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Światowit 4 (45)/Fasc.B, 229-242

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2002

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KAROL SZYMCZAK (*IA UW*)

## A PROBLEM OF THE BULLET SHAPED CORES: A GLOBAL PERSPECTIVE

## I. Introduction

Summarizing the First Workshop on PPN Chipped Lithic Industries, held in Berlin, 29<sup>th</sup> of March - 2<sup>nd</sup> of April, 1993, S.K. Kozłowski and H.G. Gebel had proposed to divide a region of the Fertile Crescent into two main techno-taxonomical provinces: the eastern, comprising the piedmont of the Zagros together with adjacent lowlands, and the western, Levantinian one (KOZŁOWSKI, GEBEL 1994). The authors called these provinces: the eastern and the western wing of the Fertile Crescent.

The most important difference between the lithic assemblages of these two provinces is the presence of the macrolithic tanged points and the naviform, double striking platform cores in the assemblages of the western wing and the willow-leaf or rhomboid (lozenge) shaped arrowheads accompanied by relatively numerous microliths and the bullet shaped (conical) cores in the assemblages of the eastern wing. In later works the western industries were called the Big Arrowheads Industries (BAI; cf. AURENCHE, KOZŁOWSKI 1999, p. 61, tableau chronologique). Analysing this situation F. Hole (1996, p. 6-7) pointed out that the BAI single headed arrows are directly connected with an open steppe zone, while the microliths appear mainly in the upland regions, which could reflect the different hunting strategies.

The same author (HOLE 1996, p. 7) suggests that the microlithic and bullet shaped core processing tradition generally should be confined to the mountainous regions, probably of Caucasus or Northern Zagros/Taurus. Believing that microlitization of stone tools in this region has a particularly long tradition reaching even Mousterian (HOLE 1970) through the Epipalaeolithic, he supposes, after M. L. Inizan (1985) that "the conical blade cores (...) seem to have their earliest manifestation in Asia, implying that the technique of pressure flaking may have moved from east to west across the central Asian steppe". O. Bar-Yosef (1996, p. 208) is of an opinion that bullet shaped core technique has rather local, Caucasian origins.

A useful definition of "bullet shaped core" was given by P.J. Wilke (1996, p. 289-290). "The term 'bullet shaped'", writes he, "refers to very regular and symmetrical cores of rather small size that are nearly parallel-sided and of elongate conical form, and that were reduced around their entire perimeters". Other synonymous names

for such cores also met in the archaeological texts are: "conical cores", "pyramidal cores" or, mainly in Russian literature, "pencil-like cores" ("karandashevidniye nukleusi"). Very important is further remark of P.J. Wilke: "It should be recognized at the outset, however, that through extensive reduction, larger prismatic-blade cores can grade gradually and imperceptibly into small, exhausted, bullet-shaped cores. The term 'bullet shaped' is thus rather arbitrary with respect to core size, and, to a certain extent, even to form". It would mean that we should not treat bullet shaped cores as a separate class, but rather as one of the phases of a successful application of a certain core reduction technique (cf. also WILKE 1996, p. 303, Fig. 2). Thus, to the same technical category should be also included the cores discarded in other phases of processing, such as prismatic ones, bearing exceptionally regular blade or bladelet negatives on their surfaces. Such cores could potentially turn into the bullet shaped ones if only their further processing could be continued. In this context an expression "bullet shaped" must be considered only as a signal word, covering in fact much wider category of core morphological classes (cf. also HILDEBRAND 1996, p. 195).

With bullet shaped cores an application of pressure-blade technology is closely associated (INIZAN 1985, WILKE 1996, p. 291). Especially the cores with an angle between a platform and a surface close to the right one are highly possible to be worked with the use of pressure technique (PELLEGRIN 1984, WILKE 1996, p. 301). It cannot be forgotten than, that when we discuss the problems concerning bullet shape cores, such as their origins or distribution, at the same time we also have in mind the problems of the origins or distribution of the pressure technique.

