al.* 1975:137 (Fig. 66:1,2).
667. *Velyka Bilozirka* k.5 g.16. Biface (knife-dagger?). Braun 1906:95 (Fig. 12).
668. *Vilno-Hrushivka* Vilnyanka District k.1 g.7. Arrowhead with a shallow coulisse. Wound. Telegin, Bratchenko 1969:12 (Fig. 7:1).
669. *Volodymyrivka* Yakymivka District k.1 g.1, two skeletons. Flake. Kubyshev *et al.* 1981:104.
670. *Volodymyrivka* Yakymivka District k.1 g.13. Flake. Kubyshev *et al.* 1981:111 (Fig. 55:5).
671. *Volodymyrivka* Yakymivka District k.1 g.5. Scraper on a blade. Kubyshev *et al.* 1981:108.
672. *Volodymyrivka* Yakymivka District k.1 g.7. Scraper on a flake. Kubyshev *et al.* 1981:109.
673. *Volodymyrivka* Yakymivka District k.5 g.8. Knife-dagger rhombic 13,7x3, 6 cm. Kubyshev *et al.* 1980:160.
674. *Vovchansk* I Yakymivka District k.1 g.10. Flake. Kubyshev *et al.* 1979:10.

675. *Vovchansk I* Yakymivka District k.1 g.33. Flake. Kubyshev *et al.* 1979:24.
676. *Vovchansk II* Yakymivka District k.1 g.11. Flake. Kubyshev *et al.* 1980:111.
677. *Vovchansk II* Yakymivka District k.1 g.17. Cenotaf. Flake. Kubyshev *et al.* 1981:116.
678. *Vovchansk II* Yakymivka District k.1 g.4. Knife on a flake. Kubyshev *et al.* 1980:20.
679. *Vovchansk II* Yakymivka District k.1 g.8, three skeletons. Arrowhead with a deep coulisse. Wound. Kubyshev *et al.* 1980:106.
680. *Vovchansk* Yakymivka District k.1 g.19, two skeletons. Flake. Kubyshev *et al.* 1979:13.
681. *Vovchansk* Yakymivka District k.1 g.5. Fragment of biface. Kubyshev *et al.* 1979:6.
682. *Vovchansk* Yakymivka District k.2 g.17. Scraper on a flake. Kubyshev *et al.* 1980:20.
683. *Vovchansk* Yakymivka District k.3 g.3. 1-2. Flakes. Kubyshev *et al.* 1979:44.
684. *Vynogradne I* Tokmak District k.3 g.16. Piercer-Burin on a flake. Pustovalov 1999:112 (Fig. 5:22).
685. *Vynogradne I* Tokmak District k.4 g.1. Cutting tool on a blade. Otruschenko *et al.* 1983:6 (Fig. 2:5).
686. *Vynogradne I* Tokmak District k.5 g.5. Cenotaf. Spearhead. Otruschenko *et al.* 1983:26 (Fig. 10:3).
687. *Vynogradne II* Tokmak District k.15 g.10. Insert tool 2,3x2, 2 cm. Otruschenko *et al.* 1983:60 (Fig. 31:7,10).
688. *Vynogradne II* Tokmak District k.15 g.11. Piercer on a flake. Production kit. Otruschenko *et al.* 1983:60.
689. *Vynogradne II* Tokmak District k.15 g.8. Arrowhead with a coulisse. Wound. Otruschenko *et al.* 1983:58 (Fig. 30:7).
690. *Vynogradne II* Tokmak District k.15 g.9. 1. Flake. 2. Piercer. Otruschenko *et al.* 1983:58 (Fig. 31:2,3).
691. *Vynogradne II* Tokmak District k.18 g.9. Spearhead rhombic, 9,8x3x1 cm. Otruschenko *et al.* 1984:26 (Fig. 23:2).
692. *Vynogradne II* Tokmak District k.24 g.23. Spearhead. Otruschenko *et al.* 1984:71 (Fig. 48:8).
693. *Vynogradne II* Tokmak District k.24 g.31. Arrowhead with a shallow coulisse. Wound. Otruschenko *et al.* 1984:26 (Fig. 23:2).
694. *Vynogradne II* Tokmak District k.26 g.10. Flake. Otruschenko *et al.* 1984:88.
695. *Vynogradne II* Tokmak District k.26 g.7. Flake. Otruschenko *et al.* 1984:86 (Fig. 58).
696. *Vynogradne II* Tokmak District k.27 g.7. 1. Knife-dagger 7,5x2,5x0,8 cm. 2. Flake. Otruschenko *et al.* 1984:95 (Fig. 62:3,4).
697. *Vynogradne II* Tokmak District k.8 g.6. Flake. Otruschenko *et al.* 1984:24.
698. *Vynogradne III* Tokmak District k.30 g.7. 1. Knife-dagger, 8,5x3,2x0,7 cm. 2. Cutting tool on a flake. Otruschenko *et al.* 1985:16 (Fig. 3:8,10).
699. *Vynogradne III* Tokmak District k.32 g.11. Flake. Otruschenko *et al.* 1985:34.
700. *Vynogradne* Tokmak District k.3 g.15. Cutting tool on a flake. Pustovalov 1999:112 (Fig. 5:23).
701. *Vynogradne* Tokmak District k.3 g.29. 1. Scraper on a flake. 2-4. Flakes. Pustovalov 1999:112 (Fig. 6:9-19).
702. *Yuriivka* Yakymivka District k.3 g.8. Spearhead 13x3 cm. Kubyshev *et al.* 1981:149.
703. *Zamozhne* Tokmak District k.1 g.2. 1-2. Scrapers on flakes. Smyrnov 1960:178 (Fig. 135:4,3).
704. *Zamozhne* Tokmak District k.3 g.6. Scraped on a flake. Smyrnov 1960:185 (Fig. 135:2).
705. *Zaporizhzhya Horytskyj* 16, k.1 g.7. 1-2. Arrowheads with a coulisse. Wound. Popandopulo 1988:4 (Fig. 1).
706. *Zaporizhzhya Kichkas I* k.35 g.3. Arrowhead with a coulisse. Wound(?). Smolichev 1929:89.
707. *Zarichne* Melitopol District k.6 g.7. Flake. Mikhailov 1995:178.
708. *Zlatopil* Vasylivka District g.19 k.10. Flake. Bidzilia *et al.* 1973:169.
709. *Zlatopil* Vasylivka District g.19 k.7. Scraper on a flake. Bidzilia *et al.* 1973:168.

II. Catacomb culture

Crimea

710. *Bohachovka* Krasnoperekopsk District k.8 g.11. Arrowhead with a deep coulisse. Wound. 'Mask'. Korpuseva *et al.* 1978:68 (Fig. 63:2).
711. *Bolotne* Dzhanjok District k.14 g.18, two skeletons. 1-4. Flakes. Kulbaka, Kachur 2000:20.
712. *Chystenke* Simferopol District k.1 g.4. Concretion. Kolotukhin, Toshev 2000:46.
713. *Dozorne* Bilohirsk District k. Kemi-Oba g.1. 1. Arrowhead with a coulisse. 2. Cutting tool on a flake. Wound(?). Schepinskiy, Toshev 2001:58.
714. *Filativka* Krasnoperekopsk District k.12 g.2. 1-16. Flakes. Production kit of arrowmaker. 'Mask'. Korpuseva *et al.* 1977:76.
715. *Filativka* Krasnoperekopsk District k.8 g.12, two skeletons. 1-2. Flakes. Korpuseva *et al.* 1977:62 (Fig. 39:3).
716. *Illicheve* Lenine District k.5 g.5. 1-6. Flakes. Korpuseva, Leskov 1964-65:17.
717. *Istochne* Krasnoperekopsk District k.14 g.11. Flake. Korpuseva *et al.* 1978:123.
718. *Istochne* Krasnoperekopsk District k.14 g.23, two skeletons. Flake. Korpuseva *et al.* 1978:136.
719. *Istochne* Krasnoperekopsk District k.14 g.28, two skeletons. 1-5. Flakes. Korpuseva *et al.* 1978:131.
720. *Istochne* Krasnoperekopsk District k.14 g.8. 1-2. Flakes. Korpuseva *et al.* 1978:121.
721. *Istochne* Krasnoperekopsk District k.15 g.6, two skeletons. Fragment of blade. Korpuseva *et al.* 1978:139.
722. *Kolosky* Krasnoperekopsk District k.1 g.12. Flake. Schepinskiy, Cherepanova 1969:289 (Fig. 109).
723. *Kolosky* Saki District k.12 g.20. 1-4. Flakes. Olkhovskiy 1983:29.
724. *Kolosky* Saki District k.12 g.28. Cenotaf. 1-2. Flakes. Olkhovskiy 1983:35.
725. *Kolosky* Saki District k.12 g.39. 1-2. Flakes. Olkhovskiy 1983:41.
726. *Kolosky* Saki District k.12 g.5, two skeletons. 1. Core. 2-3. Flakes. Olkhovskiy 1983:15.
727. *Kolosky* Saki District k.12 g.8. 1-4. Flakes. Olkhovskiy 1983:22.
728. *Kolosky* Saki District k.3 g.10b. Flake. Olkhovskiy 1977:13 (Fig. 40).
729. *Krasnaya Zorka* Simferopol District k.1 g.19, two skeletons. Flake. Koltukhov, Toshev 1998:62.
730. *Krasnaya Zorka* Simferopol District k.1 g.20. Flake. Koltukhov, Toshev 1998:62.
731. *Krasnoyarske* Saki District k.11 g.23, three skeletons.

1. Arrowhead with a coulisse. 2-3. Flakes. Wound. Kolotukhin, Toshev 2000:154 (Fig. 84:2).
732. *Krasnoyarske* Saki District k.11 g.5, two skeletons. 1. Darthead. 2. Flake. Kolotukhin, Toshev 2000:146.
733. *Krasnoyarske* Saki District k.8 g.1. Flake. Kolotukhin, Toshev 2000:141.
734. *Krylovka* Saki District k.1 g.1. Spokeshave on a flake. Olkhovskiy 1985:6 (Fig. 18).
735. *Krylovka* Saki District k.1 g.4. Flake. Olkhovskiy 1985:8.
736. *Lomonosove* Nyzhnohirsk District k.11 g.5. 1-3. Flakes. Koltukhov, Toshev 1998:83.
737. *Lugove* Saki District k.4 g.9. Knife-dagger 9,9x4,1 cm. Kolotukhin, Toshev 2000:101 (Fig. 69:4).
738. *Martynivka* Krasnoperekopsk District k.1 1. Flake. Schepinskiy, Cherepanova 1969:244.
739. *Martynivka* Krasnoperekopsk District k.1 g.13. Flake. Schepinskiy, Cherepanova 1969:244 (Fig. 95:13).
740. *Mar'yine* Simferopol District k.12 g.2. Spearhead. Shults, Stoliar 1958:61.
741. *Natashyne* Saki District k.10 g.6. Scraper on a flake. Kolotukhin, Toshev 2000:194 (Fig. 131:7).
742. *Natashyne* Saki District k.10 g.9. Cutting tool on a flake. Kolotukhin, Toshev 2000:197 (Fig. 132:5).
743. *Natashyne* Saki District k.18 g.9. 1-2. Flakes. Kolotukhin, Toshev 2000:215 (Fig. 145:17,18).
744. *Pionerske* Simferopol District k.1 g.15. Flake. Koltukhov, Toshev 1998:16.
745. *Pryrichne* Nyzhnohirsk District k.1 g.13. Biface. 15x4 cm. Gavrilov *et al.* 2002:98.
746. *Pryrichne* Nyzhnohirsk District k.1 g.14. 1-2. Flakes. Gavrilov *et al.* 2002:98.
747. *Pryrichne* Nyzhnohirsk District k.1 g.15, two skeletons. Flake. Gavrilov *et al.* 2002:98.
748. *Romashkyne* Saki District k.2 3. Flake. Olkhovskiy 1982:14.
749. *Rysove* Krasnoperekopsk District k.1 g.43. Flake. Schepinskiy, Cherepanova 1969:124.
750. *Rysove* Krasnoperekopsk District k.4 g.39, two skeletons. Spearhead. Schepinskiy, Cherepanova 1969:159 (Fig. 60:7).
751. *Rysove* Krasnoperekopsk District k.4 g.57, two skeletons. Flake. Schepinskiy, Cherepanova 1969:164.
752. *Rysove* Krasnoperekopsk District k.7 g.26. Arrowhead with a shallow coulisse. Wound. Schepinskiy, Cherepanova 1969:178 (Fig. 67:18).
753. *Shalashi* Saki District k.10 g.12. Flake. Kolotukhin, Toshev 2000:55.
754. *Shalashi* Saki District k.10 g.15. Flake. Kolotukhin, Toshev 2000:55.
755. *Shalashi* Saki District k.10 g.5. Cutting tool on a flake. Kolotukhin, Toshev 2000:53.
756. *Shturmove* Saki District k.2 g.17. 1-2. Arrowheads with a deep coulisse. Olkhovskiy 1984:15 (Fig. 7:8).
757. *Slavne* Rozdolne District k.1 g.5. 1-2. Flakes. Kolotukhin, Toshev 2000:106 (Fig. 55).
758. *Slavne* Rozdolne District k.3 g.5, two skeletons. Flake. Kolotukhin, Toshev 2000:114 (Fig. 59:5).
759. *Slavne* Saki District k.1 g.2, two skeletons. 1. Darthead. 2. Concretion. 3-4. Flakes. 5-19. Arrowheads with a deep coulisse. Production kit. Quiver set. 'Mask'. Koltukhov, Toshev 1998:100 (Fig. 52).
760. *Slavne* Saki District k.1 g.3, two skeletons. Darthead. Koltukhov, Toshev 1998:104 (Fig. 54:2).
761. *Suvorivske* Saki District k.14 g.5. Flake. Kolotukhin, Toshev 2000:122 (Fig. 88:5).
762. *Suvorivske* Saki District k.16 g.6. 1. Cutting tool on a flake. 2. Concretion. Kolotukhin, Toshev 2000:127 (Fig. 91:2).
763. *Tankove* Krasnoperekopsk District k.8 g.9. Flake. Schepinskiy, Cherepanova 1969:196.
764. *Tsilynne* Dzhankoj District k.1 g.25. Arrowhead with a deep coulisse. 'Mask'. Korpusova *et al.* 1978:23 (Fig. 22:2).
765. *Tsilynne* Dzhankoj District k.1 g.7, two skeletons. Flake. Korpusova *et al.* 1978:6.
766. *Tsilynne* Dzhankoj District k.1 g.8. Cutting tool on a flake. Korpusova *et al.* 1978:6 (Fig. 14:2).
767. *Tsilynne* Dzhankoj District k.14 g.7. 1-2. Flakes. Production kit of arrowmaker. Korpusova *et al.* 1977:101 (Fig. 60:4).
768. *Tsilynne* Dzhankoj District k.16 g.11, two skeletons. Flake. Korpusova *et al.* 1977:127 (Fig. 71:5).
769. *Tsilynne* Dzhankoj District k.5 g.6, two skeletons. Fragment of biface. Korpusova *et al.* 1978:27 (Fig. 37:2).
770. *Tsilynne* Dzhankoj District k.6 g.4. Arrowhead with a deep coulisse. Wound. Production kit. Korpusova *et al.* 1978:46 (Fig. 45:2).
771. *Tsyvetochnoye* Bilohirsk District k.1 g.6, two skeletons. 1. Flake. 2. Darthead 7,9x2,8 cm. Puzdrovskiy, Toshev 2001:151.

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772. *Andrusivka* Kryvyj Rig District k.1 g.6. Flake. Romashko *et al.* 1988:58 (Fig. 207).
773. *Andrusivka* Kryvyj Rig District k.2 g.3. Burin on a flake. Romashko *et al.* 1988:64 (Fig. 214).
774. *Andrusivka* Kryvyj Rig District k.2 g.5. Flake. Romashko *et al.* 1988:64.
775. *Blagodatne* IV Pavlohrad District k.12 g.1. Flake. Marina *et al.* 1986:22.
776. *Blagodatne* IV Pavlohrad District k.13 g.11. Flake. Marina *et al.* 1986:27.
777. *Blagodatne* IV Pavlohrad District k.13 g.15. Flake. Marina *et al.* 1986:26.
778. *Blagodatne* IV Pavlohrad District k.13 g.6, four skeletons. 1. Knife-dagger 8x3 cm. 2-3. Scrapers on flakes. 'Mask'. Marina *et al.* 1986:24 (Fig. 4:4-6).
779. *Blagodatne* IV Pavlohrad District k.13 g.7. Blade. 'Mask'. Marina *et al.* 1986:26.
780. *Blagodatne* IV Pavlohrad District k.4 g.6. Knife-dagger 11x4 cm. Marina *et al.* 1986:16 (Fig. 3:7).
781. *Blyzniyuky* Kryvyj Rig District k.5 g.10. 1-2. Flakes. Melnik 1983:104 (Fig. 22).
782. *Bulahivka* I Pavlohrad District k.3 g.8. Knife-dagger rhombic. Kovaleva, Peretiatio 1973:142 (Fig. 406).
783. *Chervona Kolonka* Apostolove District k.1 g.35. Scraper on a flake. Mozolevskiy *et al.* 1986:103.
784. *Chervonokam'yane* Solone District k.1 g.6. 1. Hammerstone. 2-3. Fragments of hammerstones. 4-7. Flakes. Kovaleva *et al.* 1992:21 (Fig. 30-34).
785. *Chkalove* II Nikopol District k.1 g.20. Arrowhead with a deep coulisse. Wound. Mozolevskiy, Nikolova 1981:30 (Fig. 19:6).
786. *Chkalovka* IV Kryvyj Rig District k.3 g.10. 1. Chisel on a flake. 2. Piercer on a flake. Kovaleva *et al.* 1991:23 (Fig. 59).

787. *Chorna Mohyla group* Nikopol District k.3 g.18. Scraper on a flake. Mozolevskiy, Nikolova 1980:10.
788. *Chorna Mohyla group* Nikopol District k.3 g.28. Arrowhead with direct base. Wound. Mozolevskiy, Nikolova 1980:10.
789. *Chornohlazove IV* Pavlohrad District k.8 g.2. 1-10. Arrowheads with a deep coulisse. Quiver set. Kovaleva, Shalobudov 1985:60 (Fig. 218).
790. *Chornyavshchina* Pavlohrad District k.3 g.4. Flake. Kovaleva, Shalobudov 1985:14 (Fig. 45).
791. *Dniprodzerzhynsk VI* k.1 g.4. Knife-dagger 9,5x3 cm. Romashko *et al.* 1988:34 (Fig. 114).
792. *Gnativka I* Novomoskovsk District k.3 g.3, two skeletons. Flake. Kovaleva, Marina 1982:89.
793. *Grygorivka* Solone District k.1 g.1. 1-4. Flakes. 5. Arrowhead with a deep coulisse. Wound. Kovaleva *et al.* 1987:66 (Fig. 127).
794. *Hannivka* Novomoskovsk District k.2 g.7. Flake. Kovaleva, Shalobudov 1986:62 (Fig. 166).
795. *Hashcheve* Novomoskovsk District k.6 g.5. Flake. Kovaleva *et al.* 1978:42.
796. *Hejkivska II* Kryvyj Rig District k.1 g.17. Adz polished. Melnik 1990:23 (Fig. 67).
797. *Hejkivska II* Kryvyj Rig District k.1 g.21. 1-2. Scrapers on flakes. 3. Flake. Melnik 1990:26 (Fig. 73).
798. *Izobilne* Nikopol District k.5 g.5. 1-2. Flakes. Mozolevskiy, Nikolova 1980:60.
799. *Kalinin IV* Tsarychanka District k.1 g.14, four skeleton. Flake. Kovaleva *et al.* 1979:17 (Fig. 27).
800. *Kalinin XIII* Tsarychanka District k.3 g.7. 1-4. Flakes. Kovaleva *et al.* 1979:89.
801. *Kam'yanka II* Apostolove District k.5 g.13. Flake. Mukhopad, Androsov 1986:45 (Fig. 158).
802. *Kam'yanske I* Nikopol District k.1 g.16. Burin on a flake. Kovaleva *et al.* 1991:98 (Fig. 294).
803. *Kotovka I* Magdalynivka District k.3 g.9. Flake. Kovaleva 1981b:5 (Fig. 6).
804. *Kovpakivka III* Magdalynivka District k.3 g.2, four skeleton. Darthead rhombic, 8,2x3,5 cm. Kovaleva 1981b:116 (Fig. 335).
805. *Kovpakivka III* Magdalynivka District k.4 g.1. 1-5. Arrowheads with deep coulissses. Quiver set. Kovaleva 1981b:119 (Fig. 347).
806. *Kovpakivka III* Magdalynivka District k.8 g.14. Flake. Kovaleva 1981b:132.
807. *Kovpakivka III* Magdalynivka District k.8 g.8, three skeletons. Flake. Kovaleva 1981b:129.
808. *Krugla Mohyla group* Nikopol District k.1 g.18. 1-2. Burins on flakes. 3. Flake. Mozolevskiy *et al.* 1983:11 (Fig. 9).
809. *Krugla Mohyla group* Nikopol District k.14 g.2. Arrowhead with a coulisse. Wound. Mozolevskiy *et al.* 1983:48 (Fig. 34:5).
810. *Kryvyj Rig I* k.2 g.6. Flake. Kovaleva *et al.* 1989:106 (Fig. 333).
811. *Kryvyj Rig Ryadovi Mohyly* k.2 g.2. Arrowhead with a deep coulisse. Wound. Melnik 1990:6 (Fig. 8:3).
812. *Kryvyj Rig Ryadovi Mohyly* k.7 g.8. Flake. Melnik 1984:44 (Fig. 138).
813. *Kryvyj Rig Ryadovi Mohyly* k.7 g.9. Spokeshave on a flake. Melnik 1984:44 (Fig. 140).
814. *Kryvyj Rig, Dovga Mohyla* k.1 g.2, two skeletons. Arrowhead with a deep coulisse. Wound. Melnik 1984:62 (Fig. 177).
815. *Kryvyj Rig, Dovga Mohyla* k.1 g.6. 1. Arrowhead with a deep coulisse. 2. Fragment of blade. 3. Scraper on a flake. 4. Flake. Production kit of arrowmaker. Melnik 1984:62 (Fig. 177).
816. *Kryvyj Rig, Dovga Mohyla* k.1 g.8, two skeletons. 1-45. Flakes. Production kit of arrowmaker. Melnik 1984:68 (Fig. 184).
817. *Kryvyj Rig, NHZK* k.1 g.5. 1-2. Cutting tool on flakes. 3. Scraper on a flake. Melnik 1982:34 (Fig. 13).
818. *Kryvyj Rig, Remontyrska Mohyla* k.1 g.10. Darthead 7,2x2,6x1 cm. Melnik 1988:26 (Fig. 78).
819. *Kryvyj Rig, Rybasove II* k.4 g.3, two skeletons. Fragment of arrowhead. Wound. Melnik 1986:71.
820. *Kryvyj Rig, SHZK* k.2 g.18, two skeletons. 1-5. Flakes. Production kit of arrowmaker. Krylova 1965:16.
821. *Kut* Apostolove District k.3 g.14. Flake. Berezovets 1960:46.
822. *Kyslychuvata II* Tomakivka District k.4 g.13. Scraper on a flake. Kovaleva *et al.* 1987:126.
823. *Kyslychuvata II* Tomakivka District k.4 g.8. Flake. Kovaleva *et al.* 1987:122.
824. *Lyskivka* Tsarychanka District k.1 g.9, three skeletons. 1-2. Scraper on a flake. 3-5. Flakes. Telegin *et al.* 1971:44.
825. *Malozaharyne I* Solone District k.1 g.6. 1. Arrowhead. 2. Spokeshave on a flake. Wound. Kovaleva, Marina, Shalobudov 1988:21 (Fig. 38).
826. *Mar'yivka III* Magdalynivka District k.1 g.7. Scraper on a flake. Kovaleva *et al.* 1978:83 (Fig. 256).
827. *Mine No 22* group Nikopol District k.2 g.17. Arrowhead with a coulisse. Mozolevskiy *et al.* 1983:61 (Fig. 43:8).
828. *Mine No 22* group Nikopol District k.3 g.3. 1. Arrowhead with a shallow coulisse. 2-4. Arrowheads with petiole. 5-47. Flakes. 48-96. Flakes with on tracks of the use. 97. Core. Production kit of arrowmaker. Mozolevskiy *et al.* 1983:65 (Fig. 44).
829. *Mogilyov, Brylyuvata Mohyla* Tsarychanka District k.1 g.14. 1-8. Flakes. 89-92. Arrowheads with a coulisse. Production kit. Telegin *et al.* 1972:11 (Fig. 11-14).
830. *Mohyly Hurskoho* group Nikopol District k.1 g.15. 1-3. Flakes. Mozolevskiy, Nikolova 1980:23.
831. *Mychajlivka VI* Sofiivka District k.3 g.6. Arrowhead with a deep coulisse. Wound. Bondar *et al.* 1976:14 (Fig. 45).
832. *Mykolaivka II* Dnepropetrovsk District k.3 g.4. Scraper on a flake. Kovaleva, Marina, Shalobudov 1984:152 (Fig. 409).
833. *Mykolaivka II* Petropavlivka District k.5 g.2. Flake. Marina, Romashko 1999:48.
834. *Mykolaivka IV* Dnepropetrovsk District k.1 g.12. Darthead 7x2 cm. Kovaleva, Shalobudov 1985:13 (Fig. 23).
835. *Mykolaivka IV* Dnepropetrovsk District k.1 g.8. Flake. Kovaleva, Shalobudov 1985:12 (Fig. 16).
836. *Novoivanivka I* Pavlohrad District k.1 g.16. 1-4. Flakes. Production kit of arrowmaker. Kovaleva 1983c:110.
837. *Novoivanivka I* Pavlohrad District k.1 g.3. Knife-dagger rhombic 15x3,2 cm. Production kit. Kovaleva 1983c:104 (Fig. 325).
838. *Novoivanivka II* Pavlohrad District k.2 g.1. Flake. 'Mask'. Kovaleva, Shalobudov 1986:12.

839. *Novokrayinka* Kryvyj Rig District k.1 g.5. Flake. Melnik 1981:7 (Fig. 25).
840. *Novokrayinka* Kryvyj Rig District k.4 g.9. 1-2. Scrapers on blades. Melnik 1990:32 (Fig. 93).
841. *Novooleksandrivka* I Dnepropetrovsk District k.6 g.10. 1-3. Flakes. Kovaleva *et al.* 1989:21 (Fig. 66).
842. *Novooleksandrivka* I Dnepropetrovsk District k.6 g.9. Flake. Kovaleva *et al.* 1989:21 (Fig. 63).
843. *Novopokrovka* II Solone District k.1 g.2. 1-12. Flakes. Production kit. Kovaleva, Marina, Shalobudov 1988:103 (Fig. 232).
844. *Novopokrovka* II Solone District k.1 g.5. 1-2. Burins on flakes. Kovaleva, Marina, Shalobudov 1988:105 (Fig. 240).
845. *Novopokrovka* III Solone District k.1 g.20, three skeletons. Knife on a blade. Kovaleva, Marina, Shalobudov 1988:123 (Fig. 293).
846. *Novopokrovka* III Solone District k.1 g.22. Scraper on a flake. Kovaleva, Marina, Shalobudov 1988:124 (Fig. 299).
847. *Novyi Svit* Tomakivka District k.2 g.3, two skeletons. 1. Scraper on a flake. 2. Flake. Androsov 1986:69 (Fig. 3:4,5).
848. *Oleksiivka* XXVI Sofitvka District k.5 g.10. Spearhead(?) rhombic 7x2,7x0,6 cm. Bondar *et al.* 1976:24 (Fig. 101).
849. *Ordzhonikidze, Katerynivka* k.31 g.3. Scraper on a flake. Polin *et al.* 2008:137.
850. *Ordzhonikidze, Katerynivka* k.31 g.6. 1. Scraper on a flake. 2. Sculpture as anthropomorphic stela, on a flake. Polin *et al.* 2008:137.
851. *Pereshchepyne* Novomoskovsk District k.1 g.5a. Flake. Bratchenko 1970:5. (Fig. 3:2).
852. *Pereshchepyne* Novomoskovsk District k.1 g.9. Cutting tool on a blade. Bratchenko 1970:5 (Fig. 6).
853. *Preobrazhenka* I Pavlohrad District k.1 g.9. Scraper on a flake. Kovaleva 1983c:80 (Fig. 238).
854. *Proletar* XXXI Magdalynivka District k.3 g.9. Flake. Kovaleva *et al.* 1980:147 (Fig. 491).
855. *Propashne* Solone District k.1 15. 1-2. Cutting tool on flakes. 3. Spearhead rhombic. Kovaleva *et al.* 1998:8 (Fig. 3:11).
856. *Pryvorotna Balka* Kryvyj Rig District k.4 g.4. Scraper on a flake. Melnik 1981:117 (Fig. 372).
857. *Pryvorotna Balka* Kryvyj Rig District k.Luk'yanivka g.10. 1. Fragment of arrowhead. 2. Flake. Wound, 'Mask'. Melnik 1981:86 (Fig. 287).
858. *Pryvorotna Balka* Kryvyj Rig District k. Luk'yanivka g.14, three skeletons. Flake. Melnik 1981:89 (Fig. 302).
859. *Pryvorotna Balka* Kryvyj Rig District k.Luk'yanivka g.17. Scraper on a flake. Melnik 1981:93 (Fig. 315).
860. *Pryvorotna Balka* Kryvyj Rig District k.Luk'yanivka g.3, three skeletons. Cutting tool on a flake. Melnik 1981:81 (Fig. 265).
861. *Pryvorotna Balka* Kryvyj Rig District k.Luk'yanivka g.9. Fragment of arrowhead. Wound. Melnik 1981:86 (Fig. 282).
862. *Rayivka* I Kryvyj Rig District k.2 g.3. Scraper on a flake. Kovaleva *et al.* 1991:78 (Fig. 233).
863. *Shandrivka* I Pavlohrad District k.1 g.10. Concretion (look like a human 'mask'), 22x18x5 cm. Kovaleva 1983c:11 (Fig. 30).
864. *Shandrivka* III Pavlohrad District k.1 g.4, four skeleton. Scraper on a flake. Kovaleva 1983c:45.
865. *Shandrivka* III Pavlohrad District k.2 g.4. Scraper on a flake. Kovaleva 1983c:51.
866. *Shyroke* Kryvyj Rig District k.3 g.16. Flake. Krylova 1965:49.
867. *Shyroke* Kryvyj Rig District k.3 g.4. 1-3. Flakes. Krylova 1965:43.
868. *Sokolove* II Novomoskovsk District k.3 g.19. 1-3. Arrowheads with a deep coulisse. Wound(?). Kovaleva *et al.* 1977:42 (Fig. 128).
869. *Sokolove* II Novomoskovsk District k.3 g.26. Blade with a retouch. Kovaleva *et al.* 1977:45 (Fig. 143).
870. *Sokolove* II Novomoskovsk District k.3 g.27. Arrowhead rhombic. Wound(?). Kovaleva *et al.* 1977:47 (Fig. 146).
871. *Sokolove* II Novomoskovsk District k.5 g.6. 1. Flake. 2. Scraper on a flake. Kovaleva *et al.* 1977:58 (Fig. 191,192).
872. *Sokolove* II Novomoskovsk District k.5 g.7. Concretion. Kovaleva *et al.* 1977:58 (Fig. 194).
873. *Spaske* III Magdalynivka District k.8 g.11, three skeletons. Scraper on a flake. Kovaleva, Peretiatio 1973:13.
874. *Spaske* V Dnepropetrovsk District k.1 g.10. 1. Cutting tool on a flake. 2-3. Flakes. Kovaleva 1972:74.
875. *Spaske* XI Magdalynivka District k.1 g.12. 1. Flake. 2. Scraper on a flake. Kovaleva 1974:46 (Fig. 50).
876. *Terny* I Pavlohrad District k.2 g.3. Flake. Kovaleva, Marina, Shalobudov 1984:15 (Fig. 24).
877. *Terny* I Pavlohrad District k.2 g.7. Flake. Kovaleva, Marina, Shalobudov 1984:18 (Fig. 32).
878. *Terny* I Pavlohrad District k.6 g.8. Scraper on a flake. Kovaleva, Marina, Shalobudov 1984:47 (Fig. 111).
879. *Terny* II Pavlohrad District k.4 g.22, two skeletons. Scraper-knife on a blade. Kovaleva, Shalobudov 1985:88 (Fig. 304).
880. *Terny* II Pavlohrad District k.4 g.8, two skeletons. Scraper-knife on a flake. Kovaleva, Shalobudov 1985:80 (Fig. 273).
881. *Terny* III Pavlohrad District k.1 g.9, two skeletons. Skraper-burin on a flake. Kovaleva, Marina, Shalobudov 1984:75 (Fig. 190).
882. *Vasylivka* I Dnepropetrovsk District k.2 g.4. Insert tool. Kovaleva *et al.* 1989:53 (Fig. 176).
883. *Vasylivka* II Dnepropetrovsk District k.2 g.5. 1-3. Arrowheads with coulissses. Wound. Kovaleva *et al.* 1989:77 (Fig. 250).
884. *Vasylivka* II Dnepropetrovsk District k.5 g.4. 1-2. Hammerstones. 3. Flake. Kovaleva *et al.* 1989:76 (Fig. 246-249).
885. *Verhnyia Maivka* XII Novomoskovsk District k.1 g.4. Scraper on a flake. Kovaleva 1974:14. (Fig. 229:1).
886. *Verhnyia Maivka* XIII Novomoskovsk District k.1 g.12. 1. Burin on a flake. 2. Piercer on a flake. 3-5. Flakes. Production kit of arrowmaker. Kovaleva 1974:109 (Fig. 359).
887. *Vilnohirska* I k.1 g.3. Darthead 9x2,7x0,8 cm. Churilova, Nor 1987:34 (Fig. 39:2).
888. *Voikove* Kryvyj Rig District k.1 g.12. 1-13. Arrowheads with deep coulissses. Quiver set. Krylova 1968:24.
889. *Vyshneve* II Sofitvka District k.9 g.13. 1-2. Arrowheads with a shallow coulisse. Bondar *et al.* 1976:45 (Fig. 227).

890. *Vyshneve* II Sofiivka District k.9 g.15. Arrowhead with a coulisse. Wound. Bondar *et al.* 1976:47 (Fig. 231,232).
891. *Zaplavka* I Magdalynivka District k.3 g.19. Flake. Kovaleva 1981b:152 (Fig. 423).
892. *Zaplavka* I Magdalynivka District k.4 g.9. 1-16. Concretions. 17-45. Flakes. 46-49. Scraped. 50-51. Scrapers. Production kit. Kovaleva 1981b:160 (Fig. 440).
893. *Zhemchujne* Pavlohrad District k.4 g.7. Hammerstone. Kovaleva, Shalobudov 1986:31.
894. *Zlatoustivka* I Kryvyj Rig District k.2 g.1. Flake. Romashko *et al.* 1988:51 (Fig. 181).
- Donetsk Region**
895. *Artemivsk* k.1 g.1. 1. Conical core (eneolite). 22x9 cm. 2. Hammerstone-retuser on concretion. 12,5x3,3 cm. 3-23. Flakes. Production kit of arrowmaker. Kravets 2001a:21.
896. *Artemivsk* k.1 g.2. 1-7. Arrowheads with a deep coulisse. Kravets 2001a:21.
897. *Artemivsk* k.2 (1995) g.1, nine skeletons. 1-6. Arrowheads with a deep coulisse. Kravets 2001a:22.
898. *Artemivsk* k.2 g.1. 1-2. Arrowheads with a deep sub-three-corne Chervona coulisse. Kravets 2001a:22.
899. *Artemivsk* k.2 g.3. 1-33. Arrowheads with a deep coulisse. 34. Darthead(?), 5,3x2,3 cm. 35-66. Uncompleted tips arrows. 67-84. Flakes. 85-86. Flakes. 87-88. Hammerstones on concretions. 89-136. Fragments of concretions. Production kit of arrowmaker. Kravets 2001a:22.
900. *Artemivsk* k.4 g.1. 1. Arrowhead with a deep coulisse. 2-3. Cores prismatic (mezolit-neolite). 4. Hammerstone-retuser. 5. Knife-dagger (?) leaved. 6-11. Flakes. 12-99. Flakes I wreckages. 100-121. Scales. 122. Blade (paleolith). Production kit of arrowmaker. Wound. Kravets 2001a:22.
901. *Burlatske* Velyka Novosilkivka District k.3 g.4. 1-9. Arrowheads with a deep coulisse. 10-28. Flakes. Production kit of arrowmaker, 'mask'. Moruzhenko *et al.* 1984:14-16 (Fig. 14,15).
902. *Donetsk* k.4 g.9. Flake. Gershkovich, Serdiukova 1991:155.
903. *Hamush-Oba* Telmanove District k.1 g.1. Knife-dagger. 9,5x3x0,8 cm. Posrednikov *et al.* 1991:30 (Fig. 60:1).
904. *Izhevka* I Kostyantynivka District k.4 g.16. 1-8. Arrowheads with a deep coulisse. [excavated in 2006 by Usachuk A.N., Polidovich Y.B.].
905. *Kalynivka* Novoazovsk District k.1 g.4, two skeletons. Flake. Kulbaka 1985:4.
906. *Kindrativka* Kostyantynivka District k.1 g.10. 1. Arrowhead with a deep coulisse. 2-3. Flakes. Kulbaka 1988:16 (Fig. 12:7-9).
907. *Kindrativka* Kostyantynivka District k.1 g.4. 1. Concretion rhombic (look like the head snake), 6,3 cm. 2. Flake. Kulbaka 1988:10 (Fig. 7:8,10).
908. *Kindrativka* Kostyantynivka District k.1 g.6. Flake. Kulbaka 1988:12 (Fig. 12:1).
909. *Kindrativka* Kostyantynivka District k.1 g.9. Arrowhead with a deep coulisse. Wound(?). Kulbaka 1988:14 (Fig. 12:4).
910. *Kindrativka* Kostyantynivka District k.2 g.5. Cenotaf. 1. Arrowhead with a deep coulisse. 2. Burin on a flake. 3. Drill on a flake. Production kit. Kulbaka, Gnatko 1989:37 (Fig. 38).
911. *Kindrativka* Kostyantynivka District k.3 g.2. Flake. Kulbaka, Gnatko 1989:49 (Fig. 56:5).
912. *Kindrativka* Kostyantynivka District k.3 g.7. Flake. Kulbaka, Gnatko 1989:56 (Fig. 57:3).
913. *Kindrativka* Kostyantynivka District k.4 g.4. Flake. Kulbaka, Gnatko 1989:68 (Fig. 64:5).
914. *Kominternove* Novoazovsk District k.2 g.2. Flake. Kulbaka, Gnatko 1990:16 (Fig. 31:7).
915. *Kominternove* Novoazovsk District k.4 g.4. 1-17. Arrowheads with a deep coulisse. 18-53. Flakes. Production kit of arrowmaker. Bratchenko *et al.* 1976:28 (Fig. 23).
916. *Kuibysheve* Velyka Novosilkivka District k.1 g.19. 1-2. Arrowheads with a deep coulisse. Moruzhenko *et al.* 1988:22.
917. *Makijivka* k.3 g.4. 1. Scraper on a flake. 2. Flake. Gershkovich, Shepel 1987:62.
918. *Makijivka* k.3 g.6. 1. Core. 2. Flake. Gershkovich, Shepel 1987:66 (Fig. 6:3).
919. *Mariupol* k.1 g.3. Fragment of blade. Kulbaka, Gnatko 1990:19 (Fig. 31:15).
920. *Mariupol*, *Vynogradnyky* k.1 g.1. Scraper on a flake. Kulbaka 1984:2 (Fig. 9).
921. *Mariupol*, *Vynogradnyky* k.1 g.8. Arrowhead with a deep coulisse. Kulbaka 1984:14 (Fig. 9).
922. *Mykolaivka* Krasnoarmiisk District k.1 g.13. Cutting tool on a flake. Polidovich 1993:52 (Fig. 27:3).
923. *Mykolaivka* Slov'yansk District k.2 g.2. 1-5. Arrowheads with a deep coulisse. 6. Flake. 7. Adze of quartzitic. 11,7x3,8x3,2 cm. Production kit of arrowmaker. Moruzhenko *et al.* 1983:36 (Fig. 26:27).
924. *Novoandriyivka* Volnovaha District k.4 g.4. Arrowhead with a deep coulisse (fragmented). Wound. Klimentko 1998:91.
925. *Novomykolaivka* II Dobropillya District k.2 g.1. 1-2. Arrowheads with a deep coulisse. 3. Cutting tool on a flake. 4. Saw on a flake. 5-10. Flakes. 11-12. Cores. Production kit of arrowmaker. Moruzhenko *et al.* 1983:72 (Fig. 50).
926. *Novomykolaivka* II Dobropillya District k.2 g.3. 1-5. Flakes. Moruzhenko *et al.* 1983:75 (Fig. 51).
927. *Novooleksiivka* Volnovaha District k.2 g.19. 1-2. Arrowheads with a deep coulisse. Moruzhenko *et al.* 1988:23 (Fig. 27:3).
928. *Novooleksiivka* Volnovaha District k.2 g.6. 1. Arrowhead with a deep coulisse. 2. Knife-dagger with the petiole 13,8x4x0,4 cm. Moruzhenko *et al.* 1988:12 (Fig. 11).
929. *Ohorodne* Pershotravneve District k.1 g.16. Flake. Posrednikov, Zarayskaya 1993:112.
930. *Ohorodne* Pershotravneve District k.1 g.19, two skeletons. 1-2. Flakes. Posrednikov, Zarayskaya 1993:116.
931. *Ohorodne* Pershotravneve District k.1 g.9. 1-2. Flakes. Posrednikov, Zarayskaya 1993:96.
932. *Ohorodne* Pershotravneve District k.3 g.6. Flake. Posrednikov, Zarayskaya 1993:143.
933. *Oktyabrsk* Volnovaha District k.1 g.12. 1-3. Cores. 4-24. Flakes. Production kit. Bratchenko *et al.* 1976:38 (Fig. 42).
934. *Orlovske* Volnovaha District k. 2 g.7. 1-2. Arrowheads with a deep coulisse. Klimentko 1998:27.
935. *Pokrovka* Amvrosiivka District k.4 g.3, two skeletons. 1. Spokeshave on a flake. 2-3. Flakes. 4. A Spokeshave-

- knife on a blade, 5.Hammerstone. Production kit. Shapovalov *et al.* 1987:54 (Fig. 42).
936. *Pokrovka* Amvrosiivka District k.4 g.6. Spearhead, 16x4x1 cm. Shapovalov *et al.* 1987:59.
937. *Prymorske II* Novoazovsk District k.1 g.4, four skeletons. Spearhead, 9x2,5 cm. Beliaev *et al.* 1976:23.
938. *Prymorske II* Novoazovsk District k.1 g.9, two skeletons. Spearhead, 12,8x3,3 cm. Beliaev *et al.* 1976:29.
939. *Pryviline* Starobesheve District k.3 g.12, two skeletons. 1-10.Arrowheads with a deep coulisse. Kulbaka, Gnato 1989:18.
940. *Pryviline* Starobesheve District k.3 g.6. Flake quartzitic. Kulbaka, Gnato 1989:13 (Fig. 21:9).
941. *Rayske* Druzhkivka District k.1 g.13. Cnotaf. Flake. Polidovych, Razumov 2007:29.
942. *Shevchenko II* Volodarske District k.2 g.12. 1-2.Hammerstones on concretion. 3.Anvil on concretion. Production kit. Moruzhenko *et al.* 1980:70 (Fig. 103, 104).
943. *Slovjansk, Artema* k.1 g.6. Darthead. Wound. Klimenko 1997:35.
944. *Slovjansk, Cherevkivka* k.1 g.5. 1-3.Arrowheads with a deep coulisse. A few ten a flakes. Production kit of arrowmaker. Kiyashko, Yatsenko 2001:275.
945. *Stara Laspa* Telmanove District k.1 g.5. Fragment of biface. Shapovalov *et al.* 1987:84 (Fig. 66:6).
946. *Stara Laspa* Telmanove District k.5 g.4. 1-3.Flakes. Kulbaka 1987:3 (Fig. 2:13).
947. *Stupki* Artemivsk District k.1 g.3. Knife-dagger with a petiole. Kravets 1998:2.
948. *Tcherkaske Slovyansk* District ground g.3. 1-2.Blades (neolith). Kuzin-Losev 2005:159 (Fig. 78:4).
949. *Vasylivka* Starobesheve District k.1 g.9. Cnotaf. Flake. Production kit. Mikhlina, Shvetsov 1972:9.
950. *Vysoke Makijivka* k.1 g.13. Fragment of blade. Kulbaka 1988:25 (Fig. 12:14).
951. *Vysoke Makijivka* k.3 g.3. Scraper. Kulbaka 1988:27 (Fig. 26:2).
- Kharkiv Region**
952. *Bezmyatezhne* Shevchenko District k.1 g.5. 1.Darthead 7,8x3,5 cm. 2.Scraper on a flake. 3-4.Flakes. Production kit of arrowmaker. Klimenko, Tsymbal 2002:141.
953. *Borovske* Shevchenko District k.1 g.2. Knife biface 10,7x6,8 cm. Klimenko 1997:75 (Fig. 45:5).
954. *Borshhivka* Shevchenko District k.3 g.1. Hammerstone. Klimenko 1997:226 (Fig. 143:3).
955. *Chervona Husarivka* Balakliya District k.3 g.1. 1-21.Flakes. Production kit. Berestnev 2001:112.
956. *Petrivske* Lozova District k.1 g.9. 1-2. Flakes. Telegin *et al.* 1973:72.
957. *Velyka Komyshuvaha* Izyum District k.2 g.2-4, three skeletons. Flake. Berestnev 2001:112.
958. *Verbivka* Shevchenko District k.10 g.5. Spearhead with the petiole 13,5x3,6 cm. Klimenko 1997:179 (Fig. 111:4).
959. *Voloska Balakliya* Shevchenko District k.5 g.3. Spearhead 10,7x3,6 cm. Klimenko 1997:51.
960. *Vyla Izyum* District k.1 12, two skeletons. 1-2.Arrowheads with a coulisse. 3.Flake. Tsimidanov, Kravchenko 2001:76 (Fig. 7:2-5).
961. *Vyla Izyum* District k.1 2, four skeleton. Flake. Tsimidanov, Kravchenko 2001:71.
962. *Vyla Izyum* District k.1 3. 1-4.Flakes. Tsimidanov, Kravchenko 2001:71 (Fig. 9:6-9).
963. *Vyla Izyum* District k.1 4. Flake. Tsimidanov, Kravchenko 2001:71.
- Kherson Region**
964. *Babenkove* Kalanchak District k.1 g.30. Flake. Schepinskiy, Cherepanova 1969:92.
965. *Brylivka* Tsyurupynsk District k.13 g.10, two skeletons. Flake. Evdokimov *et al.* 1985:25.
966. *Brylivka* Tsyurupynsk District k.13 g.2, two skeletons. Scraper on a flake. Evdokimov *et al.* 1985:22.
967. *Brylivka* Tsyurupynsk District k.16 g.21. 1.Scraper on a flake. 2-3.Cutting tool on flakes. 4-6.Drills on flakes. Production kit. Evdokimov *et al.* 1985:39 (Fig. 25).
968. *Brylivka* Tsyurupynsk District k.17 g.21, two skeletons. Flake. Evdokimov *et al.* 1985:55.
969. *Brylivka* Tsyurupynsk District k.17 g.22. Flake. Evdokimov *et al.* 1985:55.
970. *Brylivka* Tsyurupynsk District k.17 g.9. Cutting tool on a flake. Evdokimov *et al.* 1985:49 (Fig. 32:6).
971. *Burhunka* Beryslav District k.2 g.15, two skeletons. Scraper on a flake. Evdokimov *et al.* 1981:124 (Fig. 103:2).
972. *Chervone I* Skadovsk District k.6 g.1. Flake. Leskov *et al.* 1963:19.
973. *Chervone I* Skadovsk District k.6 g.2, two skeletons. Scraper on a flake. Leskov *et al.* 1963:20.
974. *Chervonyj Perekop I* Kahovka District k.27 g.7, two skeletons. 1.Arrowhead with a shallow coulisse. 2.Flake. Wound. Leskov *et al.* 1970:46.
975. *Chervonyj Yar* Beryslav District k.1 g.18, two skeletons. Arrowhead with a deep coulisse. Wound. Evdokimov *et al.* 1978:45.
976. *Chervonyj Yar* Beryslav District k.1 g.26, two skeletons. Flake. Evdokimov *et al.* 1978:50.
977. *Chornyanka I* Kahovka District k.5 g.5. Flake. Kubyshchev *et al.* 1979:32.
978. *Chornyanka II* Kahovka District k.12 g.8. Flake. Kubyshchev *et al.* 1985:36.
979. *Chornyanka II* Kahovka District k.13 g.4. 1-3.Flakes. Kubyshchev *et al.* 1985:40.
980. *Dniprovskij Bilozerka* District k.1 g.5. Flake. Evdokimov *et al.* 1991:35 (Fig. 28).
981. *Dniprovskij Bilozerka* District k.1 g.7, two skeletons. Flake. Evdokimov *et al.* 1991:35 (Fig. 30:4).
982. *Dolynske* Chaplynskyj District k.1 g.7. Scraper on a flake. Kubyshchev *et al.* 1983:156.
983. *Fedorivka* Bilozerka District k.4 g.9. Arrowhead with a deep coulisse. Wound. Evdokimov *et al.* 1989:104 (Fig. 106:2).
984. *Gromivka* Novotroitske District k.1 g.16, two skeletons. Flake. Kubyshchev *et al.* 1980:167.
985. *Gromivka* Novotroitske District k.1 g.7. 1-9.Flakes. 10-13.Arrowheads with a deep coulisse. Production kit. Kubyshchev *et al.* 1980:165.
986. *Kayirka* Chaplynskyj District k.1 g.7, two skeletons. 1.Spokeshave on a flake. 2.Flake. Kubyshchev *et al.* 1983:198 (Fig. 104).
987. *Kayirka* Chaplynskyj District k.2 g.9, three skeletons. Scraper on a flake. Kubyshchev *et al.* 1987:24.
988. *Kayirka* Chaplynskyj District k.6 g.14, two skeletons. Arrowhead with a coulisse. Wound. Kubyshchev *et al.* 1986:92.
989. *Kayiry* Hornostayivskyj District k.1 g.9. Knife-dag-

- ger with the petiole 13,4x3,3x0,9 cm. Kubyshev *et al.* 1988:44.
990. *Kayiry* I Hornostayivskiy District k.17 g.2. Scraper on a flake. Kubyshev *et al.* 1989:19 (Fig. 1:2).
991. *Kayiry* II Hornostayivskiy District k.1 g.11. 1-3. Scrapers on flakes. 4. Fragment of biface. Production kit foundry hand. Kubyshev *et al.* 1989:21.
992. *Kayiry* II Hornostayivskiy District k.1 g.13. 1. Cutting tool on a blade. 2. Darthead (?) 7,8x2,7x0,8 cm. 3-8. Arrowheads with a coulisse. 9-15. Concretions. 16-23. Cores. 24-107. Flakes. Production kit of arrowmaker. Kubyshev *et al.* 1989:23 (Fig. 14,15).
993. *Kayiry* II Hornostayivskiy District k.1 g.15. Scraper on a flake. Kubyshev *et al.* 1989:25 (Fig. 16).
994. *Kayiry* II Hornostayivskiy District k.1 g.6, three skeletons. Flake. Kubyshev *et al.* 1989:20.
995. *Kirove* Beryslav District k.2 g.9, three skeletons. Flake. Evdokimov *et al.* 1983:8.
996. *Mayachka* Tsyurupynsk District k.20 g.1. Spokeshave double on a flake (sculpture?) 3x3 cm. Evdokimov *et al.* 1988:34 (Fig. 29:4).
997. *Nadezhdivka* Bilozerka District k.1 g.15, two skeletons. Flake. Evdokimov *et al.* 1984:110.
998. *Novochornomor'ya* Hola Prystan District k.4 g.17, three skeletons. Arrowhead with a coulisse. Wound. Kopvanenko, Sharafudinova 1963:19 (Fig. 8:4).
999. *Novochornomor'ya* Hola Prystan District k.7 g.5, three skeletons. Darthead (?) with a petiole, 7,8x2,5 cm. Kopvanenko, Sharafudinova 1963:37 (Fig. 17:3).
1000. *Novomyrivka* Henichesk District k.1 g.5. 1-6. Arrowheads with a deep coulisse. Quiver set. Kubyshev *et al.* 1983:129 (Fig. 58).
1001. *Novogyrovivka* Henichesk District k.1 g.15, two skeletons. Knife-dagger 11x2,5 cm. Kubyshev *et al.* 1985:54 (Fig. 39).
1002. *Novo-Kam'yanka* Kahovka District k.1 g.2. Scraper on a flake. Kubyshev *et al.* 1974:37.
1003. *Novo-Kam'yanka* Kahovka District k.3 g.6. 1. Darthead 6,8x2,3x0,5 cm. 2. Blade. Kubyshev *et al.* 1983:22 (Fig. 7).
1004. *Novo-Kam'yanka* Kahovka District k.3 g.9. Flake. Kubyshev *et al.* 1983:23 (Fig. 8:2).
1005. *Novo-Kam'yanka* Kahovka District k.6 g.7, three skeletons. Flake. Kubyshev *et al.* 1974:61.
1006. *Novokayiry* Beryslav District k.2 g.22. 1-2. Cutting tool on flakes. Toshev *et al.* 1988:24 (Fig. 31:3).
1007. *Novokayiry* Beryslav District k.2 g.37. Piercer on a flake. Toshev *et al.* 1988:33 (Fig. 46:2).
1008. *NovoMychajlivka* Novotroitske District k.6 g.5. Spearhead 9,7x2,8 cm. Kubyshev *et al.* 1988:182.
1009. *Oleksandrivka* Velyka Oleksandrivka District k.5 g.9. Scraper on a flake. Evdokimov *et al.* 1989:130 (Fig. 126:3).
1010. *Pershokostyantynivka* Chaplynskiy District k.1 g.15. Flake. Kubyshev *et al.* 1988:145.
1011. *Pervomayivka* I Verhnij Rohachyk District k.1 g.6. Flake. Evdokimov *et al.* 1981:6.
1012. *Pervomayivka* I Verhnij Rohachyk District k.2 g.1. Scraper on a flake. Production kit foundry hand. Evdokimov *et al.* 1981:15.
1013. *Pervomayivka* III Verhnij Rohachyk District k.3 g.6. Arrowhead with a deep coulisse. Wound. 'Mask'. Evdokimov *et al.* 1981:76 (Fig. 79,80).
1014. *Pervomayivka* Verhnij Rohachyk District k.5 g.7. Cenotaf. Cutting tool on a flake. Illinska *et al.* 1960:133.
1015. *Podokalynivka* Tsyurupynsk District k.1 g.7. 1-2. Arrowheads with a deep coulisse. Evdokimov *et al.* 1979:64 (Fig. 54:2,3).
1016. *Podokalynivka* Tsyurupynsk District k.6 g.37. Arrowhead with a deep coulisse. Wound. Evdokimov *et al.* 1979:58 (Fig. 33:2).
1017. *Polyove* Kalanchak District k.4 g.3. Cutting tool on a flake. Evdokimov *et al.* 1985:85 (Fig. 57:3).
1018. *Pravdyne* Bilozerka District k.1 g.10. Flake. Evdokimov *et al.* 1984:49.
1019. *Radyansk* Bilozerka District k.2 g.9, three skeletons. Flake. Evdokimov *et al.* 1989:37 (Fig. 30:6).
1020. *Ryadovi Mohyly* Novovorontsovsk District k.16 g.14, two skeletons. Flake. Kubyshev *et al.* 1978:40.
1021. *Semenivka* II Kahovka District k.1 g.3. 1-4. Flakes. Leskov *et al.* 1972:77 (Fig. 3:6).
1022. *Serhiyivka* I Novotroitske District k.1 g.12. Flake. Kubyshev *et al.* 1984:125.
1023. *Serhiyivka* II Novotroitske District k.1 g.8. Knife-dagger 8,4x2, 7x0, 6 cm. Kubyshev *et al.* 1984:152.
1024. *Serhiyivka* Novotroitske District k.3 g.6. Hammerstone. Kubyshev *et al.* 1976:129.
1025. *Shevchenko* II Skadovsk District k.3 g.2. Flake. Chernenko, Korpusova 1968:6.
1026. *Shevchenko* Skadovsk District k.4 g.10, three skeletons. 1. Fragment of darthead 5x2 cm. 2. Fragment of blade. Khloubystina 1986:29.
1027. *Shyroka Balka* Bilozerka District k.1 g.3. 1-7. Hammerstones on pebbles. 8-33. Flakes. 34. Fragment of the polished tool. 35. Scraper on a flake. Production kit. Evdokimov *et al.* 1977:40.
1028. *Shyroka Balka* Bilozerka District k.1 g.5. 1-6. Scrapers on flakes. 7. Sickle insert(?). Production kit. Evdokimov *et al.* 1977:41 (Fig. 36:4).
1029. *Shyroka Balka* Bilozerka District k.2 g.19. 1-2. Flakes. Evdokimov *et al.* 1977:49.
1030. *Shyroka Balka* Bilozerka District k.4 g.25. Hammerstone. Evdokimov *et al.* 1977:66.
1031. *Shyroka* III Skadovsk District k.18 g.7. Flake. Chernenko, Korpusova 1968:3.
1032. *Skvortsova* Kahovka District k.1 g.4. Flake. Kubyshev *et al.* 1987:38.
1033. *Sofiivka* I Kahovka District k.24 g.3. Arrowhead with a deep coulisse. Wound. Terenzhkin *et al.* 1973:18.
1034. *Sofiivka* Kahovka District k.30 g.3. Flake. Leskov *et al.* 1972:59.
1035. *Stanislav* Bilozerka District k.1 g.6, two skeletons. Flake. Evdokimov *et al.* 1984:119.
1036. *Starosillya* Velyka Oleksandrivka District k.4 g.12, three skeletons. Darthead petioled 6,5x2,3 cm. Shilov 1977:62 (Fig. 6:7).
1037. *Starosillya* Velyka Oleksandrivka District k.5 g.8. Scraper on a flake. Kubyshev *et al.* 1981:42 (Fig. 27).
1038. *Starosillya* Velyka Oleksandrivka District k.6 g.7. Flake. Kubyshev *et al.* 1981:50.
1039. *Syvashivka* Novotroitske District k.2 g.13. 1-2. Flakes. Kubyshev *et al.* 1980:185.
1040. *Syvashivka* Novotroitske District k.2 g.20. 1-2. Flakes. Kubyshev *et al.* 1980:188.
1041. *Tamaryne* Beryslav District k.1 g.11A. 1-2. Scrapers on flakes. Evdokimov *et al.* 1989:58 (Fig. 49).

1042. *Tamaryne* Beryslav District k.1 g.6. 1.Drill on a flake. 2-7.Flakes. 8-9.Scrapers on flakes. Production kit of arrowmaker. Evdokimov *et al.* 1989:54 (Fig. 47).
1043. *Vasylyvka* Novotroitske District k.1 g.8, two skeletons. Flake. Kubyshev *et al.* 1984:65.
1044. *Vilna* Ukraine Kahovka District k.7 g.2. 1-3.Flakes. Leskov *et al.* 1971:76.
1045. *Vodoslavka* Novotroitske District k.12 g.15. Burin on a flake. Kubyshev *et al.* 1983:103.
1046. *Zmiyvka* Beryslav District k.1 g.5, two skeletons. Scraper on a flake. Evdokimov *et al.* 1986:46 (Fig. 39:2).

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1047. *Holovkivka* V Oleksandrija District k.24 g.2. 1-2.Arrowheads with a shallow coulisse. Polin *et al.* 1994:9. (Fig. 13:6,7).
1048. *Holovkivka* V Oleksandrija District k.6 g.12, two skeletons. 1-2.Flakes. 3.Core. Polin *et al.* 1994:4.
1049. *Holovkivka* VI Oleksandrija District k.23 g.2. 1-5.Flakes. Polin *et al.* 1994:8.
1050. *Lozuvatka* Kompaniivtsy District k.20 g.10. Cenotaf. Flake quartzitic. Tupchienko 1989:17.
1051. *Lozuvatka* Kompaniivtsy District k.20 g.11. 1-2.Flakes. Tupchienko 1989:17.
1052. *Lozuvatka* Kompaniivtsy District k.20 g.16. Flake. Tupchienko 1989:26.
1053. *Lozuvatka* Kompaniivtsy District k.21 g.2. 1-4.Flakes. Production kit. Tupchienko 1989:35.
1054. *Pomichna* Novoukrainka District k.2 g.8. Flake. Tupchienko 1989:131.
1055. *Zaharivka* I Novoukrainka District k.9 g.10. Scraper-spokeshave on a flake. Tupchienko 1989:143.
1056. *Zaharivka* I Novoukrainka District k.9 g.6. 1-5.Flakes. 6.Cutting tool on a flake. Tupchienko 1989:140.
1057. *Zvenyhorodka* X Oleksandrija District k.1 g.4. Piercer on a flake. Polin *et al.* 1994:21 (Fig. 31:3).
1058. *Zvenyhorodka* X Oleksandrija District k.3 g.4. 1-2.Flakes. Polin *et al.* 1994:25 (Fig. 37:2,3).
1059. *Zvenyhorodka* X Oleksandrija District k.4 g.5, two skeletons. Flake. Polin *et al.* 1994:26 (Fig. 40:2).
1060. *Zvenyhorodka* X Oleksandrija District k.7 g.4. Cutting tool on a flake. 'Mask'. Polin *et al.* 1994:31 (Fig. 46:5).
1061. *Zvenyhorodka* X Oleksandrija District k.8 g.2. 1-3.Flakes to the quartzite. Polin *et al.* 1994:32 (Fig. 48:3).
1062. *Zvenyhorodka* X Oleksandrija District k.9 g.3. 1-5.Arrowheads with deep coulisse. 6.Knife-dagger. 8,4x3cm. 'Mask'. Polin *et al.* 1994:33 (Fig. 51).
1069. *Bobrykove* Antracyt District k.1 g.3. Scraper on a flake. Kliuchnev 1993:129 (Fig. 3:2).
1070. *Chornuhyne* Perevalsk District k.1 g.6. Darthead 9x3,3x0,7 cm. Gershkovich 1996:138 (Fig. 7:2).
1071. *Frunze* Slovyanoserbks District k.3 g.2. Arrowhead with a deep coulisse. Wound(?). Smyrnov 1996:36 (Fig. 12).
1072. *Govoruha* Slovyanoserbks District k.1 g.1. Cutting tool on a flake. Krotova 1976:5 (Fig. 5).
1073. *Govoruha* Slovyanoserbks District k.1 g.3, two skeletons. 1-2.Arrowheads with a deep coulisse. Krotova 1976:7 (Fig. 6).
1074. *Govoruha* Slovyanoserbks District k.3 g.7, two skeletons. Knife on a flake. Krotova 1976:32 (Fig. 24).
1075. *Govoruha* Slovyanoserbks District k.6 g.13. Flake. Krotova 1976:56 (Fig. 38).
1076. *Govoruha* Slovyanoserbks District k.7 g.17. Flake. Krotova 1976:80 (Fig. 52).
1077. *Govoruha* Slovyanoserbks District k.7 g.2. Flake. Krotova 1976:63 (Fig. 44).
1078. *Holubovskij* Popasna District k.1 g.1B. Knife-dagger 10,8x3x0,9 cm. Antonenko *et al.* 1984:7.
1079. *Holubovskij* Popasna District k.4 g.1. 1.Scraper-knife on a flake. 2.Spokeshave on a flake. Antonenko *et al.* 1984:15 (Fig. 110-114).
1080. *Honcharivka* Svatove District k.1 g.13. Flake. Production kit. Bratchenko 2001:12.
1081. *Kam'yanka* Kreminna District k.15 g.3. 1-7.Arrowheads with a coulisse. Quiver set. Rogudeev 2000:78.
1082. *Krasnaya Zarya* Perevalsk District k.1 g.3. 1.Cutting tool on a flake. 2.Scraper on a flake. 3-4.Chisels on flakes. 5.Spokeshave-saw on a flake. 6.Burin on a flake. 7.Cutting tool on a flake. Production kit. Sanzharov, Britiuk 1996:65 (Fig. 5:1-7).
1083. *Luhansk Hartmanskij* k.2 g.2. 1.Cutting tool on a flake. 2-4.Flakes. Kruglov, Podgaetskiy 1935:35.
1084. *Luhansk Sorokynskij* k.3 g.1, two skeletons. 1.Flake. 2.Quartzitic pebble. Bratchenko 2000:78.
1085. *Luhansk*, 1929 k.1 g.11. Flake. Bratchenko 2000:80.
1086. *Luhansk*, *Telmana* k.2 g.9. 1.Scraper on a flake. 2-3.Flakes. Bratchenko 2001:12.
1087. *Luhansk*, *Zelena Roshha* k.1 g.10. Flake. Krasilnikov *et al.* 1988:10 (Fig. 14:5).
1088. *Lysychansk LNPZ* k.2 g.1, three skeletons. Flake. Bratchenko 2001:11.
1089. *Lysychansk LNPZ* k.4 g.4. Flake. Bratchenko 2001:11.
1090. *Maidan* Svatove District k.1 k.1, two skeletons. Dart-head. Production kit. Bratchenko 2001:12.
1091. *Mykolaivka* Stanychno-Luhansk District k.1 g.6. 1-2.Arrowheads with a coulisse. Cherednichenko *et al.* 1971:16 (Fig. 2).
1092. *Mykolaivka* Stanychno-Luhansk District k.6 g.2. Retoucher on a flake. Cherednichenko *et al.* 1971:35.
1093. *Mykolaivka* Stanychno-Luhansk District k.6 g.4b. Flake. Cherednichenko *et al.* 1971:35.
1094. *Nova Astrakhan* Kreminna District k.1 g.1. Flake. Bratchenko, Pislariy 1972:18.
1095. *Nova Astrakhan* Kreminna District k.1 g.7. Flake. Bratchenko, Pislariy 1972:22.
1096. *Novodonbaske* Starobilsk District k.1 g.2. Flake. Antonenko *et al.* 1989:27 (Fig. 213).
1097. *Novodonbaske* Starobilsk District k.1 g.3, two skeletons. Flake. Antonenko *et al.* 1989:27 (Fig. 229).

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1063. *Astahove* I Sverdlovsk District k.3 g.2. Scraper on a flake. Evdokimov *et al.* 1975:5 (Fig. 10:2).
1064. *Bezhinove* Kreminna District k.1 g.5. 1-2.Flakes. 3-7.Hammerstones. Pislariy *et al.* 1975:98 (Fig. 117).
1065. *Biryukove* Sverdlovsk District k.6 g.3. Flake. Production kit. Antonenko *et al.* 1987:97.
1066. *Blahovka* Sverdlovsk District k.1 g.2. Concretion. Moruzhenko *et al.* 1981 :8
1067. *Blahovka* Sverdlovsk District k.1 g.7, two skeletons. 1.Arrowhead with a deep coulisse. 2.Scraper on a flake. Wound. Pislariy *et al.* 1977:97 (Fig. 74).
1068. *Blahovka* Sverdlovsk District k.1 g.9. Arrowhead with a deep coulisse. Wound. Pislariy *et al.* 1977:99 (Fig. 75).

1098. *Novogrygorivka* Slovyanosersb District k.1 g.2. Flake. Pislariy *et al.* 1977:40.
1099. *Novomykilske* Kreminna District k.1 g.5, two skeletons. 1-5 Arrowheads (4 with a coulisse, 1 petioled). 6-55 Flakes, 56 Concretion, 57 Biface, 58 Concretion. Production kit of arrowmaker. Bratchenko, Pislariy 1972:8 (Fig. 8,9).
1100. *Nyzhnya Baranykivk* Bilovodsk District k.2 g.5. Flake. Bratchenko *et al.* 1976:116 (Fig. 117:4).
1101. *Oleksandrivsk* k.1 g.29. 1-2 Flakes. 3 Flake quartzitic. Bratchenko 1972:21 (Fig. 21:2).
1102. *Oleksandrivsk* k.1 g.32, four skeleton. Concretion. Bratchenko 1972:32.
1103. *Oleksandrivsk* k.1 g.49. 1-9 Arrowheads with a coulisse. 10-22 Flakes. 23 Biface. Production kit of arrowmaker. Bratchenko 1972:35 (Fig. 32).
1104. *Oleksandrivsk* k.2 g.6. Cenotaf. 1-2 Flakes. Bratchenko 1972:43.
1105. *Oleksandrivsk* k.6 g.10. 1-2 Flakes. Bratchenko 1972:67 (Fig. 56).
1106. *Oleksandrivsk* k.6 g.3. Fragment of blade. Bratchenko 1972:62.
1107. *Oleksandrivsk* k.9 g.25. Spearhead. Production kit. Bratchenko 1972:89 (Fig. 77).
1108. *Oleksandrivsk* k.9 g.67, two skeletons. Scraper on a flake. Bratchenko 1972:119 (Fig. 92:3).
1109. *Oleksandrivsk* k.9 g.68. 1-2 Scrapers on flakes. 3-4 Flakes. Production kit. Bratchenko 1972:121 (Fig. 95).
1110. *Petrovske* Antracyt District k.1 g.9. 1-2 Flakes. Bratchenko 2001:12.
1111. *Preobrazhenne* Svatove District k.1 g.13. Hammerstone. Krasilnikov, Telnova 1990:27 (Fig. 26:8).
1112. *Preobrazhenne* Svatove District k.1 g.15. 1-16 Flakes. Krasilnikov, Telnova 1990:30 (Fig. 29).
1113. *Preobrazhenne* Svatove District k.1 g.6. Spearhead 11,8x3,8x1 cm. Krasilnikov, Telnova 1990:16 (Fig. 16:3).
1114. *Pryshyb* Slovyanosersb District k.1 g.9. Flake. Production kit foundry hand. Bratchenko *et al.* 1978:26.
1115. *Pryvillya* Kreminna District k.1 g.4. Scraper on a flake. Pislariy *et al.* 1975:13 (Fig. 14).
1116. *Pryvillya* Kreminna District k.2 g.4. Scraper on a flake. Pislariy *et al.* 1975:26. (Fig. 28).
1117. *Pryvillya* Kreminna District k.8 g.2, two skeletons. Fragment of retouching blade. Pislariy *et al.* 1975:58.
1118. *Sokolnyky* Slovyanosersb District k.2 g.8, two skeletons. Flake. Bratchenko *et al.* 1978:83 (Fig. 90).
1119. *Svatove* k.1 g.3. Cutting tool on a flake. Bratchenko 1973:5.
1120. *Svatove* k.1 g.5, two skeletons. 1-3 Flakes. Bratchenko 1973:7.
1121. *Svatove* k.3 g.2. 1-5 Flakes. Bratchenko 1973:13.
1122. *Svatove* k.3 g.6. Blade (eneolit). Bratchenko 1973:15 (Fig. 22:2).
1123. *Svatove* k.7 g.5. Flake. Bratchenko 1973:31.
1124. *Svatove* k.8 g.1, two skeletons. 1-2 Bifaces. Bratchenko 1973:35 (Fig. 54:5).
1125. *Svatove* k.9 g.2. Hammerstone. Bratchenko 1973:38.
1126. *Tarasivka* Troyicke District k.1 g.8. 1 Knife-dagger 13x4,2x0,5 cm. 2 Flake. Antonenko *et al.* 1989:15 (Fig. 99,100).
1127. *Topolivka* Popasna District k.1 g.3, two skeletons. 1-2 Scrapers on flakes. Pislariy *et al.* 1980:27 (Fig. 18).
1128. *Topolivka* Popasna District k.1 g.7, two skeletons. Flake. Pislariy *et al.* 1980:27 (Fig. 18).
1129. *Topolivka* Popasna District k.2 g.6. Scraper on a flake. Pislariy *et al.* 1980:36 (Fig. 22).
1130. *Topolivka* Popasna District k.2 g.8. Flake. Pislariy *et al.* 1980:37.
1131. *Vojtove* III Svatove District k.4 g.10. 1-2 Arrowheads with deep coulisces. 3-4 Flakes. Production kit. Sanzharov 2008:17.
1132. *Zholobok* Slovyanosersb District k.3 g.1. 1 Biface. 2-5 Cores. Production kit of arrowmaker. Pislariy *et al.* 1977:21 (Fig. 14,15).
1133. *Zholobok* Slovyanosersb District k.3 g.6. 1-12 Arrowheads with a deep coulisce. 13 Darthead 8,2x3,5 cm. 14 Spearhead 11,4x3,9 cm. Production kit of arrowmaker. Pislariy *et al.* 1977:26 (Fig. 18, 19).
1134. *Znam'yanka* Slovyanosersb District k.1 g.5, two skeletons. Cutting tool on a flake. Bratchenko *et al.* 1978:69 (Fig. 75).
1135. *Znam'yanka* Slovyanosersb District k.2 g.7. Cenotaf. Flake. Bratchenko *et al.* 1978:75.
1136. *Zymohir'ya* Slovyanosersb District k.1 g.13. Fragment of blade. Pislariy *et al.* 1977:64 (Fig. 46).
1137. *Zymohir'ya* Slovyanosersb District k.1 g.3. 1-8 Arrowheads with a deep coulisce. Quiver set. Pislariy *et al.* 1977:52 (Fig. 40).
1138. *Zymohir'ya* Slovyanosersb District k.1 g.9, two skeletons. 1-3 Flakes. 4 Scraper on a flake. Pislariy *et al.* 1977:58 (Fig. 43).
1139. *Zymohir'ya* Slovyanosersb District k.2 g.9. 1 Fragment of blade. 2 Flake. Pislariy *et al.* 1980:57 (Fig. 40).

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1140. *Dumeny* Rokshany District k.1 g.9. Knife on a paleolithic blade. Demchenko 1983:67 (Fig. 4:1).
1141. *Hankausy* Yedinet District k.3 g.8. 1-3 Arrowheads with a coulisce. 4-6 Flakes. 7-8 Cutting tool on flakes. Dergachev 1982:46.
1142. *Hura-Bykuluj* Tyraspol District k.5 g.11. Flake. Toschev 1986:161.
1143. *Korpach* Slobodziya District k.3 g.7. Scraper on a flake. Toschev 1991:95.
1144. *Kuzmyn* Kam'yanka District k.1 g.5. Arrowhead with a coulisce. Wound. Bubulich, Khakheu 2002:132 (Fig. 10).
1145. *Nikolske* Slobodziya District k.1 g.15. Flake. Agulnikov, Sava 2004:16 (Fig. 6:4).
1146. *Nikolske* Slobodziya District k.8 g.11. 1-2 Scrapers. 3 Spokeshave. 4 Fragment of the polished adz. Production kit of arrowmaker. Agulnikov, Sava 2004:89 (Fig. 42).
1147. *Novi* Raskayetsy Rokshany District k.1 g.12. Flake. Yarovoy 1990:20.
1148. *Purkar* Rokshany District k.1 g.38. 1 Knife-dagger 10x2,5 cm. 2 Flake with a retouch. 3-6 Arrowheads with coulisces. Quiver set. Yarovoy 1990:84 (Fig. 37:2).
1149. *Purkar* Rokshany District k.2 g.16. Flake. Yarovoy 1990:101.
1150. *Rokshany* k.1 g.17. Scraper-spokeshave on a flake. Dergachev 1989:18 (Fig. 58).
1151. *Rokshany* k.4 g.11. Scraper-knife on a flake. Dergachev 1989:41 (Fig. 14:7).

1152. *Stari Kukoneshty* Yedinets District k.1 g.1. 1-2. Arrowheads with a shallow coulisse. 4-6. Flakes. Dergachev 1982:56.
1153. *Ursoaya* Rokshany District k.3 g.13. 1-2. Halves of arrowheads with coulissses. Wound. Chebotarenko *et al.* 1989:125 (Fig. 55:2,3).
- Mykolaiv Region**
1154. *Aktove* Voznesensk District k.1 g.2. 1. Arrowhead with a coulisse. 2-3. Flakes. Wound. Shaposhnikova *et al.* 1987:58.
1155. *Antonivka* Nova Odesa District k.1 g.13. Cutting tool on a flake. Shaposhnikova *et al.* 1975:318 (Fig. 127:8).
1156. *Antonivka* Nova Odesa District k.1 g.26. 1. Flake. 2. Piercer on a flake. Shaposhnikova *et al.* 1975:319 (Fig. 129).
1157. *Antonivka* Nova Odesa District k.1 g.34. Arrowhead with a coulisse. Wound(?). Shaposhnikova *et al.* 1975:332.
1158. *Antonivka* Nova Odesa District k.5 g.14. Scraper on a flake. Shaposhnikova *et al.* 1975:358 (Fig. 137).
1159. *Antonivka* Nova Odesa District k.8 g.9. Core. Shaposhnikova *et al.* 1975:358.
1160. *Barativka* Novyi Bug District k.2 g.18. Cutting tool on a flake. Sharafutdinova 1980:62 (Fig. 3:2).
1161. *Buhs'kyj* Arbuzyz District k.3 g.20. three skeletons. Flake. Shaposhnikova *et al.* 1977:208.
1162. *Dobra Krynytsya* Bashtanka District k.9 g.7. Hammerstone. Shaposhnikova *et al.* 1985:53 (Fig. 26).
1163. *Ivanivka* Arbuzyz District k.3 g.12. Flake. Shaposhnikova *et al.* 1976:193.
1164. *Kalynivka* II Zhovtneve District k.5 g.11b. 1-3. Cutting tool on flakes. 4-5. Scrapers on flakes. 6. Arrowhead. 7. Spokeshave on a flake. Production kit of arrowmaker. Nikitin 1983:43 (Fig. 139, 140).
1165. *Kalynivka* II Zhovtneve District k.5 g.3. two skeletons. Flake. Nikitin 1983:36.
1166. *Kapustyne* Zhovtneve District k.1 g.7. two skeletons. 1. Arrowhead with a deep coulisse. 2. Cutting tool on a flake. Wound(?). Shaposhnikova *et al.* 1984:36.
1167. *Kasperivka* Nova Odesa District k.1 g.6. Flake. Shaposhnikova *et al.* 1974:14 (Fig. 7).
1168. *Kasperivka* Nova Odesa District k.3 g.8. 1-2. Flakes. Shaposhnikova *et al.* 1974:44.
1169. *Kovalivka* I Mykolaiv District k.2 g.7. Core. Kovpanenko 1969:12 (Fig. 16:3).
1170. *Kovalivka* III Mykolaiv District k.1 g.14-15. two skeletons. 1-3. Flakes. Kovpanenko 1971:9 (Fig. 7: 6).
1171. *Kovalivka* VI Mykolaiv District k.4 g.5. Flake. Kovpanenko *et al.* 1974:25 (Fig. 26:9).
1172. *Kovalivka* VIII Mykolaiv District k.1 g.15. 1-5. Flakes. 6-18. Arrowheads with a deep coulisse. Production kit of arrowmaker. Kovpanenko *et al.* 1974:107 (Fig. 129).
1173. *Krementchuk* Voznesensk District k.6 g.4. Flake. Shaposhnikova *et al.* 1987:165.
1174. *Lupareve* Zhovtneve District k.1 g.4. Scraper on a flake. Petrenko, Elagina 1969:5.
1175. *Lymany* Zhovtneve District k.3 g.14. two skeletons. Spearhead. Petrenko, Elagina 1969:58 (Fig. 215).
1176. *Mar'yivka* Bashtanka District k.1 g.11. 1-2. Flakes. Shaposhnikova *et al.* 1985:76.
1177. *Mar'yivka* Bashtanka District k.1 g.12. Piercer on a flake. Shaposhnikova *et al.* 1986:122.
1178. *Mar'yivka* Bashtanka District k.3 g.5. Cenotaf. Flake. Shaposhnikova *et al.* 1986:132.
1179. *Nova Odesa* I k.3 g.1. 18. 1-10. Flakes. Shaposhnikova *et al.* 1974:125.
1180. *Nova Odesa* I k.7 g.2. Flake. Shaposhnikova *et al.* 1975:307 (Fig. 121).
1181. *Novogrygorivka* Nova Odesa District k.1 g.42. 1-3. Flakes. 4. Scraper on a flake. Shaposhnikova *et al.* 1974:248.
1182. *Novopetrivka* I Bratske District k.1 g.20. two skeletons. 1-2. Cutting tool on flakes. 3. Flake. Shaposhnikova *et al.* 1975:251 (Fig. 100).
1183. *Novopetrivka* I Bratske District k.4 g.22. Flake. Shaposhnikova *et al.* 1975:281.
1184. *Novopetrivske* III Nova Odesa District k.1 g.31. two skeletons. 1-4. Flakes. Shaposhnikova *et al.* 1988:62 (Fig. 44:2).
1185. *Pelahiivka* Novyi Bug District k.1 g.19. Scraper on a flake. Shaposhnikova *et al.* 1967:51.
1186. *Popilne* Berezanske District k.1 g.2. Scraper on a flake. Nikitin 1974:3 (Fig. 7).
1187. *Pryshyb* Berezneuhuvate District k.25 g.21. two skeletons. Flake. Shaposhnikova *et al.* 1984:76 (Fig. 53:1).
1188. *Pryshyb* Berezneuhuvate District k.4 g.17. 1. Cutting tool on a flake. 2. Hammerstone. 3. Flake. Shaposhnikova *et al.* 1984:33 (Fig. 26).
1189. *Pryshyb* Berezneuhuvate District k.4 g.37. Arrowhead with a coulisse. Wound(?). Shaposhnikova *et al.* 1984:85.
1190. *Pryvilne* Bashtanka District k.1 g.30. Flake. Shaposhnikova, Bochkarev 1970:4.
1191. *Sofiivka* Novyi Bug District k.1 g.10. Scraper on a flake. Shaposhnikova *et al.* 1967:70.
1192. *Sokolivka* Bashtanka District k.2 g.17. Flake. Sharafutdinova 1980:101.
1193. *Sokolivka* Bashtanka District k.2 g.6. Flake. Sharafutdinova 1980:94 (Fig. 12:4).
1194. *Sokolivka* Berezneuhuvate District k.1 g.7A. 1. Fragment of biface. 2. Spokeshave on a flake. 3. Cutting tool on a flake. Nikitin, Snytko 1984:10 (Fig. 42).
1195. *Taborivka* Voznesensk District k.25 g.1. 1-2. Spokeshaves on flakes. 3-4. Knives for a wood on flakes. 5-6. Saws on a flakes. 7-9. Drills on flakes. Production kit. Berezanska, Liashko 1989:23.
1196. *Taborivka* Voznesensk District k.37 g.2. Flake with two symmetric coulissses – a sculpture (?). Shaposhnikova *et al.* 1984:21.
1197. *Vodyano-Loryne* Yelanets District k.1 g.8. Flake. Shaposhnikova *et al.* 1986:216 (Fig. 102).
1198. *Vynogradnyj Sad* Domanivka District k.1 g.8. Flake. Shaposhnikova *et al.* 1986:52.
1199. *Vynogradnyj Sad* Domanivka District k.6 g.15. two skeletons. Flake. Shaposhnikova *et al.* 1986:92 (Fig. 37).
1200. *Vysunsk* Berezneuhuvate District k.13 g.8. Flake. Shaposhnikova *et al.* 1977:129 (Fig. 73).
- Odesa Region**
1201. *Bashtanivka* Tatarbunary District k.4 g.20. Flake. Toschev 1986:161.
1202. *Berezynne* Tarutynskij District k.2 g.4. Flake. Toschev 1986:153.

1203. *Hadzhider* I Saratskyj District k.1 g.19. 1-2.Flakes. Dvorianinov *et al.* 1985:144.
1204. *Hadzhider* I Saratskyj District k.6 g.5. Flake. Dvorianinov *et al.* 1985:144.
1205. *Holmske Artsyz* District k.2 g.9. Flake. Cherniakov *et al.* 1986:71.
1206. *Lymany* Tatarbunary District k.3 g.25. Flake. Subbotin *et al.* 1985:11 (Fig. 9:4).
1207. *Lymany* Tatarbunary District k.3 g.54. 1-6.Flakes. Subbotin *et al.* 1985:20.
1208. *Lymany* Tatarbunary District k.3 g.55. 1-6.Flakes. Subbotin *et al.* 1985:20 (Fig. 174:5).
1209. *Myrne* Belyayevo District k.1 g.17. Flake. Toshev 1986:161.
1210. *Nova Dolyna* Odesa District k.3 g.9. 1.Knife on a flake. 2-3.Flakes. Petrenko *et al.* 2002:52 (Fig. 6:5-7).
1211. *Petrodolynske* Ovidiopol District k.1 g.10. Flake. Toshev 1986:153.
1212. *Popilna* Belyayevo District k.1 g.2. Flake. Toshev 1986:153.
1213. *Prymorske* Bilhorod-Dntrovskyj District k.1 g.24, two skeletons. Flake. Toshev 1991:66.
1214. *Revova* Shyryaev District k.3 g.13. 1-4.Flakes. Ivanova *et al.* 2005:65 (Fig. 43:2-5).
1215. *Semenivka* Bilhorod-Dntrovskyj District k.14 g.16. 1-3.Arrowheads with a shallow coulisse. 4-6.Flakes. Quiver set. Toshev 1991:66.
1216. *Serhiyivka* Sarata District k.1 g.3. 1-3.Axes with the polished blades. Dzyhovskiy, Subotin 1997:173 (Fig. 2).
1217. *Strumok* Tatarbunary District k.5 g.11. Flake. Toshev 1986:161.
1218. *Vyshneve* Tatarbunary District k.17 g.16, two skeletons. Cutting tool on a flake. Dvorianinov *et al.* 1985:154 (Fig. 8:3).
1219. *Vyshneve* Tatarbunary District k.17 g.24. Flake. Dvorianinov *et al.* 1985:157.
1220. *Vyshneve* Tatarbunary District k.17 g.25. Burin on a blade. Dvorianinov *et al.* 1985:157 (Fig. 9:3).
1221. *Yefymivka* Belyayevo District k.10 g.3. Flake. Shmagliy, Cherniakov 1985:112.
1222. *Yefymivka* Belyayevo District k.9 g.2. 1-5.Arrowheads with a coulisse. Quiver set. Shmagliy, Cherniakov 1985:99.
1223. *Yefymivka* Belyayevo District k.9 g.20. Arrowhead with a coulisse. Wound. Shmagliy, Cherniakov 1985:111.
1224. *Zaharkina Mohyla* Tatarbunary District k.1 g.54. 1.Core. 2.Spokeshave on a flake. 3.Cutting tool on a flake. Production kit. Toshev 1986:56.
- Rostov Region (Russian Federation)**
1225. *Beserhyenyevskiy* III Taganrog District k.9 g.3. Flake. Yatsenko 2005:108.
1226. *Beserhyenyevskiy* III Taganrog District k.9 g.6. 1-16.Flakes. Production kit. Yatsenko 2005:118.
1227. *Donskoj* Novocherkassk District k.1 g.30. 1-22.Flakes. Iliukov 1999:75.
1228. *Kerchik* Oktyabrskiy District k.16 g.15. Cenotaf. 1-30.Flakes. 31.Large biface. Production kit. Trudy... 1999:19.
1229. *Kerchik* Oktyabrskiy District k.16 g.21. 1.Scraper on a flake. 2.Knife on a blade. Trudy... 1999:21.
1230. *Kerchik* Oktyabrskiy District k.24 g.10. Core. Trudy... 1999:22.
1231. *Kuznecovskiy* II Semykarakorskij District k.1 g.3. Flake. Uzianov 1983:131 (Fig. 6:1).
1232. *Lakedemonivka* I Neklinovo District k.3 g.7. Flake. Iliukov, Kazakova 1988:37.
1233. *Lakedemonivka* III Neklinovo District k.2 g.15. 1.Flake. 2.Hammerstone. Iliukov, Kazakova 1988:43.
1234. *Lakedemonivka* III Neklinovo District k.2 g.3. Concretion. Iliukov, Kazakova 1988:42.
1235. *Lakedemonivka* III Neklinovo District k.2 g.6. Dart-head 10x2 cm. Iliukov, Kazakova 1988:42.
- Voronezh Region (Russian Federation)**
1236. *Shyelayevo* Valujki District k.1 g.1, three skeletons. 1-15.Flakes. 16-17.Arrowheads with a coulisse. 18.Piercer on a flake. Production kit. Karagodin 1977:230 (Fig. 3).
- Zaporizhzhya Region**
1237. *Akkermen* I Melitopol District k.14 g.7. Arrowhead with a coulisse. Wound. Viazmitina *et al.* 1960:62.
1238. *Akkermen* I Melitopol District k.6 g.3. 1-4.Arrowheads with a coulisse. Viazmitina *et al.* 1960:52.
1239. *Akkermen* I Melitopol District k.9 g.6. 1.Arrowhead with a coulisse. 2.Flake. Wound. Viazmitina *et al.* 1960:55.
1240. *Akkermen* II Melitopol District k.11 g.1, two skeletons. Scraper on a flake. Viazmitina *et al.* 1960:113.
1241. *Akkermen* II Melitopol District k.17 g.2, two skeletons. Knife-dagger 16,4x4 cm. Viazmitina *et al.* 1960:122.
1242. *Akkermen* II Melitopol District k.4 g.1. Darthead with a petiole. Wound(?). Viazmitina *et al.* 1960:70.
1243. *Atmanaj* II Yakymivka District k.3 g.15. Core. Kubyshv *et al.* 1981:75.
1244. *Atmanaj* II Yakymivka District k.3 g.16, three skeletons. Preform of darthead or arrow. Kubyshv *et al.* 1981:75.
1245. *Avhustynivka* Vilnyanka District k.3 g.7. 1-5.Scrapers on flakes. 6.Flake. Production kit. Otruschenko *et al.* 1975:185 (Fig. 94).
1246. *Balky* Vasylivka District k.6 g.1. 1.Scraper on a flake. 2-3.Flakes. Bidzilia *et al.* 1974:25.
1247. *Barvynivka* Myhailivka District k.10 g.3. Flake. Otruschenko *et al.* 1987:24 (Fig. 16).
1248. *Barvynivka* Myhailivka District k.6 g.13. Blade. Production kit. Otruschenko *et al.* 1986:18 (Fig. 5:7).
1249. *Barvynivka* Myhailivka District k.7 g.5. Scraper on a flake. Otruschenko *et al.* 1987:7 (Fig. 5:7).
1250. *Basan* I Polohy District k.4 g.3. Flake. Pleshivenko 1988:23 (Fig. 6:4).
1251. *Borysivka* Prymorske District k.1 g.18. Arrowhead with a coulisse. Wound. Pleshivenko, Popandopulo 1986:13 (Fig. 7:1).
1252. *Davydivka* I Yakymivka District k.1 g.17. 1-9.Arrowheads with a deep coulisse. 10-37.Flakes. Production kit of arrowmaker. Kubyshv *et al.* 1986:21.
1253. *Davydivka* I Yakymivka District k.1 g.7. Flake. 'Mask'. Kubyshv *et al.* 1986:16.
1254. *Davydivka* Yakymivka District k.1 g.5. 1-2.Dartheads. Production kit of arrowmaker. Kubyshv *et al.* 1982:79.
1255. *Dolyna* Melitopol District k.1 g.5, two skeletons. Fragment of tool. Furmanska 1960:138.
1256. *Kam'yanka-Dniprovska* I k.2 g.9. Arrowhead with a deep coulisse. Wound. Otruschenko *et al.* 1986:66 (Fig. 24:7).

1257. *Kam'yanka-Dniprovska* II k.8 g.6, two skeletons. Dart-head (?) with rounding bas, 8,5x4 cm. Otruschenko *et al.* 1986:85 (Fig. 26).
1258. *Kinski Rozdory* III Polohy District k.3 g.10. 1.Flake. 2.Scraper on a flake, Pleshivenko 1988:57 (Fig. 11:6,7).
1259. *Kinski Rozdory* III Polohy District k.3 g.7. Flake, Pleshivenko 1988:55 (Fig. 11:4).
1260. *Kostyantynivka* Melitopol District k.1 g.3. Scraper on a flake, Boltrik *et al.* 1987:4.
1261. *Kostyantynivka* Melitopol District k.2 g.10. 1.Burin on a flake, 2.Arrowhead with a deep coulisse, Wound(?). Boltrik *et al.* 1987:17.
1262. *Kostyantynivka* Melitopol District k.2 g.4, two skeletons. Cutting tool on a flake, Production kit. Boltrik *et al.* 1987:12.
1263. *Kostyantynivka* Melitopol District k.2 g.5. 1.Scraper on a flake, 2.Burin on a flake, Boltrik *et al.* 1987:14.
1264. *Mala Ternivka* Yakymivka District k.1 g.15, two skeletons. Fragment of blade, Kubyshev *et al.* 1981:167.
1265. *Mala Ternivka* Yakymivka District k.1 g.9, two skeletons. 1.Fragment of biface, 2.Skraper-burin on a flake, 3.Scraper on a flake, Production kit. Kubyshev *et al.* 1981:163.
1266. *Mala Ternivka* Yakymivka District k.2 g.9. 1-2.Fragments of cores, 3.Skraper-pressure tool on a flake, 4.Spokeshave on a flake, 5.Scraper on a flake, 6.Scraper-knife on a flake, 7.Fragment of biface, 8.Cutting tool on a flake, 9.Scraper on a flake, 10-12.Cutting tools on flakes, 13.Flake, 14-16.Arrowheads with a deep coulisse, 17.Flake quartzitic, Production kit of arrowmaker. Kubyshev *et al.* 1981:178 (Fig. 109).
1267. *Malokaternivka* Zaporizhzhya District k.37 g.16. Flake, Pleshivenko 1992:31. (Fig. 26:4).
1268. *Malokaternivka* Zaporizhzhya District k.37 g.18. Scraper on a flake, Pleshivenko 1992:31 (Fig. 26:11).
1269. *Malokaternivka* Zaporizhzhya District k.37 g.19. Cutting tool on a flake, Pleshivenko 1992:31 (Fig. 27:4).
1270. *Mamay-Hora* Kam'yanka-Dniprovska District ground g.10. Flake, Toshev 1995:33.
1271. *Mamay-Hora* Kam'yanka-Dniprovska District ground g.14, two skeletons. Flake, Toshev 1995:35.
1272. *Mamay-Hora* Kam'yanka-Dniprovska District ground g.15. Flake, Toshev 1995:35.
1273. *Mamay-Hora* Kam'yanka-Dniprovska District ground g.17. Arrowhead with a coulisse, Wound. Toshev 1995:37.
1274. *Mamay-Hora* Kam'yanka-Dniprovska District k.161 g.6, three skeletons. Flake, Toshev 1995:42.
1275. *Mamay-Hora* Kam'yanka-Dniprovska District k.4 g.10. 1-4.Arrowheads with a deep coulisse, 5-8.Spokeshaves on flakes, 9.Spokeshave-chisel on a flake, 10-23.Flakes, Production kit of arrowmaker. Andruk, Toshev 1999:40.
1276. *Mychajlivka* k.12 g.6. Flake, Otruschenko *et al.* 1983:76.
1277. *Novomykolaivka* Melitopol District k.5 g.7. 1-3.Arrowheads with a deep coulisse, Boltrik *et al.* 1985:27 (Fig. 16).
1278. *Novoukrayinka* Vilnyanka District k.5 g.12. 1.Darthead 4,7x3, 8 cm. 2.Scraper-knife on a blade, Pleshivenko, Popandopulo 1986:36 (Fig. 22).
1279. *Orihiv* k.1 g.28. 1-8.Arrowheads with a deep coulisse, Quiver set. Samar *et al.* 1992:28 (Fig. 32:3).
1280. *Orlyanka* III Vasylivka District k.3 g.14. Flake, Bidzilia *et al.* 1973:12.
1281. *Orlyanka* III Vasylivka District k.3 g.9. Flake, Bidzilia *et al.* 1973:10.
1282. *Petro-Mychajlivka* I Vilnyanka District k.8 g.7. 1-2.Arrowheads with a coulisse, Production kit of arrowmaker. Otruschenko *et al.* 1981:191 (Fig. 119).
1283. *Radyvonivka* Yakymivka District k.1 g.11. 1-2.Flakes, 'Mask'. Kubyshev *et al.* 1982:42.
1284. *Radyvonivka* Yakymivka District k.1 g.5, two skeletons. Knife-dagger, 10x3,5 cm. Kubyshev *et al.* 1982:39.
1285. *Radyvonivka* Yakymivka District k.2 g.5. Cenotaf. Flake, Kubyshev *et al.* 1982:17. (Fig. 25:4).
1286. *Ryasn Mohyly*, group Vasylivka District k.5 g.17. 1-2.Arrowheads with a coulisse, Bidzilia *et al.* 1973:176 (Fig. 40:3).
1287. *Shelyuhy* Yakymivka District k.11 g.2, two skeletons. 1-2.Arrowheads with a deep coulisse, 3.Knife-dagger, 8,1x2,4 cm. 4-10.Flakes, Production kit of arrowmaker. Kubyshev *et al.* 1987:134.
1288. *Shevchenko* Tokmak District k.2 g.13. Arrowhead with a coulisse, Smyrnov 1960:172 (Fig. 127:5).
1289. *Sosnivka* Melitopol District k.1 g.1. Darthead with a petiole, 9x3 cm. Mikhailov 1990:107.
1290. *Starobohdanivka* Melitopol District k.1 g.4. 1-4.Flakes, Otruschenko *et al.* 1980:23 (Fig. 23.5).
1291. *Troyicke* Melitopol District k.3 g.9, two skeletons. Flake, Klein 1960:152.
1292. *Vasylivka* I k.4 g.3. Flake, Pleshivenko 1990:26 (Fig. 26).
1293. *Vasylivka* I k.4 g.5. 1-2.Flakes, Pleshivenko 1990:29 (Fig. 27).
1294. *Vasylivka* II k.1 g.17. Flake, Kravchenko, Tuboltsev 1990:105.
1295. *Vasylivka* k.1 g.8, two skeletons. 1-4.Flakes, Kaiser, Pleshivenko 2000:132.
1296. *Vasylivka* k.11 g.3. 1-3.Flakes, Pleshivenko 1990:19 (Fig. 19).
1297. *Vasylivka* k.7 g.11. 1.Darthead 8,6x3 cm. 2.Flake, Pleshivenko 1990:10 (Fig. 7).
1298. *Velyka Bilozerka* k.21 p, 18. Flake, Otruschenko *et al.* 1978:51.
1299. *Volodymyrivka* Yakymivka District k.1 g.18. 1-4.Arrowheads with a deep coulisse, 5.Darthead 11,5x3,1 cm. Kubyshev *et al.* 1981:114.
1300. *Volodymyrivka* Yakymivka District k.1 g.20, two skeletons. 1-13.Arrowheads with a deep coulisse, 14-15. Dartheads, 16-47.Flakes (mezolit-neolit). Production kit of arrowmaker. Razumov, Shevchenko 2007:110-117.
1301. *Vovchansk* II Yakymivka District k.1 g.25. Cenotaf. Blade, Kubyshev *et al.* 1980:122.
1302. *Vovchansk* II Yakymivka District k.1 g.27a, two skeletons. Flake, Kubyshev *et al.* 1980:123.
1303. *Vovchansk* Yakymivka District k.1 g.40. Flake, Kubyshev *et al.* 1979:33.
1304. *Vovchansk* Yakymivka District k.4 g.5. 1.Darthead rhombic, 2.Hammerstone, 3-4.Flakes, Production kit. Kubyshev *et al.* 1980:27 (Fig. 16).
1305. *Vovchansk* Yakymivka District k.5 g.2. Concretion, Production kit. Kubyshev *et al.* 1980:35.
1306. *Vovchyi* Yakymivka District k.4 g.28. 1.Flake, 2.Darthead leaved. Kubyshev *et al.* 1987:151.

1307. *Vynogradne* III Tokmak District k.30 g.2. Cenotaf. 1-3.Flakes. Production kit of arrowmaker. Otruschenko *et al.* 1985:7.
1308. *Vynogradne* III Tokmak District k.31 g.3. Flake. 'Mask'. Otruschenko *et al.* 1985:26.
1309. *Vynogradne* III Tokmak District k.32 g.10. 1-2.Arrowheads with a coulisse. 'Mask'. Otruschenko *et al.* 1985:33. (Fig. 14:2).
1310. *Vynogradne* III Tokmak District k.32 g.7. 1-4.Flakes. Otruschenko *et al.* 1985:31 (Fig. 13:7).
1311. *Vynogradne* Tokmak District k.19 g.22. 1-2.Arrowheads with a coulisse. Otruschenko *et al.* 1984:6 (Fig. 46:8).
1312. *Vynogradne* Tokmak District k.19 g.8, three skeletons. 1-3.Arrowheads with a coulisse. Otruschenko *et al.* 1984:32 (Fig. 26:5-7).
1313. *Yefremivka* Yakymivka District k.7 g.4. Darthead. Kubyshch *et al.* 1984:120.
1314. *Zamozhne* I Tokmak District k.5 g.5, two skeletons. 1-6.Arrowheads with a deep coulisse. 'Mask'. Otruschenko *et al.* 1981:139. (Fig. 89:1).
1315. *Zamozhne* III Tokmak District k.15 g.4. Flake. 'Mask'. Otruschenko *et al.* 1985:89 (Fig. 35:14).
1316. *Zamozhne* III Tokmak District k.15 g.5, two skeletons. Flake. 'Mask'. Otruschenko *et al.* 1985:91.
1317. *Zamozhne* Tokmak District k.15 g.6. 1-2.Flakes. 3.Scraper on a flake. 'Mask'. Otruschenko *et al.* 1985:91 (Fig. 36).
1318. *Zamozhne* Tokmak District k.3 g.4, two skeletons. Flake. Smyrnov 1960:184.
1319. *Zamozhne* Tokmak District k.3 g.5. Flake. Smyrnov 1960:184.
1320. *Zamozhne* Tokmak District k.4 g.7. Spearhead. 10x2,3 cm. Smyrnov 1960:187.
1321. *Zarichne* Melitopol District k.6 g.12, two skeletons. Knife-dagger with a petiole, 11,7x2,4 cm. Mikhailov 1995:180.
1322. *Zeleniy Lug* Yakymivka District k.1 g.1. Cenotaf. 1.Darthead with a petiole, 6,5x2,5 cm. 2.Scraper on a flake. Boltrik *et al.* 1983:60 (Fig. 47).
1323. *Zhovtneve* III Tokmak District k.12 g.11. Cenotaf. 1-78.Concretions. Otruschenko *et al.* 1981:94 (Fig. 53:3).
1324. *Zhovtneve* Tokmak District k.12 g.2, two skeletons. 1-3.Arrowheads with a coulisse. 4-11.Flakes. Production kit of arrowmaker. Rassamakin 1990:100.
1331. *Chkalove* Nikopol District k.3 g.17. Arrowhead with a shallow coulisse. Wound. Kovaleva 1981a:71.
1332. *Chornyvshchina* Pavlohrad District k.3 g.3. Scraper on a flake. Kovaleva, Shalobudov 1985:14 (Fig. 41).
1333. *Chortomyk group* Nikopol District k.1 g.3. Cenotaf. 1.Flake 2.Fragment of biface. Mozolevskiy, Pustovalov 1999:123 (Fig. 4:3).
1334. *Dmuhajlivka* XIV Magdalynivka District k.2 g.4. Scraper-burin on a flake. Kovaleva 1981a:71.
1335. *Dnipropetrovsk Ihrenskiy cemetery* g.1. Fragment of biface. Wound(?). Balakin 1982:108.
1336. *Gubynyha* II Novomoskovsk District k.3 g.1, two skeletons. 1-2.Flakes. Kovaleva 1981a:70.
1337. *Hupalivka* XVI Magdalynivka District k.1 g.1. Cutting tool on a flake. Kovaleva 1981a:71.
1338. *Kalinina* VII Tsarychanka District k.2 g.5. Scraper on a flake. Kovaleva *et al.* 1979:41.
1339. *Kalinina* XIV Tsarychanka District k.1 g.4. Flake. Kovaleva *et al.* 1979:93 (Fig. 291).
1340. *Kalinina* XVII Tsarychanka District k.2 g.1. Flake. Kovaleva *et al.* 1979:118 (Fig. 381).
1341. *Kotovka* I Magdalynivka District k.1 g.3. Flake. Kovaleva 1981b:5 (Fig. 7).
1342. *Krugla Mohyla* group Nikopol District k.14 g.2. Arrowhead with a shallow coulisse. Wound(?). Mozolevskiy *et al.* 1989:36.
1343. *Kryvyj Rig* Remontyrsk Mohyla k.1 g.6. Flake. Melnik 1988:17 (Fig. 4).
1344. *Kut Apostolovo* District k.7 g.5. Flake. Berezovets 1960:52.
1345. *Kut Apostolovo* District k.8 g.6. 1-8.Arrowheads with a shallow coulisse. Quiver set. Berezovets 1960:58 (Fig. 16:1).
1346. *Mine No 22 group* Nikopol District k.14 g.6. Flake. Mozolevskiy *et al.* 1989:36.
1347. *Novoivanivka* II Pavlohrad District k.2 g.3. Scraper on a flake. Kovaleva, Shalobudov 1986:12 (Fig. 18).
1348. *Novopidkryazh* I Tsarychanka District k.1 g.1. Flake. Kovaleva *et al.* 1975:11 (Fig. 4:2).
1349. *Novopidkryazh* I Tsarychanka District k.3 g.4. Flake. Kovaleva *et al.* 1975:16 (Fig. 33).
1350. *Novopidkryazh* IV Tsarychanka District k.1 g.2. Scraper on a flake. Kovaleva *et al.* 1976:19 (Fig. 26:2).
1351. *Novopidkryazh* V Tsarychanka District k.1 g.5. Arrowhead with a shallow coulisse. Wound. Kovaleva *et al.* 1976:28 (Fig. 91:1).
1352. *Novopidkryazh* VI Tsarychanka District k.1 g.1. Arrowhead with a shallow coulisse. Wound. Kovaleva *et al.* 1976:35 (Fig. 113:1).
1353. *Novopidkryazh* VIII Tsarychanka District k.2 g.1. Scraper on a flake. Kovaleva *et al.* 1976:54 (Fig. 160:1).
1354. *Oleksandrivka* I Novomoskovsk District k.4 g.3. Concretion. Kovaleva *et al.* 1978:8.
1355. *Opanasivka* Snyelnikove District k.4 g.2. Scraper on a flake. Antonenko *et al.* 1976:12.
1356. *Pidgorodne* X Magdalynivka District k.11 g.9. Flake. Kovaleva, Peretiakko 1973:132.
1357. *Preobrazhenka* II Pavlohrad District k.2 g.1. Flake. Kovaleva 1983c:95 (Fig. 284).
1358. *Proletar* XXX Magdalynivka District k.1 g.10. Spokeshave on a flake. Kovaleva *et al.* 1980:97 (Fig. 325).
1359. *Proletar* XXXIV Magdalynivka District k.7 g.2. Scraper on a flake. Kovaleva *et al.* 1980:182 (Fig. 606).

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Crimea

1325. *Bile Saki* District k.3 g.19. Spokeshave on a flake. Koltukhov, Toschev 1998:109 (Fig. 19:5).
1326. *Pionerske Saki* District k.3 g.4. 1-2.Flakes. Koltukhov, Toschev 1998:109 (Fig. 19:5).
1327. *Tsilynne* Dzhankoj District k.13 g.4. Flake. Korpusova *et al.* 1977:81.
1328. *Tsilynne* Dzhankoj District k.6 g.16. Cutting tool on a flake. Korpusova *et al.* 1978:54 (Fig. 49:5).

Dnepropetrovsk Region

1329. *Blyznyuky* Dnepropetrovsk District k.1 g.1. 1-3.Arrowheads with a shallow coulisse. 4.Arrowhead petioled. 5.Biface. 6.Flake. Quiver set. Krylova 1967:16.
1330. *Bohuslav* I k.1 g.4. 1-2.Flakes. Kovaleva 1981a:70.