The maps showing distribution of the PPN flint assemblages with a significant share of bullet shaped cores in the Near East were elaborated by several authors (INIZAN, LECHEVALLIER, 1994, p. 24, Fig. 1, WILKE 1996, Fig. 1). As we have said above, such assemblages appear nearly exclusively East of Tigris River, and perfectly mark a borderline between the eastern and the western wing of the Fertile Crescent. For some assemblages the specific figures of bullet shaped cores representation could be given: Ali Kosh – less than 90%, Asiab – 54.1%, Karim Shahir – 39.1% (HILDEBRAND 1996, p. 200, Table 2), Nemrik 9 – ca 50% (KOZŁOWSKI, SZYMCZAK 1990, p. 64, 71, Table A, see also fig. 1).

After analysing the dates from Ali Kosh (C1 and C2 – 9.500-8.700 BP, B1 – 8.700-8.000 BP, A1 – 8.000-7.600 BP), Asiab (9.755 ±85 BP), Karim Shahir (ca 10.850-10.550 BP) and Pa Sangar (older than 12.000 BP – with no bullet shaped cores present), E.A. Hildebrand (1996, p. 200, Table 2) concluded that the pressure technique must have appeared in Zagros region between 12.000 and ca 10.500 BP, to expand gradually during the following millennia (note that all 14C dates mentioned in this paper are given in conventional – uncalibrated – years BP). E.A. Hildebrand's opinion seems to stay in quite a good accordance with the chronological results from Nemrik 9, where the oldest series of 14C dates, which could be considered as probable, indicates the first half of the 12<sup>th</sup> millennium BP (PAZDUR 1992, p. 116, Table 1/VI).

However, such an early chronology becomes doubtful, if we have taken into account the results obtained in the M'lefaat site, where a share of bullet shaped cores is also significant (KOZŁOWSKI 1998, p. 196-197, Figs. 13, 14). The charcoal samples elaborated in the Gliwice Laboratory gave four dates between 14.000 and 12.000 BP, and another four between 11.000 and 9.500 BP (KOZŁOWSKI 1998, p. 188, Fig. 4). Yet, the repeated dates from the wet sieved botanical samples sent for the accelerator dating to the Oxford 14C Laboratory gave considerably younger results: 9.890 ±120 BP, 9.870 ±140 BP, 9.680 ±100 BP and 9.660 ±250 BP (KOZŁOWSKI 1998, p. 189). S.K. Kozłowski (1994; 1998, p. 189) is of an opinion that "ageing" is a general problem of the dates obtained from the Near Eastern charcoal samples: "Dates clearly earlier than could be expected are frequently being obtained from Middle-Eastern sediments", writes he.

According to the same author the accelerator dates from M'lefaat correspond with phase II in Nemrik, dated before to 11.300 ±200, 11.180 ±90 and 10.900 ±140 BP (PAZDUR 1992) and phase IIIA in Murreybet, dated to 11.150-10.950 BP (AURENCHE, KOZŁOWSKI 1999, p. 178). Thus, if we introduced to our discussion a general "ageing correction", we would have to agree that the beginnings of a bullet shaped cores reduction with the use of pressure technique should be dated to the first half of the 10<sup>th</sup> millennium BP, which is, as we will see below, not significantly earlier than in other cultural units of Eurasia.

The maps presented by M.L. Inizan and M. Lechevallier (1994, p. 24, Fig. 1), F. Hole (1994, p. 332, Fig. 1), P.J. Wilke (1996, p. 291, Fig. 1) or O. Aurenche and S.K. Kozłowski (1999, p. 54, Fig. 7) show that the PPN sites with bullet shaped cores in the East reach only the western parts of the Iranian Plateau (Ganj Dareh, Abdoul Hossein), and do not cross a zone of the salty deserts. M.L. Inizan and M. Lechevallier (1994, p. 24, fig. 1) mark the single sites with pressure technique as far as in Afghanistan and Pakistan. Yet, such a picture of

distribution of the bullet shaped cores in the Early Holocene of the Old World is far incomplete. Besides some contributory papers discussing an occurrence of pressure technique in particular regions (INIZAN, LECHEVALLIER 1990; INIZAN, LECHEVALLIER, PLUMET 1992) we do not find any publication presenting a discussed phenomenon in whole. In this paper we would like to widen a view on this problem and show it in a global perspective, even though such an approach have brought us much more new questions than answers.