1360. *Pryadivka* VI Tsarychanka District k.1 g.1. Arrowhead with a shallow coulisse. Wound. Kovaleva 1981a:71.
1361. *Pryadivka* VII Tsarychanka District k.2 g.5. Flake. Kovaleva 1981a:71.
1362. *Rahmanivka* Kryvyj Rig District k.4 g.7. Arrowhead petioled. Wound(?). Kovaleva 1981a:70.
1363. *Shandrivka* I Pavlohrad District k.4 g.1. Flake. Kovaleva 1983c:20 (Fig. 49).
1364. *Sokolove* II Novomoskovsk District k.4 g.2. Cutting tool on a flake. Kovaleva *et al.* 1977:53 (Fig. 174).
1365. *Sokolove* VI Novomoskovsk District k.1 g.5. Cutting tool on a flake. Kovaleva *et al.* 1977:99.
1366. *Terny* I Pavlohrad District k.2 g.2. 1-4. Flakes. Kovaleva, Marina, Shalobudov 1984:15 (Fig. 21,22).
1367. *Terny* II Pavlohrad District k.4 g.19. Flake. Kovaleva, Shalobudov 1985a:86 (Fig. 298).
1368. *Terny* II Pavlohrad District k.4 g.2. Flake. Kovaleva, Shalobudov 1985a:76 (Fig. 256).
1369. *VelykoMychajlivka* II Pokrovka District k.5 g.4. Flake. Kovaleva, Marina, Shalobudov 1984:169 (Fig. 456).
1370. *Vilnohirsk* III k.1 g.1. Arrowhead with a shallow coulisse. Wound(?). Churilova, Nor 1987:59 (Fig. 70:2).
1371. *Zaplavka* II Magdalynivka District k.2 g.1. Scraper on a flake. Kovaleva 1981b:180.
1372. *Zavadski Mohyly group* Nikolop District k.7 g.25. Flake. Mozolevskiy *et al.* 1991:19.
1373. *Zelenyj Gaj* Solone District k.6 g.3. Arrowhead with a shallow coulisse. Wound. Kovaleva 1981a:71.
- Donetsk Region**
1374. *Bezymenne* Novoazovsk District k.5 g.7. 1-5. Flakes. Klimentko, Tsymbal 1998:74.
1375. *Byeyeva Mohyla* Gorovka k.1 g.3. 1-2. Cutting tools. 3. Scraper on a flake. 4-10. Arrowheads with a shallow coulisse. Quiver set. Polidovich 1993:81 (Fig. 52).
1376. *Chuhuno-Krepinka* Shahtarsk District k.1 g.1. Scraper on a flake. Moruzhenko *et al.* 1984:19 (Fig. 16:6).
1377. *Dibrovka* Shahtarsk District k.6 g.2. Flake. Moruzhenko *et al.* 1989:57 (Fig. 97:3).
1378. *Donetsk, Tekstylshhyk* k.2 g.5. 1-2. Arrowheads with a shallow coulisse. Wound. Litvinenko 1998b:48.
1379. *Donetsk, Tekstylshhyk* k.4 g.19. Flake. Gershkovich 1986:134.
1380. *Hamush-Oba* Telmanove District k.2 g.8. Flake. Posrednikov *et al.* 1991:36 (Fig. 76:1).
1381. *Komyshuvaha* Slov'yansk District k.5 g.1. Scraper on a flake. Gershkovich 1986:133.
1382. *Makijivka* k.3 g.3. Flake. Gershkovich, Shepel 1987:61 (Fig. 4:6).
1383. *Mykolaivka* Krasnoarmijsk District k.1 g.8. 1. Knife-scraper on a blade, 13,3x2,8 cm. 2. Flake. 3. Cutting tool on a flake. 4-10. Arrowheads with a shallow coulisse. Quiver set. Polidovich 1993:51 (Fig. 26).
1384. *Mykolaivka* Slov'yansk District k.3 g.1. Flake. Moruzhenko *et al.* 1983:44 (Fig. 40).
1385. *Mykolaivka* Slov'yansk District k.8 g.1. Scraper on a flake. Moruzhenko *et al.* 1983:55.
1386. *Mykolaivka* Starobesheve District cemetery g.5. Arrowhead with a deep coulisse. Wound. Litvinenko 1998b:48.
1387. *Novoandriyivka* Volnovaha District k.4 g.1. Arrowhead with direct bas. Wound(?). Klimentko, Tsymbal 1998:73.
1388. *Novopoltavka* Kostyantynivka District k.4 g.1. Cutting tool on a flake. Bondar *et al.* 1981:16 (Fig. 44).
1389. *Novoselivka* Krasnoarmijsk District k.1 g.23. Flake. Polidovich 1993:25.
1390. *Novoyavlenka* Oleksandrivka District k.13 g.3. 1. Concretion. 2-4. Flakes. Bondar *et al.* 1980:35 (Fig. 98,99).
1391. *Olhovatka* I Shahtarsk District k.3 g.4. Flake. Klimentko *et al.* 1994:47.
1392. *Pisky* Yasynuvata District k.1 g.2. Chisel on a flake. Litvinenko, Zarayskaya 2003:209.
1393. *Popiv Yar* Dobropillya District k.6 g.3. Arrowhead with a petiole. Wound. Bondar *et al.* 1981:20 (Fig. 59,60).
1394. *Pryvillya* Slov'yansk District k.1 g.2. 1-2. Flakes. Production kit. Sanzharov, Posrednikov 1985:89 (Fig. 50:12,13).
1395. *Samojlove* Novoazovsk District k.1 g.8. Core. Shvetsov 2003:241.
1396. *Samojlove* Novoazovsk District k.2 g.6. Scraper on a flake. Shvetsov 2003:248.
1397. *Tsymlyanka* I Amvrosiivka District k.1 g.2. Arrowhead or darthead. Wound(?). Litvinenko 1998:48.
1398. *Tsymlyanka* II Amvrosiivka District k.1 3, two skeletons. Flake. Production kit of arrowmaker. Litvinenko 1998:98.
1399. *Udarnik* Krasnyj Lyman District k.3 g.1. Core. Polidovich 1993:36.
1400. *Udarnik* Krasnyj Lyman District k.3 g.2. 1-2. Flakes. Polidovich 1993:36.
1401. *Vysoke* Makijivka k. 2 g.1. Scraper on a flake. Kulbaka 1988:26 (Fig. 12:16).
1402. *Vysoke* Makijivka k.1 g.1. Arrowhead with a petiole. Wound. Kulbaka 1988:19 (Fig. 12:10).
1403. *Vysoke* Makijivka k.1 g.8. Cenotaf. Cutting tool on a flake. Kulbaka 1988:21 (Fig. 12:11).
1404. *Vysoke* Makijivka k.3 g.2. Flake. Kulbaka 1988:27 (Fig. 21:7).
1405. *Zaporozhets* Telmanove District k.1 g.15-16, two skeletons. 1-2. Flakes. 3. Fragment of blade. Litvinenko, Zarayskaya 2003:211.
1406. *Zaporozhets* Telmanove District k.1 g.18. Cutting tool on a flake. Litvinenko, Zarayskaya 2003:212.
- Kharkiv Region**
1407. *Chervona Husarivka* B Balakliya District k.1 g.4. Flake. Berestnev 2001:68.
1408. *Chervona Husarivka* B Balakliya District k.1 g.5. Flake. Berestnev 2001:68.
1409. *Chervona Husarivka* D Balakliya District k.1 g.1. Flake. Production kit. Berestnev 2001:68 (Fig. 49:11-16).
1410. *Knyazev* Barvenkove District k.1 g.5. 1-6. Arrowheads with a shallow coulisse. Quiver set. Berestnev 2001:68 (Fig. 49).
1411. *Morokyne* Blyznyuky District k.15 g.1. Cutting tool on a flake. Bondar *et al.* 1981:50 (Fig. 188).
1412. *Morokyne* Blyznyuky District k.8 g.1. Flake. Production kit. Bondar *et al.* 1980:22.
1413. *Yegorivka* I Balakliya District k.1 g.1. Arrowhead with a shallow coulisse. Berestnev 2001:68 (Fig. 50).
- Kherson Region**
1414. *Gromivka* Novotroitske District k.1 g.11. Arrowhead with a shallow coulisse. Wound(?). Kubyshev *et al.* 1980:166.

1415. *Kalynivka* Novotroitske District k.1 g.4. Arrowhead petioled, Wound(?). Kubyshev *et al.* 1984:165 (Fig. 93).
1416. *Novooleksandrivka* Novovoroncove District k.1 g.1. 1-2. Arrowheads with a shallow coulisse, Wound. Kubyshev *et al.* 1987:70.
1417. *Pervomayivka* Verhnij Rohachyk District k.3 g.5. Flake. Sharafutdinova 1982:49.
1418. *Skvortsovka* Kahovka District k.1 g.8. 1-3. Flakes, Kubyshev *et al.* 1987:40.
1419. *Veletnivka* Henichesk 1 District k.g. 4. Flake, Kubyshev *et al.* 1987:99.
1420. *Vilna* Ukraina Kahovka District k.1 g.5. Blade (eneolite), Kubyshev *et al.* 1975:81 (Fig. 29:3).
1421. *Vilne* Kahovka District k.1 g.15. 1-2. Scrapers on flakes, Leskov *et al.* 1971:33.
1422. *Voskresenka* I Novotroitske District k.2 g.1. 1-16. Tools, flakes and fragments of cores of neolith, Kubyshev *et al.* 1987:75 (Fig. 48).

Kirovohrad Region

1423. *Holovkivka* V Oleksandrija District k.6 g.2. Cutting tool on a flake, Polin *et al.* 1994:2.
1424. *Znam'yanka* k.1 g.3. Flake, Tupchienko 1989:122.

Kyiv Region

1425. *Kozarovychi* Vyshhorod District k.1 g.49. 1. Cutting tool on a flake, 2. Flake, Makhno, Bratchenko 1977:55.

Luhansk Region

1426. *Astahove* I Sverdlovsk District k.22 g.5. Concretion, Evdokimov *et al.* 1975:50.
1427. *Babychyche* Troyickij District k.1 g.6. Cutting tool on a flake, Bondar *et al.* 1982:9 (Fig. 33).
1428. *Biryukove* Sverdlovsk District k.1 g.4. Flake, Razumov 1999b:215.
1429. *Biryukove* Sverdlovsk District k.2 g.2. Cutting tool on a flake, Razumov 1999b:215.
1430. *Klunnikove* Antracyt District k.8 g.1. Flake, Bondar *et al.* 1982:41 (Fig. 210).
1431. *Kripaki* Slovyanosersk District k.1 g.2. 1. Flake, 2. Spokeshave on a flake, Bratchenko *et al.* 1978:93 (Fig. 101).
1432. *Lysychansk LNPZ* k.1 g.1. Flake, Razumov 1999b:215.
1433. *Molodohvardijsk* Krasnodon District k.2 g.5. Arrowhead with a shallow coulisse, Wound. Pislariy 1979:22 (Fig. 19).
1434. *Molodohvardijsk* Krasnodon District k.2 g.6. Cutting tool on a flake, Pislariy 1979:23.
1435. *Novodonbasko* Starobilskij District k.1 g.7. Cutting tool on a flake, Antonenko *et al.* 1989:32 (Fig. 277).
1436. *Novoselivka* Perevalskij District k.1 g.23. Flake, Pislariy *et al.* 1977:81 (Fig. 57).
1437. *Nyzhnya Baranykivka* Bilovodsk District k.5 g.10. 1. Fragment of concretion, 2. Arrowhead, Production kit of arrowmaker. Bratchenko 2003:202.
1438. *Oknine* Novo-Ajdarskij District k.1 g.1. Flake, Gladkikh *et al.* 1974:47.
1439. *Oleksandrivsk* k.6 g.47. Flake, Bratchenko 1972:105.
1440. *Pryshyb* Slovyanosersk District k.1 g.29. 1. Flake, 2. Scraper on a flake, Bratchenko *et al.* 1978:31 (Fig. 60).
1441. *Pryshyb* Slovyanosersk District k.1 g.30. Scraper on a flake, Bratchenko *et al.* 1978:31 (Fig. 61).

1442. *Pryvillya* Kreminna District k.11 g.11. Flake, Pislariy *et al.* 1975:74.
1443. *Pryvillya* Kreminna District k.11 g.13. 1-2. Scrapers on flakes, 3-22. Flakes, 23. Cutting tool on a blade, Production kit of arrowmaker. Pislariy *et al.* 1975:76 (Fig. 94).
1444. *Pryvillya* Kreminna District k.13 g.2. Flake, Pislariy *et al.* 1975:90 (Fig. 106).
1445. *Smile* Slovyanosersk District k.1 g.3. Flake, Bratchenko *et al.* 1978:17 (Fig. 3).
1446. *Tryohizbenka* Slovyanosersk District k.2 g.3. Flake, Gladkikh *et al.* 1973:17.
1447. *Velykij Suhodil* Krasnodon District k.2 g.6. Flake, Pislariy 1979:6 (Fig. 3).
1448. *Velykij Suhodil* Krasnodon District k.3 g.7. Flake, Pislariy 1979:6.
1449. *Zatyshne* Kreminna District k.2 g.1. Flake, Antonenko *et al.* 1992:9 (Fig. 19).
1450. *Zatyshne* Kreminna District k.3 g.4. Cutting tool on a flake, Antonenko *et al.* 1991:27 (Fig. 198).
1451. *Znam'yanka* Slovyanosersk District k.1 g.3. Flake, Bratchenko *et al.* 1978:69 (Fig. 73).
1452. *Zymohir'ya* Slovyanosersk District k.2 g.1. Flake, Pislariy *et al.* 1980:51 (Fig. 36).

Moldova

1453. *Hadzhymys* Rokshany District k.2 g.11. 1. Scraper on a flake, 2. Flake, Chebotarenko *et al.* 1989:163 (Fig. 71:7:8).
1454. *Hura-Bykulij* Tyraspol District ground g.13. 1-6. Flakes, Otroschenko 2001:101 (Fig. 18).
1455. *Korpach* Slobodziya District k.2 g.2. Flake, Toschev 1986:187.
1456. *Kuzmin* Kam'yanka District k.7 g.13. Hammerstone, Manzura *et al.* 1992:77 (Fig. 30:4).
1457. *Nikolske* Slobodziya District k.12 g.7. Flake, Agulnikov, Sava 2004:117 (Fig. 58:5).
1458. *Nikolske* Slobodziya District k.13 g.2. Arrowhead with a shallow coulisse, Agulnikov, Sava 2004:121 (Fig. 59:3).
1459. *Nikolske* Slobodziya District k.8 g.19. 1-2. Arrowheads with a shallow coulisse, Wound. Agulnikov, Sava 2004:92 (Fig. 43).
1460. *Novi Raskayetsy* Rokshany District k.1 g.15. Arrowhead with a shallow coulisse, Wound. Yarovoy 1990:22.
1461. *Oknitsa* k.6 g.7. Flake, Manzura *et al.* 1992:49 (Fig. 21:8).
1462. *Olanesht* Rokshany District k.4 g.1. Sickle insert 6,5x2,7 cm. Yarovoy 1990:166 (Fig. 72:5).

Mykolaiv Region

1463. *Aktove* Voznesensk District k.2 g.2. 1-57. Flakes, 58. Arrowhead with a shallow coulisse, Production kit of arrowmaker. Shaposhnikova *et al.* 1987:82 (Fig. 62).
1464. *Bakshala* Domanivka District k.2 g.8. Flake, Shaposhnikova *et al.* 1986:104 (Fig. 41).
1465. *Kalynivka* II Zhovtneve District k.8 g.7. Spokeshave on a flake, Nikitin 1983:64 (Fig. 216).
1466. *Kovalivka* VI Mykolaiv District k.1 g.2. Arrowhead with a coulisse, Wound. Kovpanenko *et al.* 1974:3 (Fig. 3).
1467. *Nova Odesa* I k.1 g.14. Scraper on a flake, Shaposhnikova *et al.* 1974:62.

1468. *Nova Odesa* IV k.1 g.15. 1-7.Flakes, 8-12.Scrapers on flakes. Production kit. Shaposhnikova *et al.* 1974:164.
1469. *Novogygorivka* Mykolaiv District k.2 g.11. Flake. Ivanova *et al.* 2005:81.
1470. *Novogygorivka* Mykolaiv District k.2 g.15. Flake. Ivanova *et al.* 2005:83 (Fig. 51:4).
1471. *Novooleksandrivka* I Bratske District k.1 g.2. Cenotaf. Flake. Shaposhnikova *et al.* 1977:141.
1472. *Novooleksandrivka* II Bratske District k.1 g.9. Arrowhead with a coulisse. Shaposhnikova *et al.* 1977:123.
1473. *Vidradnyj* Bashtanka District k.1 g.2. Arrowhead with a shallow coulisse. Wound. Shaposhnikova 1971:5.
1474. *Vodyano-Loryne* Yelanets District k.1 g.6. Flake. Shaposhnikova *et al.* 1986:215.
1475. *Vysunsk* Berezneuvate District k.14 g.11. Flake. Shaposhnikova *et al.* 1977:143 (Fig. 81:3).
- Odesa Region**
1476. *Holmske* Artsyz District k.1 g.2. Cutting tool on a flake. Cherniakov *et al.* 1986:53 (Fig. 3:6).
1477. *Mykolaivka* II Tarutyne District k.8 g.6. Flake. Toshev 1986:175.
1478. *Odesa, Slobidka-Romanivka* k.1 g.23. Arrowhead with a shallow coulisse. Zbenovich, Leskov 1969:37.
1479. *Semenivka* Bilhorod-Dntrovskij District k.11 g.21. 1-4.Flakes. Subbotin 1985:73.
1480. *Semenivka* Bilhorod-Dntrovskij District k.11 g.4. Scraper on a flake. Subbotin 1985:74.
1481. *Zhovtneve* Bolhradskij District k.1 g.1. Flake. Toshev 1986:180.
- Poltava Region**
1482. *Kompanijci* Kremenčuk District k.1 g.261. Flake. Makhno, Bratchenko 1977:53.
1483. *Voloshyne* III Kremenčuk District k.4 g.4. Cutting tool on a flake. Suprunenko *et al.* 2005:68 (Fig. 21:1).
- Rostov Region (Russian Federation)**
1484. *Kerchik* Oktyabrskij District k.17 g.9. 1.Arrowhead with a shallow coulisse. 2.Flake. Wound(?). Trudy... 1999:14.
1485. *Rostov-na-Donu TEC* II k.1 g.4. Arrowhead with direct bas. Wound. Sharafutdinova 1987:36.
1486. *Rostov-na-Donu TEC* II k.5 g.3. Arrowhead with a petiole. Wound. Sharafutdinova 1987:36.
1487. *Rostov-na-Donu Western* k.5 g.3. Arrowhead with a petiole. Wound. Sharafutdinova 1987:37.
1488. *Ryepnyj* I Oktyabrskij District k.7 g.10. 1-4.Arrowheads with a shallow coulisse. Quiver set. Glebov 2004:95 (Fig. 28:2).
1489. *Yasyryev* I Oktyabrskij District k.8 g.9. Arrowhead. Wound. Sharafutdinova 1987:37.
- Cherkasy Region**
1490. *Dobryanka* Talne District k.1 g.3. Arrowhead with a shallow coulisse. Wound. Klochko 2001:203.
- Zaporizhzhya Region**
1491. *Balabyne* Polohy District k.1 g.2. Cutting tool on a blade. Antonov 1998:105 (Fig. 1:4).
1492. *Barvynivka* Myhailivka District k.7 g.15. 1-4.Arrowheads, 3 with a coulisse, 1 with direct bas. Otruschenko *et al.* 1987:10 (Fig. 7).
1493. *Barvynivka* Myhailivka District k.8 g.1. 1-6.Flake. Production kit of arrowmaker. Otruschenko *et al.* 1987:13 (Fig. 11).
1494. *Basan* I Polohy District k.4 g.1. Flake. Pleshivenko 1988:21 (Fig. 6:2).
1495. *Basan* I Polohy District k.4 g.7. Flake. Pleshivenko 1988:27 (Fig. 6:7).
1496. *Basan* Polohy District k.4 g.5. Flake. Samar, Antonov 1998:88.
1497. *Braharnya, Hortycya island (Zaporizhzhya)* g.2. Cenotaf. Arrowhead with a coulisse. Teslenko, Ostapenko 2000:85 (Fig. 9:2).
1498. *Davydivka* Yakymivka District k.8 g.2. Scraper on a flake. Kubyshev *et al.* 1986:43.
1499. *Davydivka* Yakymivka District k.8 g.4. Blade. Kubyshev *et al.* 1986:43.
1500. *Dniprovka* I Vilnyanka District k.5 g.3. Piercer on a flake. Otruschenko *et al.* 1978:120 (Fig. 86:1).
1501. *Dniprovka* III Vilnyanka District k.6 g.10. Scraper on a flake. Liashko *et al.* 1979:53 (Fig. 32:8).
1502. *Hnarovske* Vilnyanka District k.1 g.6. Flake. Otruschenko *et al.* 1981:158 (Fig. 100:2).
1503. *Kichkas I (Zaporizhzhya)* k.16 g.E. Arrowhead with a shallow coulisse. Wound(?). Smolichev 1929:186.
1504. *Kichkas I (Zaporizhzhya)* k.35 g.2. Arrowhead with a shallow coulisse. Wound(?). Smolichev 1929:186.
1505. *Nove* Melitopol District k.10 g.14. Flake. Boltrik *et al.* 1983:33.
1506. *Novoukrayinka* Vilnyanka District k.3 g.3. Cutting tool on a flake. Pleshivenko, Popandopulo 1986:30.
1507. *Novoukrayinka* Vilnyanka District k.4 g.3. Knife on a blade. Pleshivenko, Popandopulo 1986:27 (Fig. 15).
1508. *Orlyanka* III Vasylivka District k.3 g.27. Flake. Bidzilia *et al.* 1973:16.
1509. *Petro-Mychajlivka* I Vilnyanka District k.2 g.2. Arrowhead with a shallow coulisse. Wound(?). Liashko *et al.* 1980:8.
1510. *Petro-Mychajlivka* I Vilnyanka District k.9 g.3. Flake. Otruschenko *et al.* 1981:193 (Fig. 122:5).
1511. *Polohy* k.1 g.2. Flake. Production kit of arrowmaker. Popandopulo 1991:69 (Fig. 2:10).
1512. *Pryshyb* Myhailivka District k.5 g.5. Flake. Rassamakin, Kolosov 1988:30 (Fig. 8:6).
1513. *Soloha group* Kam'yanka-Dniprovska District k.3 g.8. Flake. Otruschenko *et al.* 1987:13.
1514. *Velyka Bilozerka* IV k.4 g.4. Spearhead(?) 13,5x3,1x0,8 cm. Production kit. Bidzilia *et al.* 1973:101 (Fig. 61:1).
1515. *Velyka Bilozerka* k.17 g.7. Cutting tool on a flake. Otruschenko 2001:99.
1516. *Velyka Znam'yanka* k.15 g.70. Arrowhead with a shallow coulisse. Wound. Andrukh *et al.* 1995:15 (Fig. 24:3).
1517. *Velykodubove* I Vilnyanka District k.1 g.4. Flake. Otruschenko *et al.* 1981:211.
1518. *Vynogradne* III Tokmak District k.30 g.1. Flake. Otruschenko *et al.* 1985:6.
1519. *Vysoke* Myhailivka District k.2 g.6. Cutting tool on a flake. Rassamakin, Kolosov 1988:29.

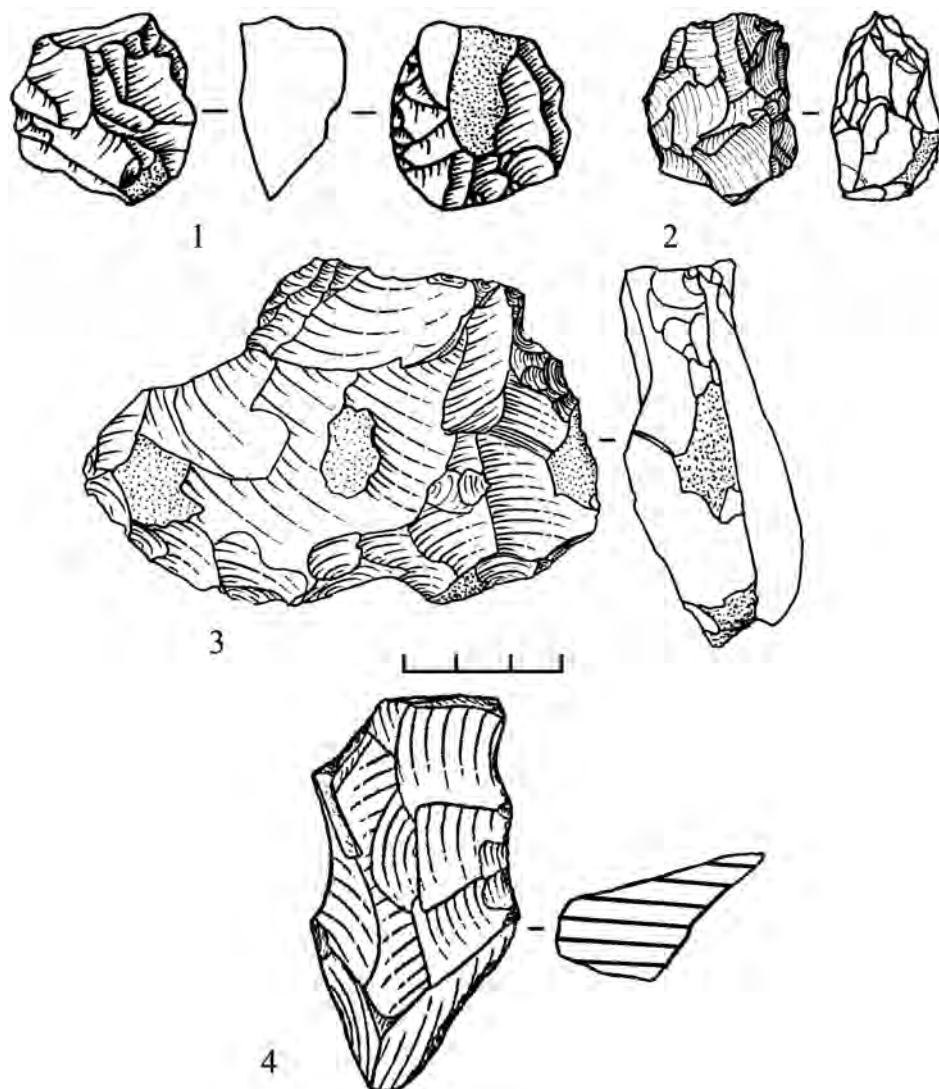


Fig. 1. Cores for obtaining flakes. 1 – Oleksandrivka Barrow 1, Grave 32 (Odessa Region) [List of sources: 556], Yamnaya; 2 – Atmanay II Barrow 3, Grave 15 (Zaporizhya Region) [1244], Early Catacomb; 3 – Holovkivka V Barrow 6, Grave 12 (Kirovohrad Region) [1049], Ingul Catacomb; 4 – Novomykolayivka II Barrow 2, Grave 1 (Donetsk Region) [926], Donets Catacomb culture

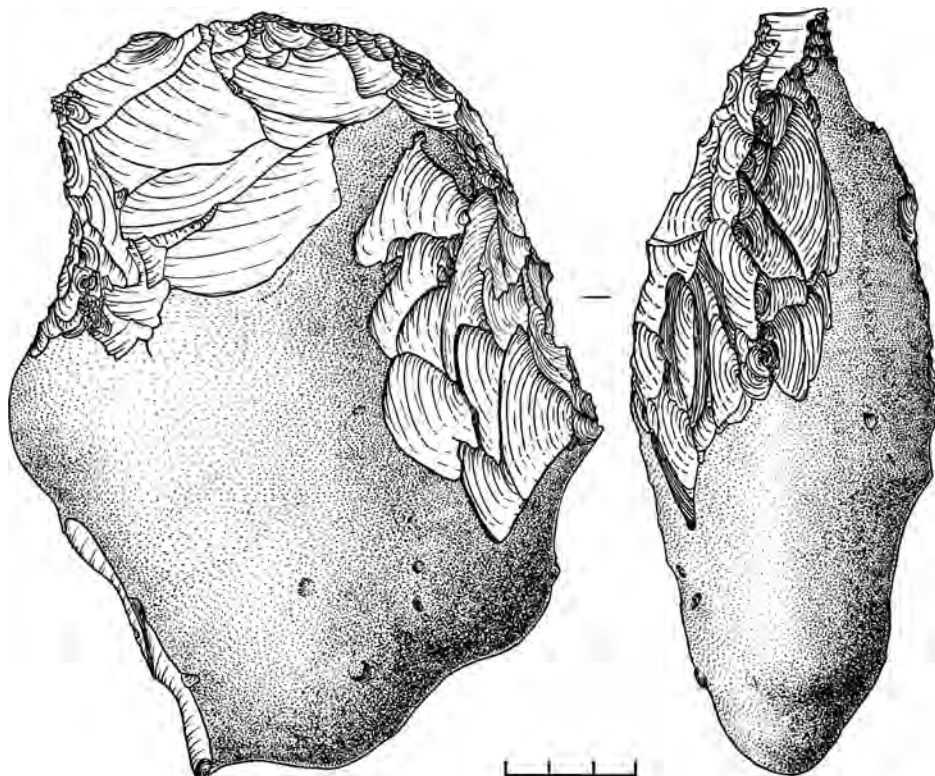


Fig. 2. Ordzhonikidze Mine No 22 Barrow 3, Grave 3 (Dnipropetrovsk Region) [829]. Core from a Late Catacomb culture 'Arrow-maker's kit'

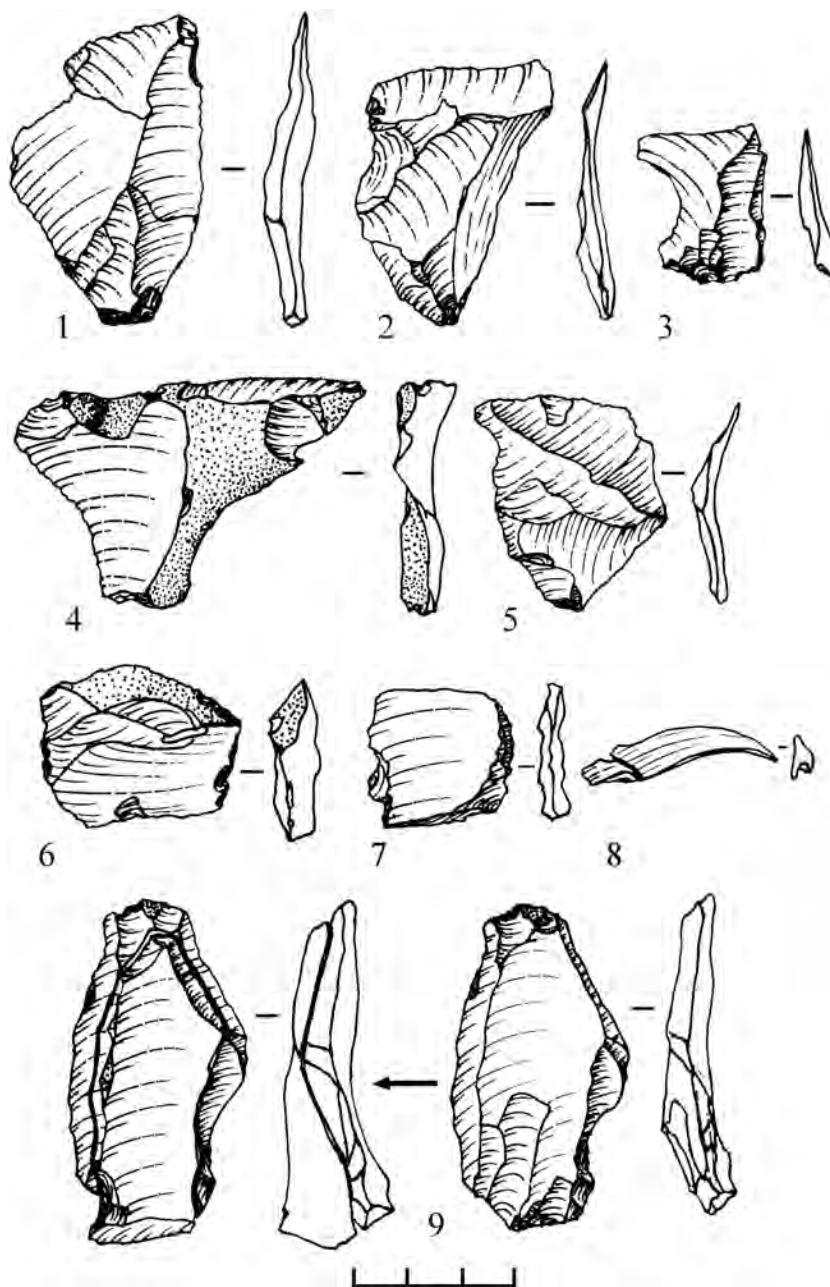


Fig. 3. Chornyavshchyna Barrow 3, Grave 2 (Dnipropetrovsk Region) [112], Yamnaya culture. 1-8 – flakes, 9 – refitted grave

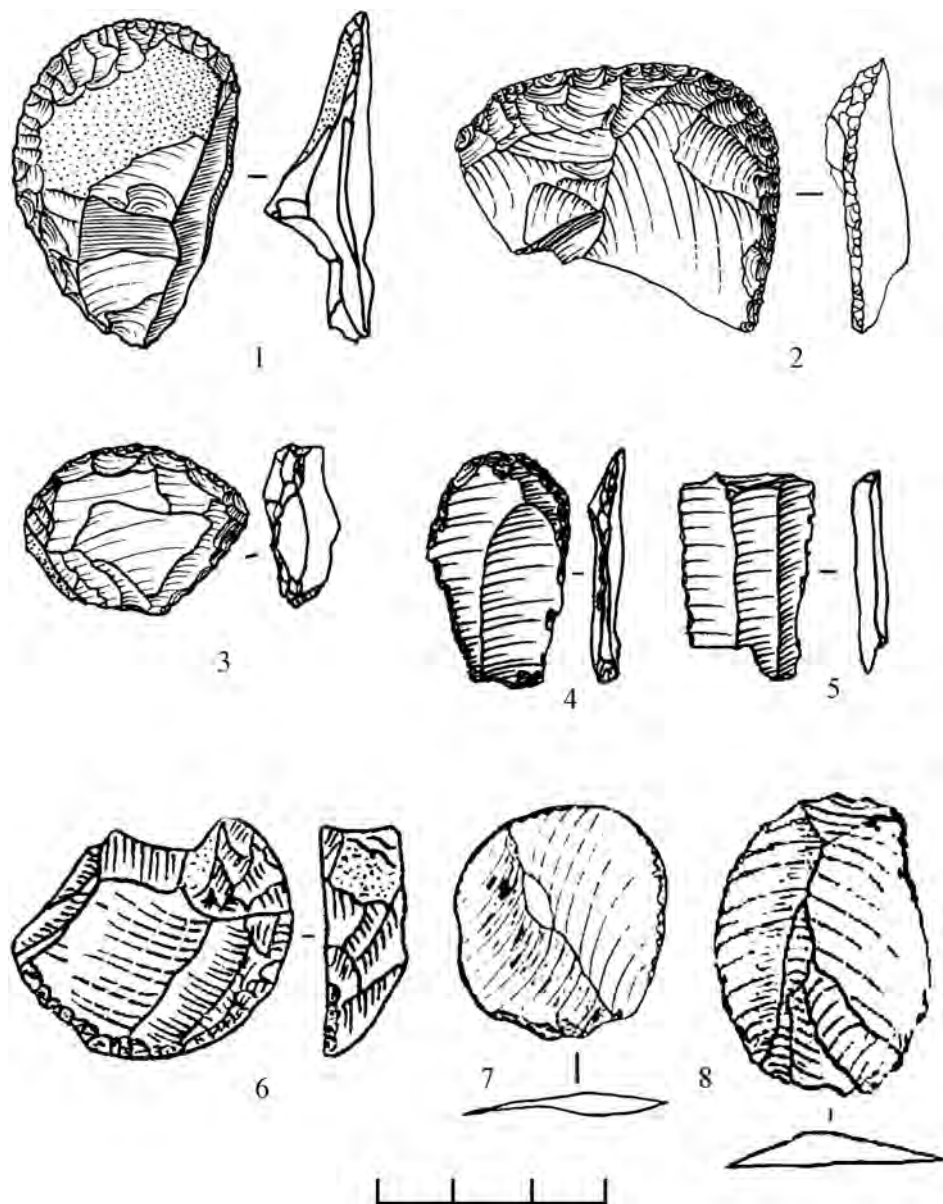


Fig. 4. Scrapers from the Yamnaya culture. Supine burials: 1 – Mohyliov Barrow 1, Grave 7 (Dnipropetrovsk Region) [153]; 2 – Kamyanka – Dniprovska I Barrow 4, Grave 3 [635]; 3 – Davydivka Barrow 1, Grave 3 [627]; 4-5 – Mala Ternivka Barrow 2, Grave 2 (Zaporizhyya Region) [638]; 6 – Martynivka Barrow 1, Grave 11 (the Crimea) [32]; 7 – Shandrivka I Barrow 1, Grave 11 [188]; 8 – I Barrow 5, Grave 11 (Dnipropetrovsk Region) [190]

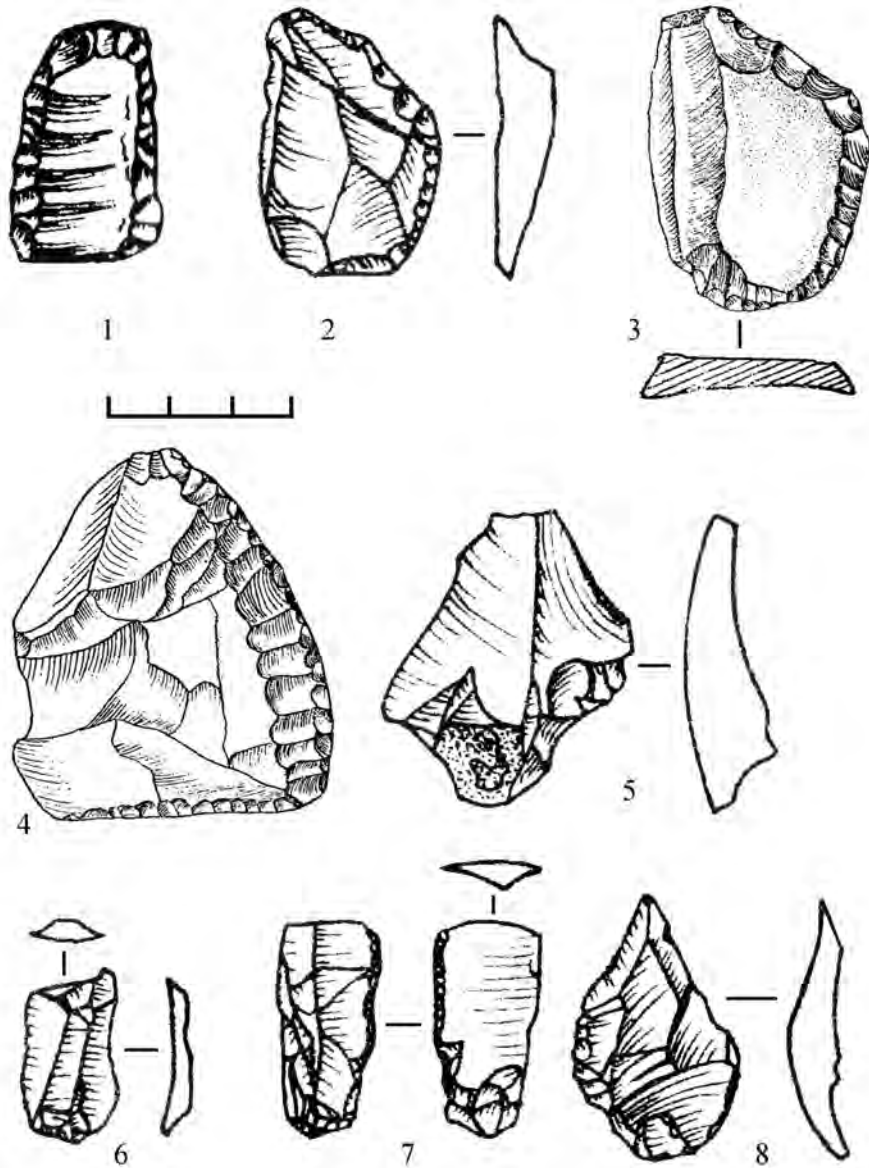


Fig. 5. Implements from the Yamnaya culture. Contracted burials. Scrapers: 1 – Hryhorivka Barrow 1, Grave 10 [535]; 2 – Vyshneve Barrow 17, Grave 43 (Odessa Region) [580]; 3 – Podokalynivka Barrow 1, Grave 6 [321]; 4 – Barrow 1, Grave 8 (Kherson Region) [322]; Knives: 5 – Vyshneve Barrow 17, Grave 43 [580]; 6 – Nahirne Barrow 14, Grave 16 [553]; 7 – Strumok Barrow 5, Grave 3 (Odessa Region) [573]; 8 – Piercer: Hryhorivka Barrow 1, Grave 9 (Odessa Region) [534]

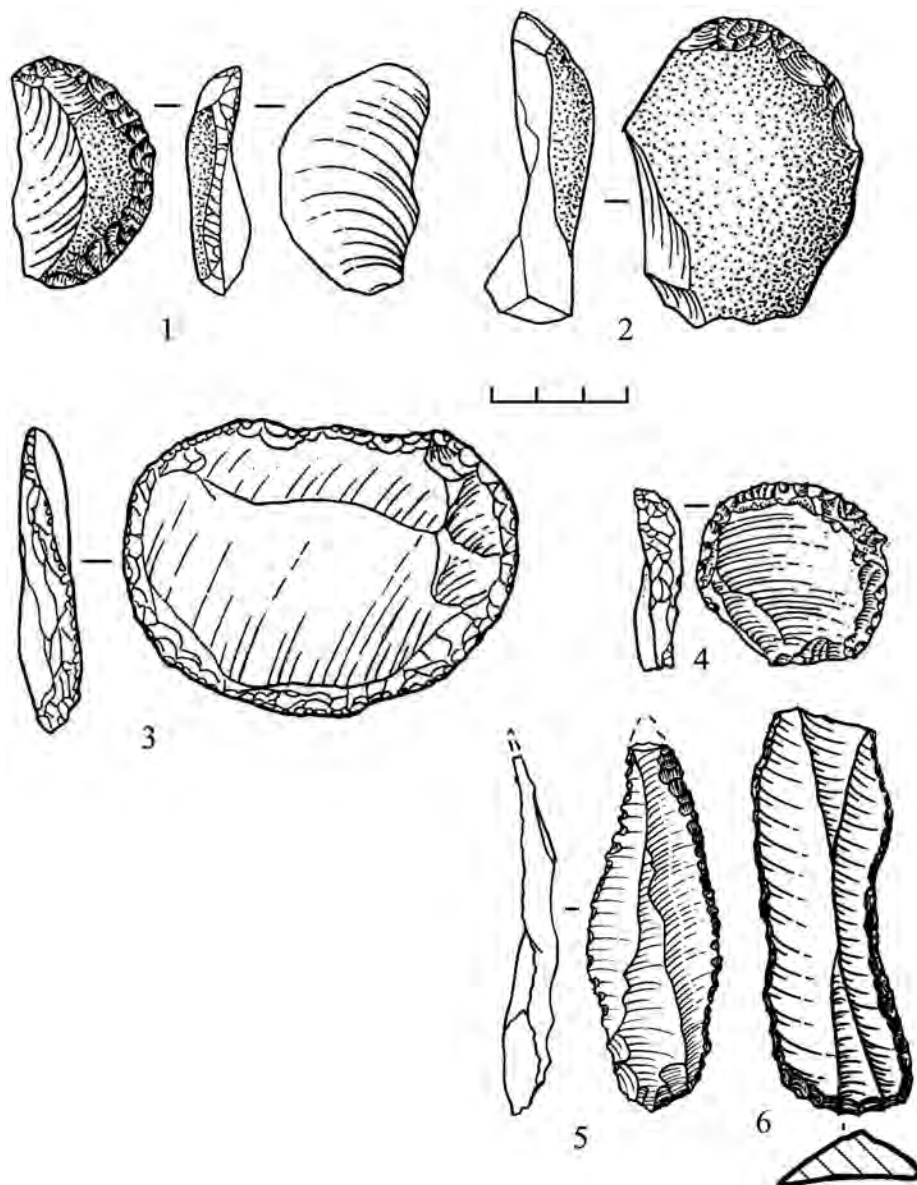


Fig. 6. Implements from Early Catacomb culture burials. Scrapers: 1-2 – Topolivka Barrow 1, Grave 3 [1128]; 3 – Luhansk, Telmana Barrow 2, Grave 9 [1087]; 4 – Pryvillya Barrow 2, Grave 4 (Luhansk Region) [1117]. Knives: 5 – Novopokrovka III Barrow 1, Grave 20 [846]; 6 – Terny II Barrow 4, Grave 22 (Dnipropetrovsk Region) [880]

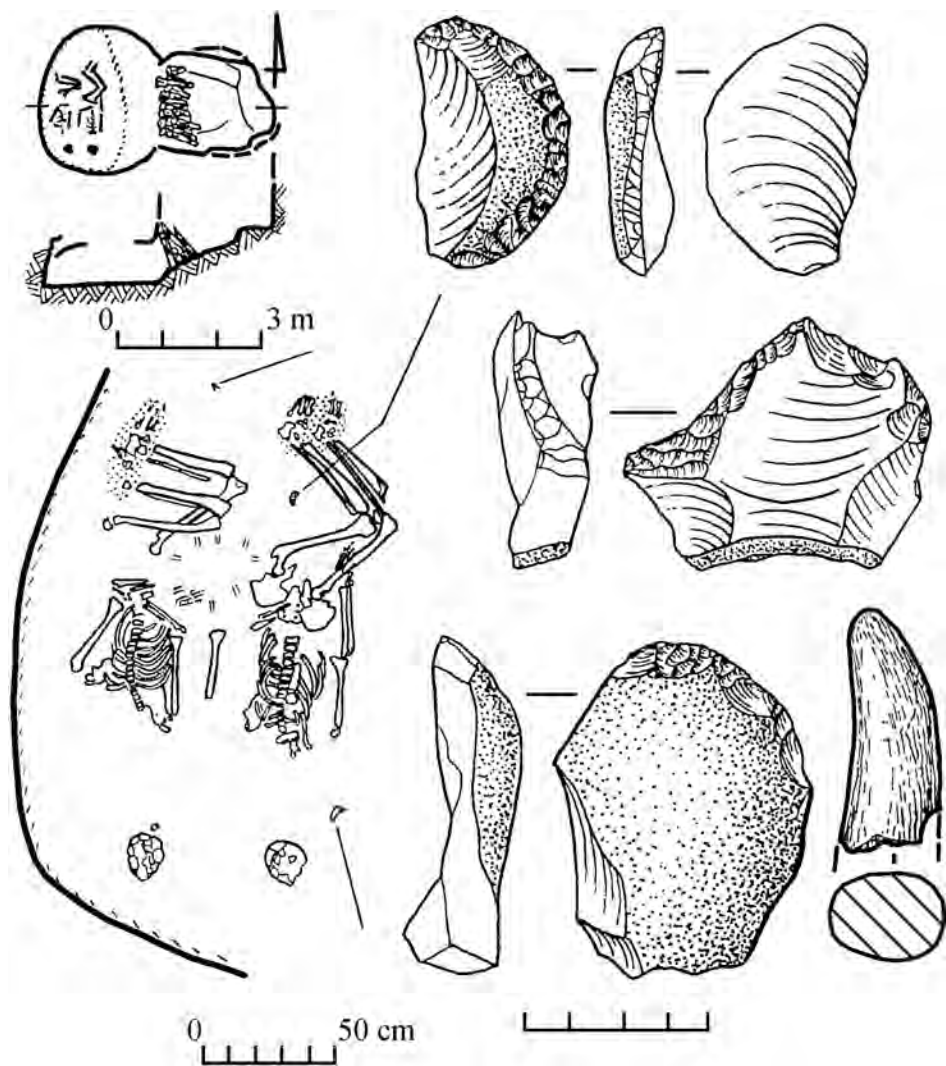


Fig. 7. Topolivka Barrow 1, Grave 3 (Luhansk Region) [1128], Early Catacomb culture Barrow. 1-3 – scrapers

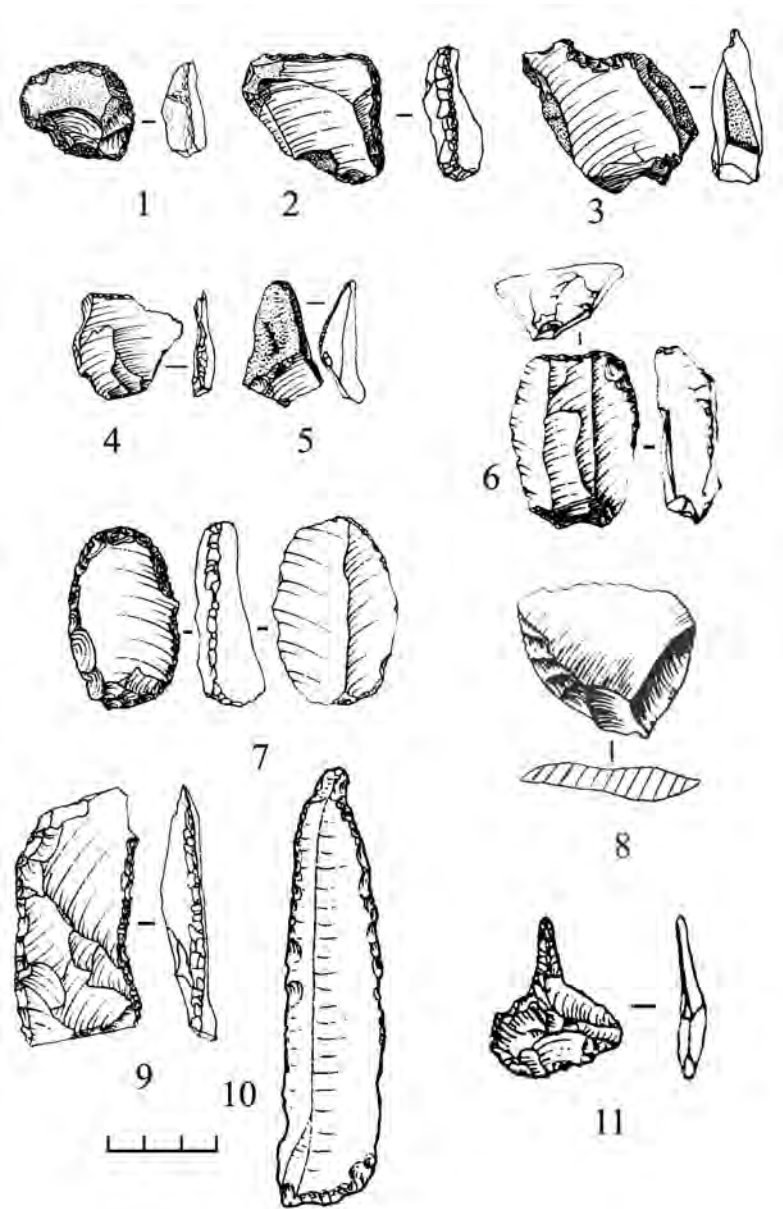


Fig. 8. Implements of the Ingul Catacomb culture. 1 – Katerynivka Barrow 31, Grave 3 [850]; 2 – Barrow 31, Grave 6 (Dnipropetrovsk Region) [851]; 3-5 – Mala Ternivka Barrow 1, Grave 9 (Zaporizhya Region) [1266]; 6, 9 – Kruhla Mohyla Barrow 1, Grave 18 [809]; 7 – Chervona Kolonka Barrow 1, Grave 35 [784]; 8 – Maryivka III Barrow 1, Grave 7 [827]; 10 – Pereshchepyne Barrow 1, Grave 9 (Dnipropetrovsk Region) [853]; 11 – Kindrativka Barrow 2, Grave 5 (Donetsk Region) [911]. 1-8 – Scrapers, 9-10 – cutting tools, 11 – drill-piercer

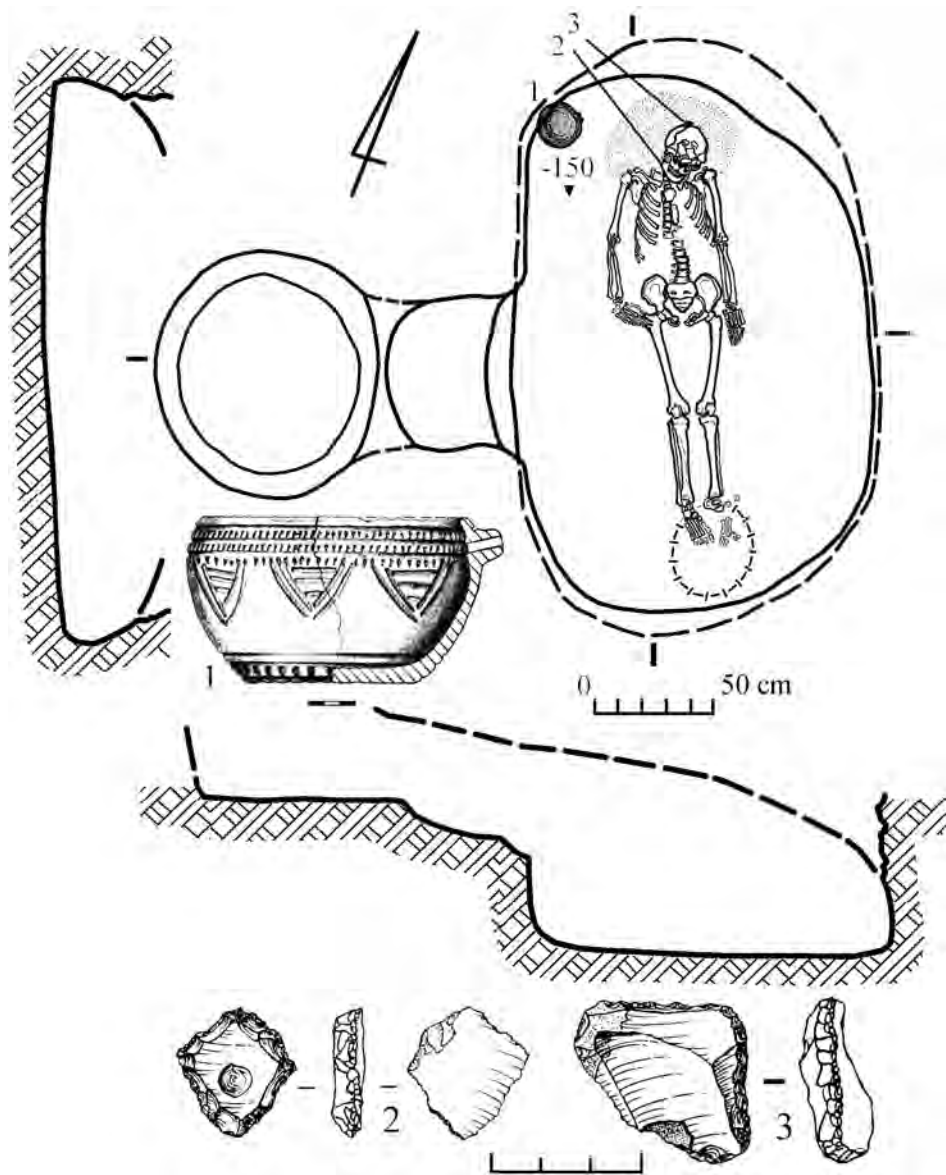


Fig. 9. Katerynivka Barrow 31, Grave 6 (Dnipropetrovsk Region) [851], Ingul Catacomb culture Barrow. 1 – modelled cup, 2 – flint figurine, 3 – flint scrapper

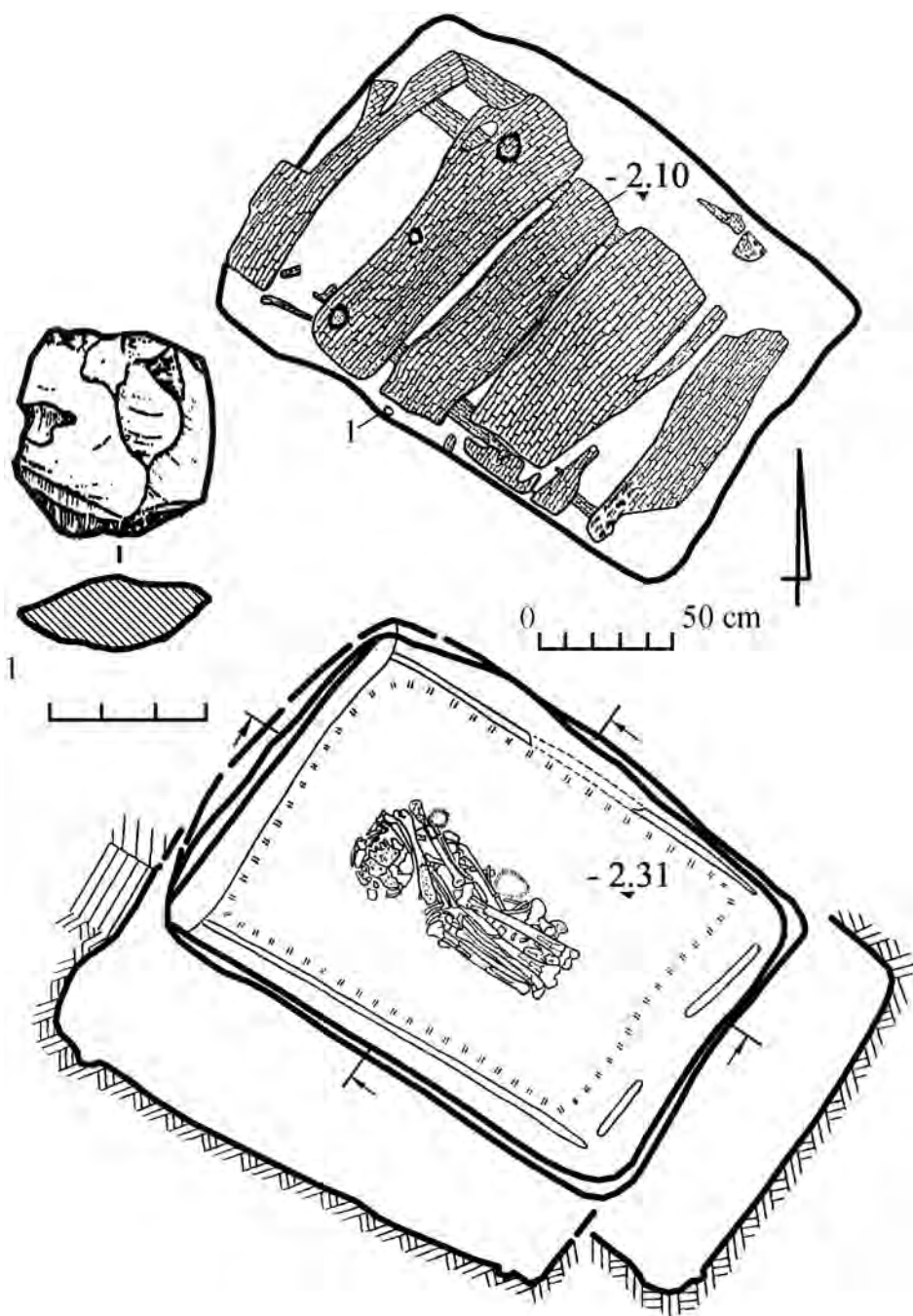


Fig. 10. Udarnik Barrow 3, Grave 1 (Donetsk Region) [1400], Babyno culture chest burial.
1 – core on top of the cover