## II. Early Holocene cultural units with well marked share of bullet shaped cores beyond Fertile Crescent

Speaking about applying the pressure technique of blade reduction and bullet shaped core working we have to be aware that although alike, it is not exactly the same everywhere and has its local peculiarities. The best example is a Kelteminarian tendency to change the bullet shaped core's orientation at the end of its exploitation by removing its top to form an opposite striking platform (Fig. 2: 1). In such a way many specimens turned into pseudo-double platform cores. We do not find traces of such an operation in the Near Eastern assemblages. Nevertheless the presence of the pressure technique itself in all the areas discussed in this paper is rather obvious.

### II.a. The Turanian Lowland – the Dzheytun and Kelteminar cultures

The mystery of the Turanian Lowland of Central Asia is not only a lack of the archaeological sites with bullet shaped cores in the period between 12<sup>th</sup> and 8<sup>th</sup> millennia BP, but a complete lack of any sites at all. The earliest neolithic settlement, in which the use of bullet shaped cores and pressure technique is perfectly marked, is dated to the second half of 8<sup>th</sup> millennium BP and is identified as the Dzheytun and Kelteminar cultures.

According to V. M. Masson (1971, p. 28-29, Table 1), who cites the former works of G.F. Korobkova (1969), in an inventory from the Dzheytun site a total of 100 flint cores was found. At least 67 of them were of prismatic form, while 7 were conical, all bearing exceptionally regular blade and bladelet negatives on their surfaces (cf. also illustrations: MASSON 1971, Table X: 10-12, Table XI: 1-11). In other Dzheytunian assemblages (e.g. Togolok-depe, Novaya Nisa; cf. KOROBKOVA 1969, p. 38, 40) the forms of cores and the technique of their reduction is very similar. Only in an inventory from T'chagally-depe the presence of regular blade cores is marked less clearly (KOROBKOVA 1969, p. 48, 57).

The earliest 14C date for the Dzheytun culture comes from Togolok-depe – 7.320 ±100 BP; the other four dates from Dzheytun (2), T'chagally-depe and Togolok-depe cover the very end of the 8<sup>th</sup> and the turn of the 7<sup>th</sup> millennium BP (BRUNET 1999, p. 32, Table 2).