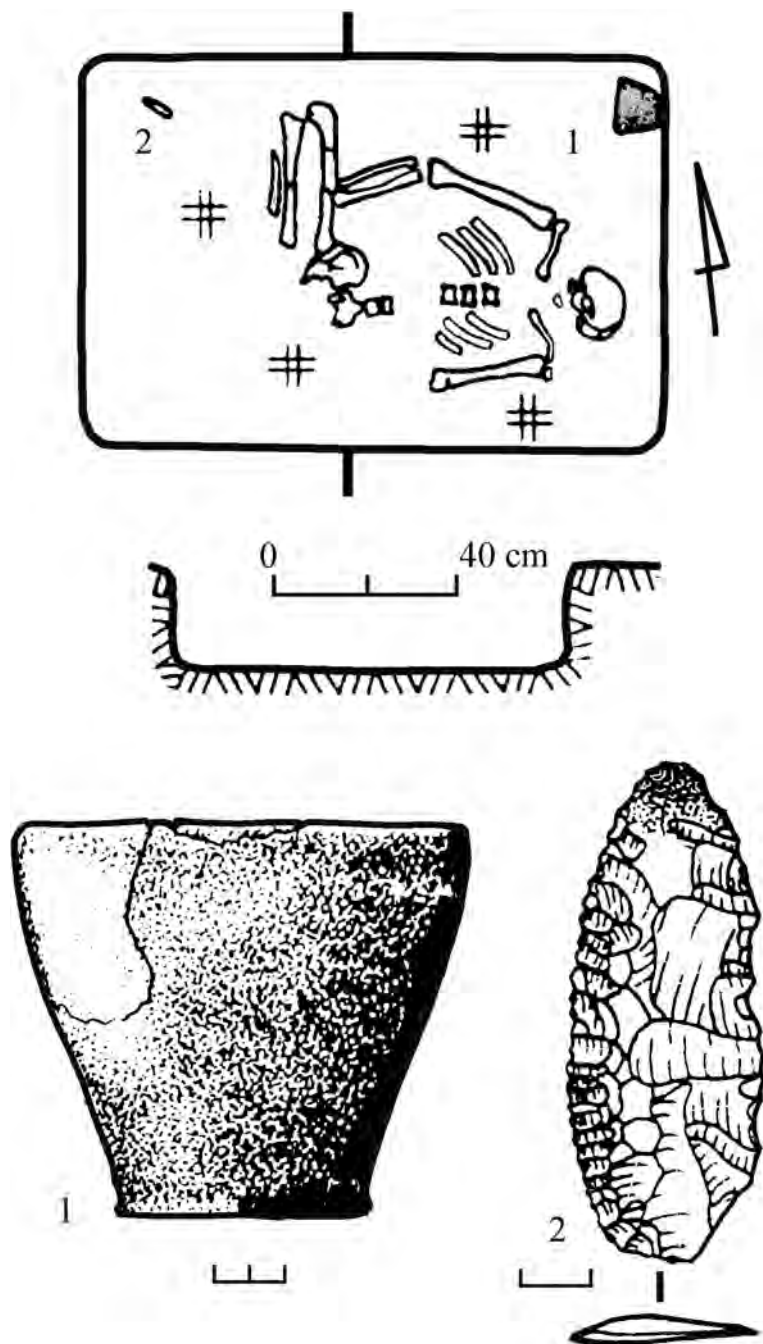


Fig. 11. Olanesti Barrow 4, Grave 1 (Moldova), Babyno culture [1463]. 1 – vessel, 2 – sickle insert

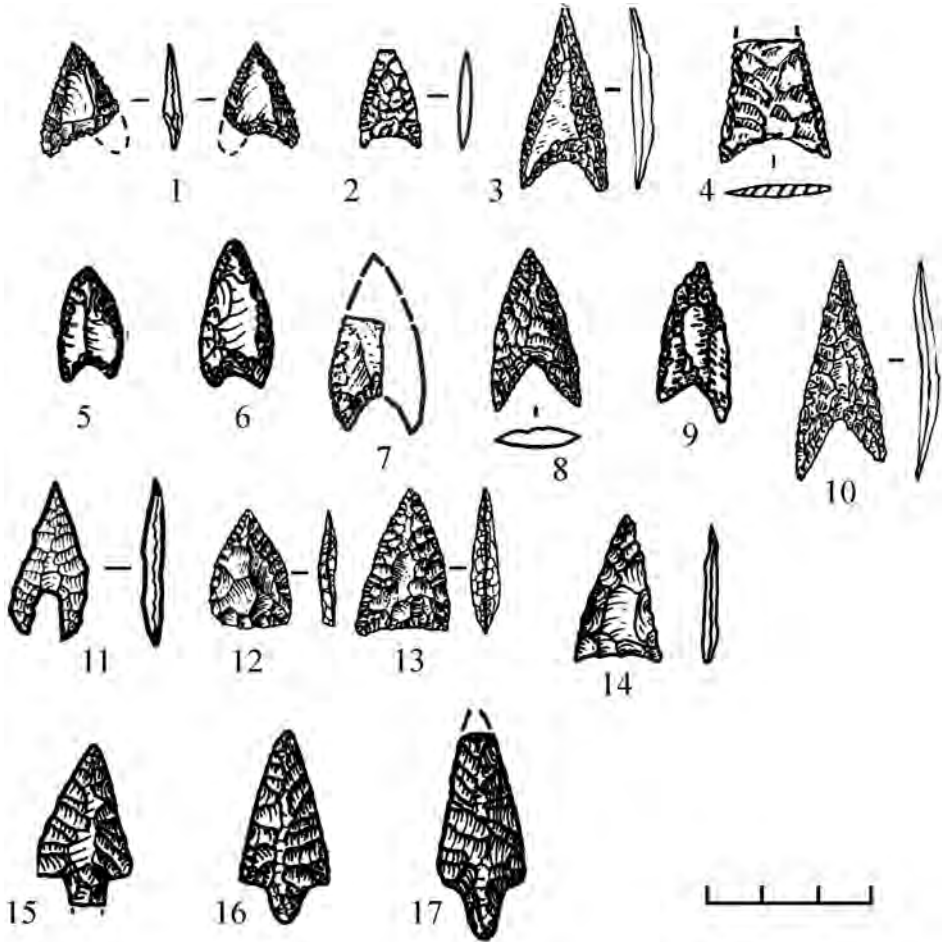


Fig. 12. Arrowheads from the Yamnaya culture. Supine burials: 1 – Kruhla Mohyla Barrow 14, Grave 2 (Dnipropetrovsk Region) [810]; 2 – Nikolske Barrow 13, Grave 1 (Moldova) [415]; 3, 10 – Zaporizhya, Khortytskyi Masyv Barrow 1, Grave 7 [706]; 4 – Kryvyi Rig I Barrow 3, Grave 4 (Dnipropetrovsk Region) [135]; 5 – Tankove Barrow 14, Grave 24 (the Crimea) [60]; 6 – Bashtanivka Barrow 4, Grave 12 (Odessa Region) [527]; 7 – Novopetrivka II Barrow 1, Grave 7 (Mykolayiv Region) [493]; 8 – Kirovka I Barrow 1, Grave 4 (Dnipropetrovsk Region) [123]; 9 – Babenkove Barrow 1, Grave 21 [281]; 11 – Zmiyivka Barrow 1, Grave 17 (Kherson Region) [359]; 12-13 – Oleksandrivsky quarrier Barrow 1, Grave 2 (Dnipropetrovsk Region) [175]; 14 – Pidvysoke Barrow 6, Grave 1 (Kirovohrad Region) [365]; 15 – Mariyivka XVII Barrow 8, Grave 3 (Dnipropetrovsk Region) [152]; 16-17 – Akkermen II Barrow 17, Grave 10 (Zaporizhya Region) [607]. 1-11 – Type A, 12-14 – Type B, 15-17 – Type C

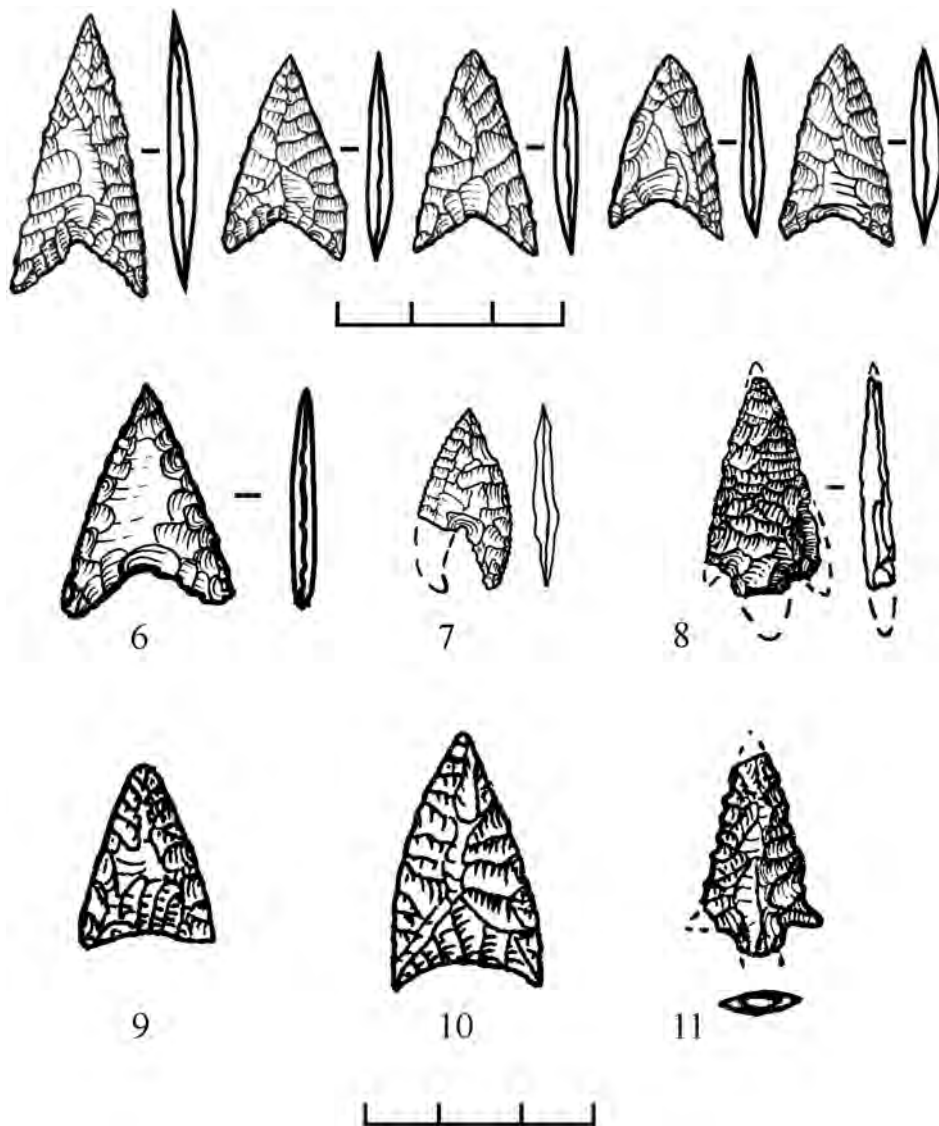


Fig. 13. Arrowheads from the Yamnaya culture. Contracted burials: 1-5 – Bile Barrow 3, Grave 5 (the Crimea) [2], Type A-I-2; 6 – Mohyla Hurskoho Barrow 2, Grave 19 (Dnipropetrovsk Region) [154], Type A-I-2; 7 – Vilnohirsk I Barrow 1, Grave 25 (Dnipropetrovsk Region) [233], Type A-II-2; 8 – Mala Ternivka Barrow 1, Grave 1 [637], Type C-III; 9 – Troitske Barrow 3, Grave 33 [660], Type B-II-2; 10 – Vilno-Hrushivka Barrow 1, Grave 7 (Zaporizhya Region) [669], Type A-II-1; 11 – Biryukove Barrow 1, Grave 5 (Luhansk Region) [375], Type C-III

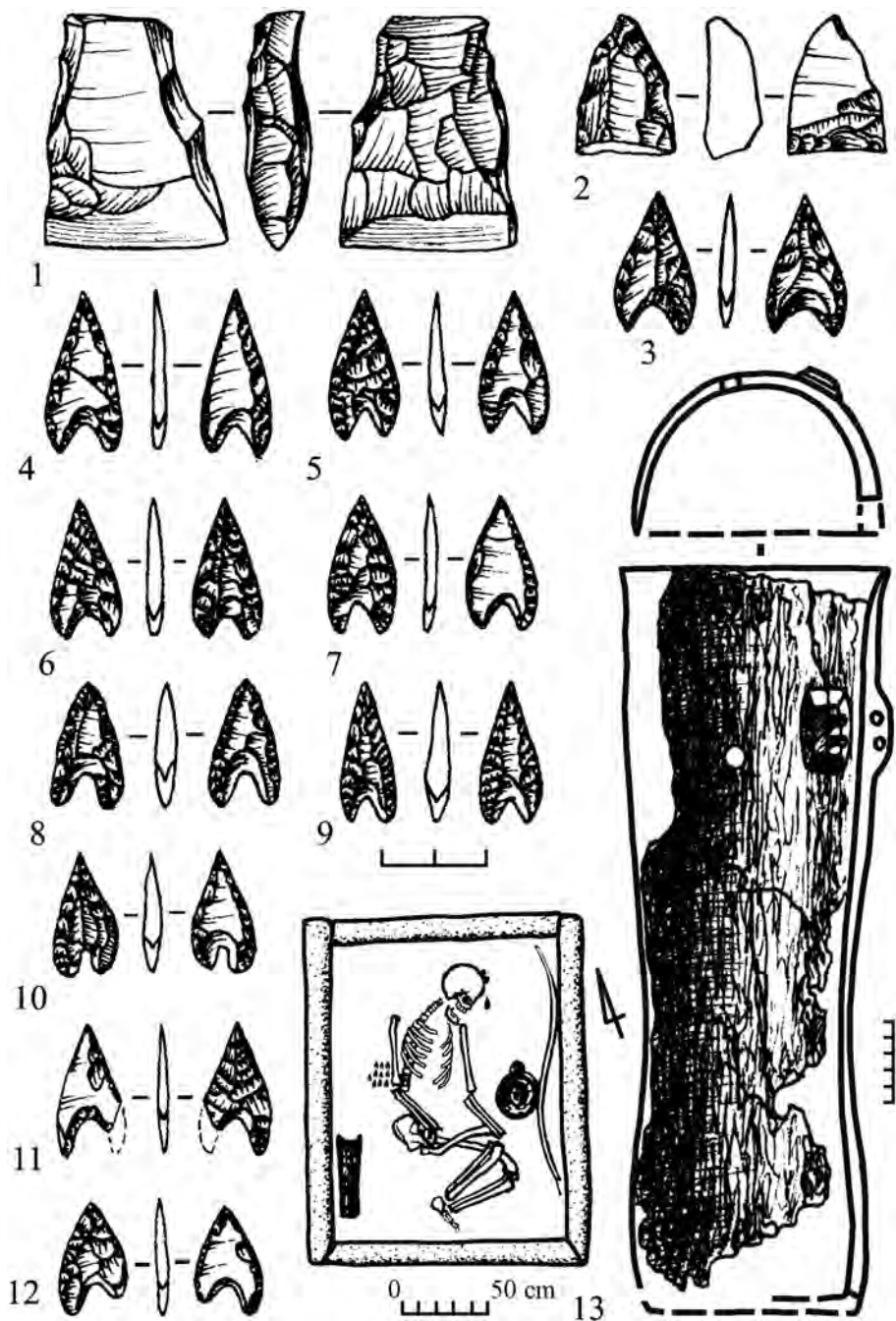


Fig. 14. Alkaliya Barrow 3, Grave 33 (Odessa Region), Yamnaya culture [525]. 1 – axe-adze, 2 – arrowhead blank, 3-12 – arrowheads of Type A-II-2, 13 – quiver

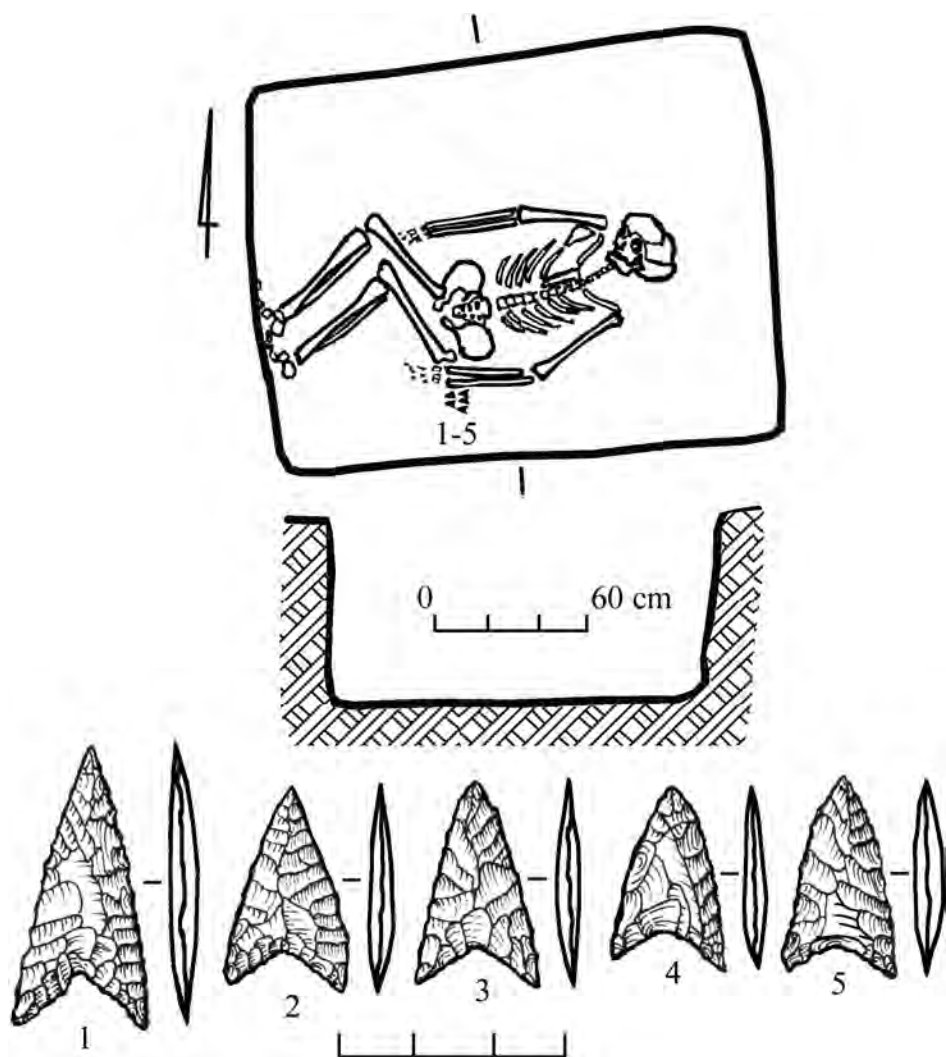


Fig. 15. Bile Barrow 3, Grave 5 (the Crimea), Yamnaya culture [2]. 1-5 – arrowheads from a quiver set

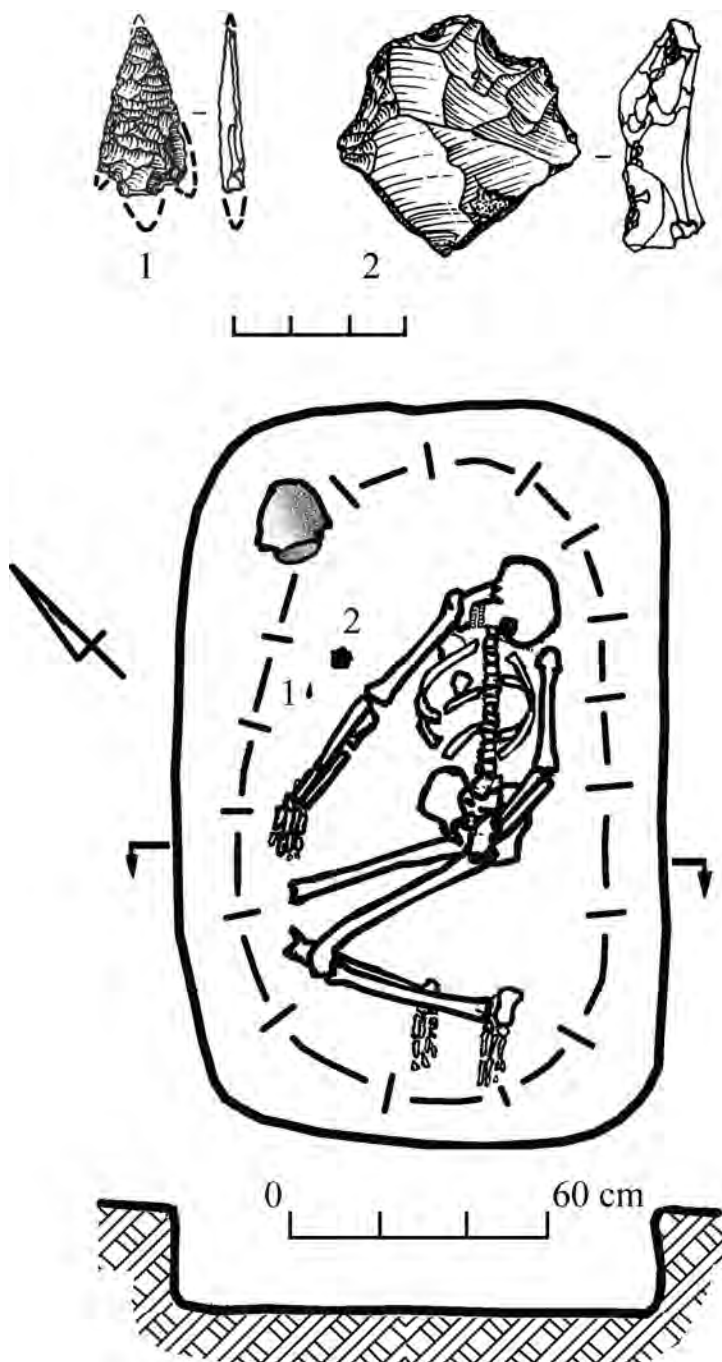


Fig. 16. Mala Ternivka Barrow 1, Grave 1 (Zaporizhya Region) [637], Yamnaya culture.
1 – tanged arrowhead, 2 – flint figurine

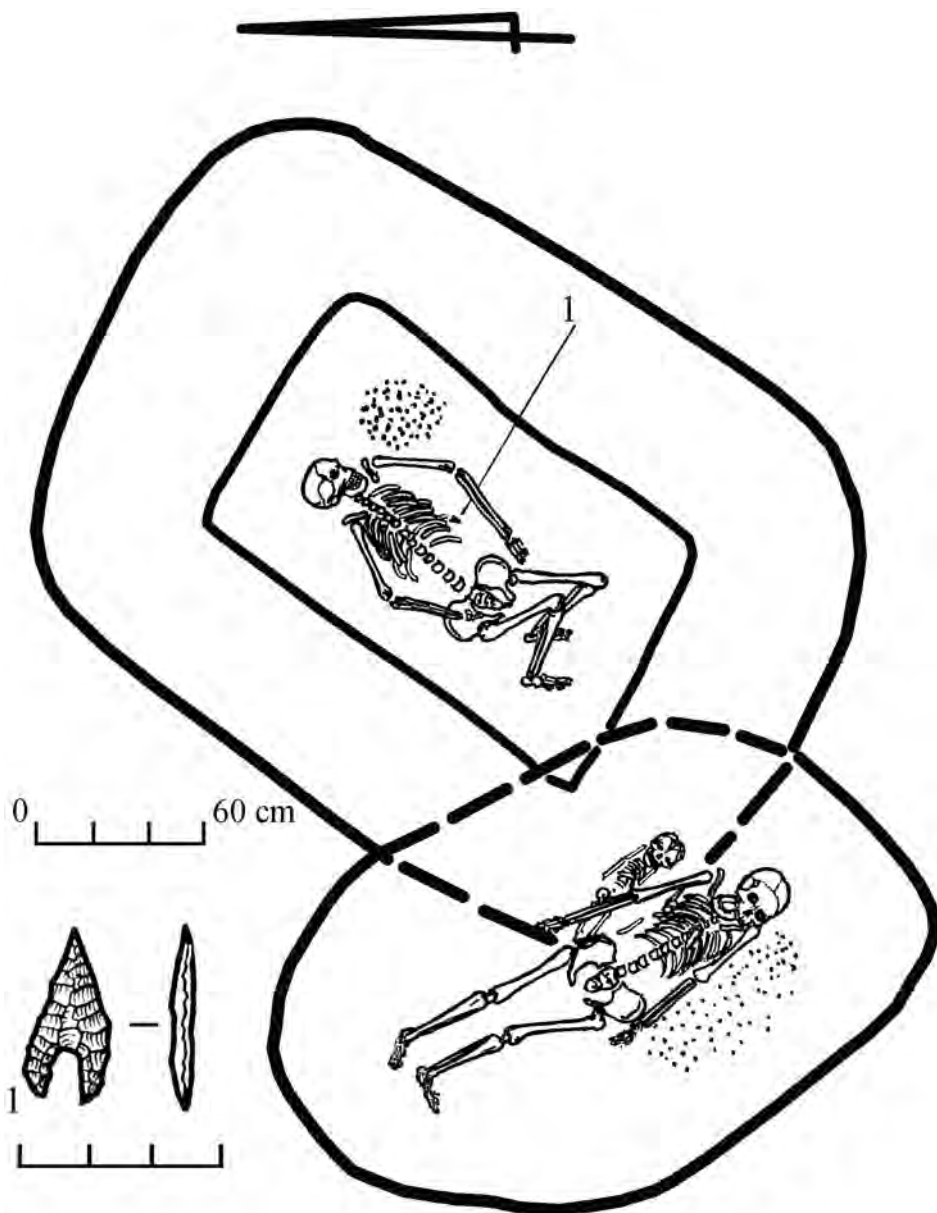


Fig. 17. Zmiyivka Barrow 1, Grave 17 (Kherson Region) [359], Yamnaya culture. 1 – arrowhead in the bones

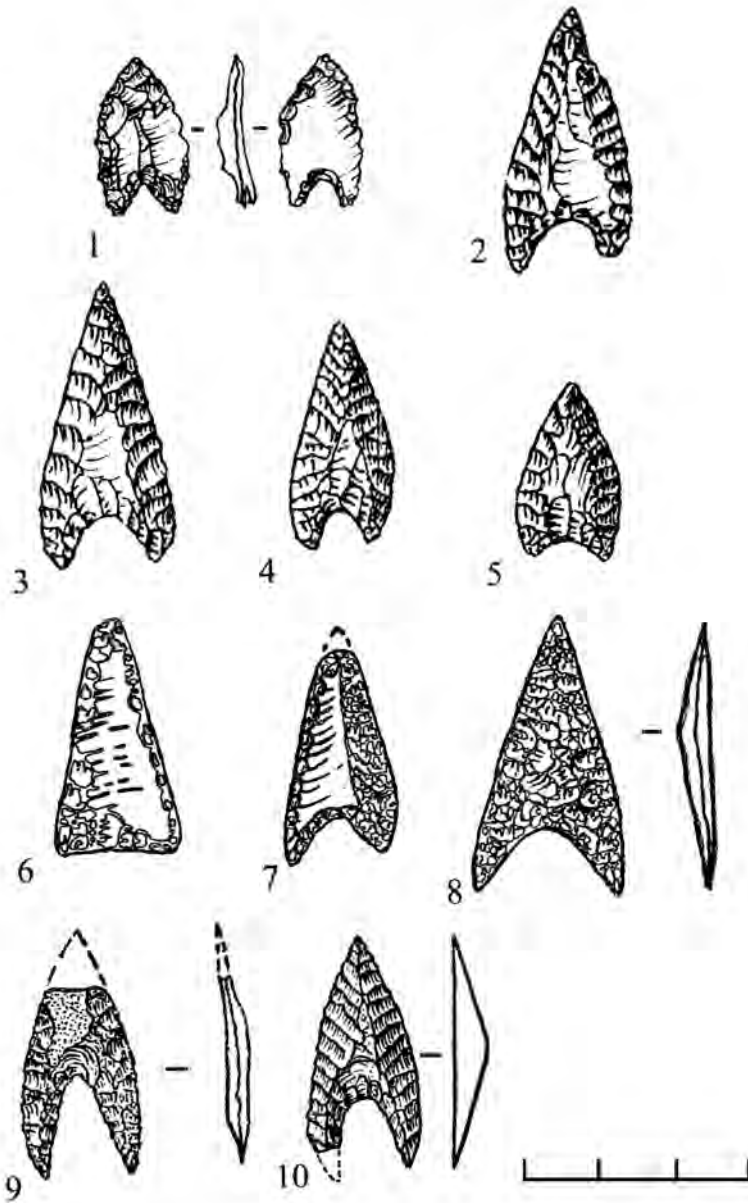


Fig. 18. Early Catacomb culture arrowheads. 1 – Mine No 22, Barrow 2, Grave 17 (Dnipropetrovsk Region) [828], Type A-I-1; 2-5 – Akkermen I Barrow 6, Grave 3 (Zaporizhyya Region) [1239], 2-4 – Type A-II-2, 5 – Type A-II-1; 6 – Akkermen I Barrow 9, Grave 6 [1240], Type B-II-2; 7 – Novochoornomorya Barrow 4, Grave 17 (Kherson Region) [999], Type A-I-1; 8 – Vynohradnyky Barrow 1, Grave 8 (Donetsk Region) [922], Type A-I-1; 9 – Blahovka Barrow 1, Grave 9 (Luhansk Region) [1069], Type A-II-2; 10 – Blahovka Barrow 1, Grave 7 [1068], Type A-II-2

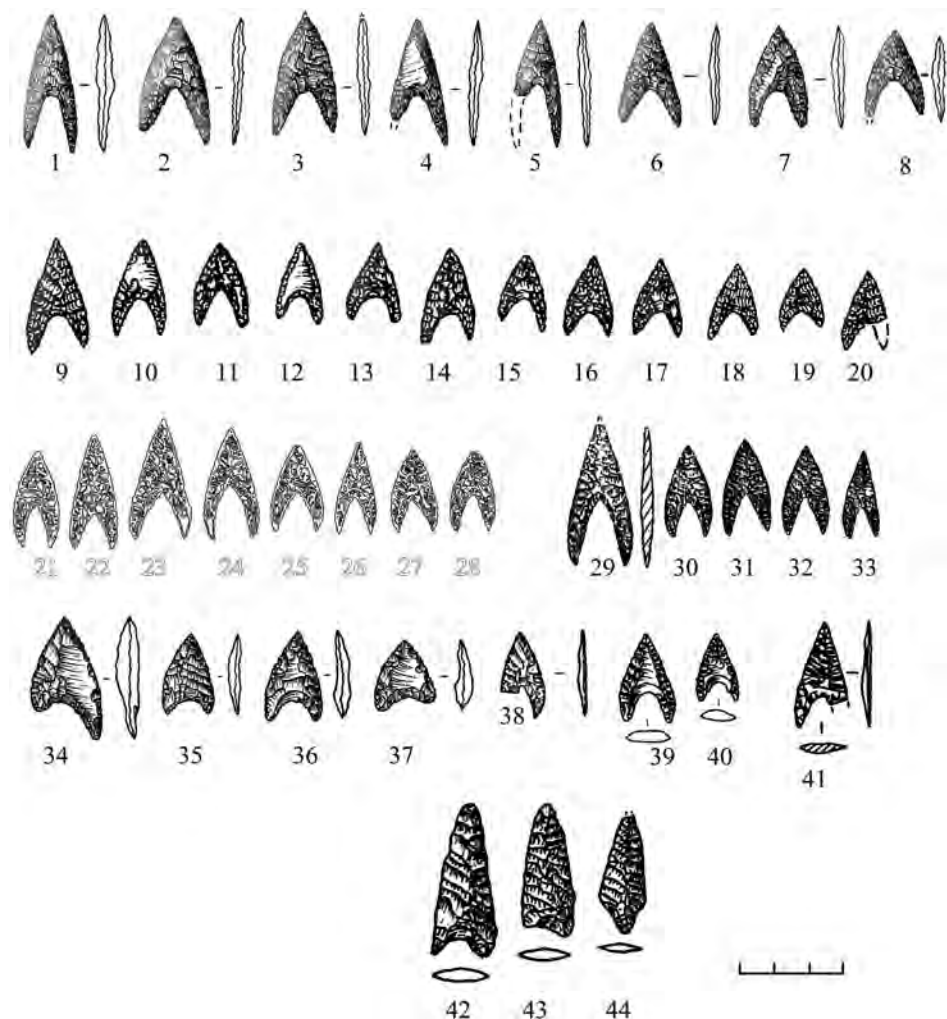


Fig. 19. Arrowheads from burials of the Donets Catacomb culture. 1-8 – Yizhevka Barrow 1, Grave 8 (Donetsk Region) [905], Type A-I-2; 9-20 – Zholobok Barrow 3, Grave 6 [1134], Type A-I-2; 21-28 – Zymohirya Barrow 1, Grave 3 (Luhansk Region)[1138], Type A-I-2; 29-33 – Mykolayivka Barrow 2, Grave 2 (Donetsk Region) [924], Type A-I-2; 34-37 – Mohyliov Barrow 1, Grave 14 (Dnipropetrovsk Region) [830], Type A-II-1; 38 – Novomykolayivka II Barrow 2, Grave 1 (Donetsk Region) [926], Type A-I-2; 39-40 – Voitove III Barrow 4, Grave 10 (Luhansk Region) [1132], Type A-II-2; 41 – Vyla Barrow 1, Grave 12 (Kharkiv Region) [961], Type A-I-2; 42-44 – Novomykilske Barrow 1, Grave 5 [1100] (Luhansk Region), 40-41 – Type A-I-1, 42 – Type C-II

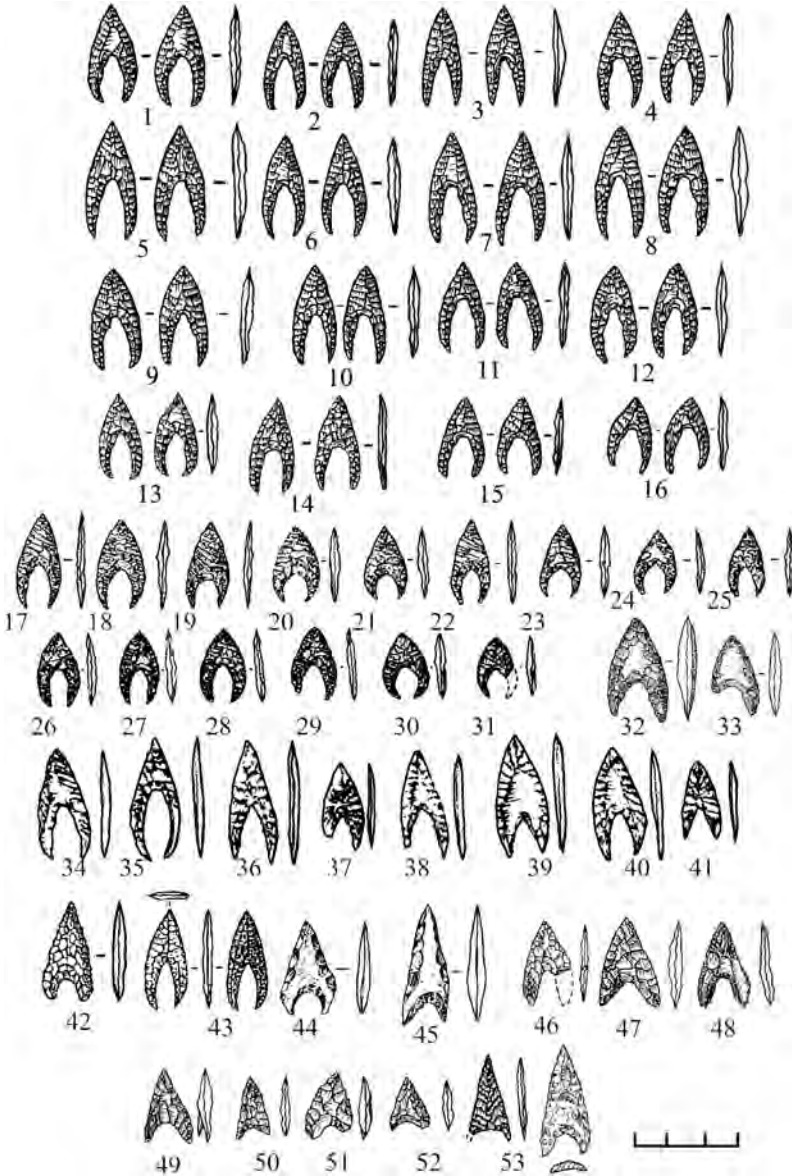


Fig. 20. Arrowheads of the Ingul Catacomb culture. 1-16 – Kominternove Barrow 4, Grave 4 (Donetsk Region) [916]; 17-25 – Davydivka Barrow 1, Grave 17 (Zaporizhya Region) [1253]; 26-31 – Novodmytrivka Barrow 1, Grave 5 (Dnipropetrovsk Region) [1001]; 32-33 – Shelyuhy Barrow 11, Grave 2 (Zaporizhya Region) [1288]; 34-41 – Orikhiv Barrow 1, Grave 28 (Dnipropetrovsk Region) [1280]; 42 – Kuzmin Barrow 1, Grave 5 (Moldova) [1145]; 43 – Pervomayivka III Barrow 3, Grave 6 [1014]; 44-45 – Podokalynivka Barrow 1, Grave 7 (Kherson Region) [1016]; 46-50 – Zvenyhorodka X Barrow 9, Grave 3 [1063]; 51-52 – Holovkivka V Barrow 24, Grave 2 (Kirovohrad Region) [1048]; 53 – Borysivka Barrow 1, Grave 18 (Zaporizhya Region) [1252]. 1-41, 43 – Type A-II-3, 42, 44, 46-49, 53 – Type A-II-2, 45, 51-52 – Type A-I-1

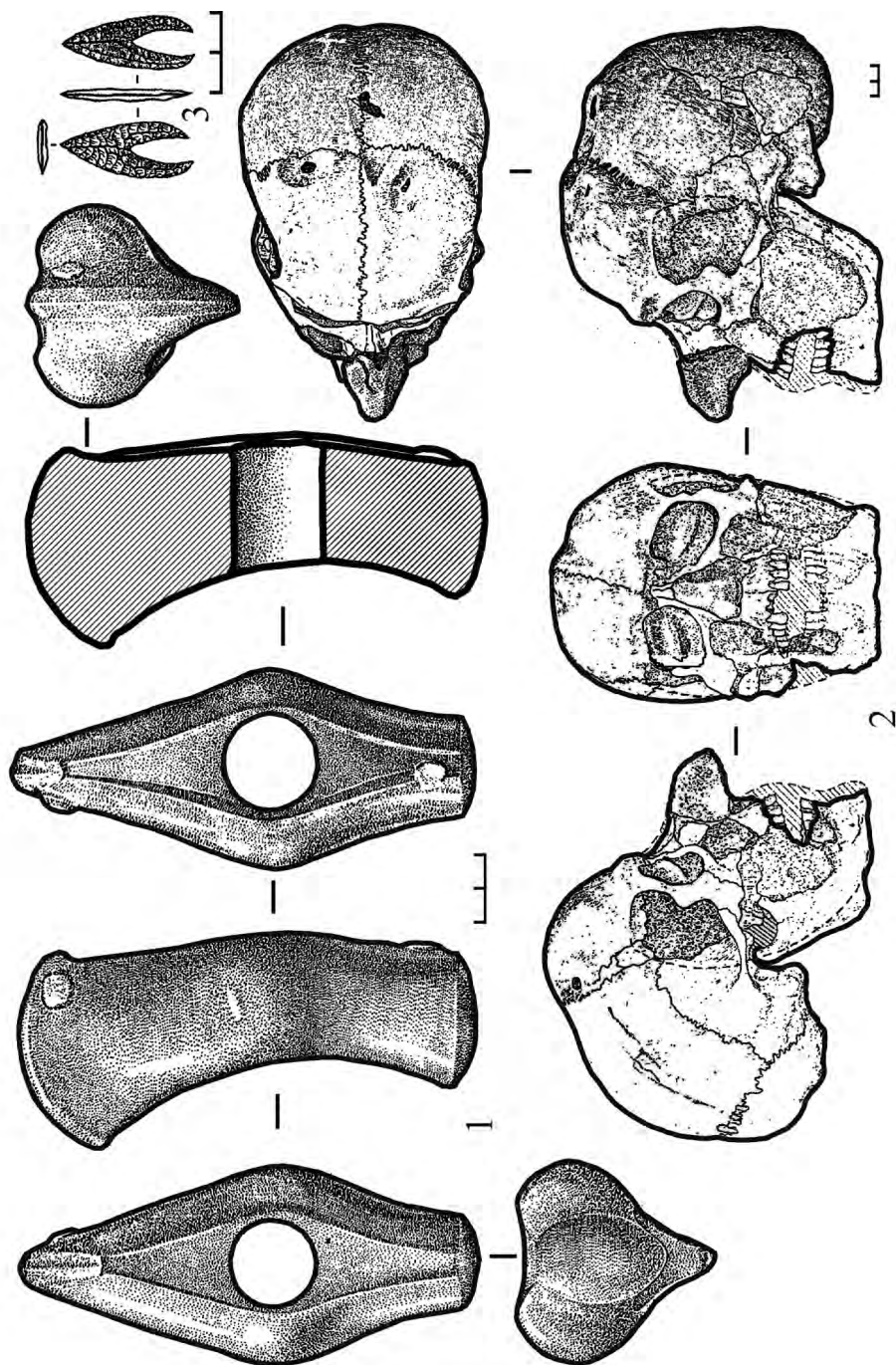


Fig. 21. Pervomayivka III Barrow 3, Grave 6 (Kherson Region) [1014], Ingul Catacomb culture Barrow. 1 – stone axe-hammer, 2 – skull with a plaster mask, 3 – arrowhead

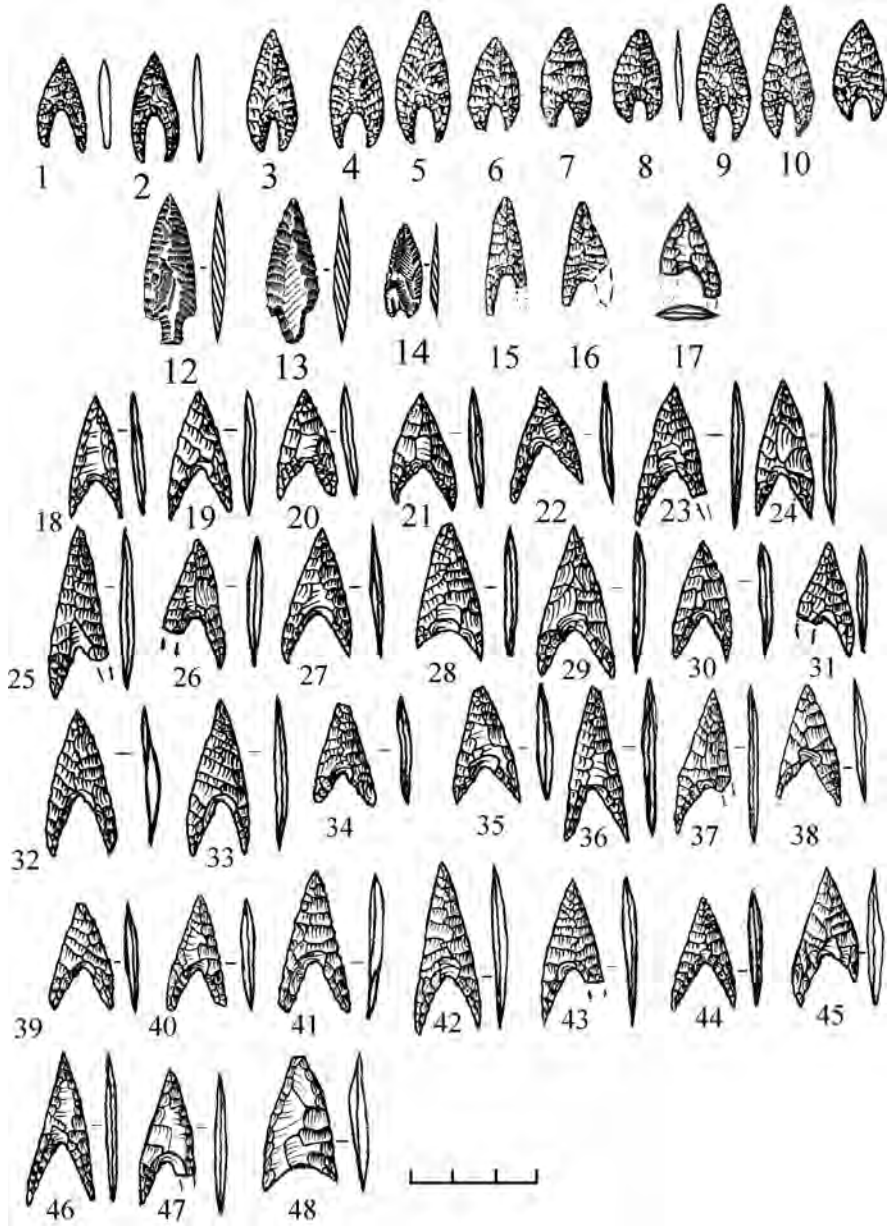


Fig. 22. Late Catacomb culture arrowheads. 1-2 – Hovorukha Barrow 1, Grave 3 [1074], Type A-II-3; 3-11 – Oleksandrivsk Barrow 1, Grave 49 (Luhansk Region) [1104], Type A-II-2; 12-14 – Ordzhonikidze Mine No 22 Barrow 3, Grave 3 (Dnipropetrovsk Region) [829], Type C-II-1, C-II-2, A-II-2; 15-16 – Shelayevo Barrow 1, Grave 1 (Voronezh Region, Russia) [1237], Type A-II-2; 17 – Artemivsk Barrow 4, Grave 1 (Donetsk Region) [901], Type A-II-3; 18-47 – Artemivsk Barrow 2, Grave 3 [900], Type A-I-1 (48 – a blank). 1-11 – Manych-type burials, 12-48 – Bakhmut-type burials

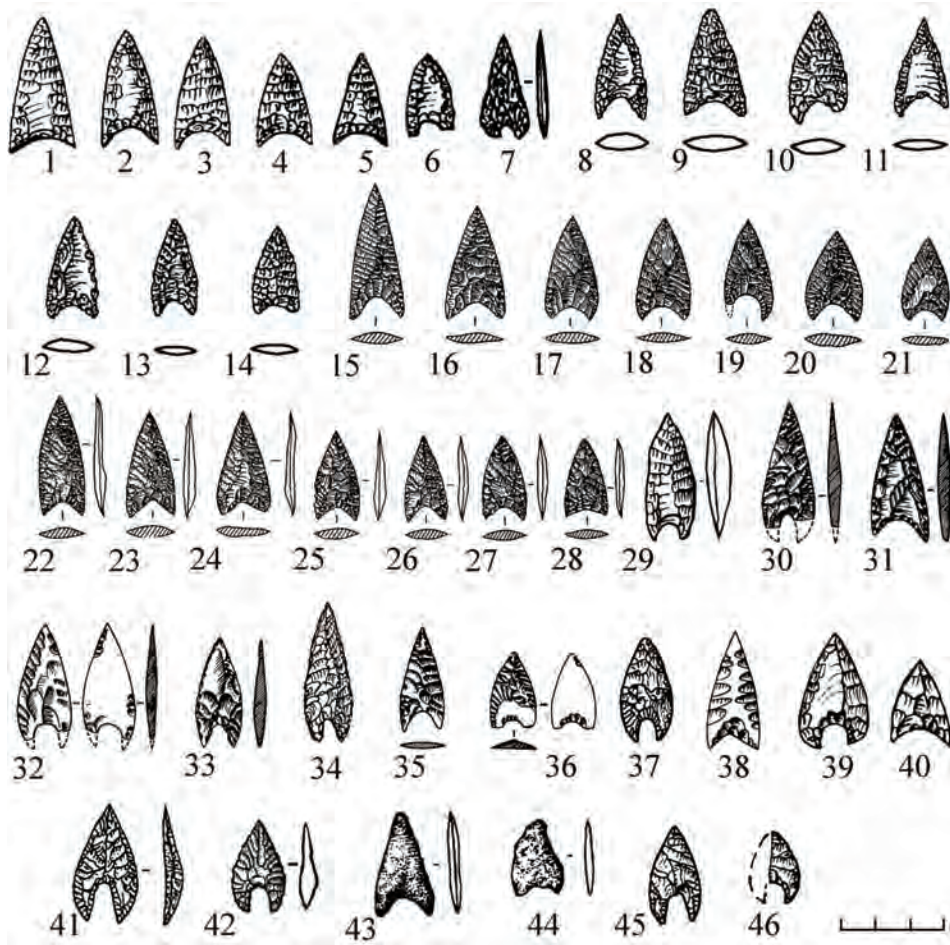


Fig. 23. Type a arrowheads from Babyno culture burials. 1-6 – Knyazeve Barrow 1, Grave 5 [1411]; 7 – Yegorivka I Barrow 1, Grave 1 (Kharkiv Region) [1414]; 8-14 – Kut Barrow 8, Grave 6 (Dnipropetrovsk Region) [1346]; 15-21 – Beyeva Mohyla Barrow 1, Grave 3 [1376]; 22-28 – Mykolayivka Barrow 1, Grave 8 (Donetsk Region) [1384]; 29 – Novopidkryazh IV Barrow 1, Grave 5 (Dnipropetrovsk Region) [1352]; 30 – Kerchik Barrow 17, Grave 9 (Rostov Region, Russia) [1485]; 31 – Novi Raskayetsi Barrow 1, Grave 15 (Moldova) [1461]; 32 – Molodohvardiysk Barrow 2, Grave 5 (Luhansk Region) [1434]; 33 – Velyka Znamyanka Barrow 15, Grave 70 (Zaporizhya Region) [1517]; 34 – Chkalove I Barrow 3, Grave 17 [1332]; 35 – Pryadivka VI Barrow 1, Grave 1 (Dnipropetrovsk Region) [1361]; 36 – Nyzhnia Baranykivka Barrow 5, Grave 10 (Luhansk Region) [1438]; 37 – Mykolayivka (soil) (Donetsk Region) [1387]; 38-40 – Blyzniuky Barrow 1, Grave 1 (Dnipropetrovsk Region) [1330]; 41 – Braharnya (the Khorlytsia island) [1498]; 42 – Aktove Barrow 2, Grave 2 (Mykolayiv Region) [1464]; 43-44 – Nikolske Barrow 8, Grave 19 (Moldova) [1460]; 45-46 – Tekstilshchik Barrow 2, Grave 5 (Donetsk) [1379]. 1-6, 9, 14, 15-16, 27-28, 38, 40, 43-44 – Type A-I-1; 8, 10-13, 17-26 – Type A-II-1; 7, 29-30, 32-35, 37, 39, 41-42, 45-46 – Type A-II-2

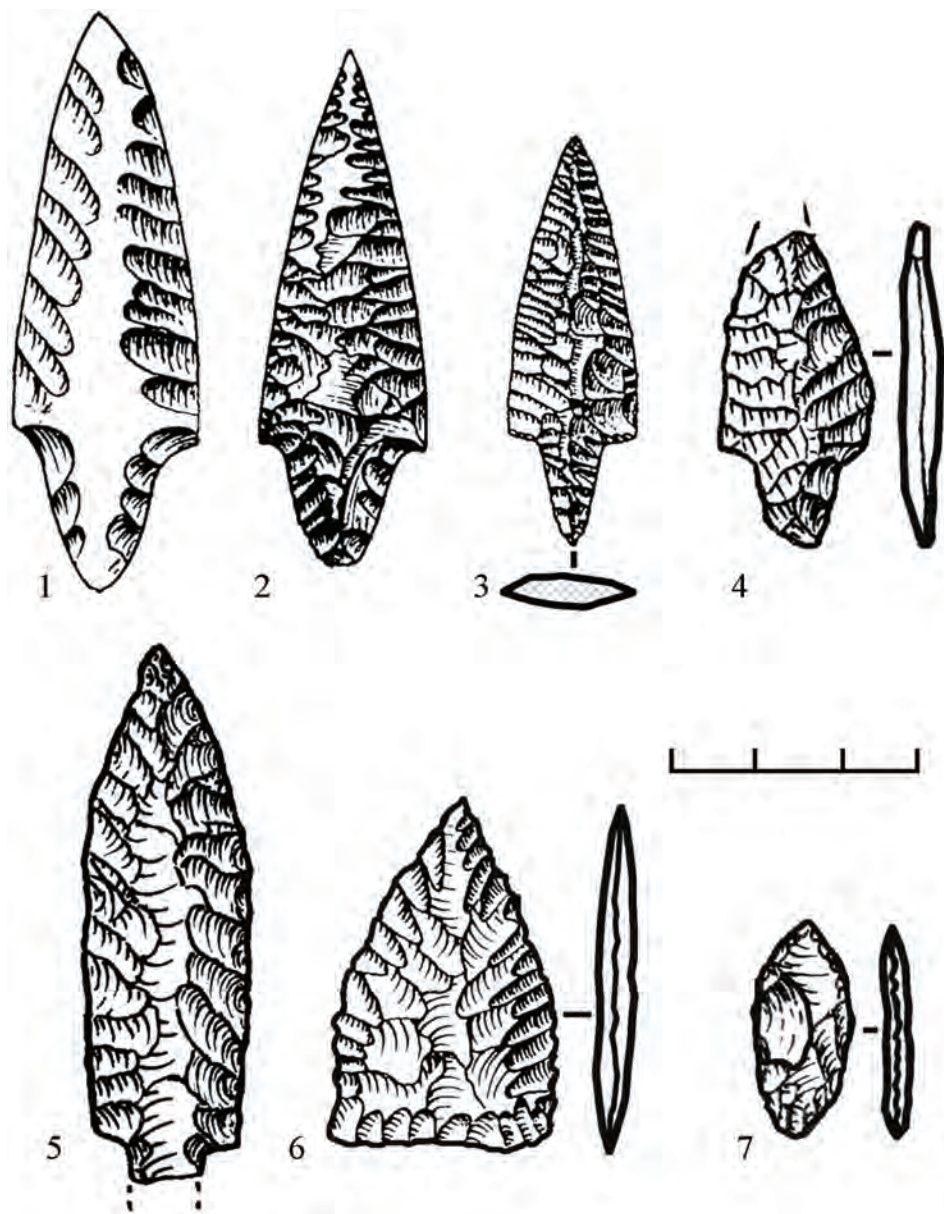


Fig. 24. Arrowheads of Types B and C from Babyno culture burials. 1 – Blyzniuky Barrow 1, Grave 1 (Dnipropetrovsk Region) [1330]; 2 – Kalynivka Barrow 1, Grave 4 (Kherson Region) [1416]; 3 – Popiv Yar Barrow 6, Grave 3 [1394]; 4 – Vysoke Barrow 1, Grave 1 (Donetsk Region) [1403]; 5 – Rostov-on-Don West Barrow 5, Grave 3 [1488]; 6 – Novoandriyivka Barrow 4, Grave 1 (Donetsk Region) [1388]; 7 – Yasyriev I Barrow 8, Grave 9 (Rostov Region, Russia) [1490]