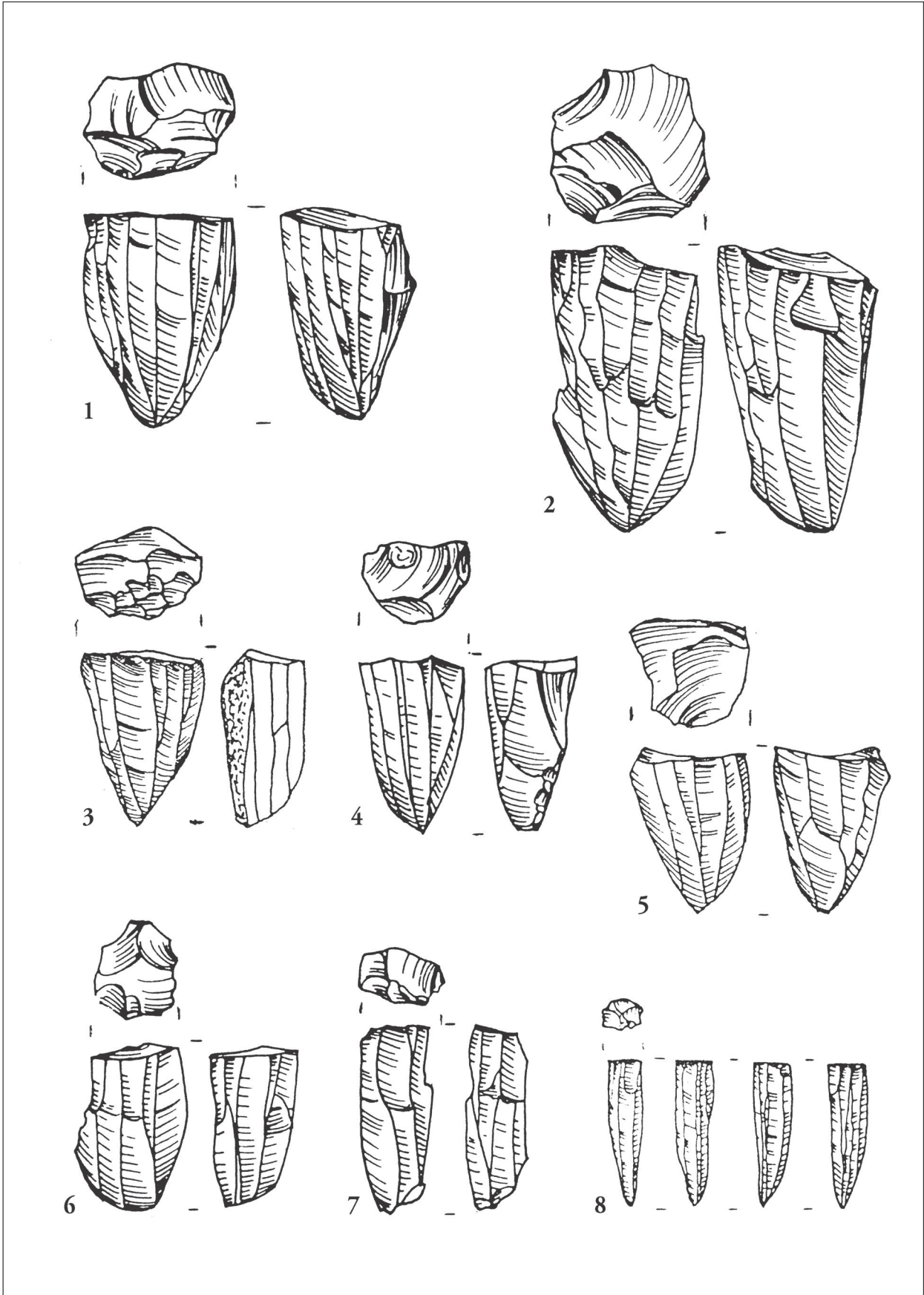


Fig. 1. 1-8 – examples of the bullet shaped cores from Nemrik 9, Pre-pottery Neolithic of Northern Iraq

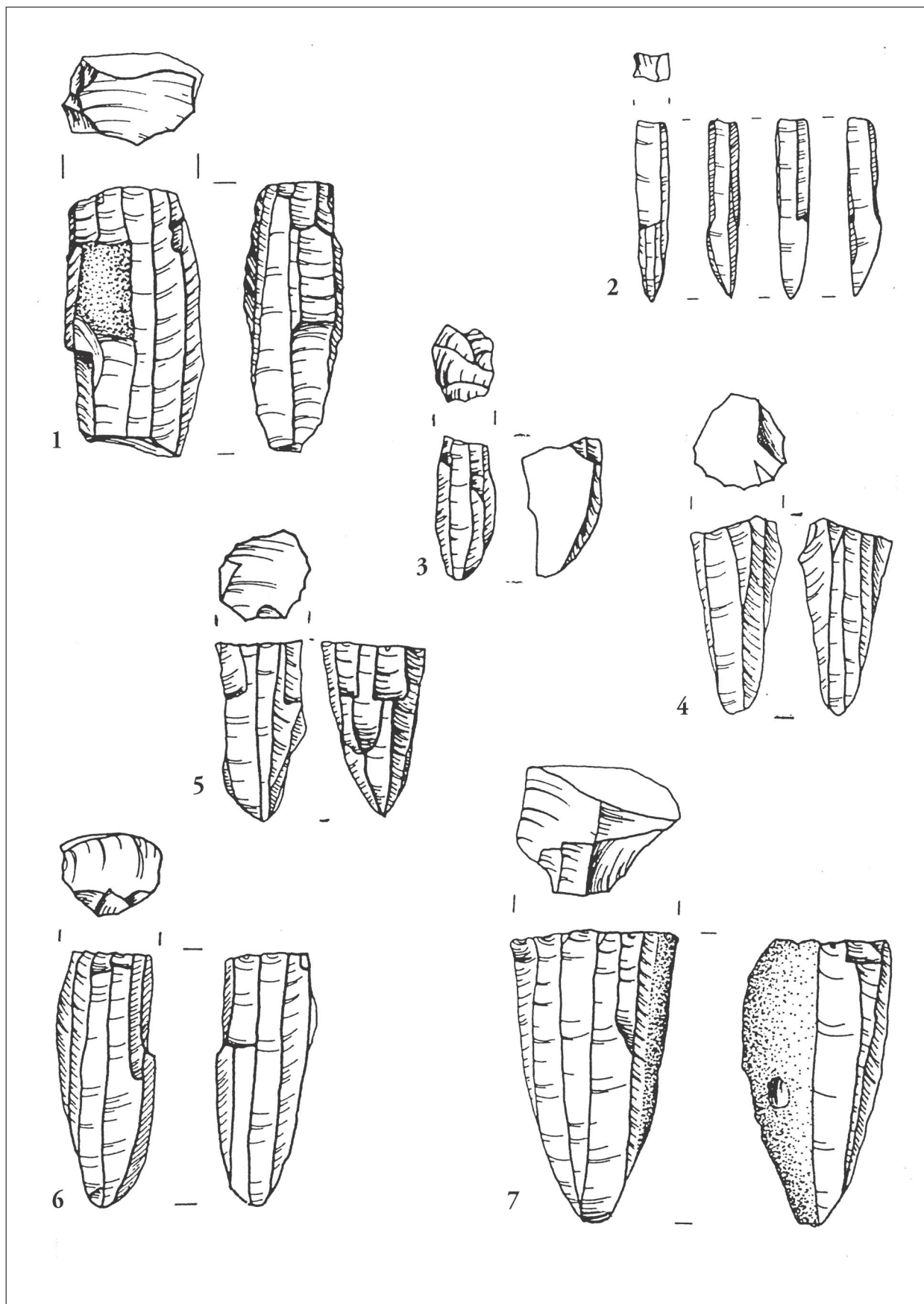


Fig. 2. 1-7 – examples of the bullet shaped cores from Ayakagytna The Site, Keltiminar culture of Uzbekistan

No clear evidence for any older (Mesolithic) settlement in the Turkmenistan lowlands is noted (DOLUKHANOV 1986, p. 123-124; BRUNET 2002, p. 74-78, Carte 4).

In the Kelteminarian flint collections the presence of regular bladelet cores exploited with the use of pressure technique is excellently marked from the very earliest stages of this unit (Dariasay phase). The homogeneous Dariasay assemblage from Ayakagytm The Site (lower layer) yielded 105 cores and core forms, 89 of which are regular – prismatic or bullet shaped (SZYMCZAK, GRETCHKINA [eds], 1997; SZYMCZAK, MUSTAFAKULOV [eds]; 1998, SZYMCZAK, KHUDZHANAZAROV [eds], 1999, 2000, field documentation, see also: SZYMCZAK, GRETCHKINA 1996, and Fig. 2). Other assemblages of the same type (e.g. Utchashtchi 131 – VINOGRADOV 1981, p. 64-67) present the similar features.

A series of eleven <sup>14</sup>C dates for the lower (Dariasai) layer of Ayakagytm The Site covers a period between 7.190 ±20 BP and 6.640 ±55 BP (SZYMCZAK, KHUDZHANAZAROV, FONTUGNE, MICHNIAK, in course of issue, Table I, Fig. 4).