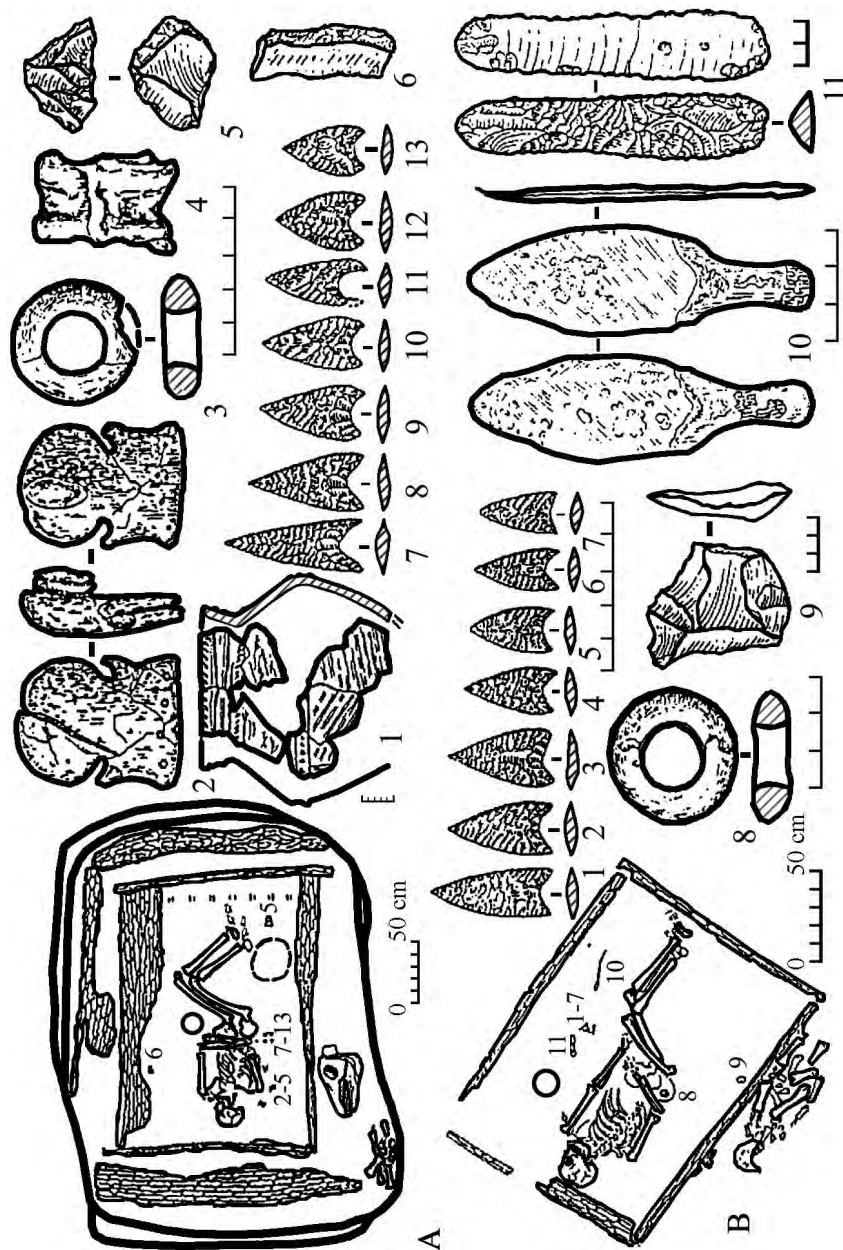


Fig. 25. A – Beyeva Mohyla Barrow 3, Grave 1 (Donetsk Region) [1376]. 1 – vessel, 2-3 – bone buckles, 4 – astragal, 5 – scrapper, 6 – knife on a ribbed flake, 7-13 – arrowheads; B – Mykolayivka Barrow 8, Grave 1 (Donetsk Region) [1384]. 1-7 – arrowheads, 8 – bone buckle, 9 – flake with traces of modification, 10 – bronze knife, 11 – knife-raclor on a ribbed flake

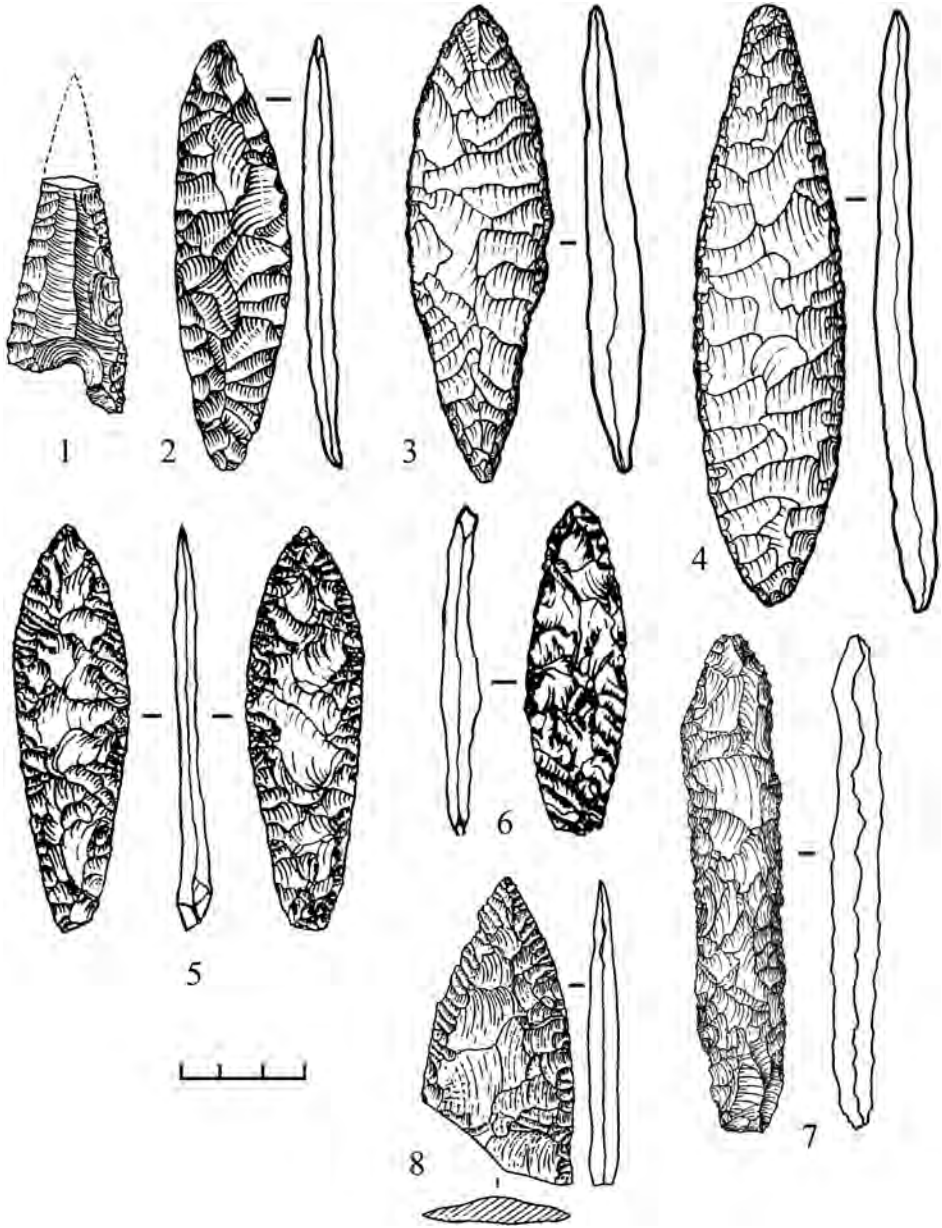


Fig. 26. Large bifaces from Yamnaya culture supine burials. 1 – Kamyanka Barrow 16, Grave 26 (Mykolayiv Region) [463]; 2 – Nikolske Barrow 7, Grave 28 (Moldova) [418]; 3 – Pereshchepyne Barrow 1, Grave 7 [177]; 4 – Mykolayivka I Barrow 3, Grave 7 (Dnipropetrovsk Region) [156]; 5 – Oktyabrskoe Barrow 3, Grave 3 [260]; 6 – Oktyabrskoe Barrow 1, Grave 3 [258]; 7 – Mariupol, Zintseva Balka Barrow 2, Grave 17 [252]; 8 – Mykolayivka Barrow 1, Grave 15 (Donetsk Region) [253]. 1 – Type A, 2-7 – Type C-I, 8 – fragment

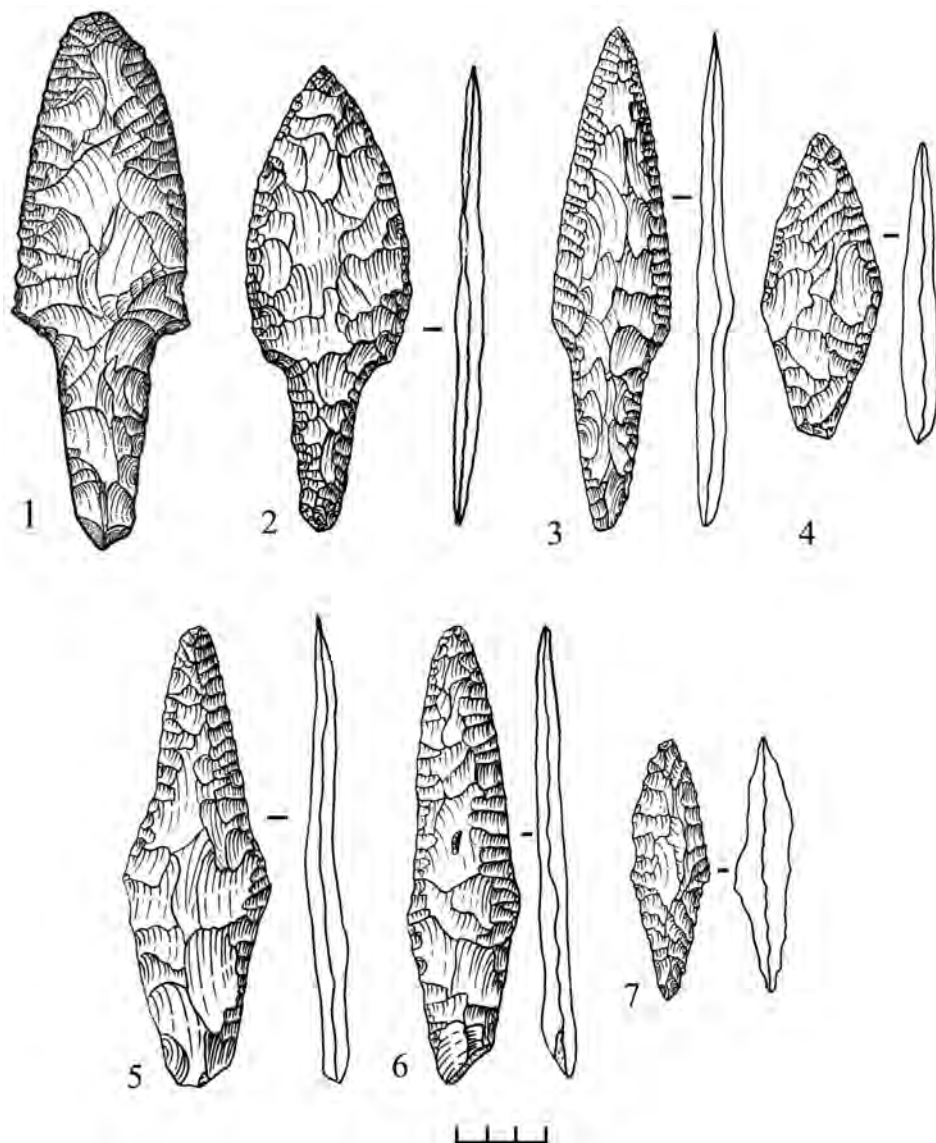


Fig. 27. Large bifaces from Yamnaya culture supine burials. 1 – Omelyanivka 1.20 (the Crimea) [41]; 2 – Novooleksiyivka 1.6 (Donetsk Region) [254]; 3 – Kayiry II, 2.2 (Kherson Region) [299]; 4 – Didova Mohyla 1.16 [113]; 5 – Kryvyi Rig 1 3.2 [134]; 6 – Khashcheve 6.13 [120]; 7 – Voikove 1 1.13 (Dnipropetrovsk Region) [234]. 1-3 – Type C-II, 4-7 – Type C-III

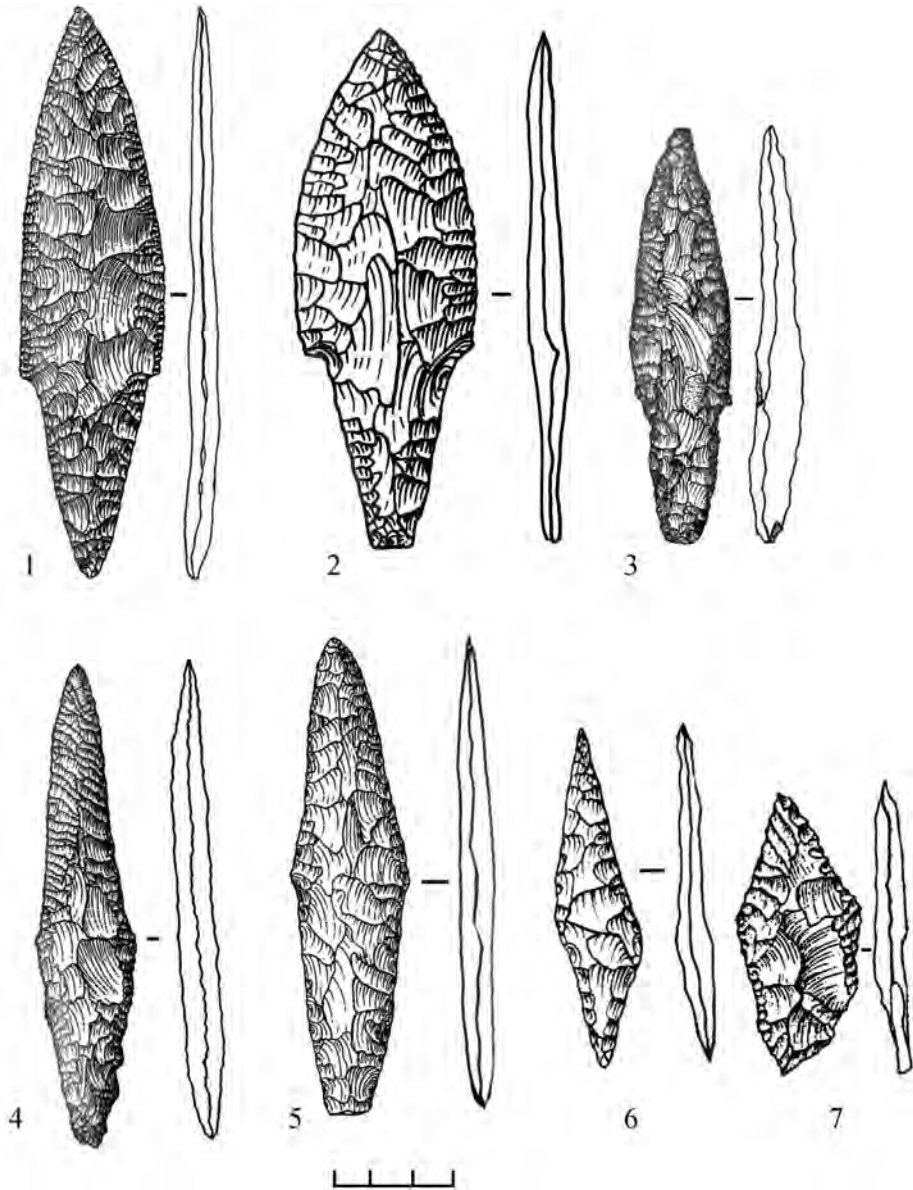


Fig. 28. Large bifaces from Yamnaya culture contracted burials. 1 – Antonivka Barrow 5, Grave 7 (Mykolayiv Region) [448]; 2 – Brylivka Barrow 16, Grave 20 (Kherson Region) [287]; 3 – Yuriyivka Barrow 3, Grave 8 (Zaporizhya Region) [703]; 4 – Pereshchepyne Barrow 4, Grave 13 (Dnipropetrovsk Region) [178]; 5 – Barativka Barrow 2, Grave 20 (Mykolayiv Region) [451]; 6 – Zvonetske II Barrow 15, Grave 8 (Dnipropetrovsk Region) [240]; 7 – Buzkiy Barrow 4, Grave 18 (Mykolayiv Region) [457]. 1-3 – Type C-II, 4-7 – Type C-III

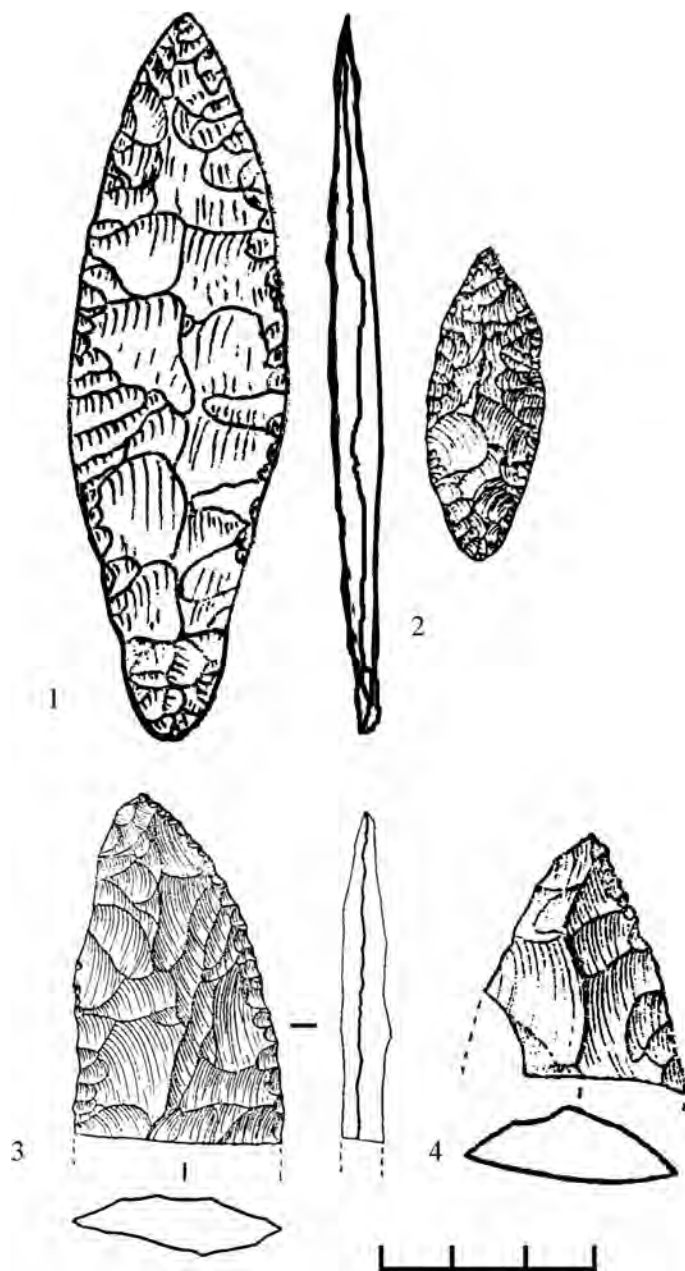


Fig. 29. Large bifaces from Yamnaya culture contracted burials. 1 – Tankove Barrow 9, Grave 26 (the Crimea) [67]; 2 – Sofiyivka Barrow 1, Grave 9 [506]; 3 – Starogorozheno Barrow 3, Grave 13 [512]; 4 – Nova Odessa IV Barrow 2, Grave 6 (Mykolayiv Region) [479]. 1-2 – Type C-I, 3-4 – fragments of bones of buried individuals

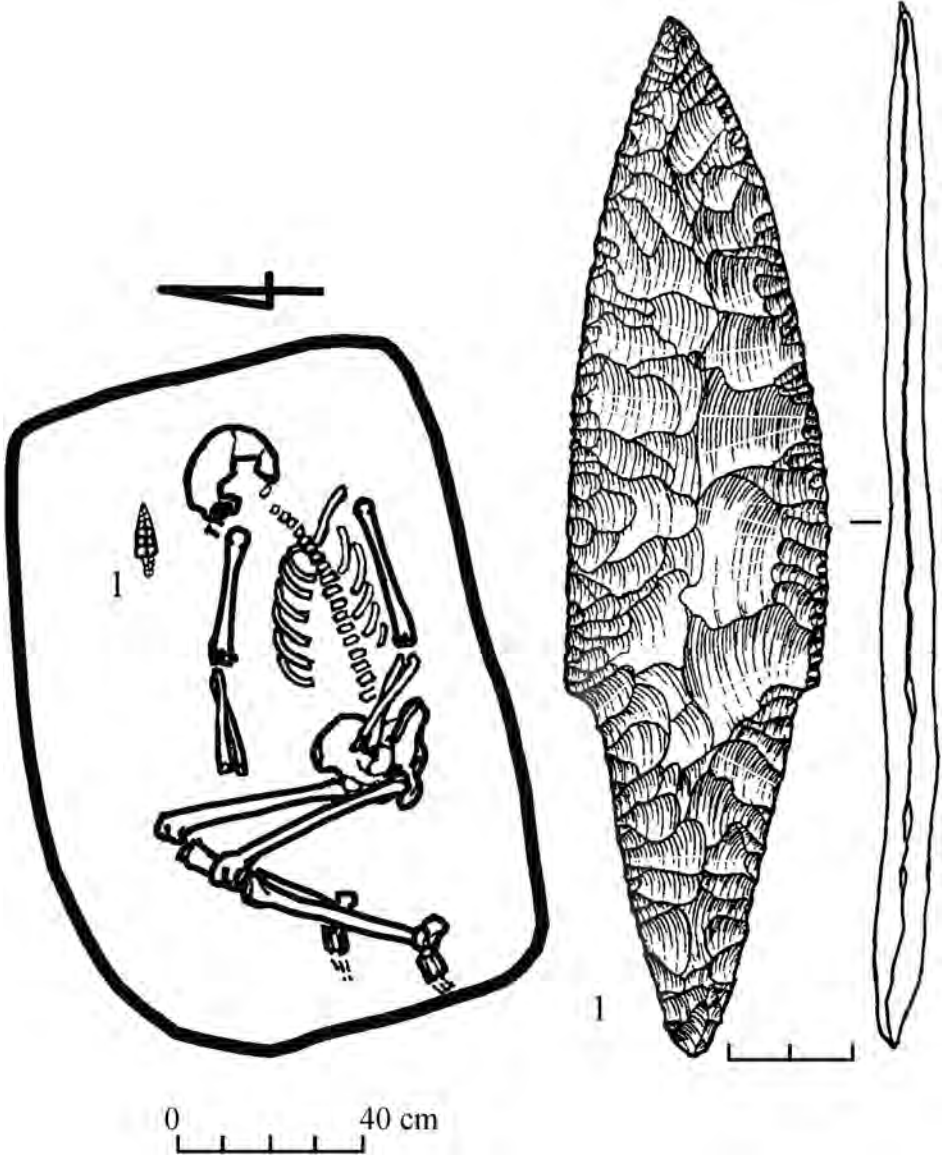


Fig. 30. Antonivka Barrow 5, Grave 7 (Mykolayiv Region) [448], Yamnaya culture. 1 – dart-head

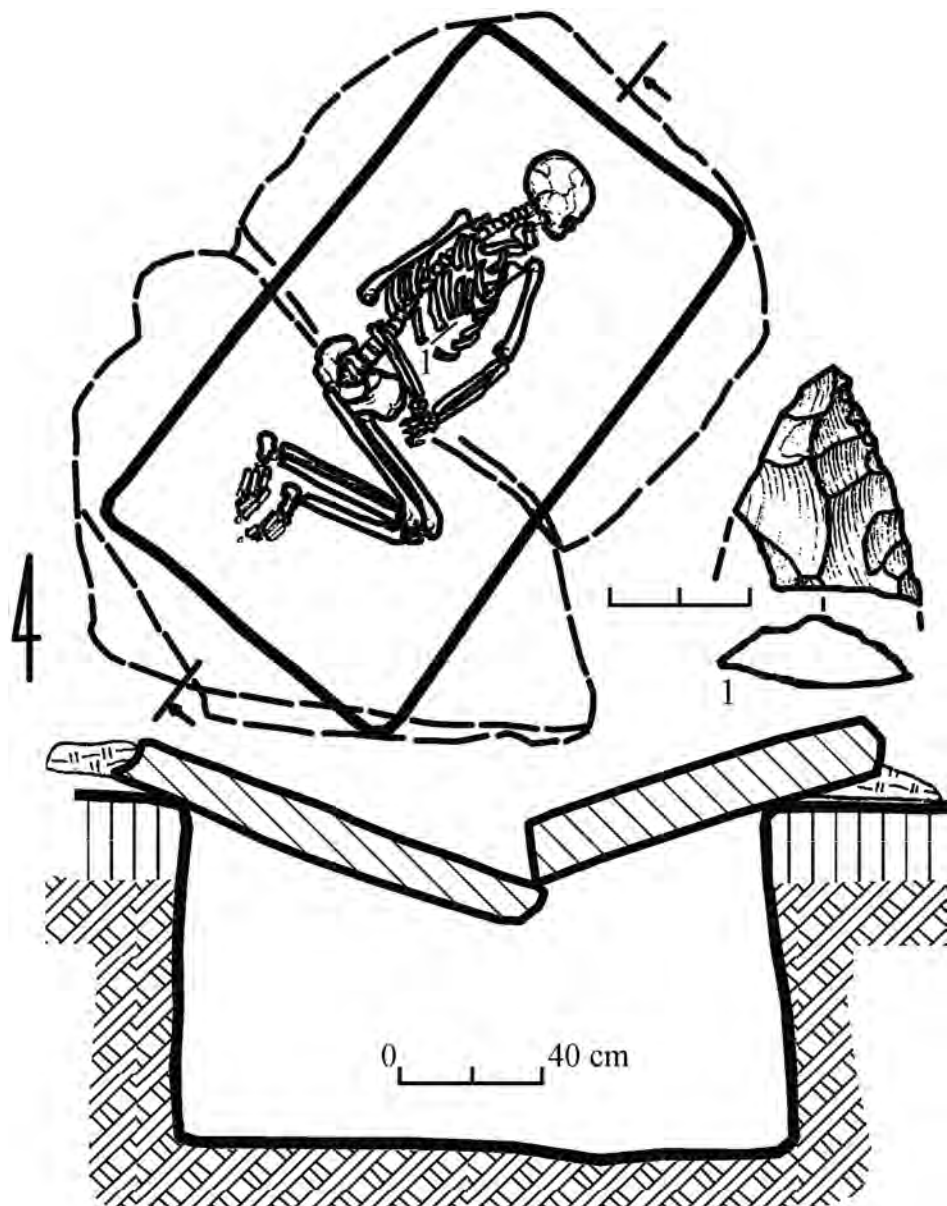


Fig. 31. Nova Odessa IV Barrow 2, Grave 6 (Mykolayiv Region) [479], Yamnaya culture.
1 – fragment of a biface

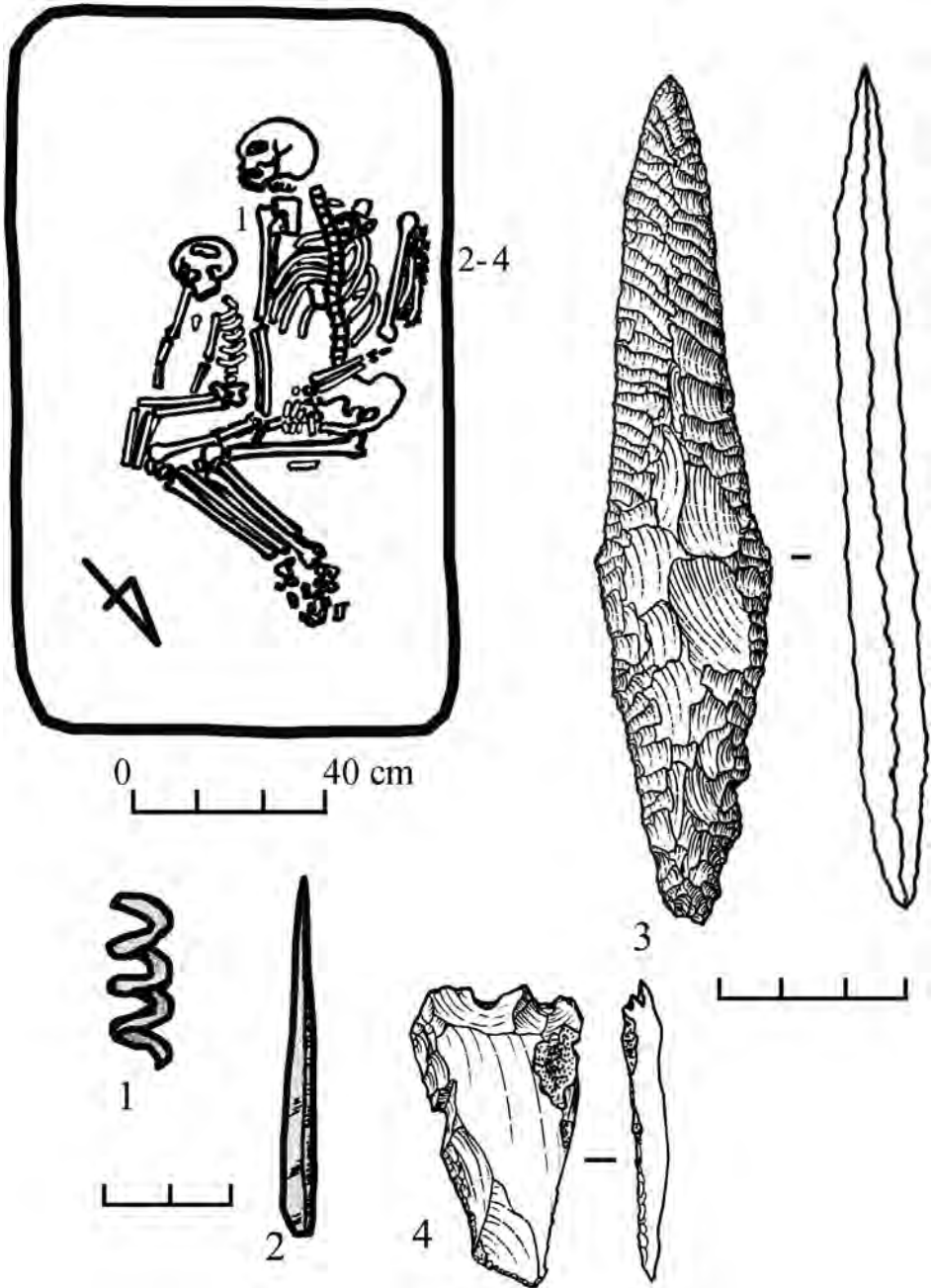


Fig. 32. Pereshchepyne Barrow 4, Grave 13 (Dnipropetrovsk Region) [178], Yamnaya culture. 1 – silver spiral, 2 – metal 'awl', 3 – knife-dagger, 4 – flake with shaped notches

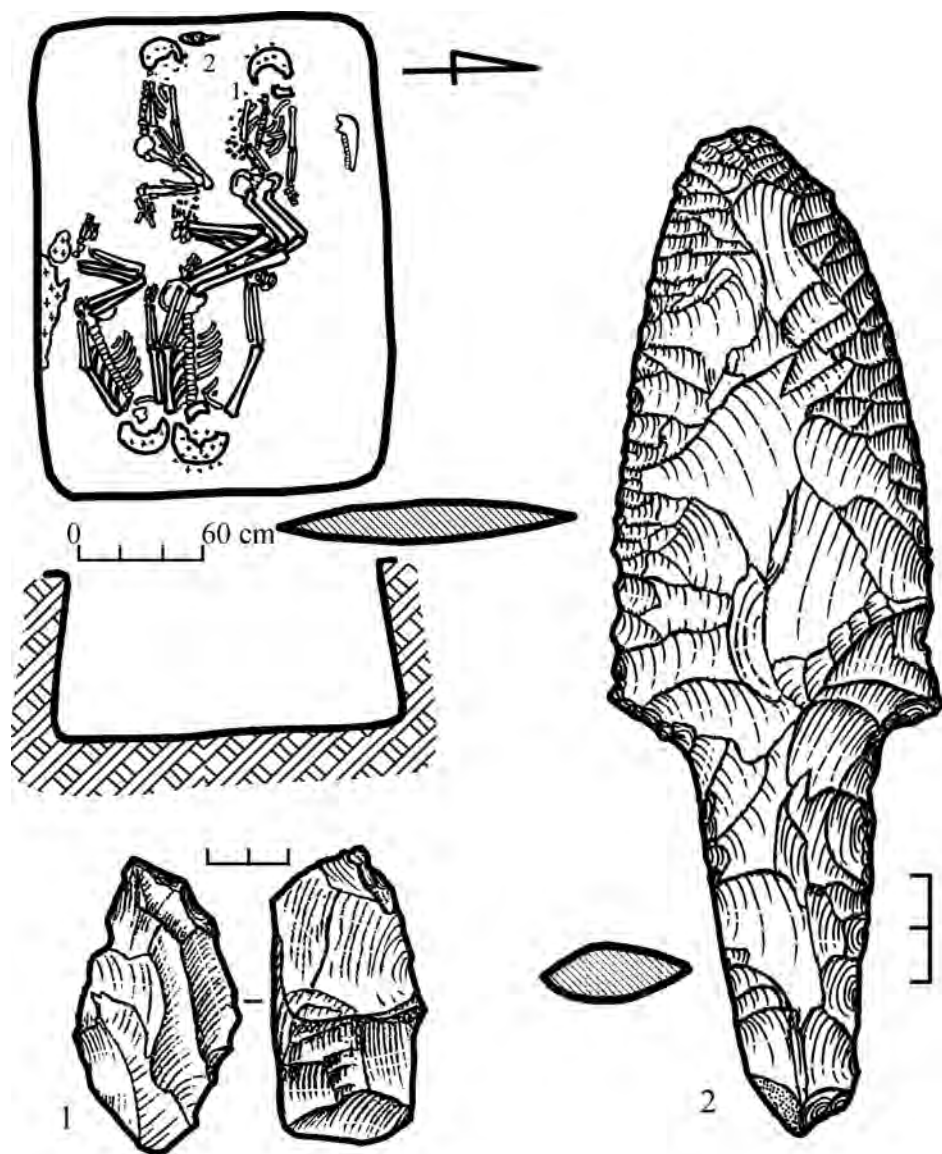


Fig. 33. Omelyanivka Barrow 1, Grave 20 (the Crimea) [41], Yamnaya culture. 1 – flake, 2 – knife-dagger

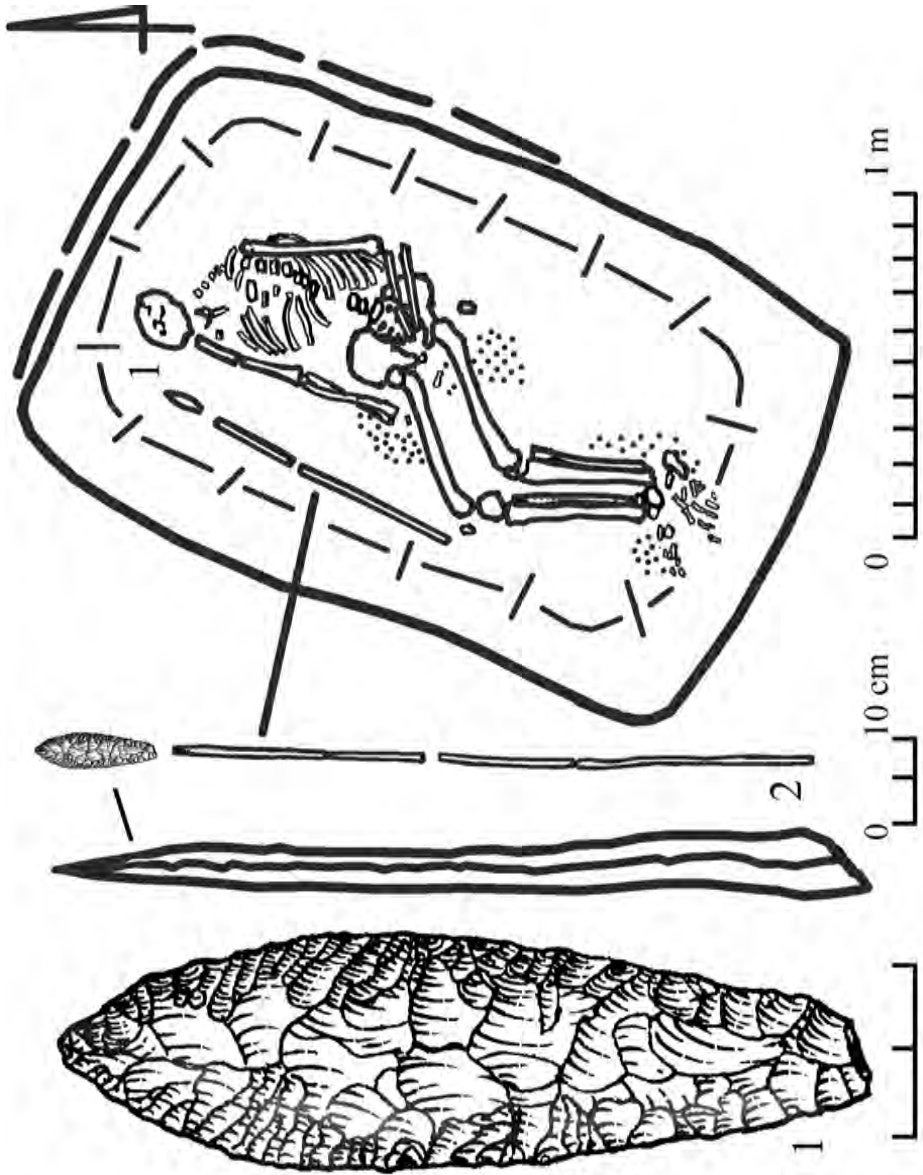


Fig. 34. Oktyabrskoe Barrow 3, Grave 3 (Donetsk Region) [260], Yamnaya culture. 1 – dart-head, 2 – dart with a staff

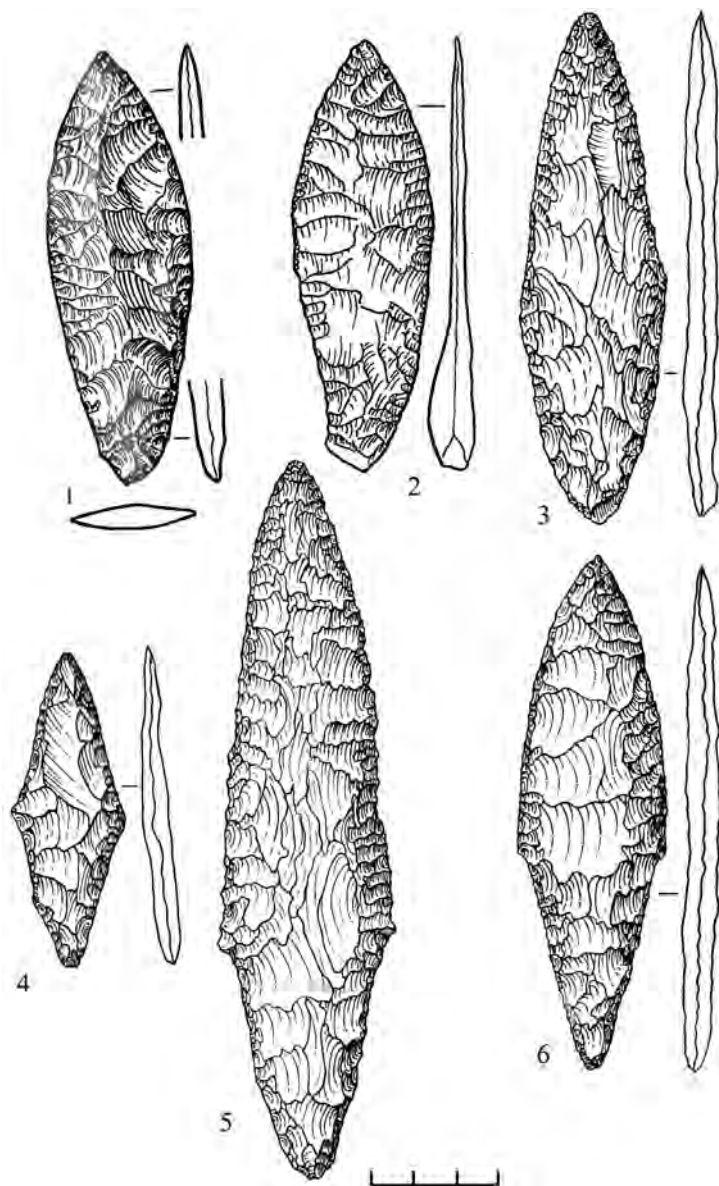


Fig. 35. Large bifaces from Early Catacomb culture burials. 1 – Oleksandrivsk Barrow 9, Grave 25 [1108]; 2 – Tarasivka Barrow 1, Grave 8 [1127]; 3 – Maidan Barrow 1, Grave 1 (Luhansk Region) [1091]; 4 – Propashne Barrow 1 Grave 15 (Dnipropetrovsk Region) [856]; 5 – Akkermen II Barrow 4, Grave 1 (Zaporizhya Region) [1243]; 6 – Novooleksiyivka 2.6 (Donetsk Region) [929]. 1-3, 5-6 – Type C-I, 4 – Type C-III

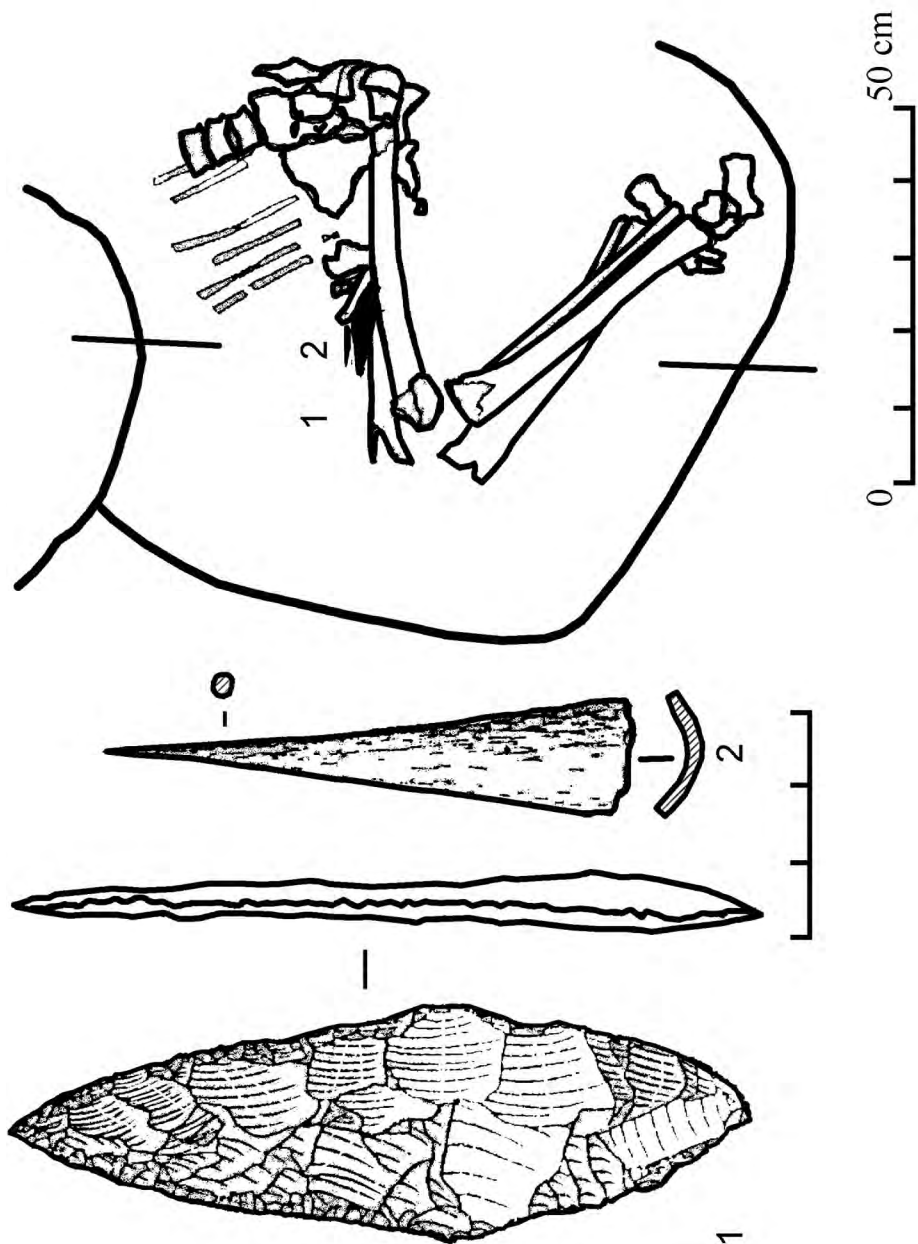


Fig. 36. Stupky Barrow 1, Grave 3 (Donetsk Region) [948], Donets Catacomb culture Barrow.
1 – knife-dagger, 2 – bone point

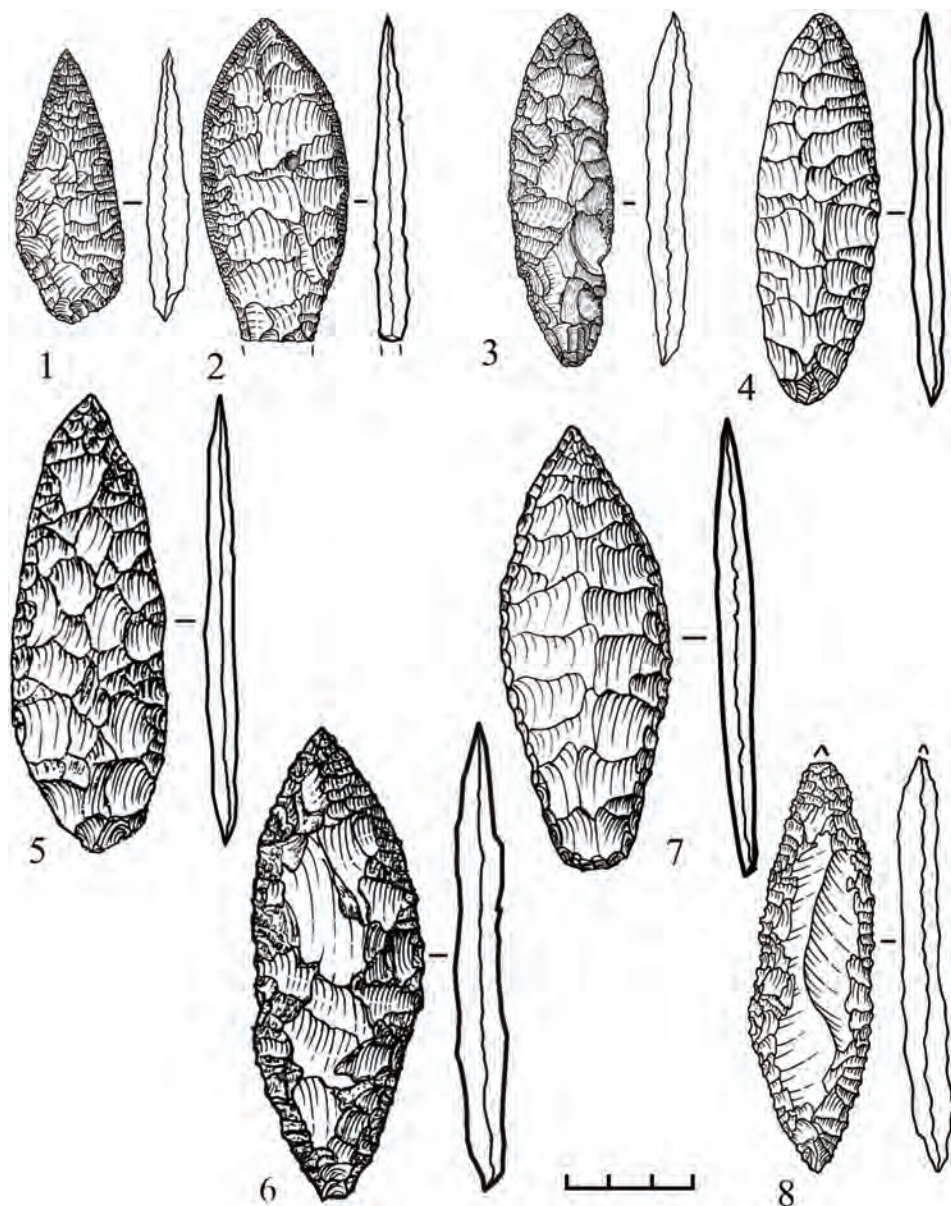


Fig. 37. Large bifaces of the Ingul Catacomb culture. Type C-I. 1-2 – Volodymyrivka Barrow 1, Grave 20 [1301]; 3 – Shelyuhy Barrow 11, Grave 2 (Zaporizhya Region) [1288]; 4 – Dniprodzerzhynsk VI Barrow 1, Grave 4 (Dnipropetrovsk Region) [792]; 5 – Rysove Barrow 5, Grave 39 (the Crimea) [751]; 6 – Chornukhyne Barrow 1, Grave 6 (Luhansk Region) [1071]; 7 – Kovpakivka III Barrow 3, Grave 2 [805]; 8 – Vilnohorsk I Barrow 1, Grave 3 (Dnipropetrovsk Region) [888]

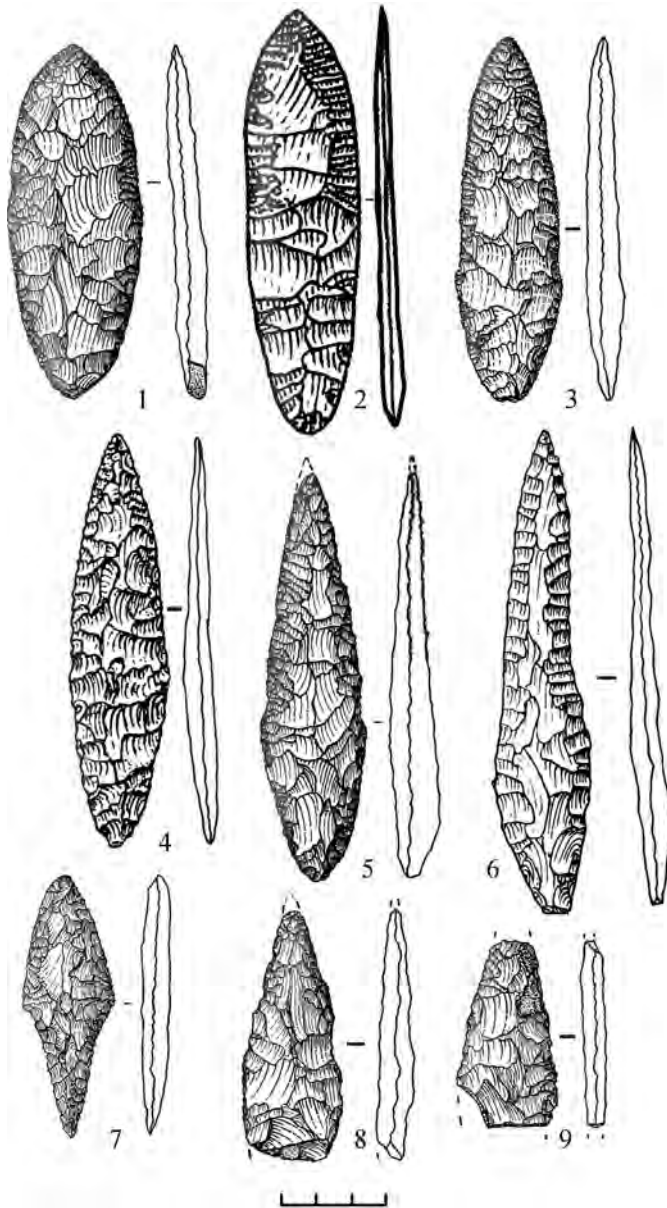


Fig. 38. Large bifaces of the Ingul Catacomb culture. 1 – Radyvonivka Barrow 1, Grave 5 (Zaporizhya Region) [1285]; 2 – Lakedemonivka III Barrow 2, Grave 6 (Rostov Region, Russia) [1236]; 3 – Vovchyi Barrow 4, Grave 28 (Zaporizhya Region) [1307]; 4 – Zamozhne Barrow 4, Grave 7 [1321]; 5 – Volodymyrivka Barrow 1, Grave 18 (Zaporizhya Region) [1300]; 6 – Novoivanivka I Barrow 1, Grave 3 (Dnipropetrovsk Region) [838]; 7 – Shelyuhy Barrow 11, Grave 2 [1288]; 8-9 – Davydivka Barrow 1, Grave 5 (Zaporizhya Region) [1255]. 1-6 – Type C-II, 7 – Type C-III, 8-9 – fragmented