As in the case of Dzheyntun culture, also in the Uzbek lowlands we do not have any evidence for the settlement which would directly precede the Dariasai one (DOLUKHANOV 1986, p. 123-124; BRUNET 2002, Carte 4). However, it has to be mentioned that in the upland and mountainous region of eastern Central Asia the situation is quite different. A number of the mesolithic sites is noted, dated as early as: 10.700 ±500 BP (Shugnou in Tadzhikistan), 10.210 ±235 BP (Ak-kupruk II in Afghanistan), 9.530 ±130 BP (Oshkhona in Tadzhikistan) or 9.475 ±100 BP (Darra-i Kalon in Afghanistan) with other <sup>14</sup>C dates covering all the local Mesolithic and Neolithic (BRUNET 1999, p. 32-33, Tableau 2). In many collections of this group (e.g. Central Fergana, Sazagan) the elements of bullet shaped core processing and the employment of pressure technique could be traced (ISLAMOVIĆ, TIMOFEEV 1986; DZHURAKULOV, KHOLMATOV 1991), though they are not that numerous and clear, especially in the territories where as a basic raw material was used not flint but other siliceous rocks such as hornstone (closely resembling green or dark red jasper) or chalcedony.

A few words should be also devoted to the region of Ustiurt plateau (East of Caspian Sea), where we find quite a number of collections characterized by “pencil-like, semi-conical cores with round reduction” (KOROBKOVA 1989, p. 156, Table 95: 22-23). Although these materials cannot be considered as homogeneous, neither have any absolute date, on the basis of typological connections with South Ural assemblages, many researchers believe that the earliest groups of the Ustiurt Mesolithic should be dated not later than

8<sup>th</sup> - 7<sup>th</sup> millenium BP (MATIUSHIN 1976, p. 153, 156-157; BIZHANOV 1982, p. 31-33; KOROBKOVA 1989, p. 157-158).

### II.b. The Tchokh culture

The Tchokh culture, located directly West of the Caspian Sea is the only Caucasian unit with the presence of bullet shaped cores well marked. Among the mesolithic layers 5 - 3 of the Tchokh site in layers 4 and 3 “appear the subconical cores with regular striking surfaces”, while in layer 3 “appear also the pencil-like forms” (BADER, TSERETELI 1989, p. 102).

The chronology of this unit is uncertain. A.A. Formozov (1963), X.A. Amirkhanov and N.O. Bader and L.D. Tsereteli (1989, p. 102) refer either layers 5 - 1 or only 5 - 3 generally to the Mesolithic, while V.G. Kotovitch (1964, p. 119) moves the chronology of layers 5 - 3 back to the Late Palaeolithic, which is rather less convincing. Anyway, it cannot be proved that in the Caucasus region the bullet shaped cores and the pressure technique appear earlier than anywhere else.

### II.c. The Yangielsk culture

According to G.N. Matiushin (1989, p. 144) in the Yangielsk culture flint assemblages there are three main types of cores: conical with single platform, para-prismatic and cubic ones (cf. also: MATIUSHIN 1976, p. 100, Fig. 24; BESPROZVANNIY, MOSIN 1996, p. 23, Fig. 2).

No direct <sup>14</sup>C dates for the Yangielsk culture are available. According to the conclusions of G.N. Matiushin (1989, p. 146-147) the beginnings of this unit should be dated as early as the turn of the Pleistocene and Holocene periods. The same author in his other work correlates the earliest, as he believes, Yangielsk site Shikaevka II with layers 27 - 24 from the Trialetian Belt Cave (MATIUSHIN 1986, p. 141, Fig. 6). If we only agreed with this correlation and taken into account the controversial (KOZŁOWSKI 1996, p. 162) <sup>14</sup>C dates for the layers under discussion: 11.660 ±640 BP and 9.500 ±200 BP, we could assume that the Yangielsk culture was formed in the beginnings of the Holocene period, more less at the same moment as its western neighbour – the Romanovsk-Ilmursin culture.