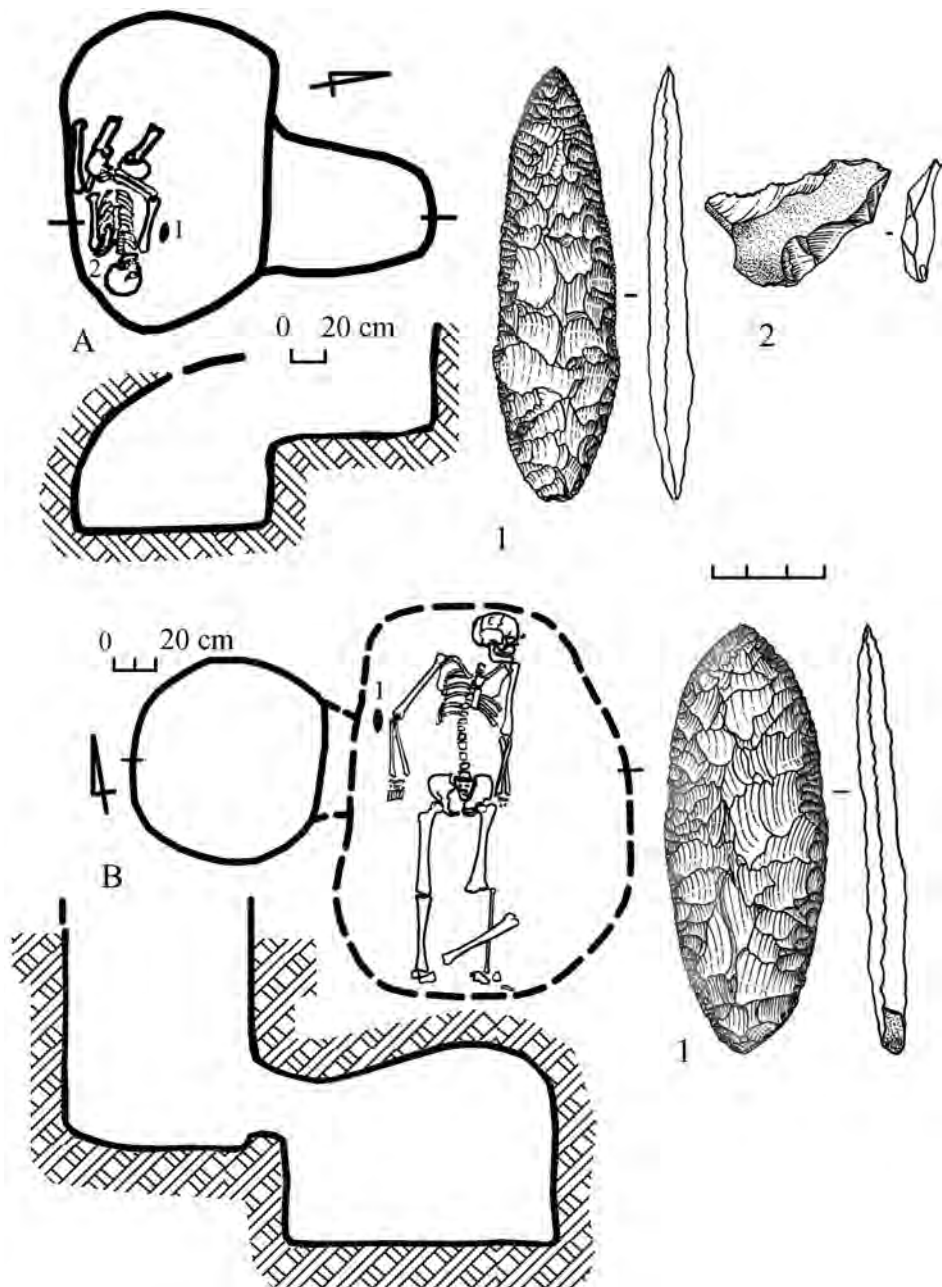


Fig. 39. A: Vovchyi Barrow 4, Grave 28 (Zaporizhya Region) [1307], Ingul Catacomb culture. 1 – dart-head, 2 – flake. B: Radyvonivka Barrow 1, Grave 5 (Zaporizhya Region) [1285], Ingul Catacomb Barrow. 1 – dart-head

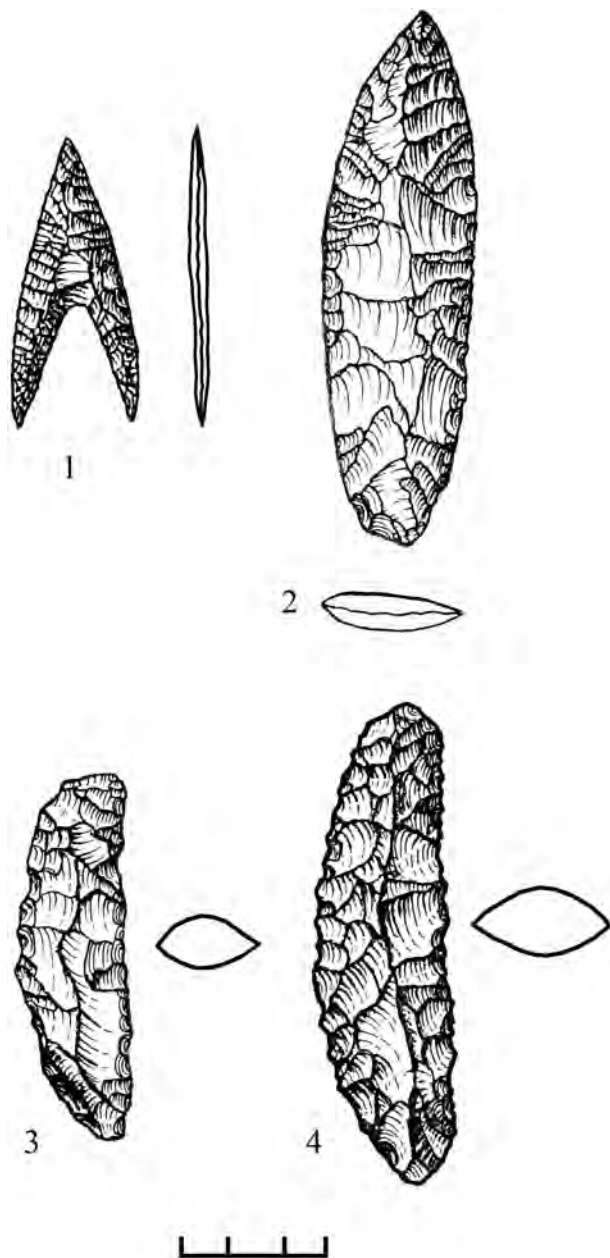


Fig. 40. Large bifaces from Late Catacomb culture burials. 1 – Artemivsk Barrow 2, Grave 3 [900]; 2 – Artemivsk Barrow 4, Grave 1 (Donetsk Region) [901]; 3-4 – Svatove Barrow 8, Grave 1 (Luhansk Region) [1125]. 1 – Type A, 2 – Type C-I, 3-4 – Type C-IV



Fig. 41. Ground axe-adzes from Yamnaya culture burials. 1 – Hryhorivka Barrow 1, Grave 10 [535]; 2 – Purkari Barrow 1, Grave 4 [435]; 3 – Semenivka Barrow 8, Grave 13 [570]; 4 – Kholmske Barrow 5, Grave 14 [542]; 5 – Mayaky Barrow 9, Grave 1 [548]; 6 – Gavanoasa Barrow 9, Grave 2 [392]; 7 – Oleksandrivka Barrow 1, Grave 32 [556]; 8 – Alkaliya Barrow 33, Grave 3 [525]; 9 – Rokshany Barrow 11, Grave 13 [436]; 10 – Nikolske Barrow 11, Grave 7 [414]; 11 – Maidanetske Barrow 1, Grave 5 (1-10 – north-western Northern Pontic Region, 11 – Cherkassy Region) [599]

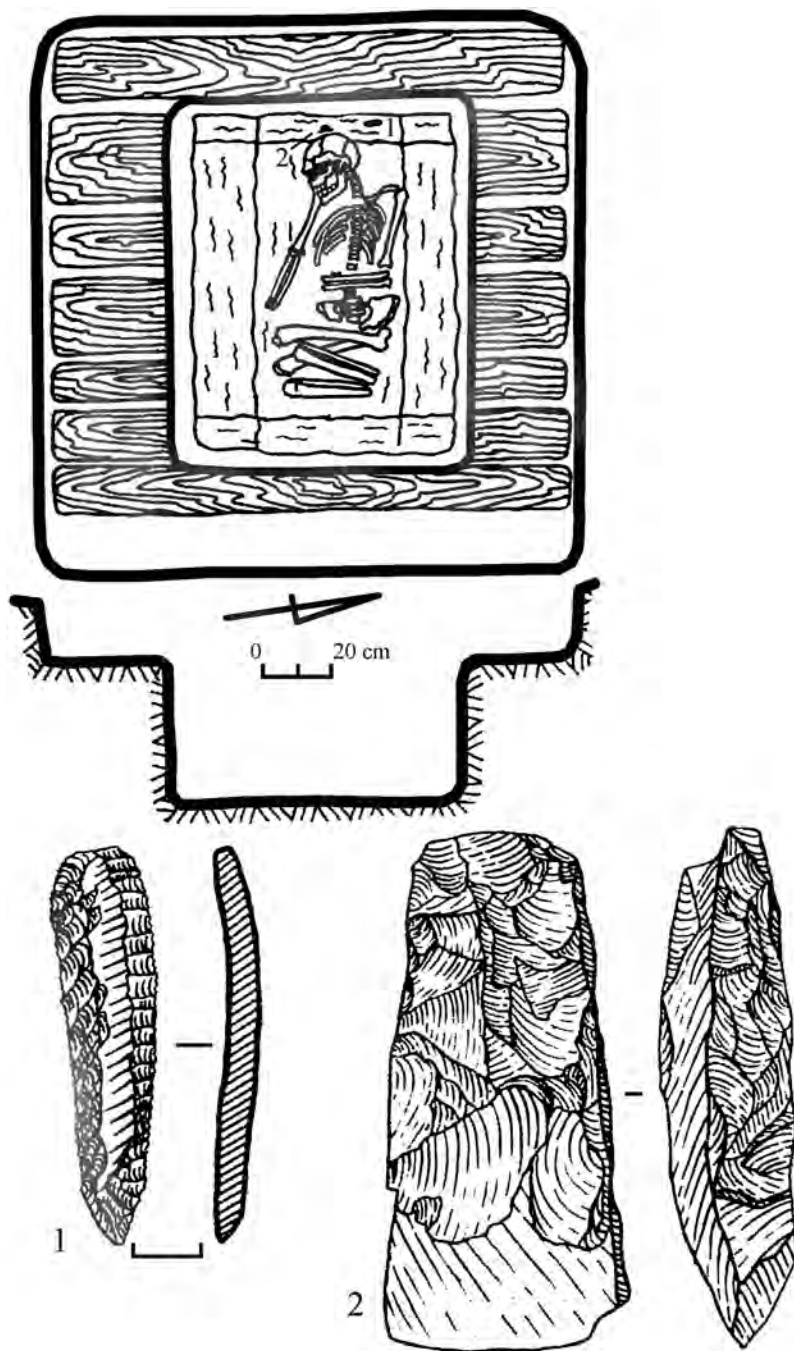


Fig. 42. Nikolske Barrow 11, Grave 7 (Moldova) [414], Yamnaya culture. 1 – knife, 2 – axe-adze

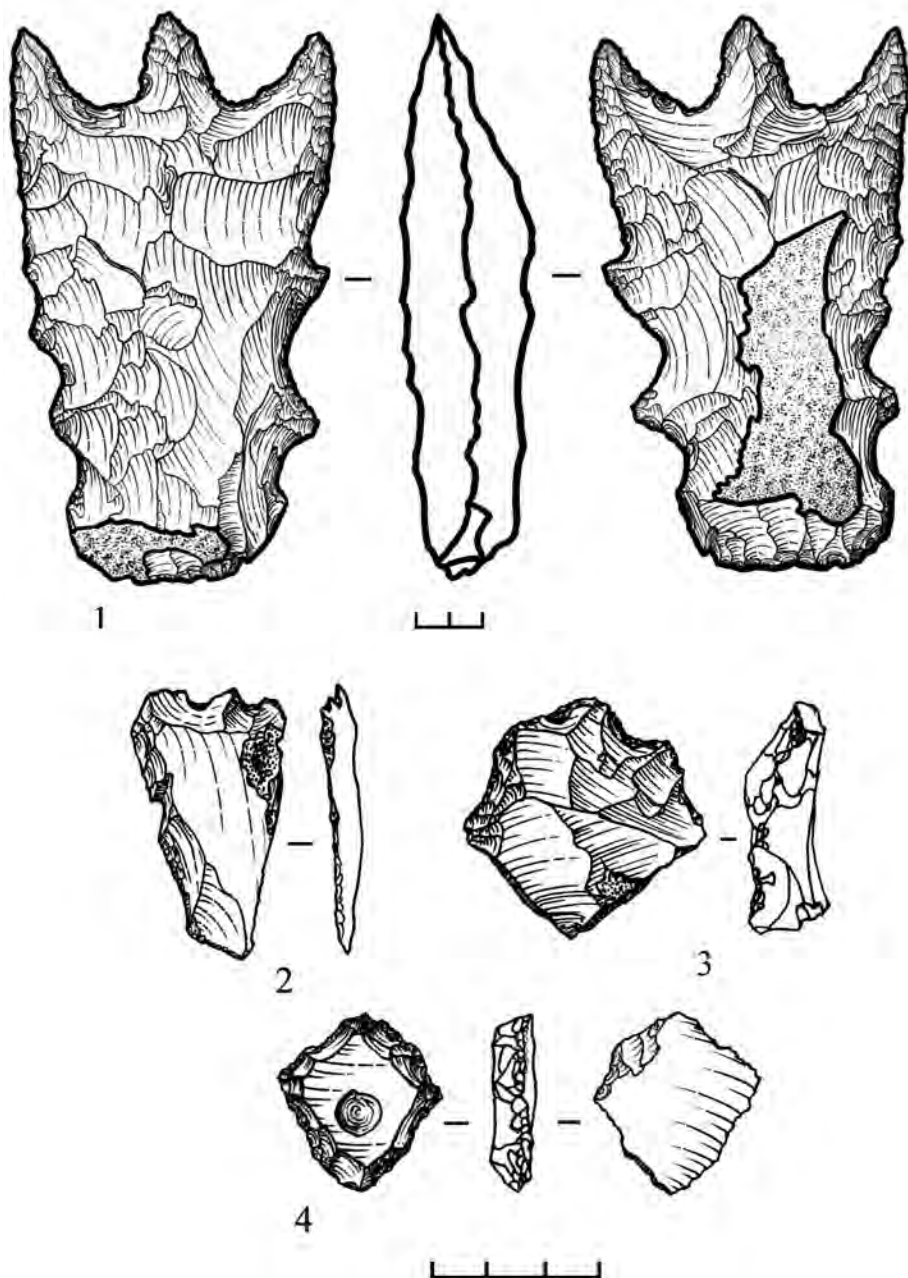


Fig. 43. Miniature sculpture. 1 – Vasylivka Barrow 1, Grave 5 (Kherson Region) [346], Yamnaya Culture; 2 – Pereshchepyne Barrow 4, Grave 13 (Dnipropetrovsk Region) [178], Yamnaya Culture; 3 – Mala Ternivka Barrow 1, Grave 1 (Zaporizhya Region) [637], Yamnaya Culture; 4 – Katerynivka Barrow 31, Grave 6 (Dnipropetrovsk Region) [851], Ingul Catacomb culture

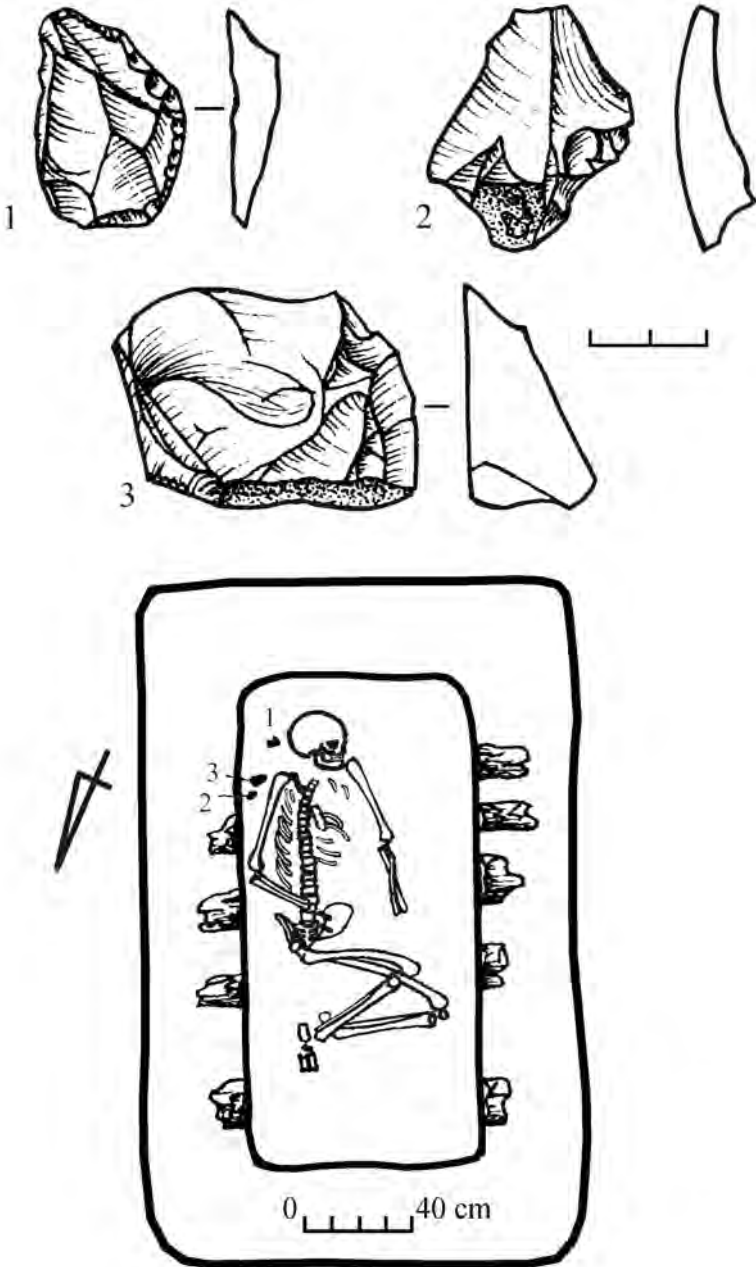


Fig. 44. Vyshneve Barrow 17, Grave 43 (Odessa Region) [580], Yamnaya culture, wood-working 'production kit'. 1 – scraper; 2 – cutting tool; 3 – saw

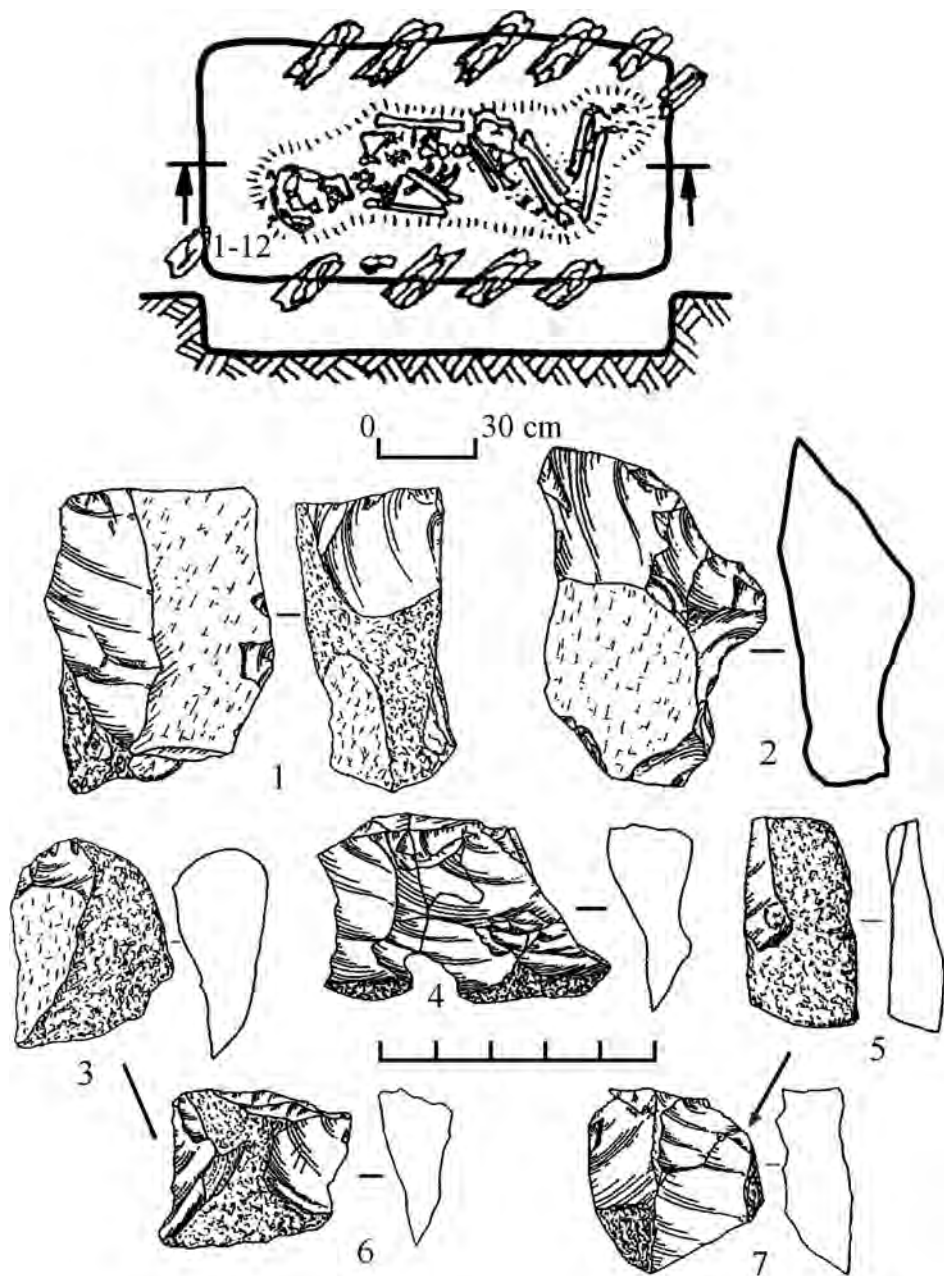


Fig. 45A. Lysychansk (Lysychansk oil refinery) Barrow 3, Grave 13 (Luhansk Region) [379], Yamnaya culture, with a 'manufacture kit'. A: 1-7 – flakes; B: 8-12 – refitting

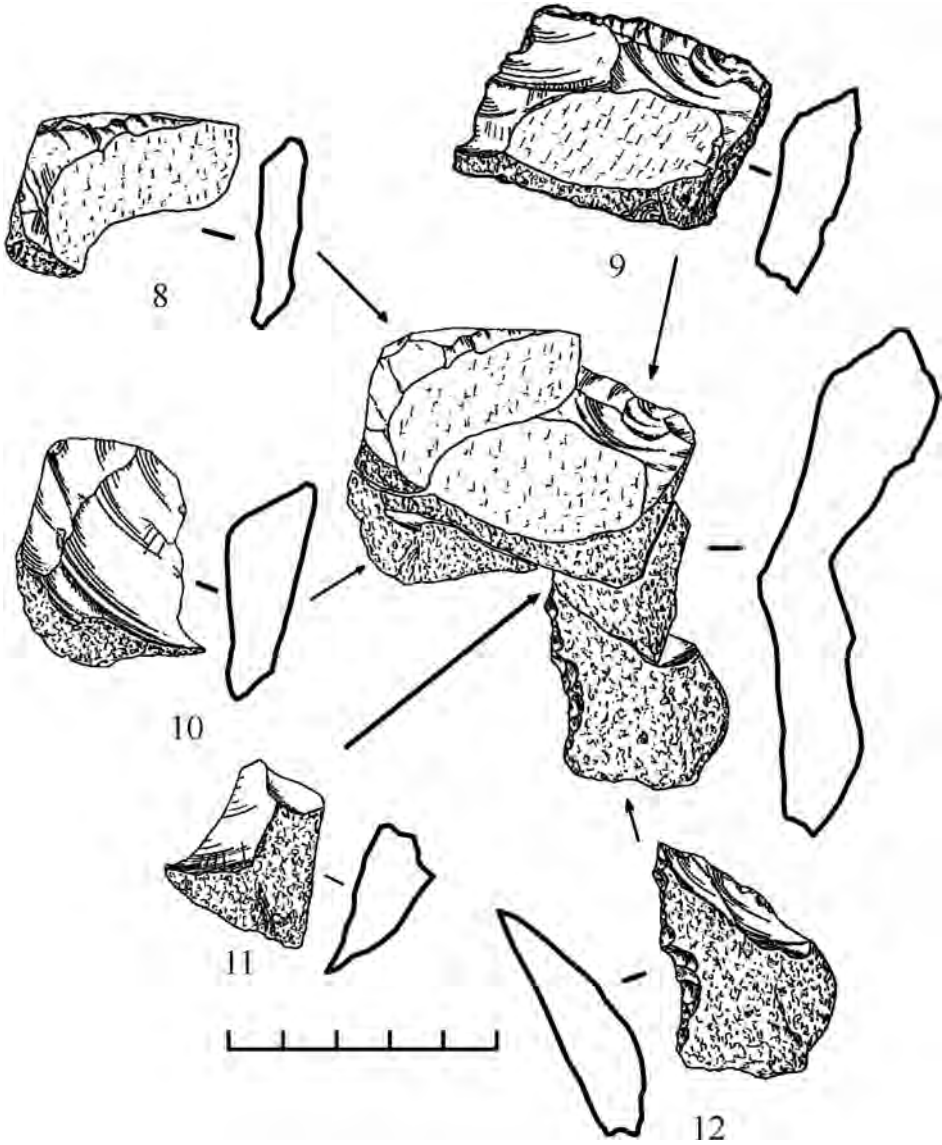


Fig. 45B. See Fig. 45A

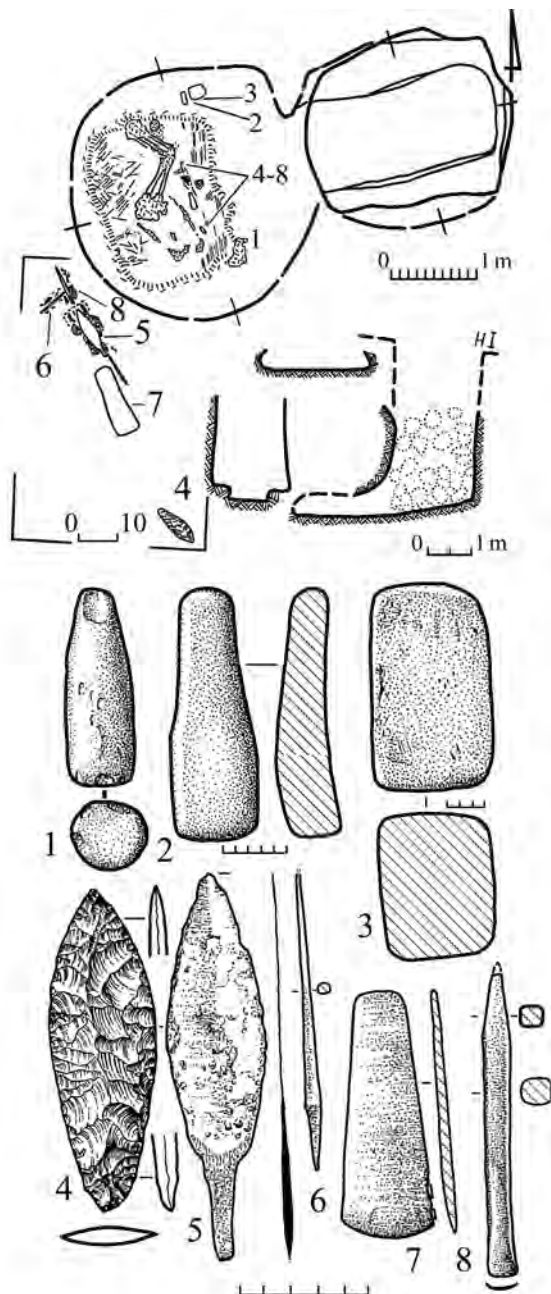


Fig. 46. Oleksandrivsk Barrow 9, Grave 25 (Luhansk Region) [1108], Early Catacomb culture. 1 – pestle, 2-3 – abrasives, 4 – biface, 5 – bronze knife, 6 – awl, 7 – adze, 8 – chisel

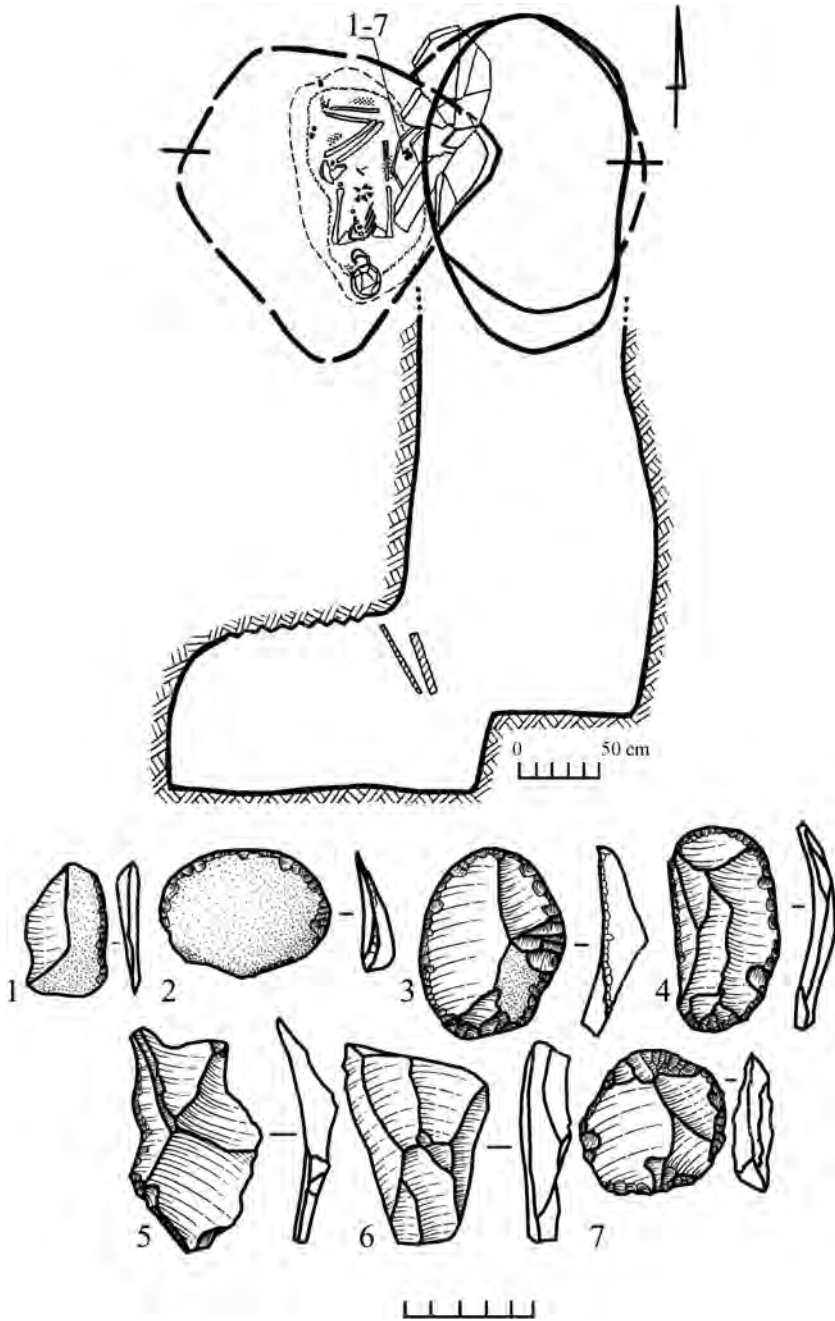


Fig. 47. Chervona Zorya Barrow 1, Grave 3 (Luhansk Region) [1083], Donets Catacomb culture. 1-7 – ‘manufacture kit’

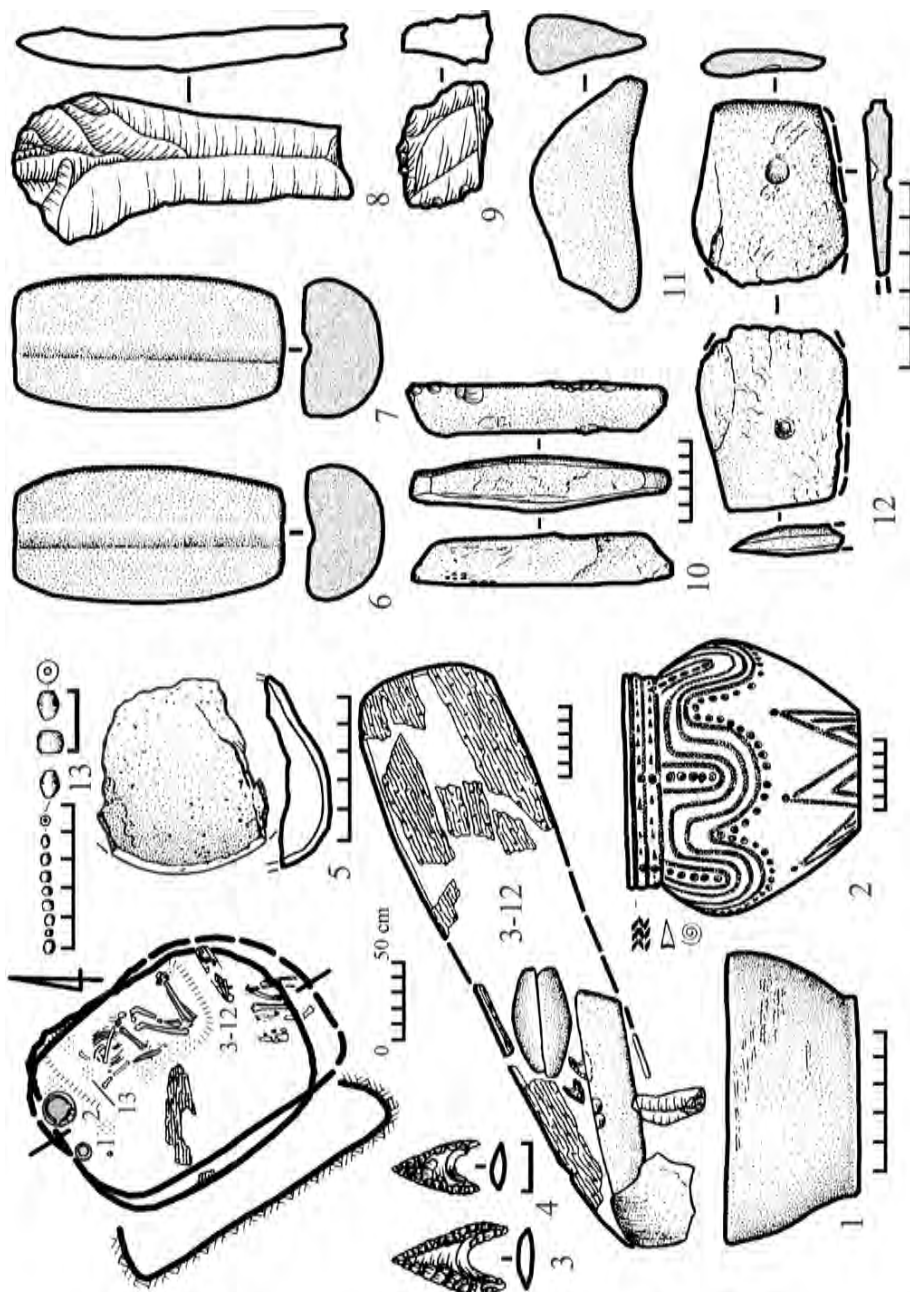


Fig. 48. Voitove III Barrow 4, Grave 10 (Luhansk Region) [1132], Donets Catacomb culture. 1-2 – pottery; 3-4 – arrowheads, 5 – shell, 6-7 – fluted abrasives, 8 – blade, 9 – quartzite flake, 10-12 – abrasives; 13 – string of beads

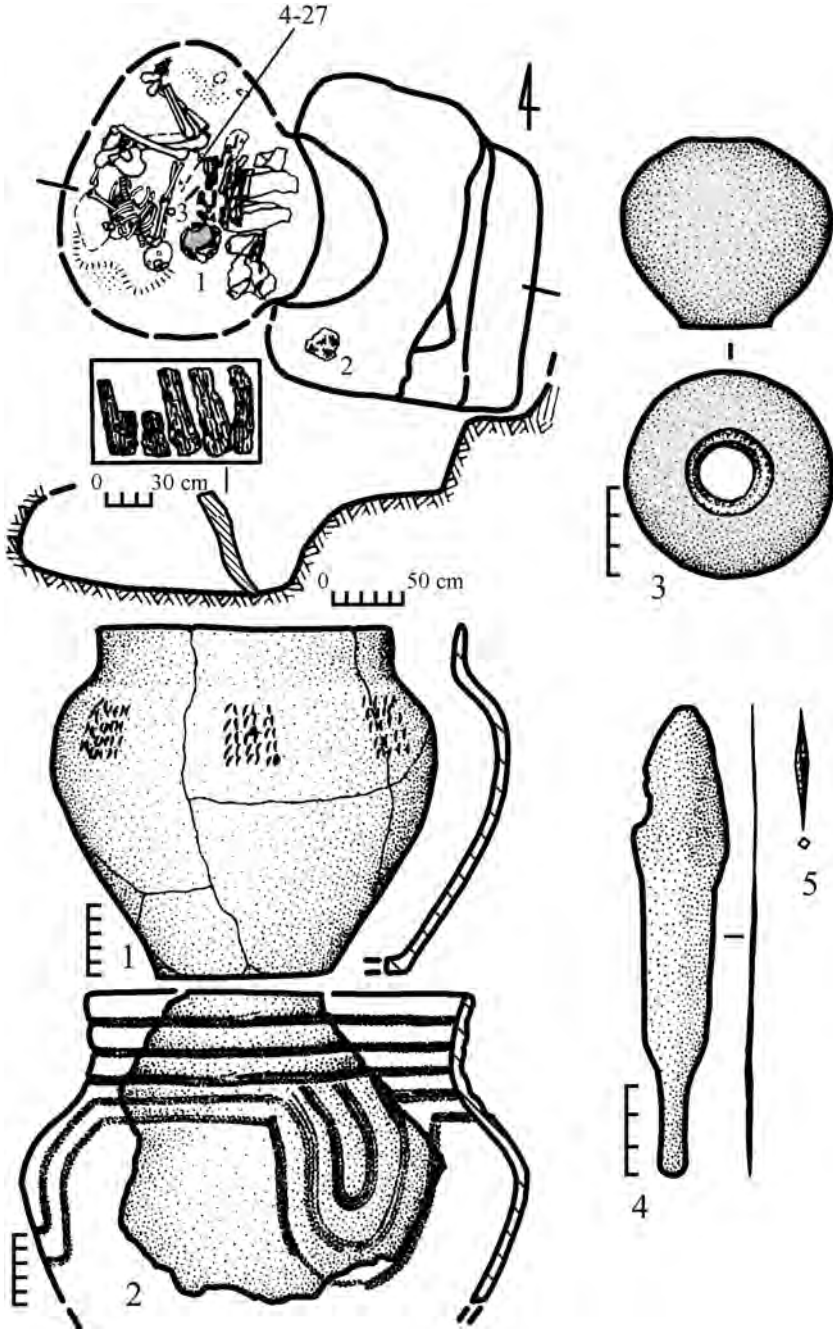


Fig. 49A. Zholobok Barrow 3, Grave 6 (Luhansk Region) [1134], Donets Catacomb culture.
 A: 1-2 – ceramics; 3 – mace top, 4 – bronze knife; 5 – bronze point. B: 6-7 – large bifaces,
 8-9 – bone artefacts, 10-22 – arrowheads Type C-I-2, 23-26 – fluted abrasives, 27 – pestle

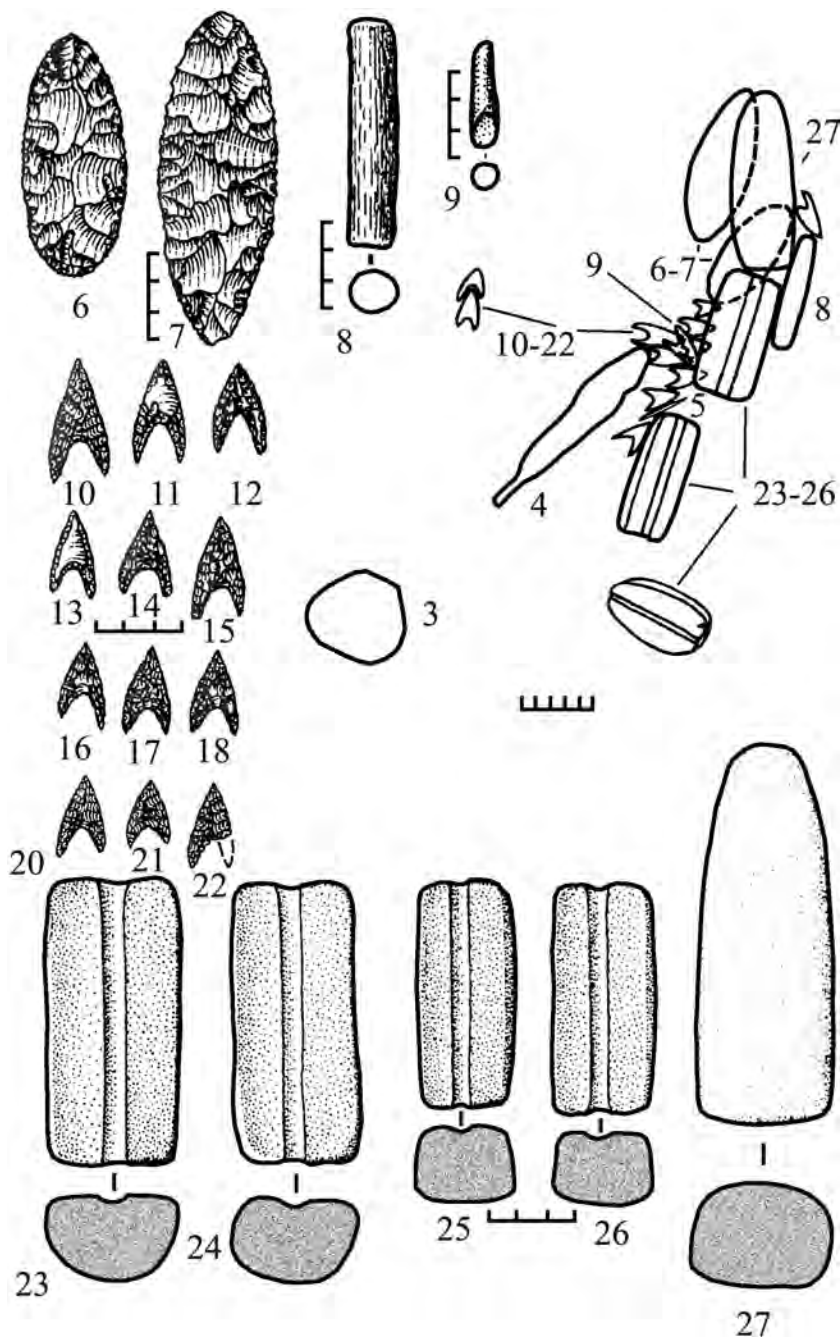


Fig. 49B. See Fig. 49A

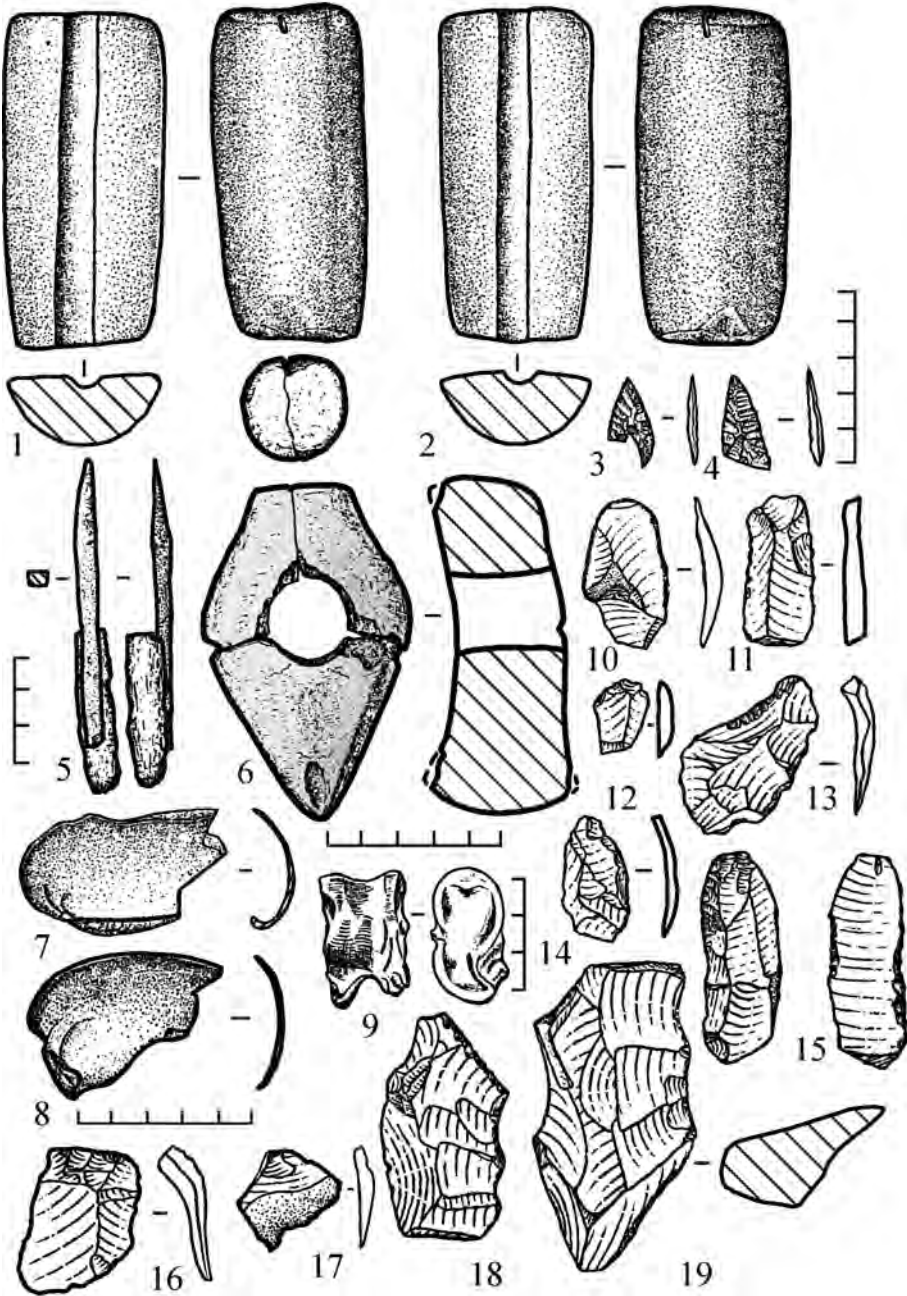


Fig. 50. Novomykolayivka II Barrow 2, Grave 1 (Donetsk Region) [926], Donets Catacomb culture 'Arrow-maker's kit'

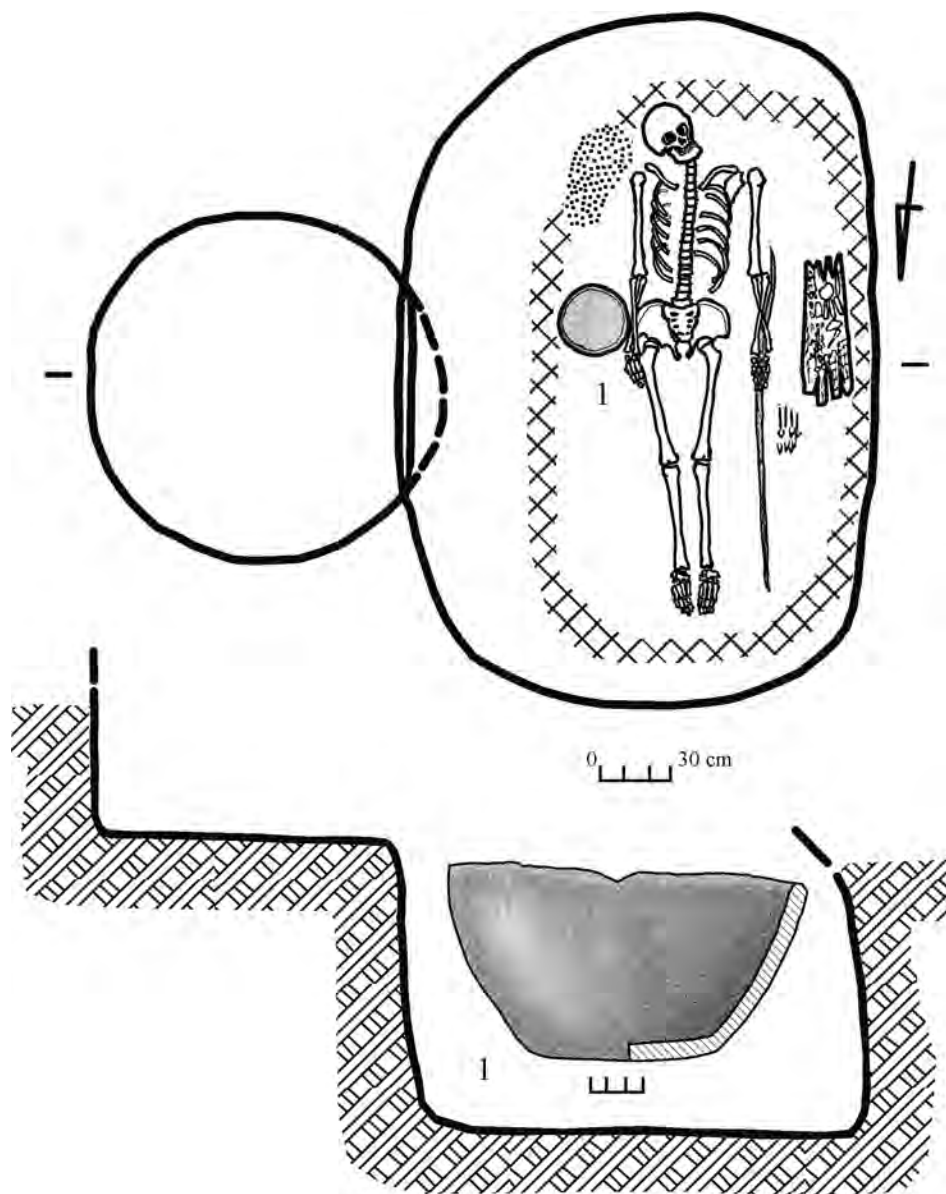


Fig. 51A. Davydivka Barrow 1, Grave 17 (Zaporizhya Region) [1253], Ingul Catacomb culture.
 A: 1 – modelled cup; B: 2-6 – abrasives, 7 – arrow-shaft; C: 8-16 – arrowheads of Type A-II-3,
 17-27 – arrowhead blanks

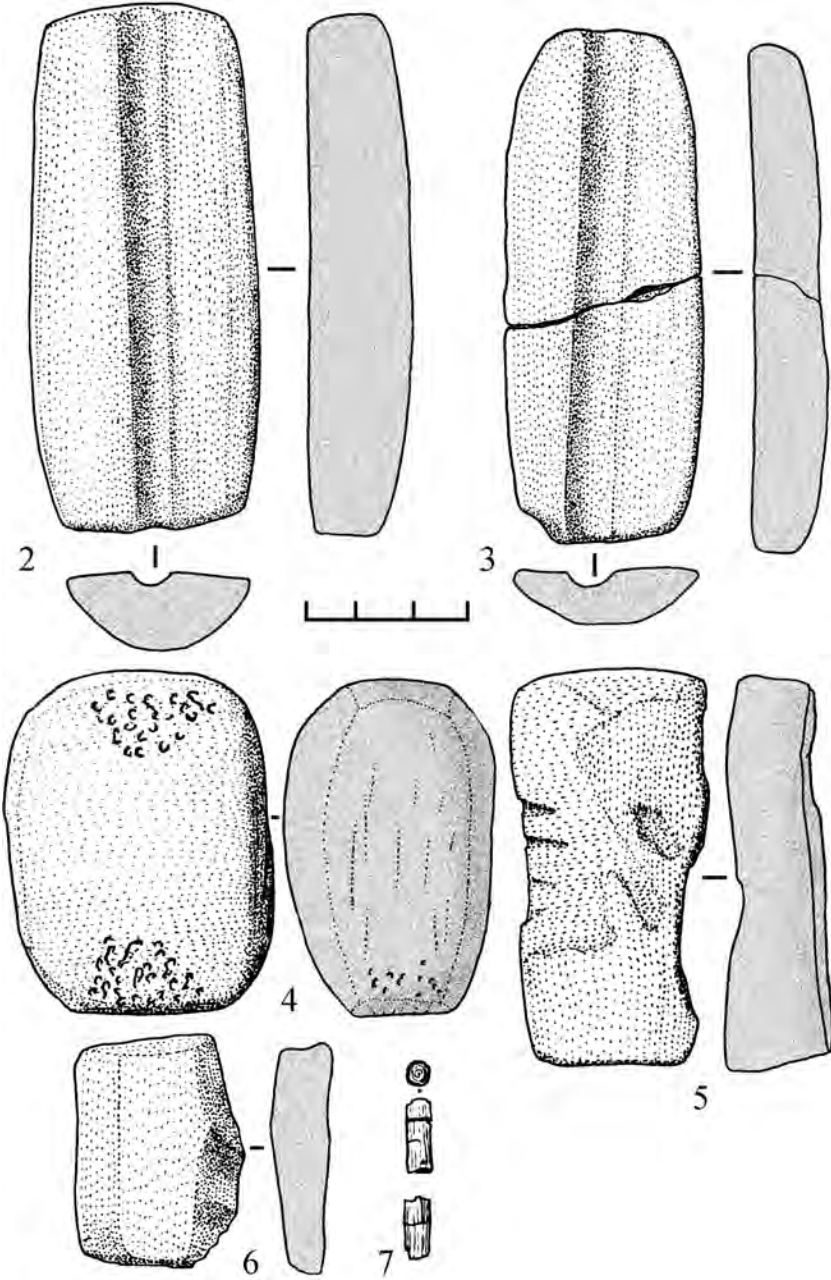


Fig. 51B.

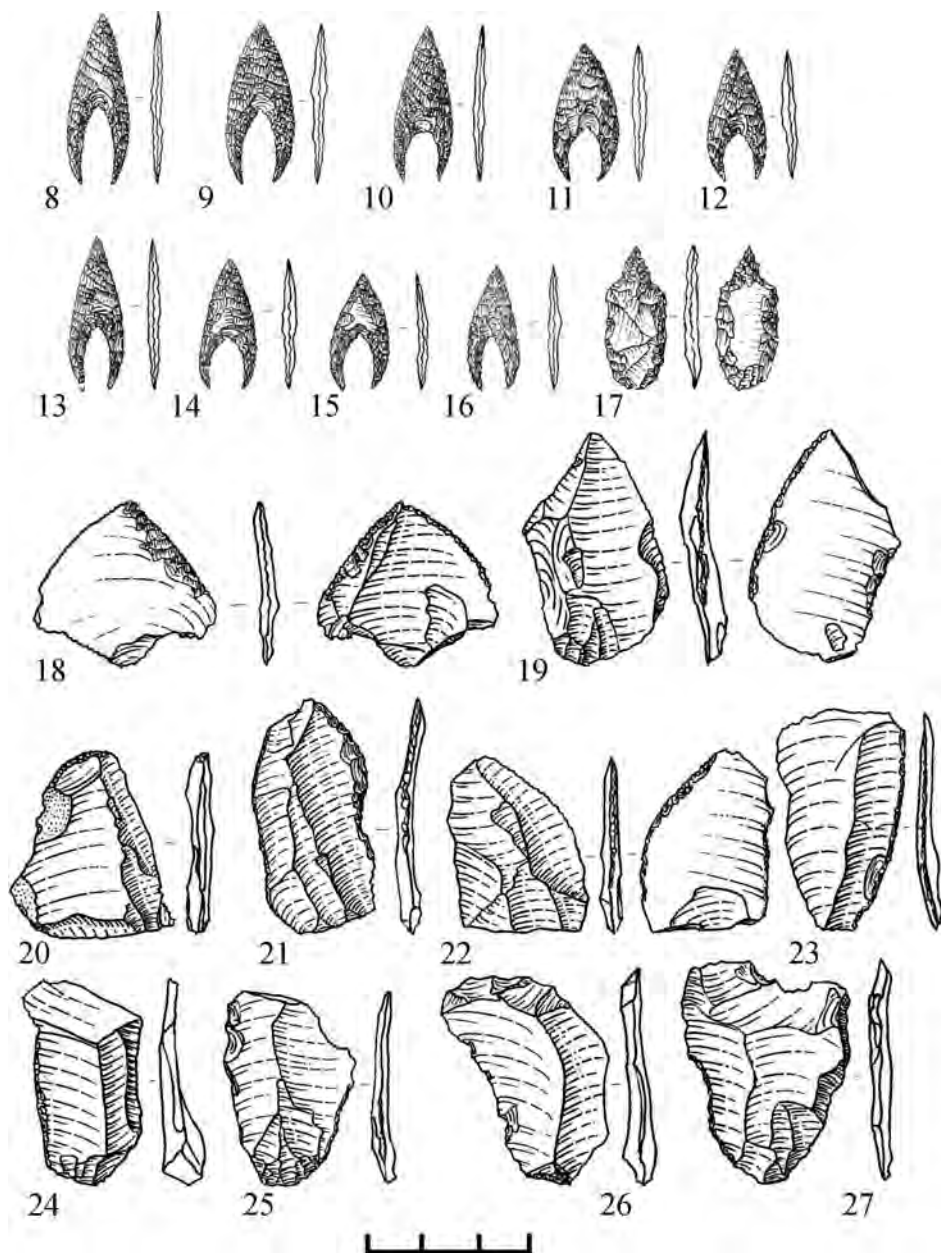


Fig. 51C.

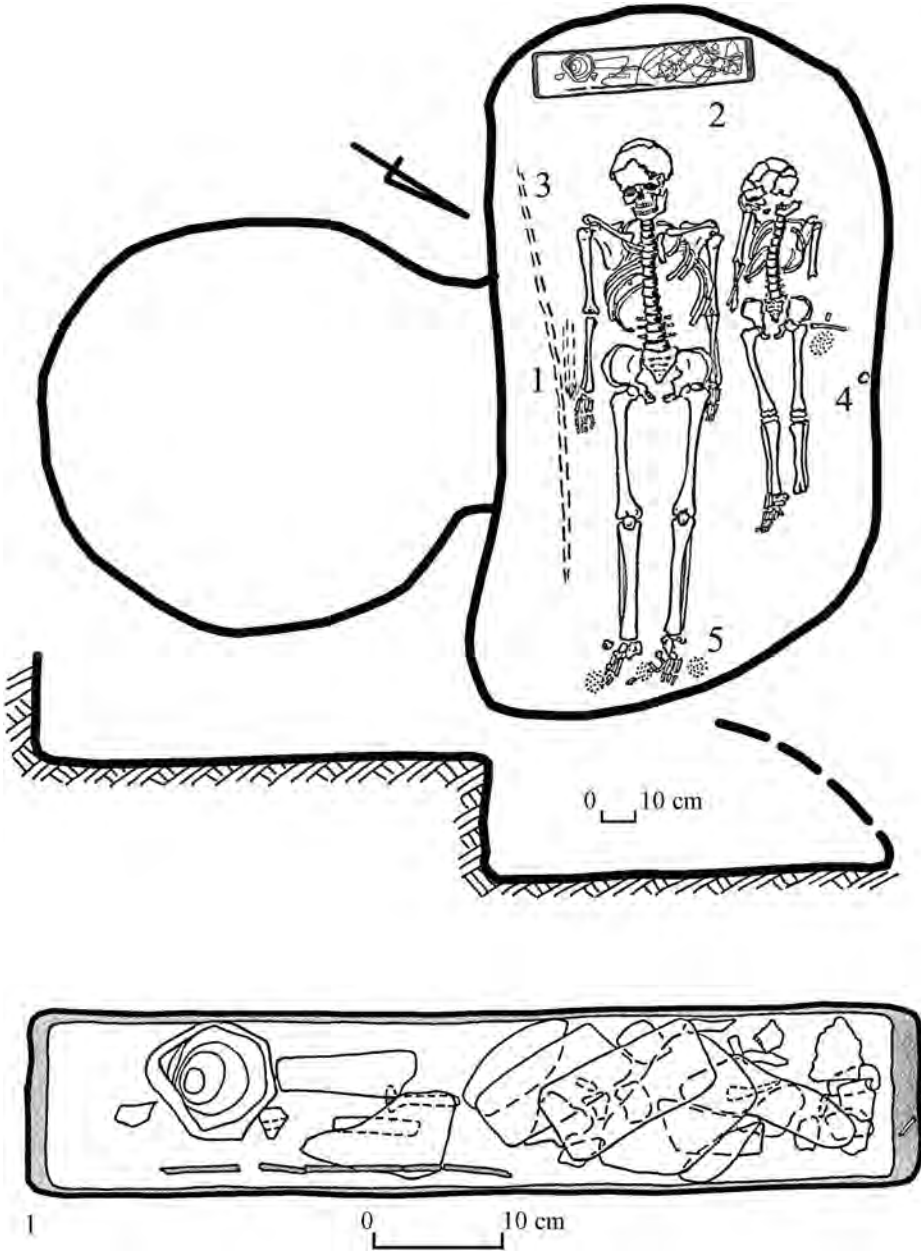


Fig. 52A. Volodymyrivka Barrow 1, Grave 20 (Zaporizhya Region) [1301], Ingul Catacomb culture. A: 1 – wooden box containing an ‘Arrow-maker’s kit’; B, C, D: 2-33 – flint artefacts of different times, 34 – horse tooth; E: 35-45 – arrowheads, 46-47 – bifaces, 48 – bronze-inlaid wooden artefact, 49 – horn artefacts

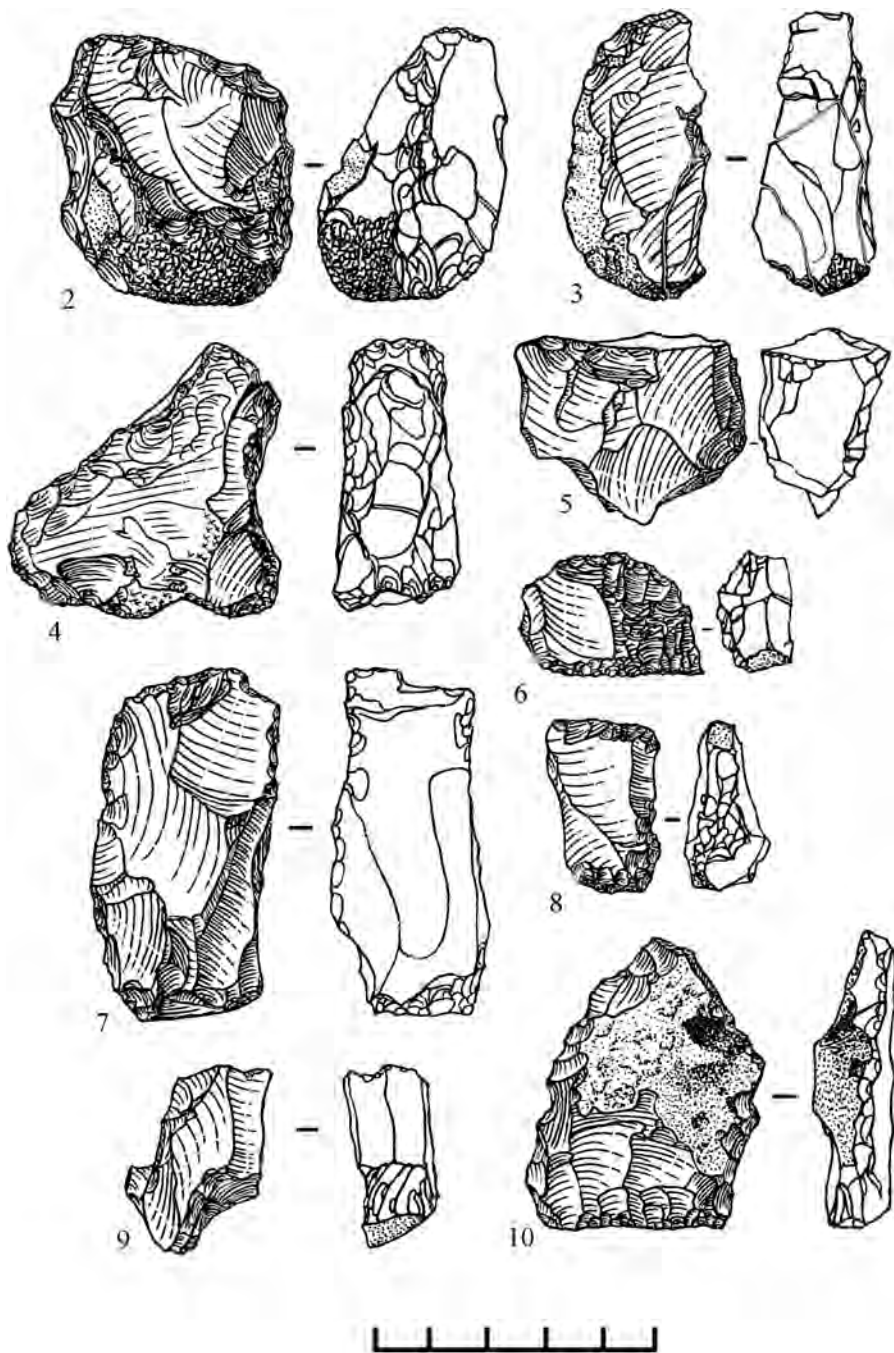


Fig. 52B.

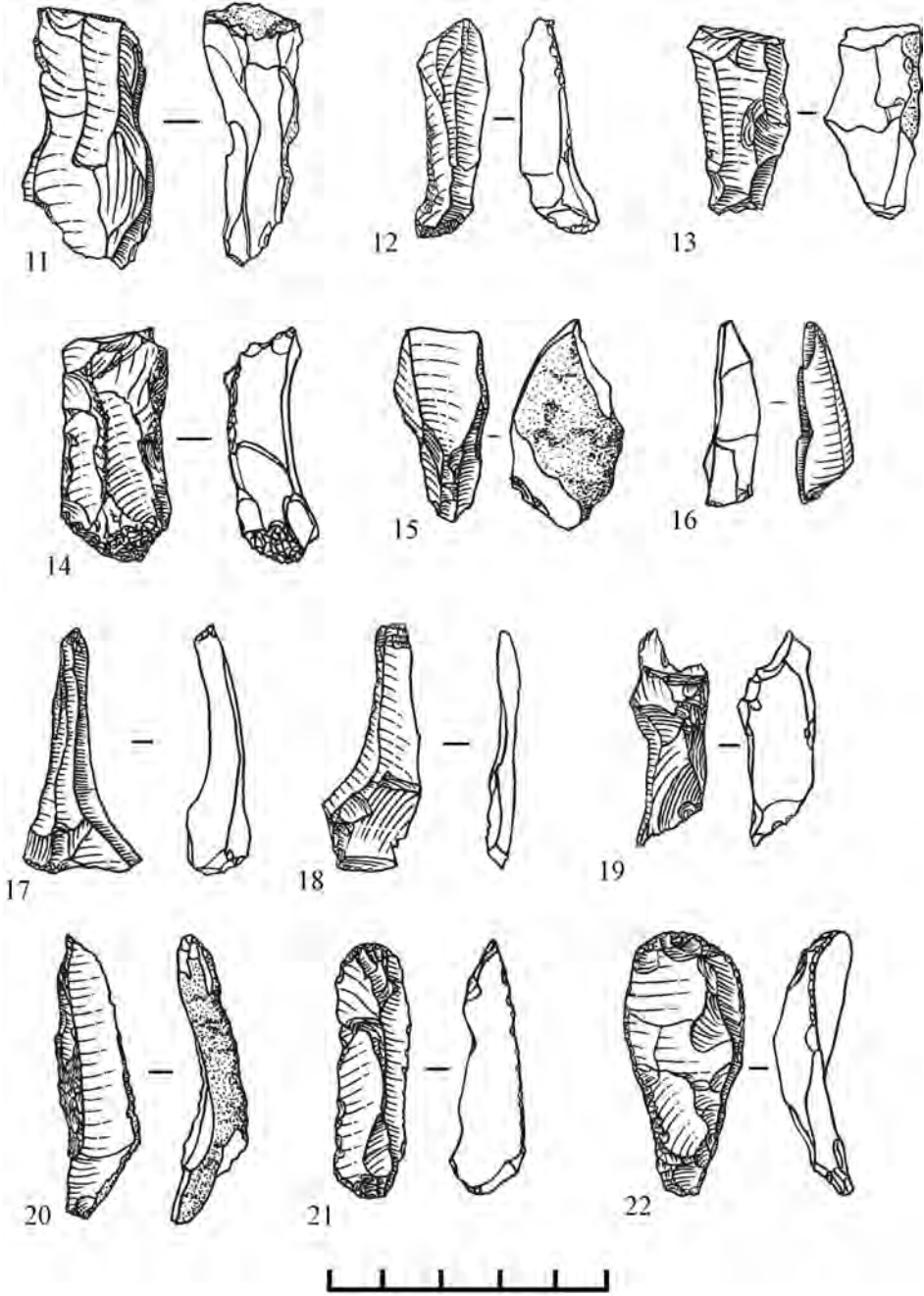


Fig. 52C.

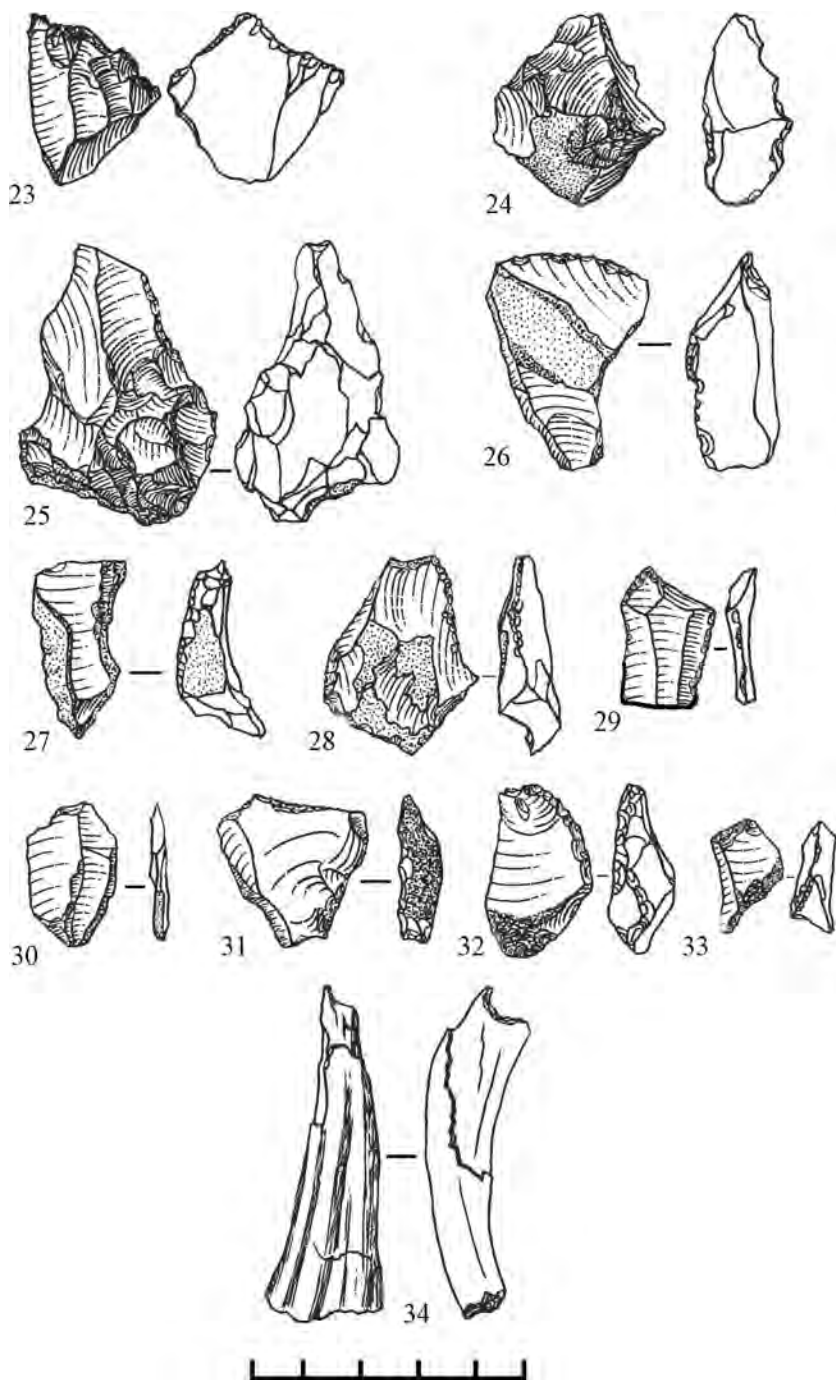


Fig. 52D.

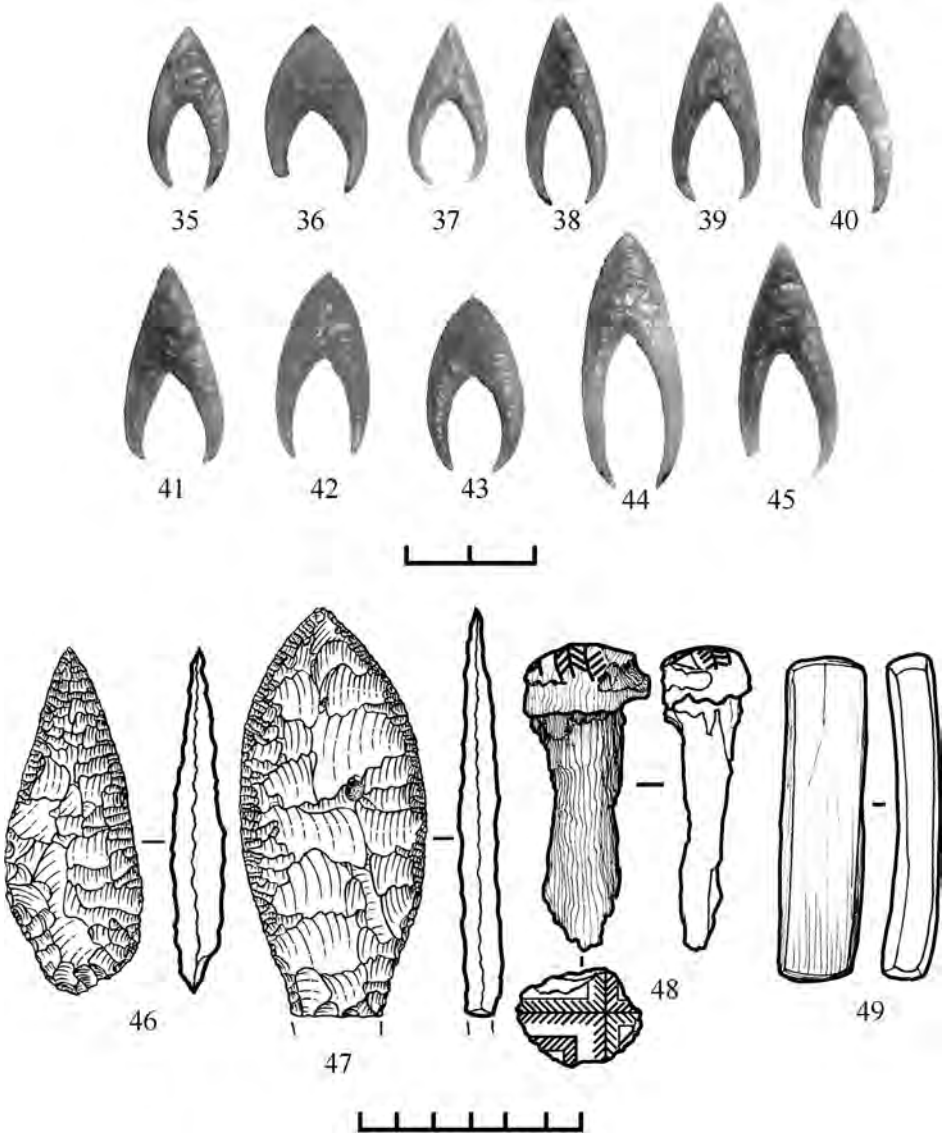


Fig. 52E.

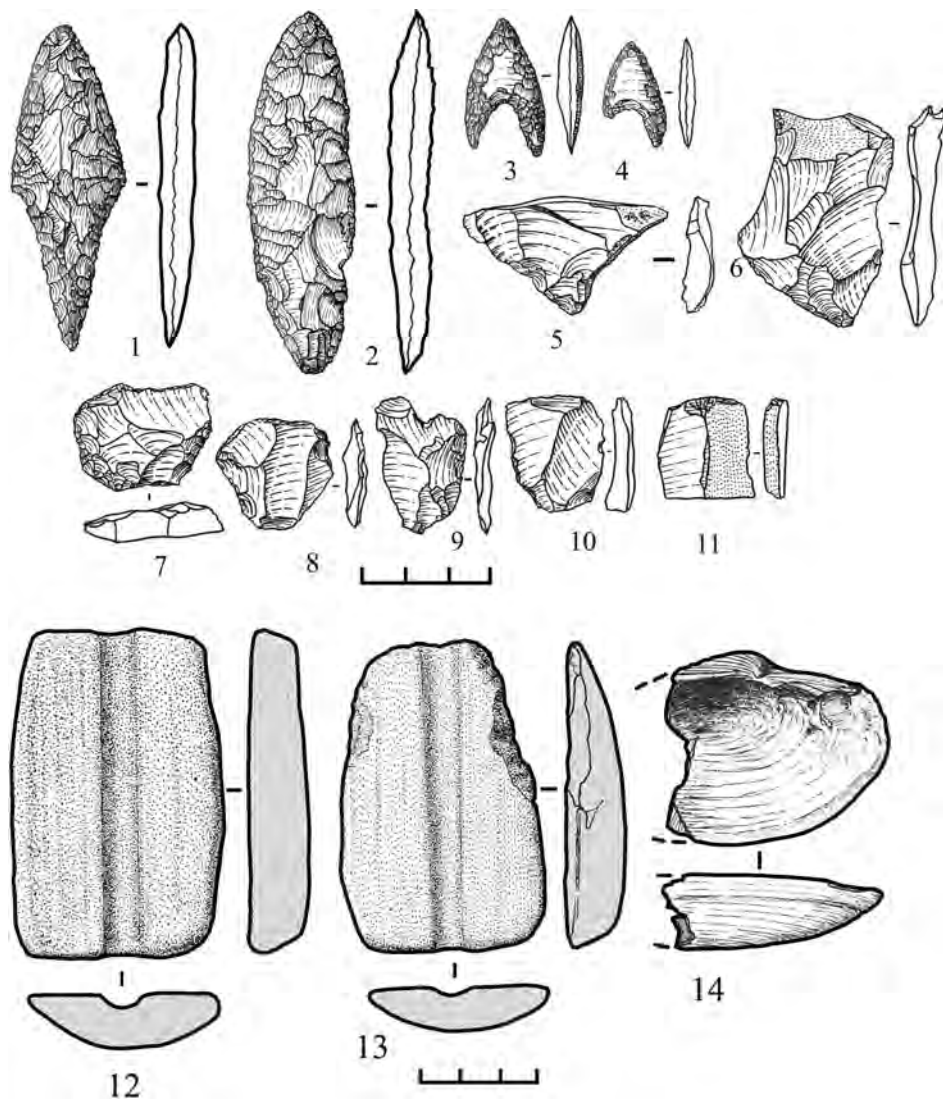


Fig. 53. Shelyuhy Barrow 11, Grave 2 (Zaporizhya Region) [1288], Ingul Catacomb culture. 1-2 – biface, 3-4 – arrowheads, 5-11 – flint artefacts; 12-13 – fluted abrasives, 14 – shell

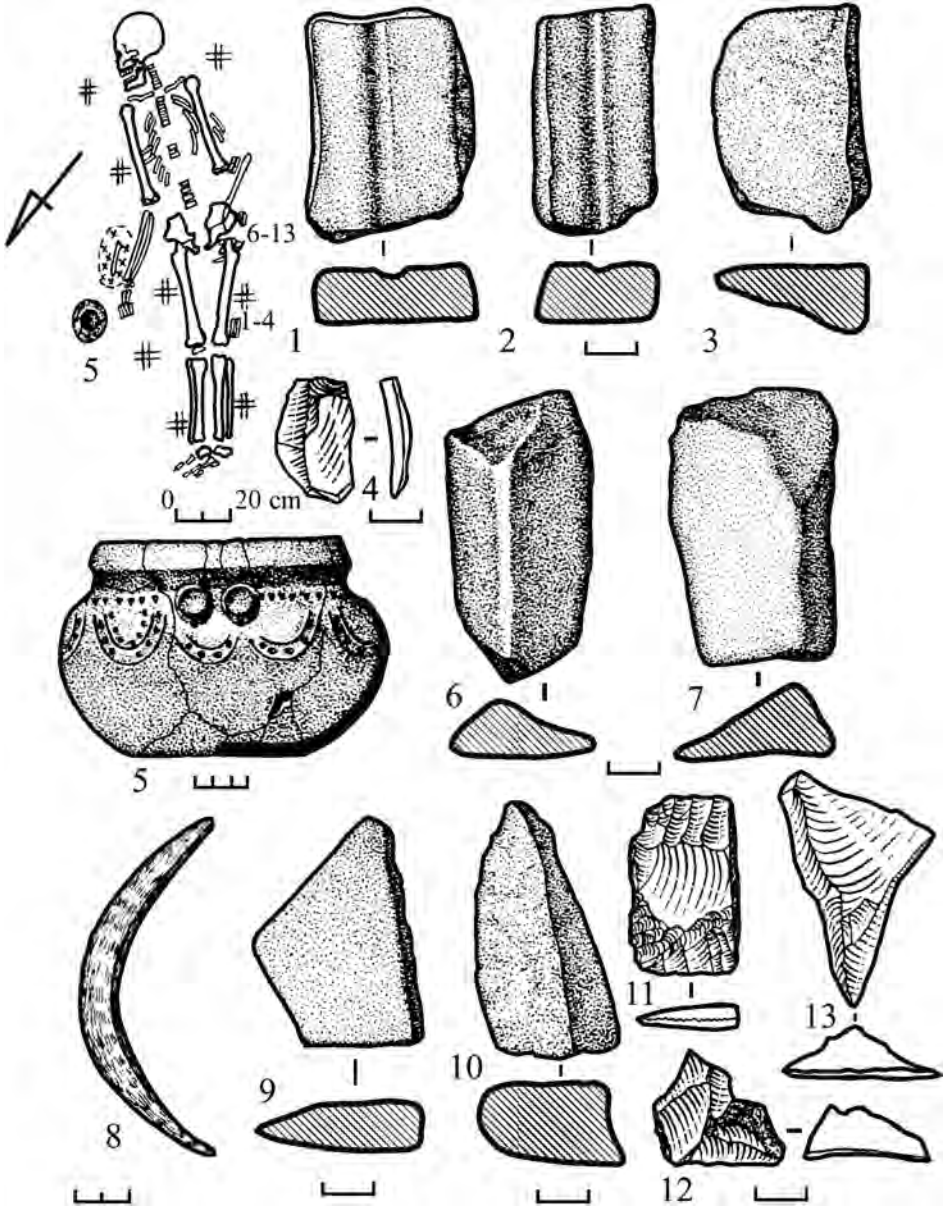


Fig. 54. Nikolske Barrow 8, Grave 11 (Moldova) [1147], Ingul Catacomb culture 'Arrow-maker's kit'. 1 – wessel, 2-6, 9-10 – abrasives, 7, 11-13 – flint artefacts, 8 – boar fan grave

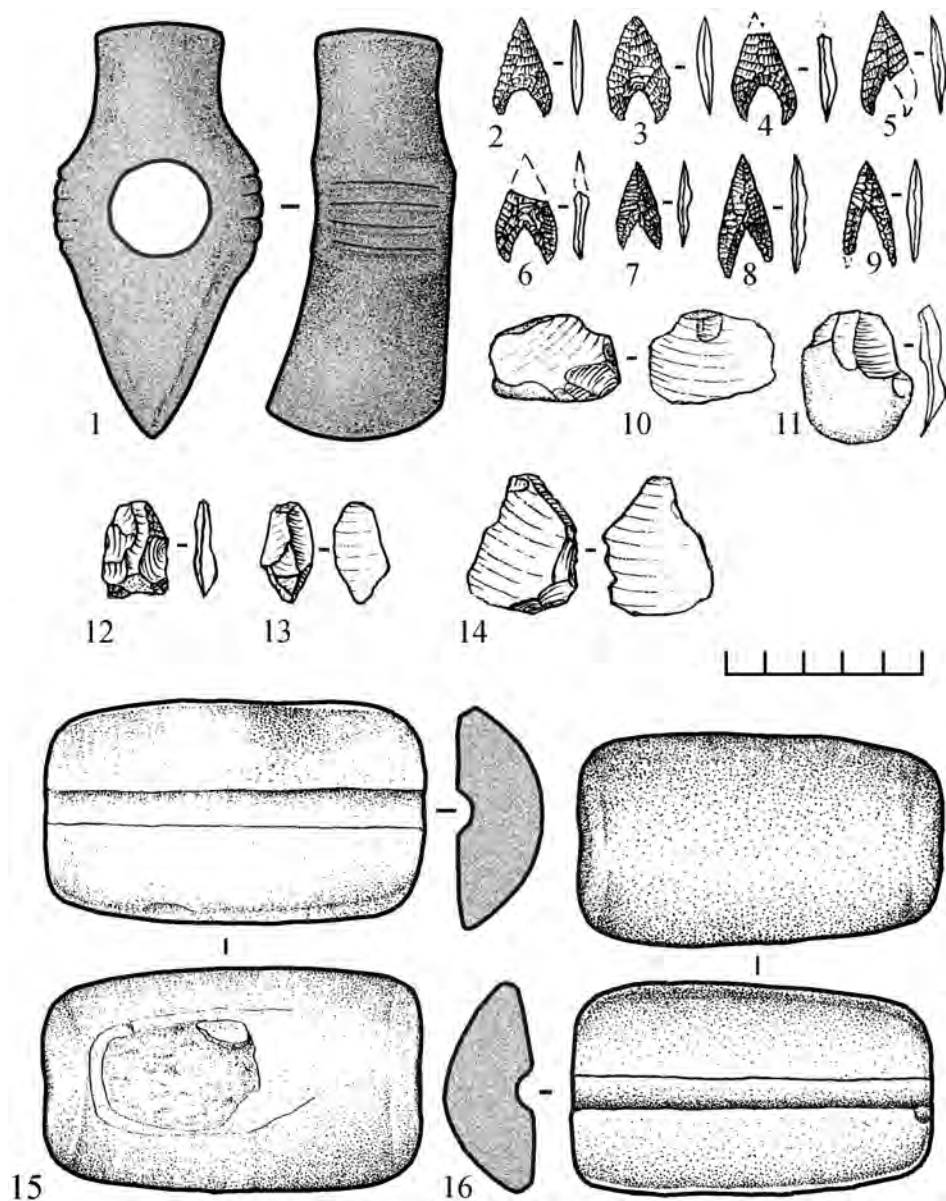


Fig. 55. Burlatske Barrow 3, Grave 4 (Donetsk Region) [902], Ingul Catacomb culture 'Arrow-maker's kit'. 1 – axe-hammer, 2-9 – arrowheads, 10-14 – arrowhead blanks, 15-16 – fluted abrasives

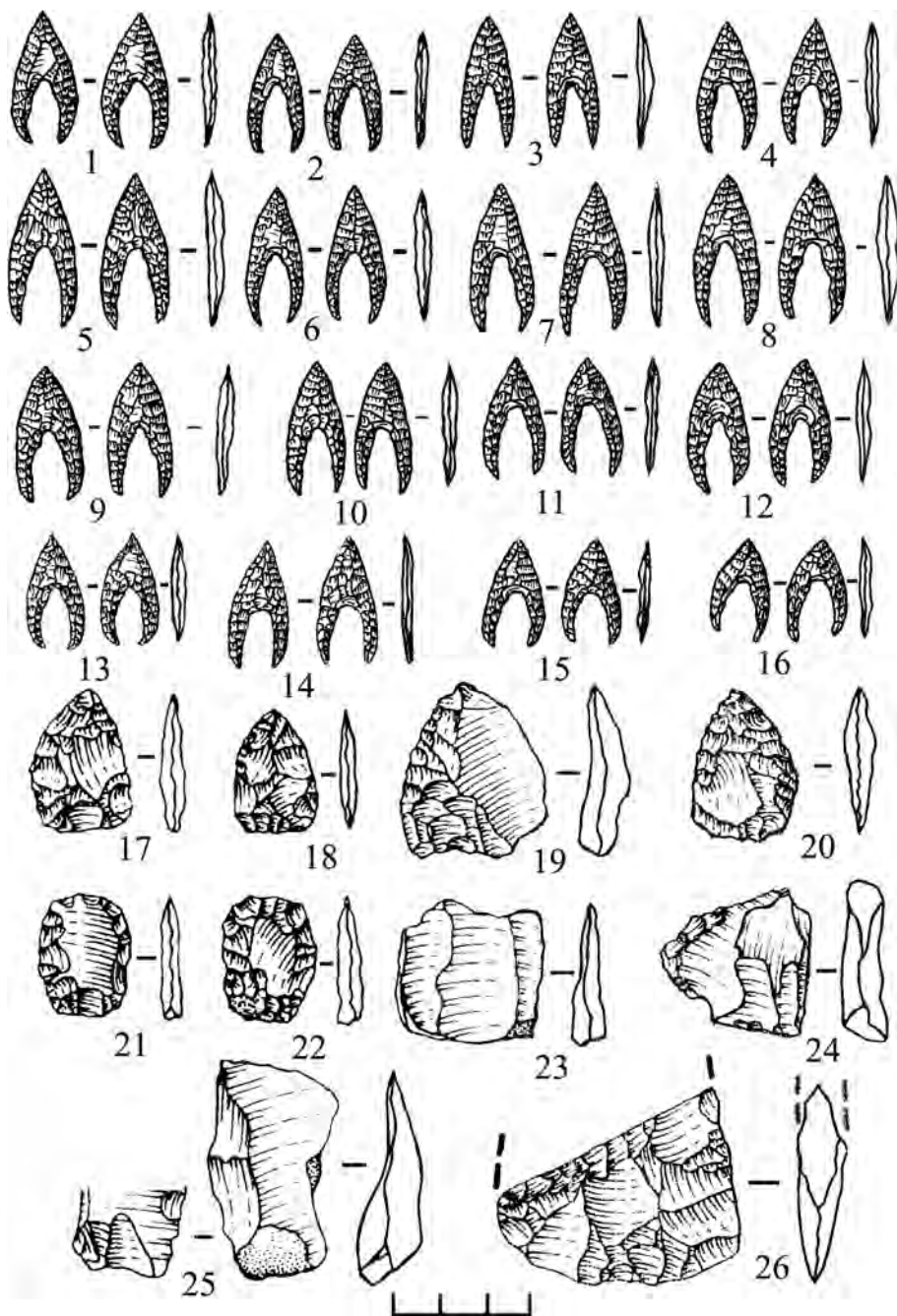


Fig. 56. Kominternove Barrow 4 Grave 4 (Donetsk Region) [916], Ingul Catacomb culture 'Arrow-maker's kit'. 1-16 – arrowheads, 17-26 – arrowhead blanks

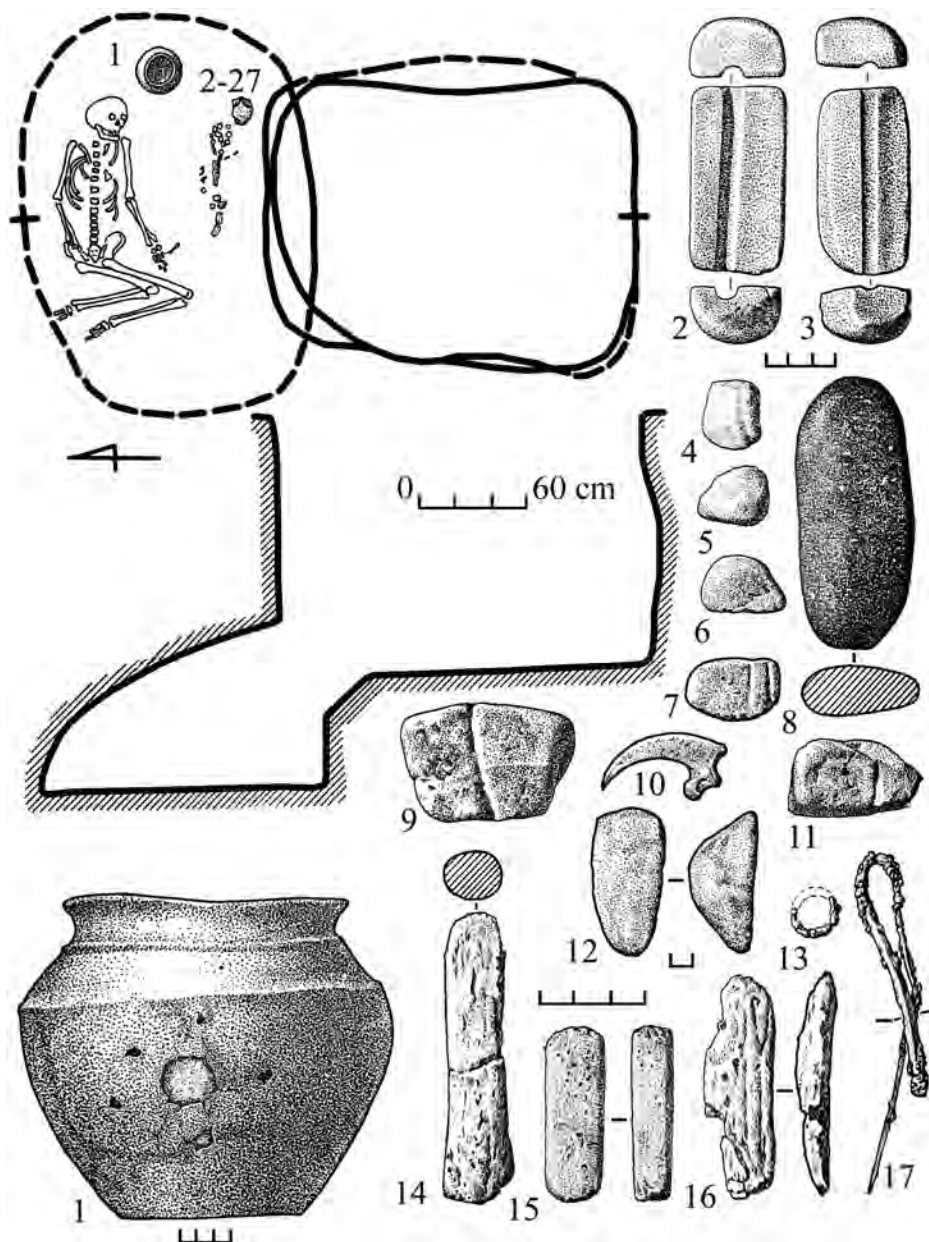


Fig. 57A. Ordzhonikidze Mine No 22, Barrow 3, Grave 3 (Dnipropetrovsk Region) [829], Late Catacomb culture 'Arrow-maker's kit'. A: 1 – vessel, 2-9, 11-12 – abrasives, 10 – a predator's claw, 13-15 – pressure tool, 16-17 – bronze artefacts. B: 18-22 – arrowhead blanks, 23 – cutting tool, 24-26 – arrowheads (7-8 – Type C-II, 9 – Type A-II-1), 27 – refitted grave

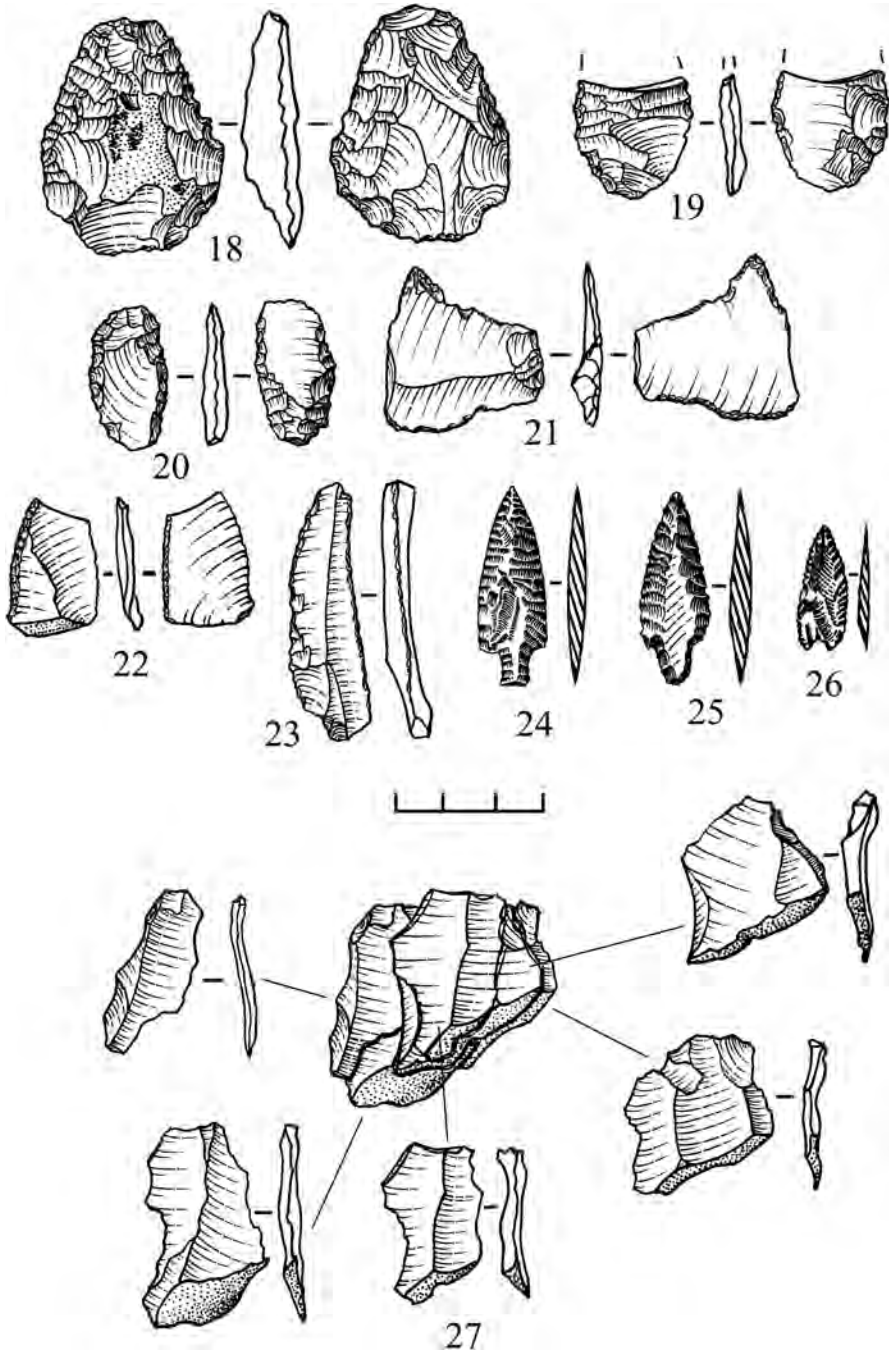


Fig. 57B. See Fig. 57A

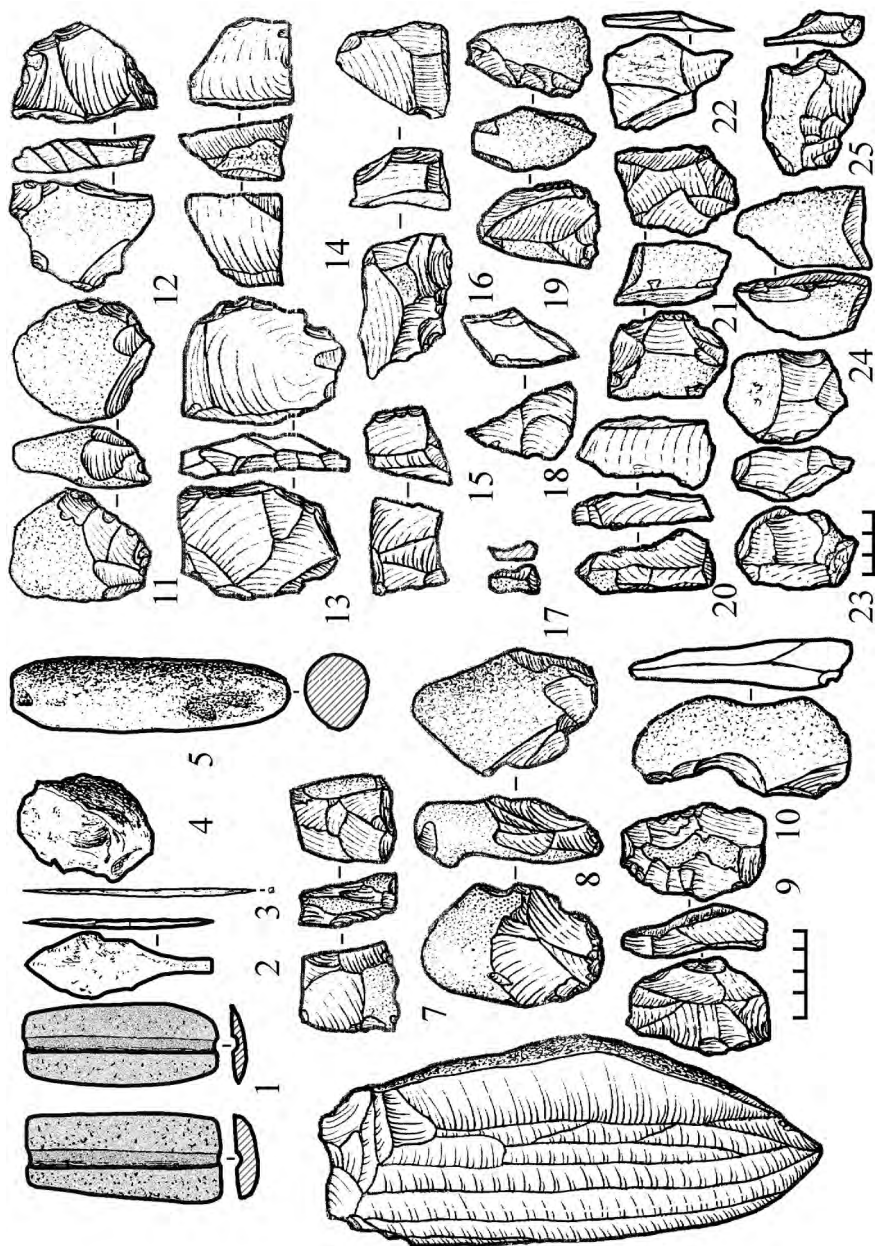


Fig. 58. Artemivsk Barrow 1, Grave 1 (Donetsk Region) [896], Bakhmut type. 'Arrow-maker's kit'. 1 – fluted abrasives, 2 – bronze knife, 3 – bronze awl, 4 – fossil shell, 5 – pestle, 6 – core of the Eneolithic period, 7-25 – arrowhead blanks

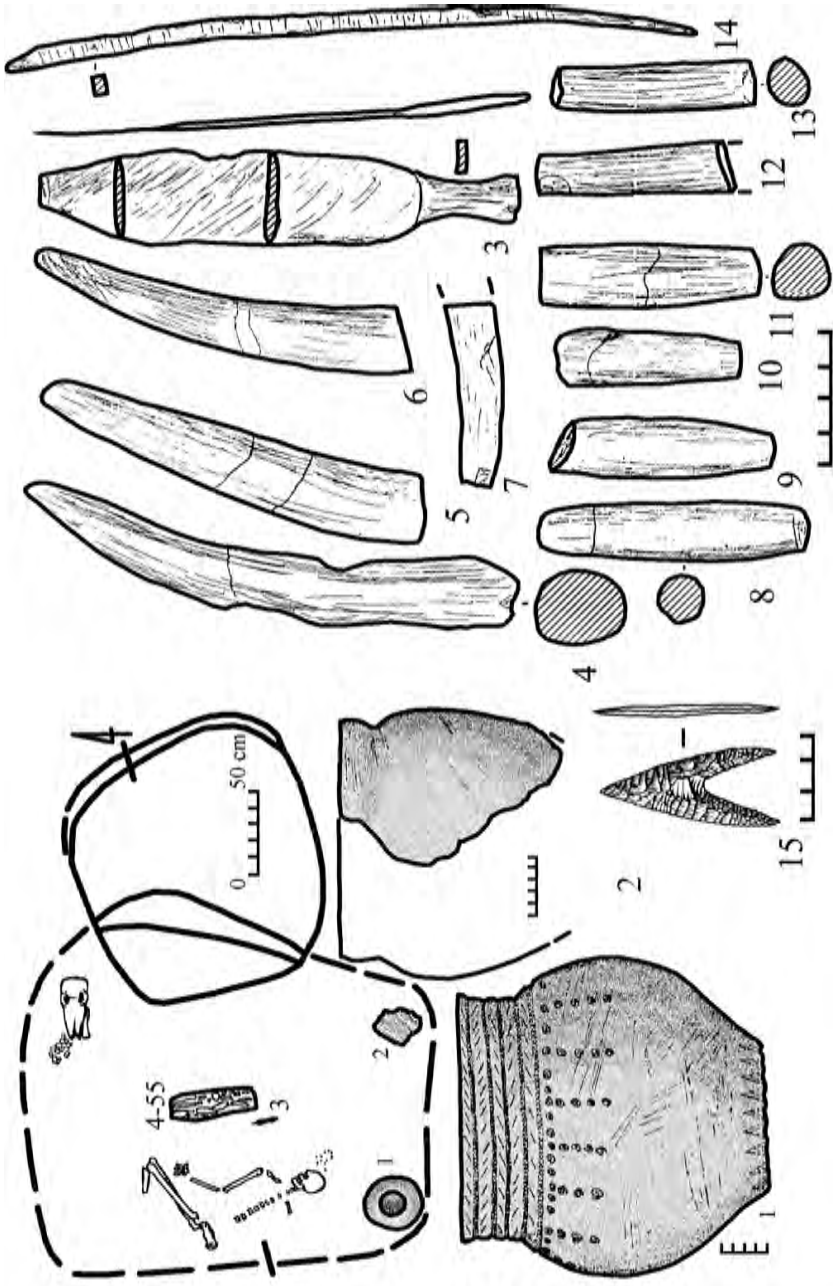


Fig. 59A. Artemivsk Barrow 2, Grave 3 (Donetsk Region) [900], Bakhmut type. 'Arrow-maker's kit'. A: 1-2 – ceramics, 3 – bronze knife, 4-13 – horn pressure tools, 14 – bronze rod, 15 – dart or arrowhead. B: 16-25 – abrasives, 26-55 – arrowhead blanks

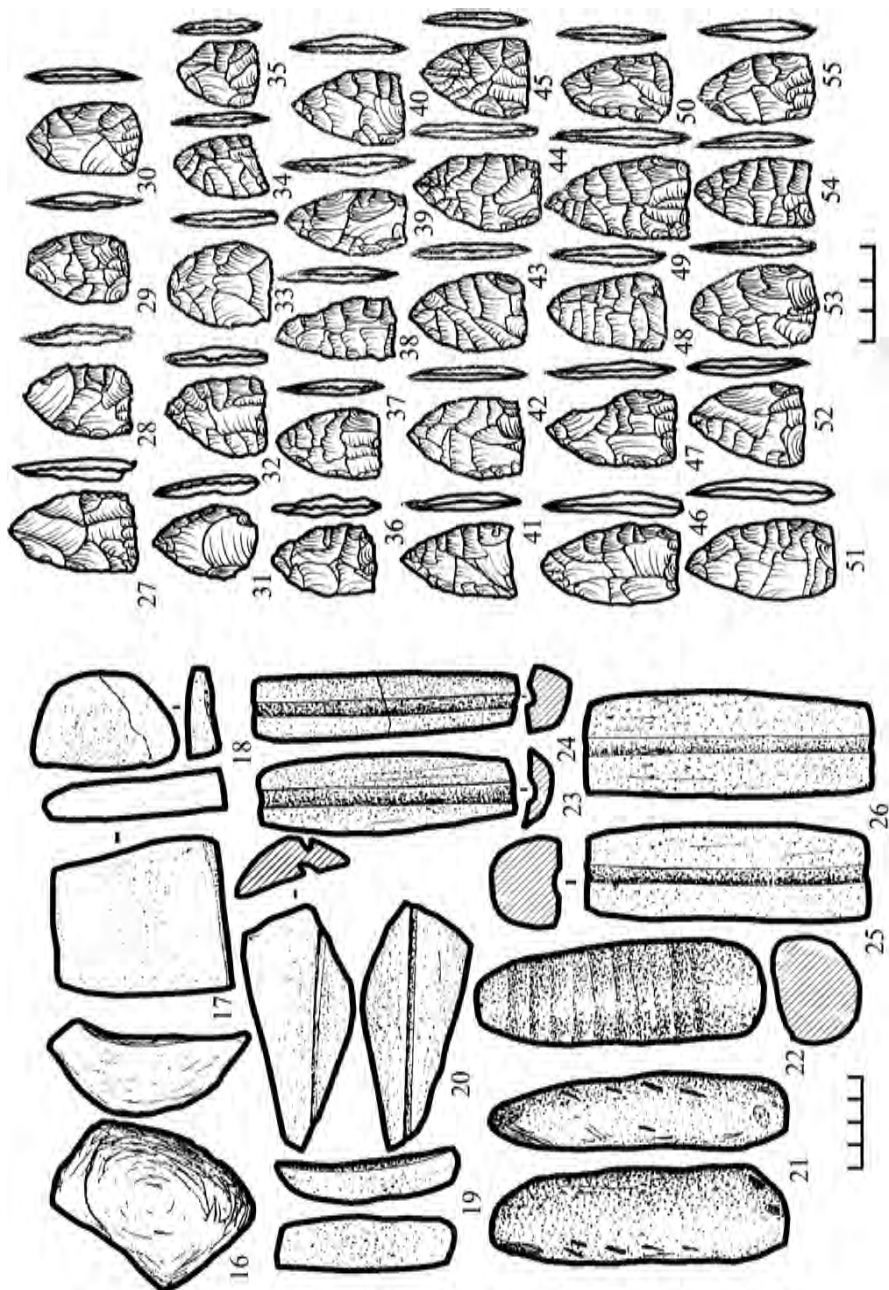


Fig. 59B. See Fig. 59A

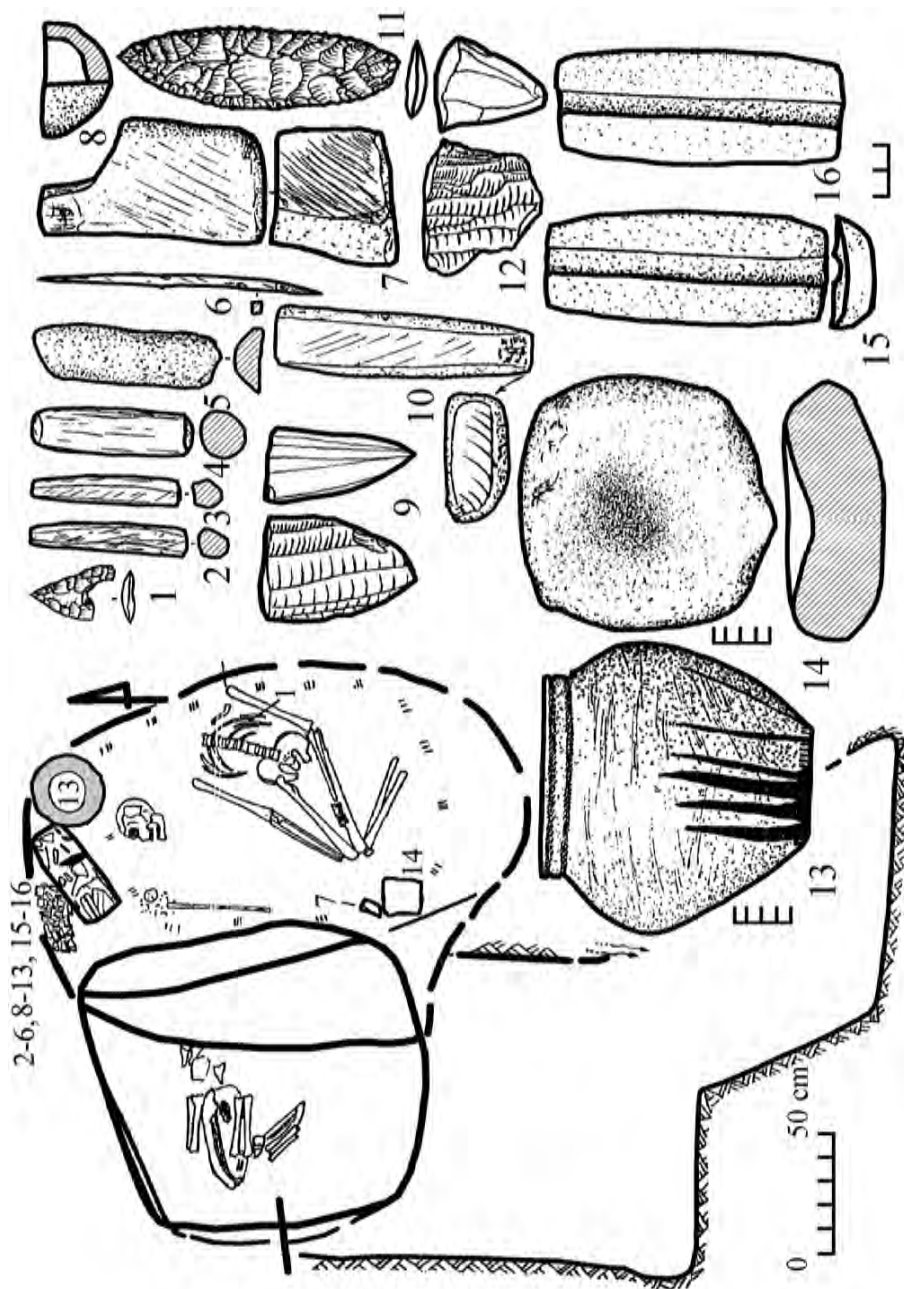


Fig. 60. Artemivsk Barrow 4, Grave 1 (Donetsk Region) [901], Bakhmut type. 'Arrow-maker's kit'. 1 – arrowhead, 2-5 – pressure tools, 6 – bronze awl, 7 – pestle, 8 – fossil shell, 9 – Eneolithic core, 10 – hammerstone, 11 – biface, 12 – core, 13 – wessel, 14 – anvil, 15-16 – fluted abrasives

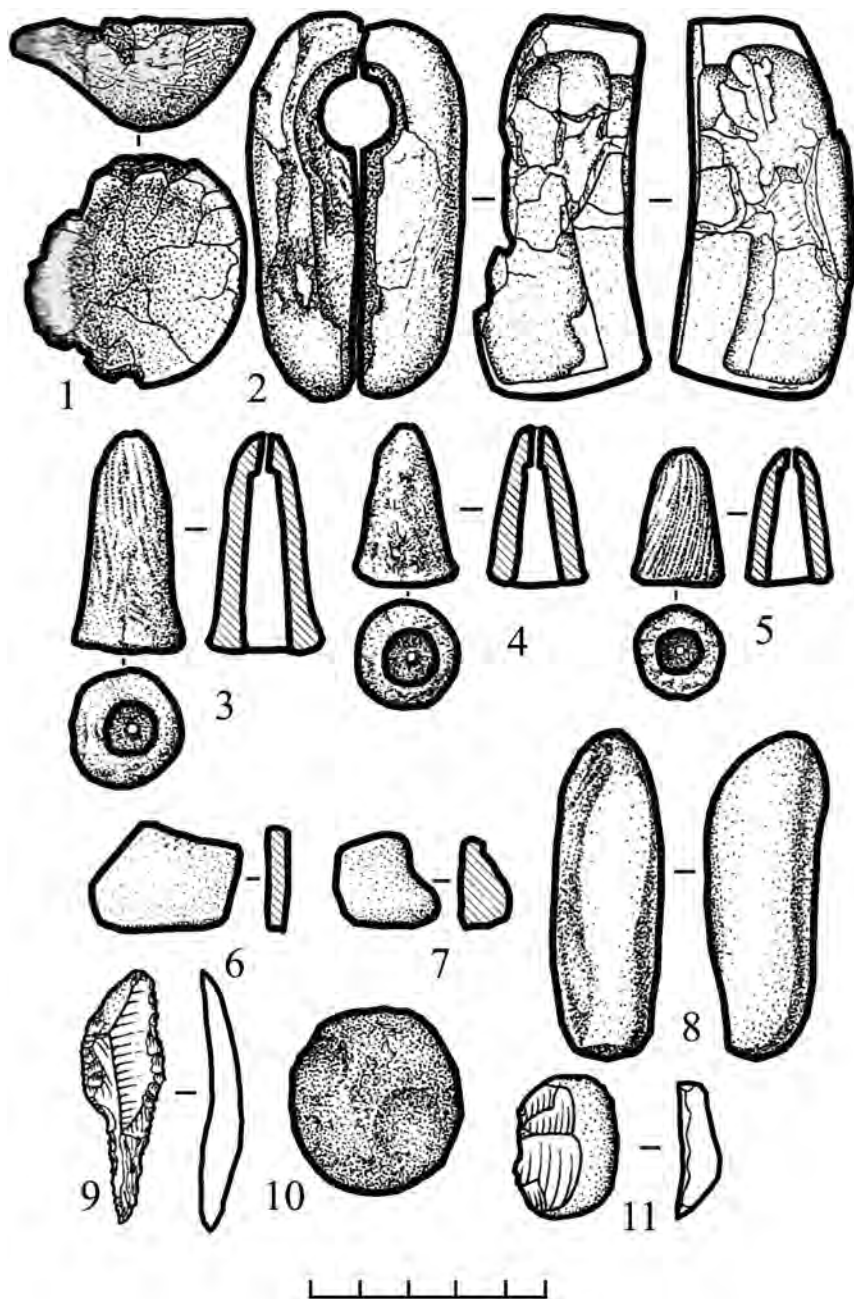


Fig. 61. Pokrovka Barrow 4, Grave 3 (Donetsk Region) [936], Late Catacomb culture 'Caster kit'. 1 – fossil shell, 2 – axe casting form, 3-5 – nozzles, 6-8 – abrasives, 9, 11 – flint tools, 10 – hammerstone

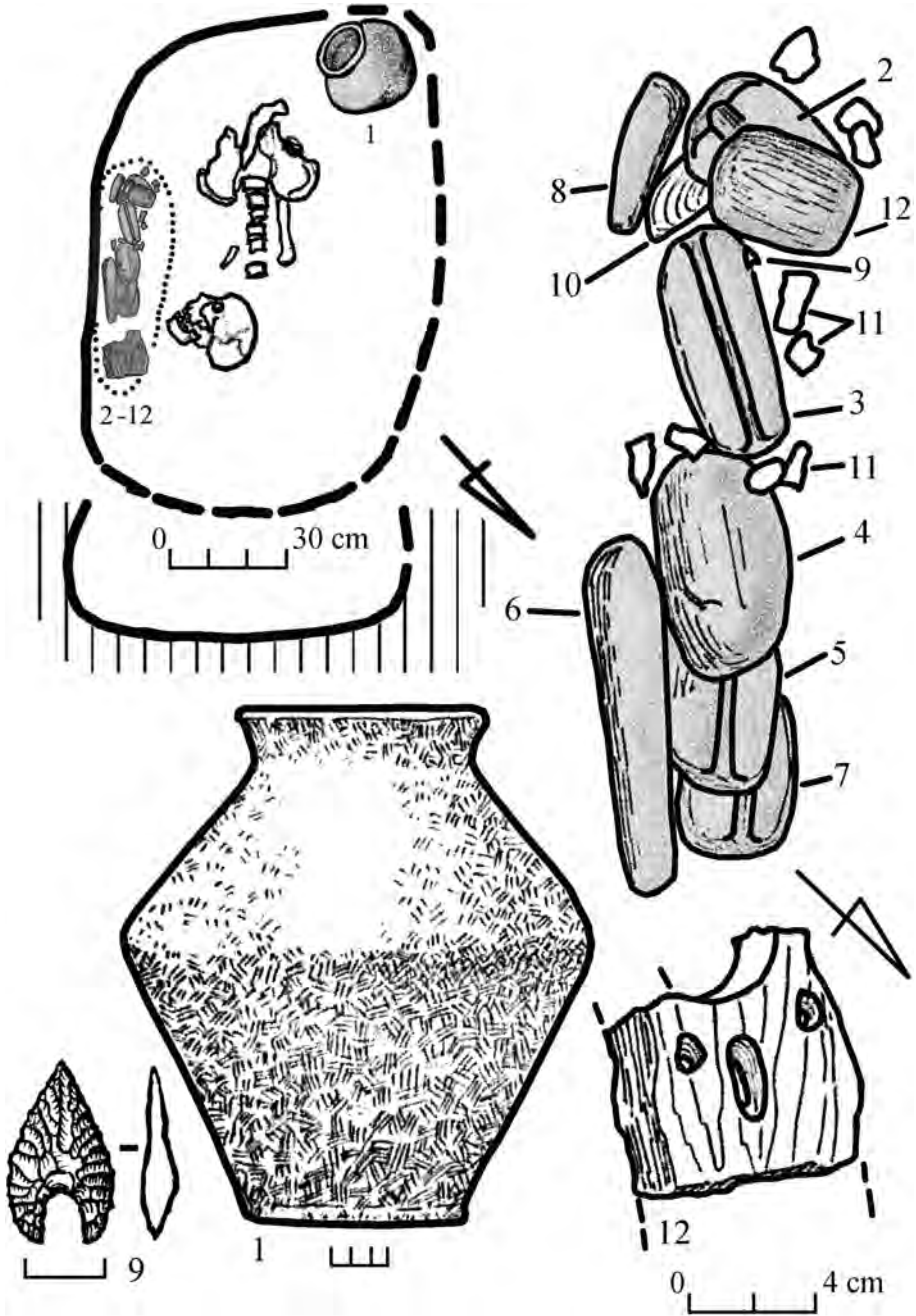


Fig. 62. Aktove Barrow 1, Grave 21 (Mykolayiv Region) [1464], Babyno culture. 'Caster kit'. 1 – vessel, 2-8 – abrasives, 9 – arrowhead, 10 – shell, 11 – flakes, 12 – wooden artefacts

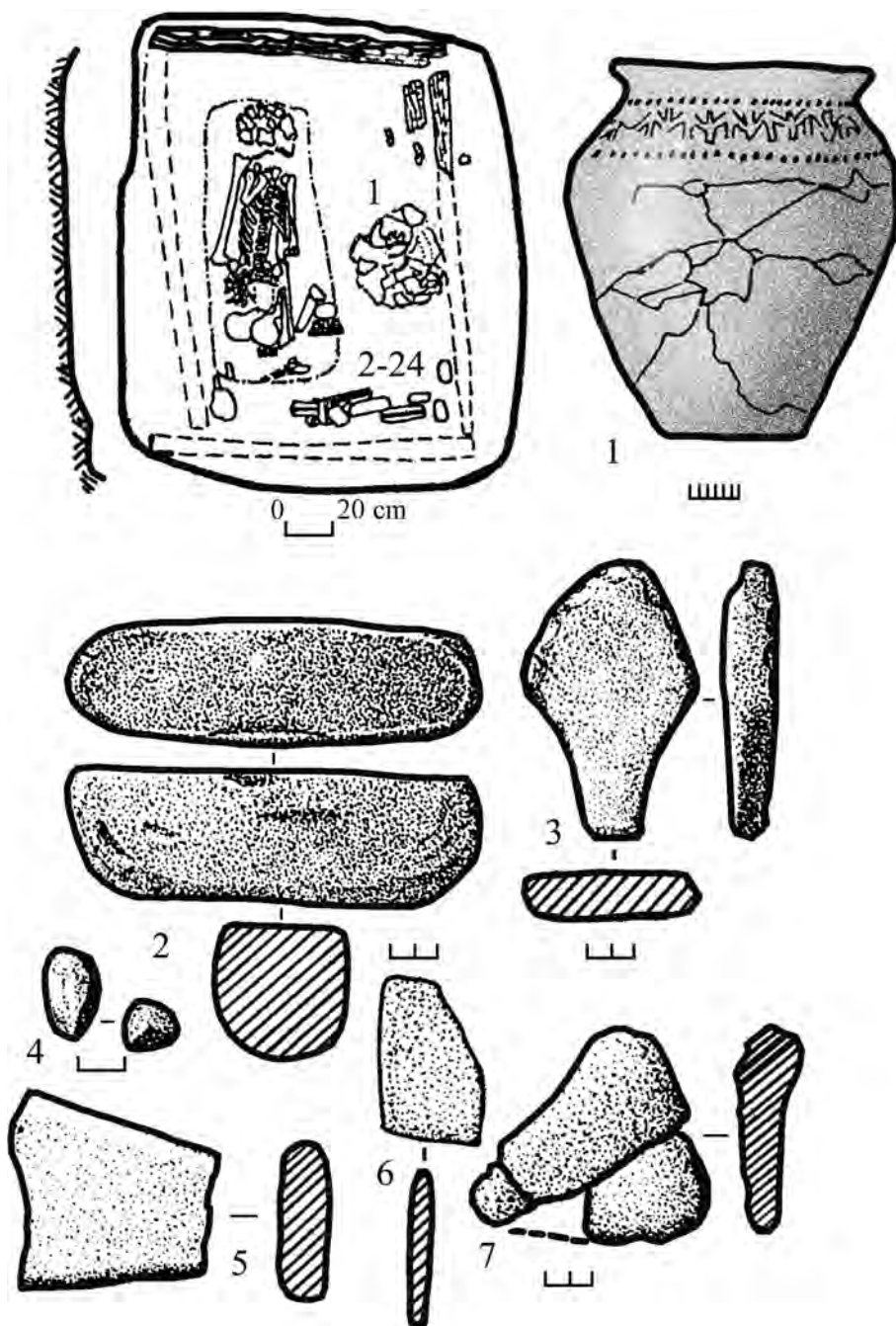


Fig. 63A. Barvynivka Barrow 1, Grave 8 (Zaporizhya Region) [1494], Babyno culture. 'Arrow-maker's kit'. A: 1 – ceramics, 2-7 – abrasives. B: 8-18 – abrasives, 19-24 – arrowhead blanks

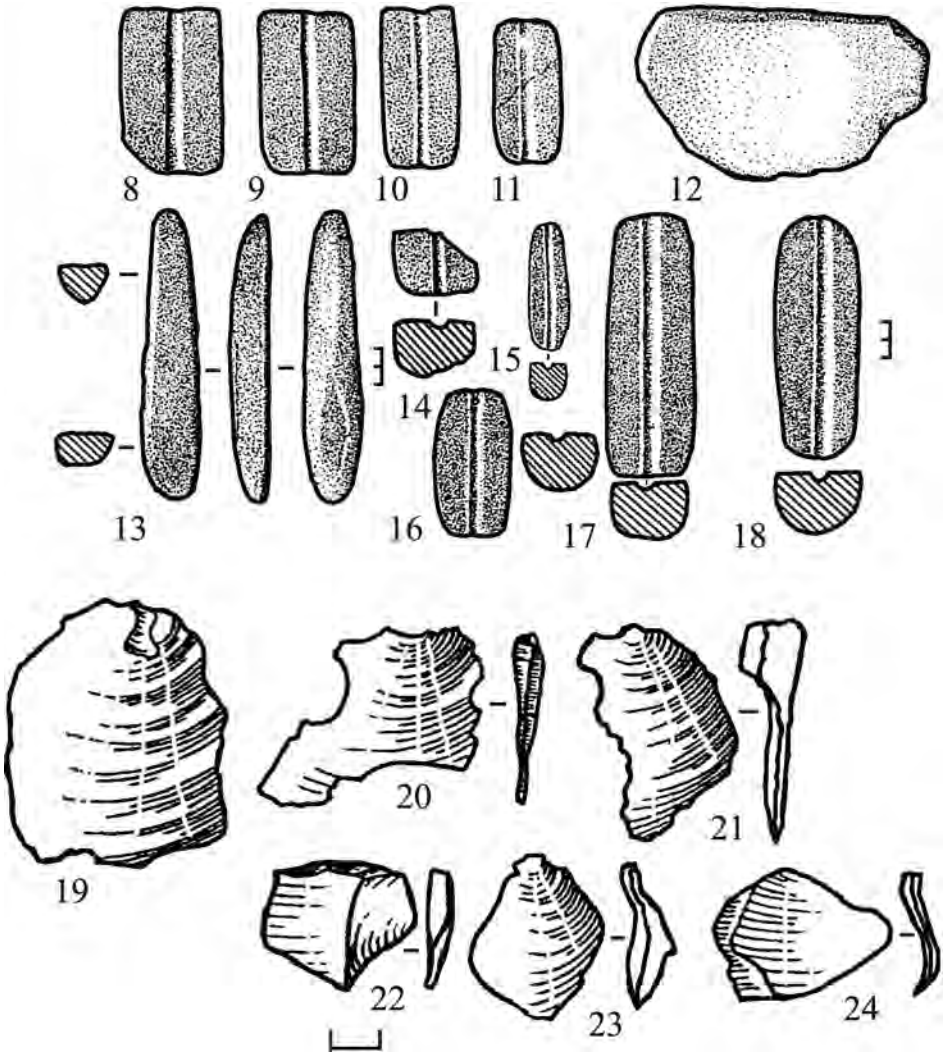


Fig. 63B.

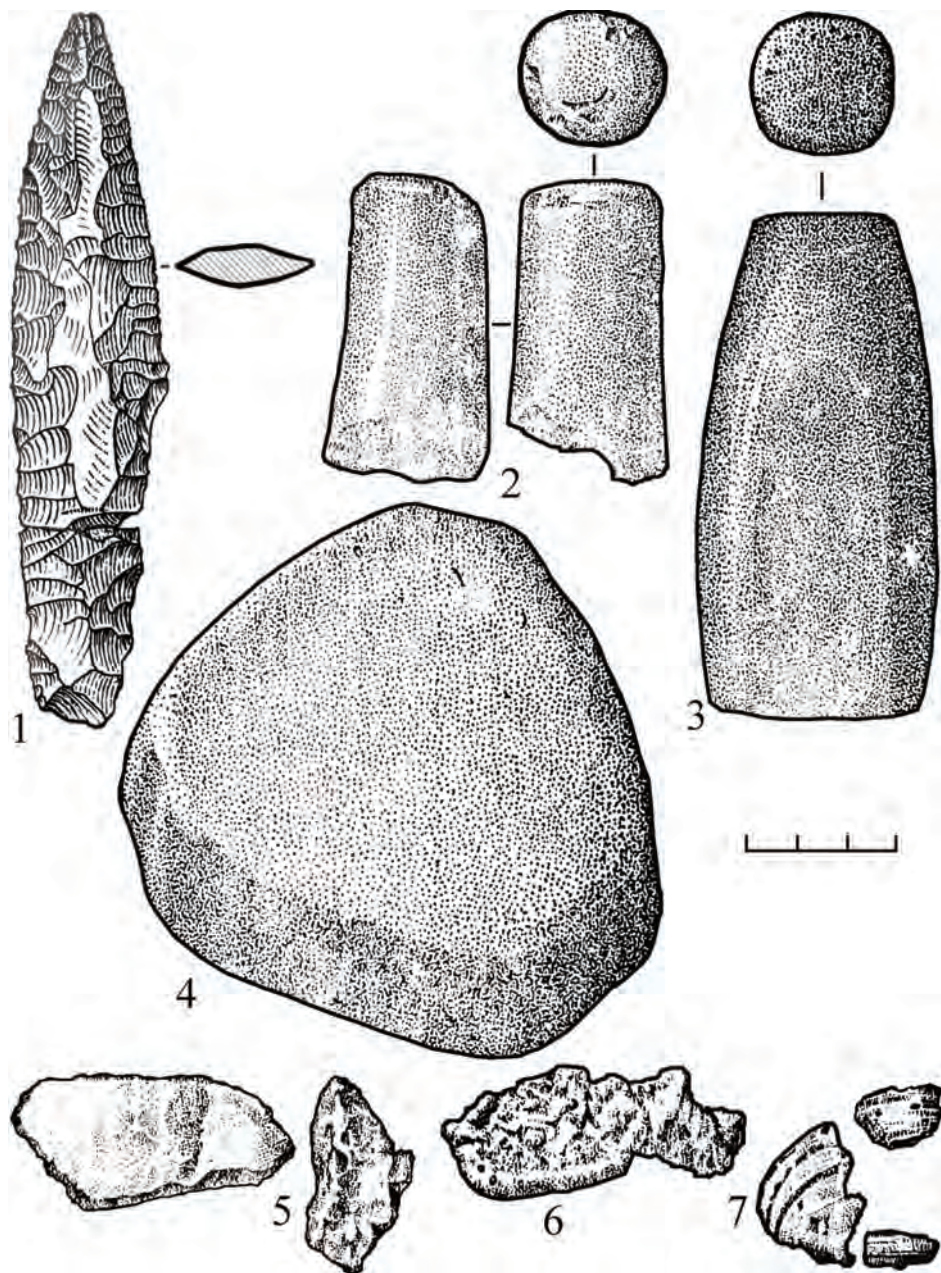


Fig. 64. Velyka Bilozerka IV Barrow 4, Grave 4 (Zaporizhya Region) [1515], Babyno culture. 1 – large biface, 2 – pestle on an axe-hammer fragment, 3 – pestle, 4 – anvil, 5-6 – abrasives, 7 – fossil shell

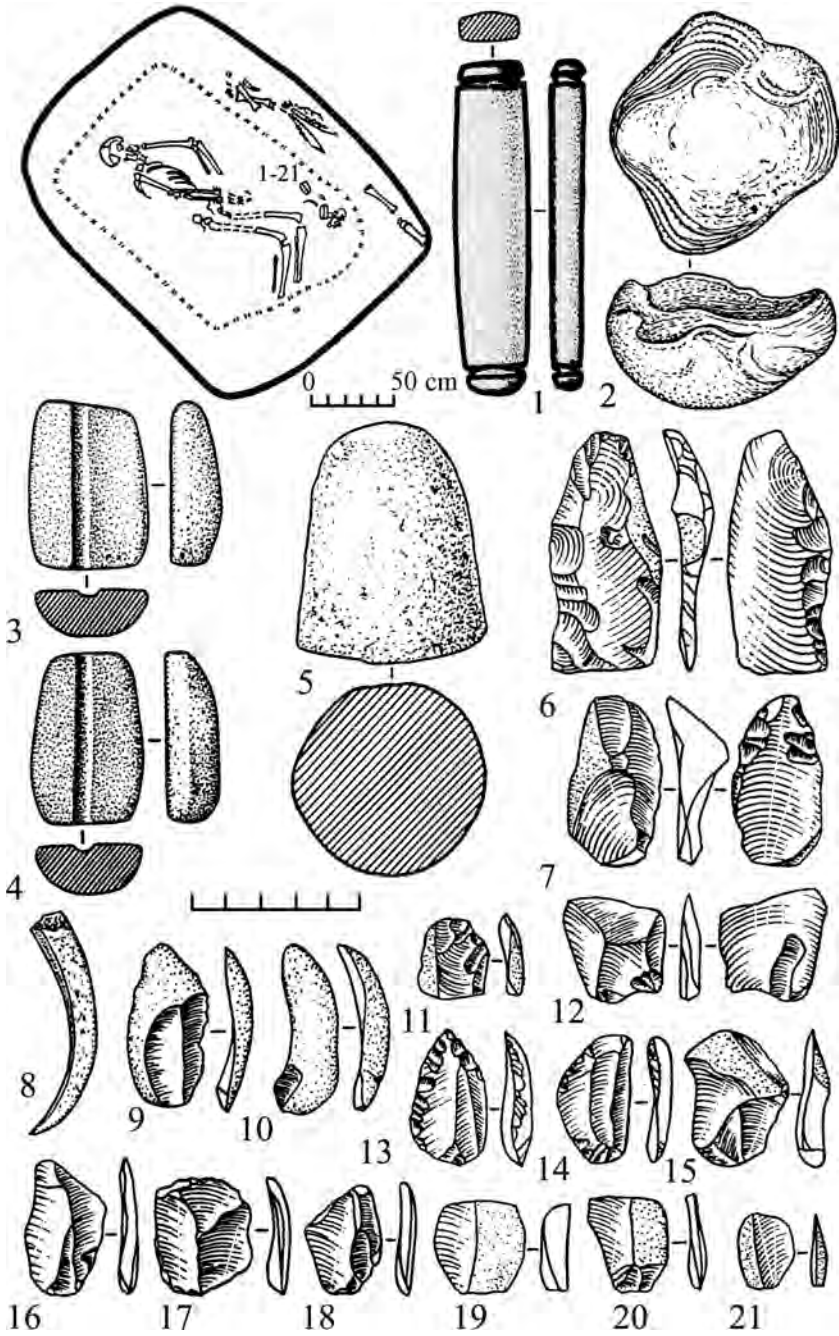


Fig. 65. Pryvillya Barrow 11, Grave 13 (Luhansk Region) [1444], Babyno culture. 'Arrow-maker's kit'. 1 – an archer's protective plate, 2 – fossil shell, 3-4 – fluted abrasives, 5 – pestle, 8 – boar fang, 6-7, 9-21 – arrowhead blanks

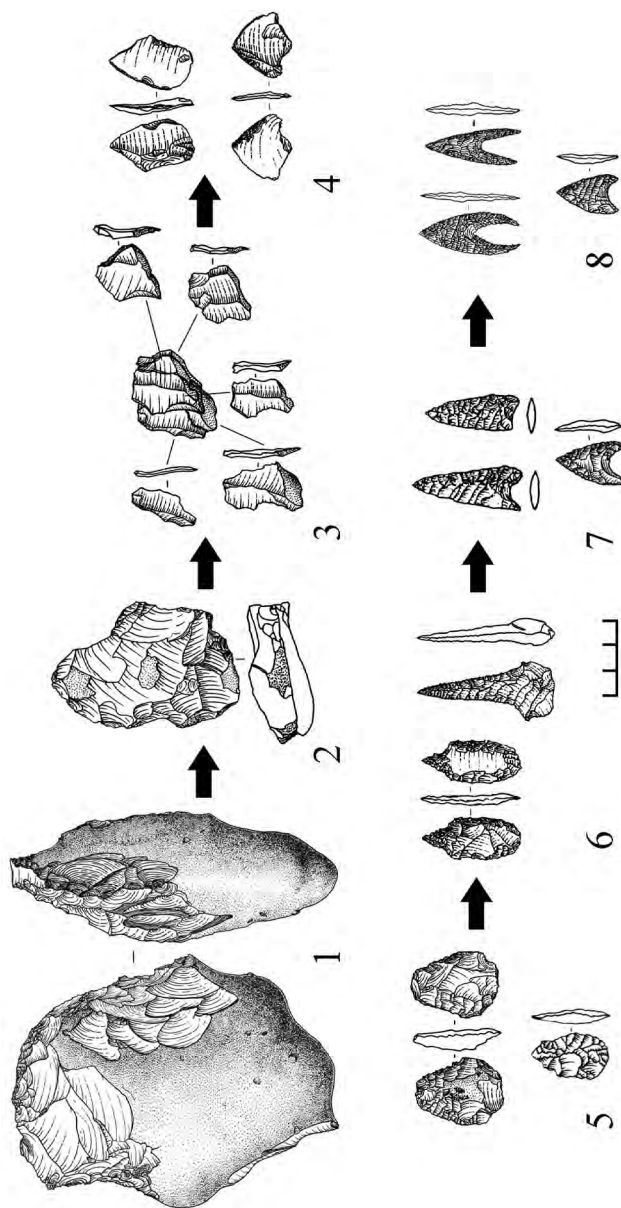


Fig. 66. Early and Middle Bronze Age arrowhead-making technique. 1 – a rib is formed on a concretion to serve as a platform for splitting-off flakes (blanks); 2-3 – blade-like flakes are split from a 'biface-like' core; 4 – points start being shaped at distal parts of the flakes; 5 – a thin biface pre-form is shaped with flattening flakes; 6 – a pressure tool is used to make a lamellar retouch, starting from the point; 7 – finally, the base of the arrowhead is shaped; 8 – functional artefacts

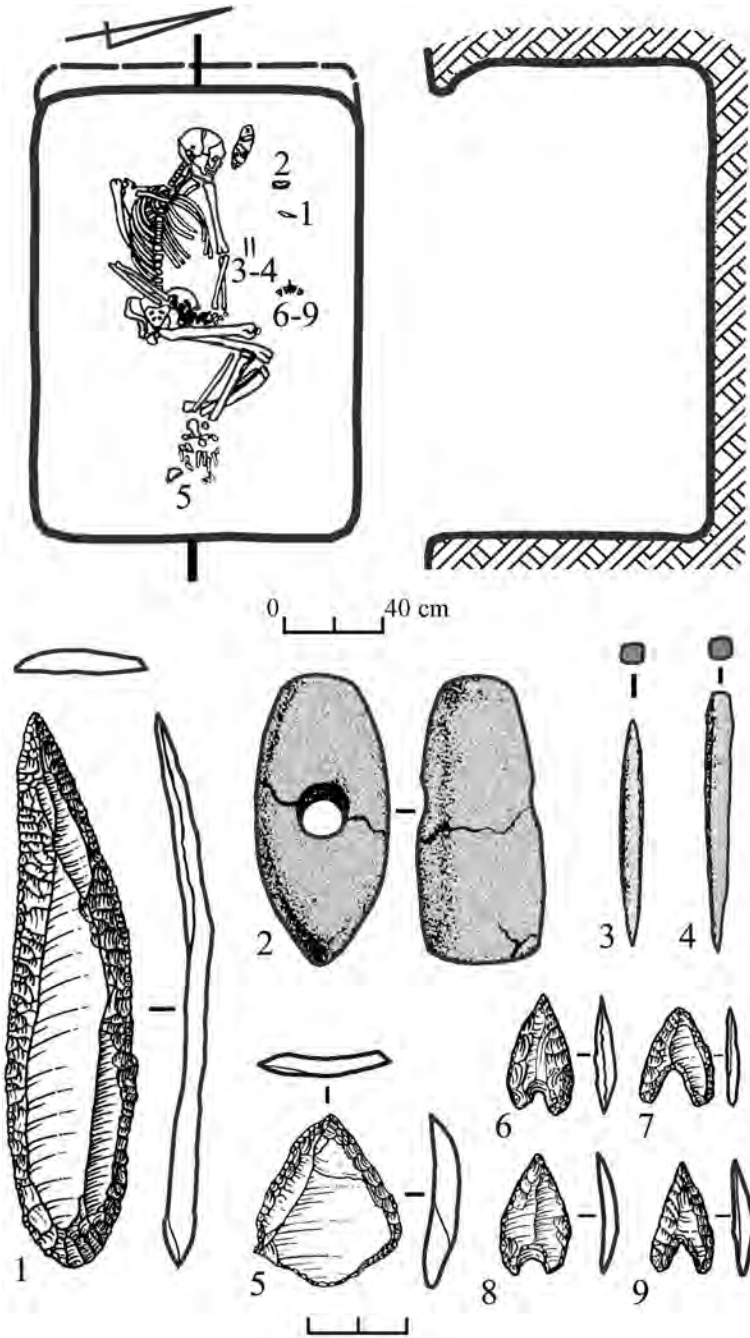


Fig. 67. Purkari Barrow 1, Grave 38 (Moldova) [1149]. A complex with 'Corded Ware' items. 1 – flint knife-dagger, 2 – axe-hammer, 3-4 – horn pressure tools, 5 – arrowhead blank, 6-9 – arrowheads

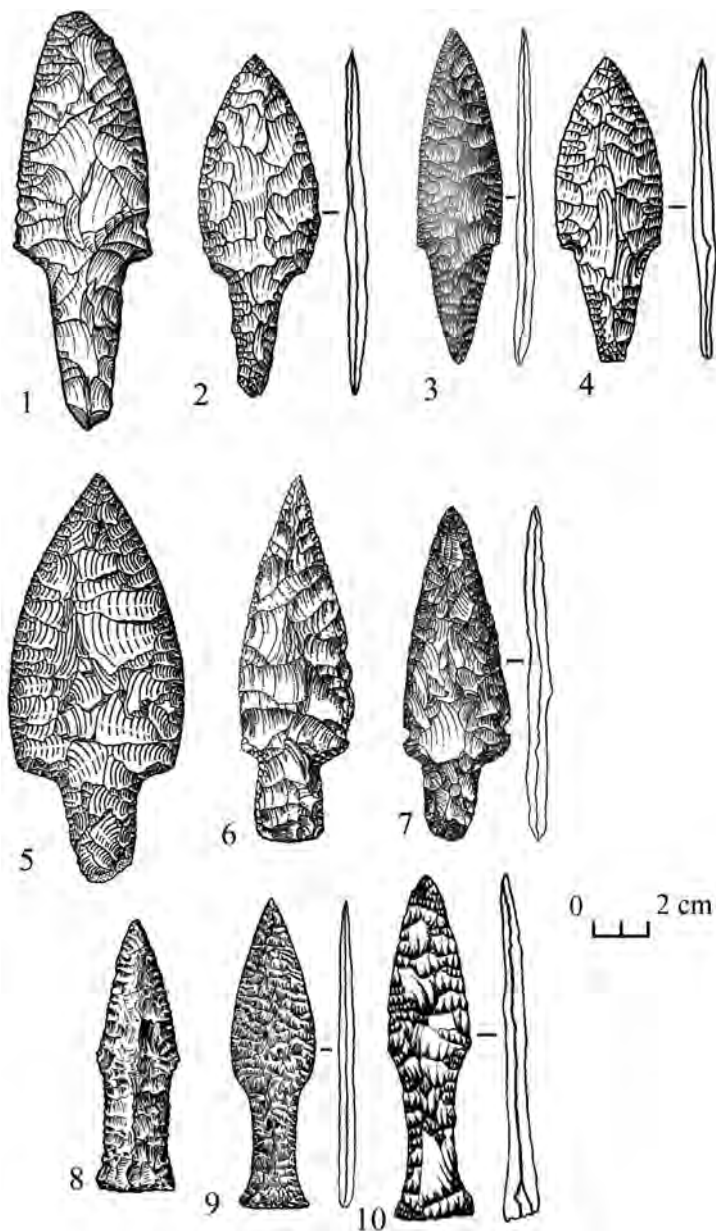


Fig. 68. Bronze-Age bifacial artefacts. 1-4 – from Northern Pontic Yamnaya culture burials; 5-7 – from sites of the Epi-Corded Ware cultures of eastern Poland and western Ukraine [Budzi-szewski, Włodarczak 2010]; 8 – from a Yamnaya settlement of Mykhailivka (Kherson Region) [Lagodovska *et al.* 1962]; 9-10 – from the Baltic Sea southern shore [Apel 2001; Czebreszuk, Kozłowska-Skoczka 2008]

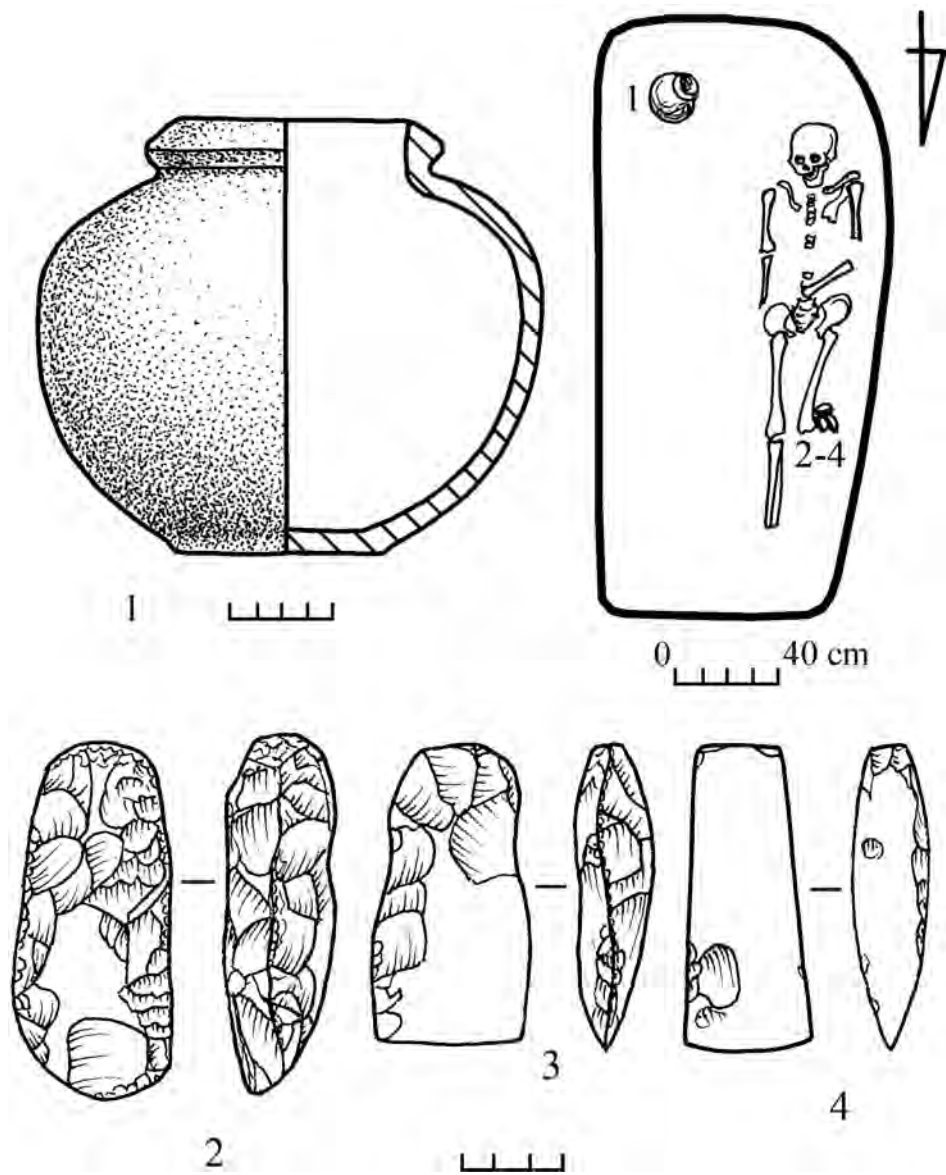


Fig. 69. Serhiyivka Barrow 1, Grave 3 (Odessa Region) [1217], Ingul Catacomb culture. 1 – vessel, 2-4 – axes of the Corded Ware cultures

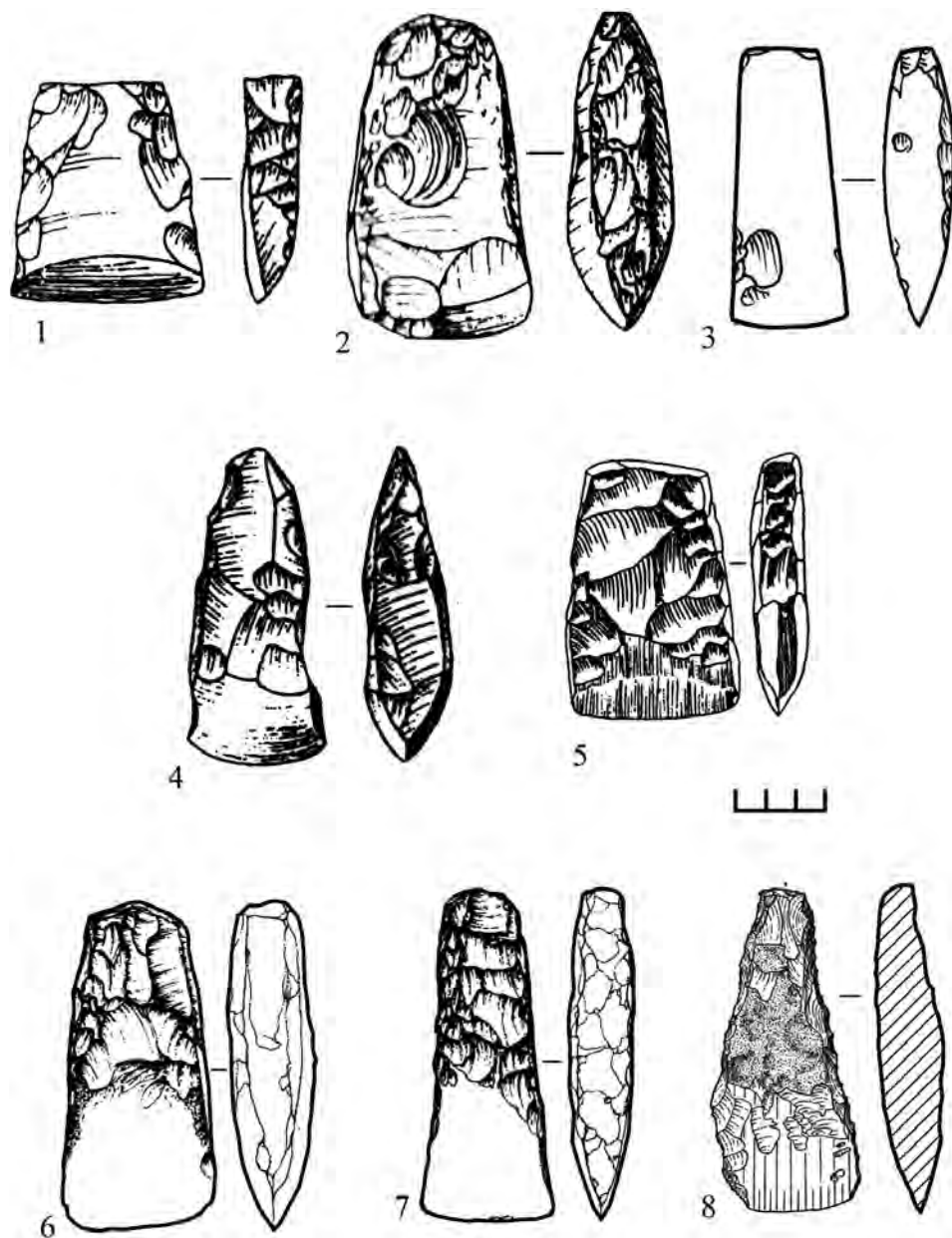


Fig. 70. Axes with ground blades. 1-4 – north-western Northern Pontic Region [Subbotin, 2003]; 5-7 – Kraków – Sandomierz Corded Ware culture [Machnik, Bagińska, Koman 2009; Włodarczak 2006]; 8 – axe of the Middle Dnieper Corded Ware culture (Voytsiekhovka cemetery, Zhytomyr Region; excavations by Lysenko)

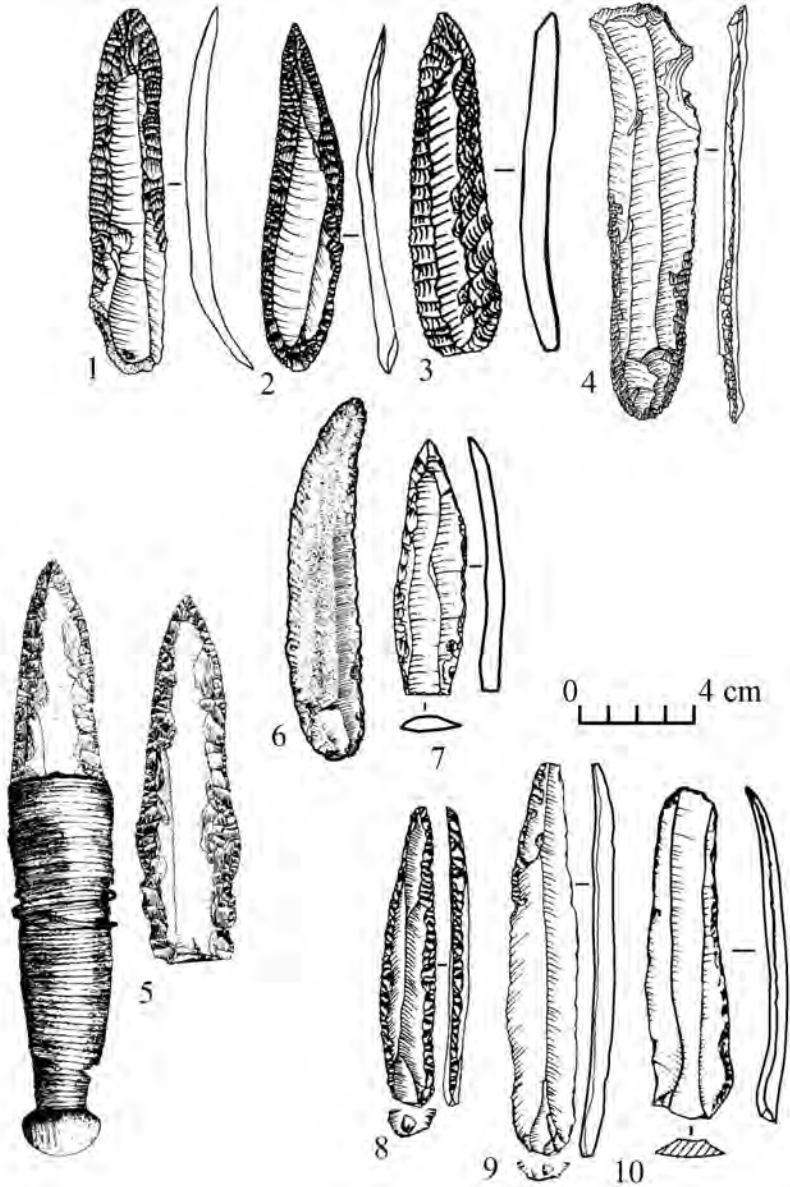


Fig. 71. Blade – based knives. 1-3 – from Yamnaya culture burials of the north-western Northern Pontic Region [Subbotin 2003]; 4 – Yamnaya complex of Porohy 1.3 (Vinnytsya Region, excavations by Razumov, Koško); 5 – Bronze-Age knife from Switzerland (Vinelz) [Budziszewski, Włodarczak 2010]; 6, 8, 9 – Kraków – Sandomierz Corded Ware culture [Włodarczak 2006; Machnik, Bagińska, Koman 2009]; 7, 10 – Czech Republic’s Corded Ware culture [Cvrkova, Koutecky, Brus 1991]

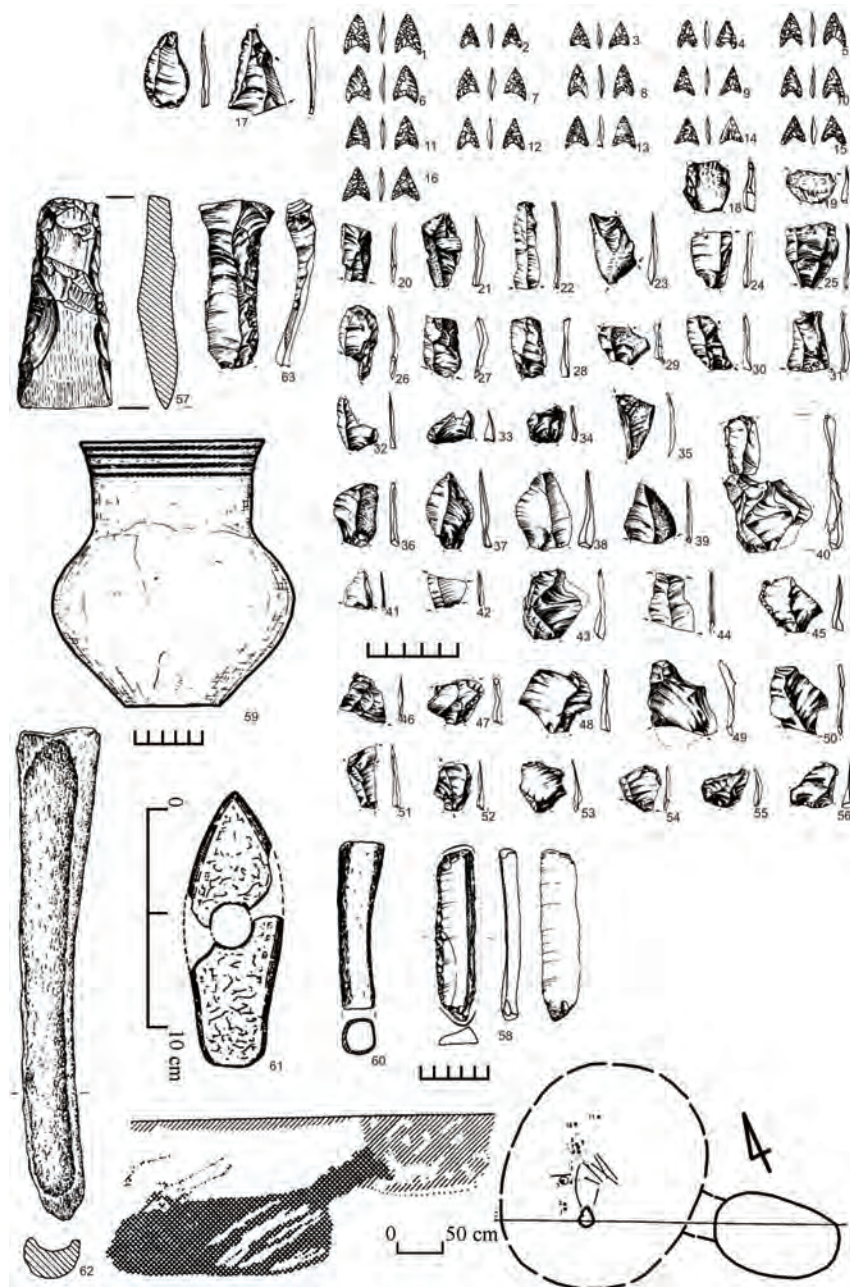


Fig. 72. Koniusza, Grave 3 (Małopolska). Catacomb burial of the Corded Ware culture, with an 'arrow-maker's kit'. 1-16 – arrowheads, 17-56 – arrowhead blanks, 57 – flint axe, 58, 63 – flint tools, 59 – vessel, 60 – horn artefact, 61 – axe-hammer, 62 – bone artefact [Włodarczak 2006]

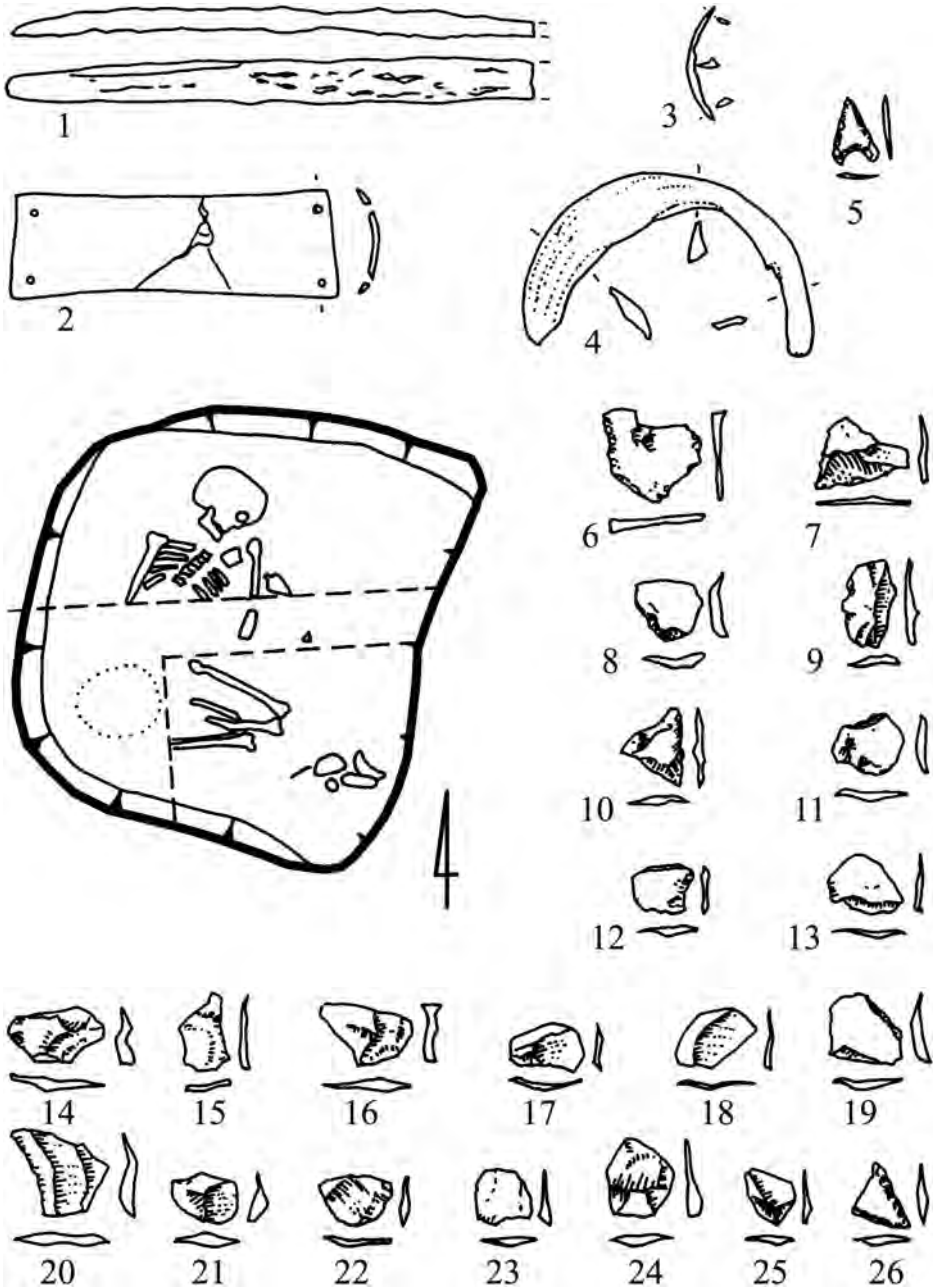


Fig. 73. Radovesice Barrow 116, Grave 78 (Czech Republic). Burial of the Bell Beaker culture, with an 'arrow-maker's kit'. 1,3 – bronze artefact, 5 – arrowhead, 2 – archer's protective plate, 4 – boar fang, 6-26 – arrowhead blanks [Batora 2006]. Scale: ?

ABBREVIATIONS

AA	– Arkheologicheskii Almanakh. Donetsk.
ADU	– Arheologichni doslidjennya v Ukraini. Kiev.
AVU	– Arheologichni vidkryttya v Ukraini. Kiev.
BPS	– Baltic Pontic Studies. Poznań.
DAS	– Donetskii Arkheologicheskii sbornik. Donetsk.
DSD	– Drevnosti Severskogo Dontsa. Luhansk.
DSPiK	– Drevnosti Stepnogo Prichernomor'ya i Kryma. Zaporizhzhya.
IA AN USSR	– Institut Arkheologii Akademii Nauk Ukrainy Sovetskoy Sotsialisticheskoy Respubliki. Moskva.
IA NANU	– Instytut Arkheologii Natsional'noi Akademii Nauk Ukrainy = Institute for Archaeology of the National Academy of Sciences of Ukraine. Kiev.
IAK	– Izvestiya Imperatorskoy Arkheologicheskoy komissii. Petersburg.
KSIA	– Kratkie Soobscheniya Instituta Arkheologii. Moskva.
MIA	– Materialy i Issledovaniya po Archeologii SSSR. Leningrad.
SA	– Sovetskaya Arkheologiya. Moskva.
SAI	– Svod Arkheologicheskikh Istochnikov. Moskva.
SE	– Sovetskaya Etnografiya. Moskva.
RA	– Rosiyskaya Arkheologiya. Moskva.

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