### II.d. The Romanovsk-Ilmursin culture

Although the lithic assemblages of the Romanovsk-Ilmursin culture nearly completely lack microliths, the regular blade cores of prismatic or conical forms always prevail (MATIUSHIN 1989, p. 130-131, Table 86).

The earliest <sup>14</sup>C dates for the Romanovsk-Ilmursin culture come from the Kholodnyy Kliutch (Siun' I) site – 9.650 ±50 BP and 9.620 ±50 BP for the soil covering directly a cultural layer (MATIUSHIN 1976, p. 308). The same author (1989, p. 132) also mentions the

Romanovka II site 14C dated for the 10<sup>th</sup> millenium BP. The remaining series of 14C dates, mainly for the mesolithic layers of the Mullino sites, comprise the 9<sup>th</sup> millenium BP. On this basis G.N. Matiushin (1989, p. 132) suggests that the origins of the Romanovsk-Ilmursin culture reach the Pleistocene/Holocene turn.

### II.e. The Kama-Petchora complex

To the Kama-Petchora complex a number of local cultural units separated by various authors and spreaded all over the East European Plain could be included: the Ulyanovo, Vitchehda Ust', Kama Ust', Vis, etc. (BUROV 1999). The lithic assemblages of all that complex base on processing the bullet shaped cores: "cores in the collections are mainly conical" (BUROV 1999, p. 281, Fig. 2, 3, 7-9; cf. also: STARKOV 1989, p. 125-128 and a paragraph devoted to the Kunda culture in this paper). It has to be stressed that practically all the Mesolithic cultural units North of the Kama-Petchora complex use the same core processing technique (cf. OSHIBKINA 1989, p. 32-45, map 4; BUROV 1999).

G.M. Burov (1999, p. 283-284) dates the beginnings of the Kama-Petchora complex to the 10<sup>th</sup> - 9<sup>th</sup> millenium BP, using the geological and typological argumentation. Although V.F. Starkov (1989, p. 128-129) is less enthusiastic over such a view, Burov's point seems to be quite convincing. The only two 14C dates for the Kama region sites are not that old: Barinka II obtained 8.265 ±130 BP and Barinka I – 7.435 ±170 BP (STARKOV 1989, p. 125, 127).

### II.f. The problem of the Seroglazovsk culture

More than 400 archaeological sites with flint artifacts are noted in the North Caspian lowland (MELENTIEEV 1989, p.104, cf. also: table 58: 43). In these collections, writes the author, "in majority the cores are conical, often with round reduction".

The lithic finds, identified as the Seroglazovsk culture, are different in their character from the assemblages of Crimea and Black Sea regions, as well as from the southern Urals ones, being rather compared with the Near Eastern Natufian (MELENTIEEV 1989, p. 105). Although the sites of the Seroglazovsk culture have no any reliable chronology, it is belived that this unit has its Mesolithic and Neolithic phases. Some authors suppose that the beginnings of the culture under discussion should be dated to the turn of the Pleistocene and Holocene, or even a little earlier (KOZŁOWSKI J.K., KOZŁOWSKI S.K. 1981, p. 58, Map 18).

### II.g. The Butovo culture

According to L.V. Koltsov and M.G. Zhilin (1999a, p. 347-348, 1999b, p. 58-62, Table I) in the flint assemblages of the Butovo culture (ca 100 sites known

today among which three dozen or so yielded a significant number of artifacts): "blades were produced mainly from subconical and prismatic cores, and microblades – from conical and pencil-like cores". Further on the authors mention that "pressure technology was used for obtaining regular blades and microblades, probably, with heat treatment".

The earliest 14C date known for the Butovo culture comes from the Butovo site – 9.310 ±110 BP (KOLTISOV, ZHILIN 1999a, p. 346). The site Bielivo 4A, described as Yenievian with Butovian elements has five 14C dates: 9.940 ±300 BP, 9.550 ±100 BP, 9.130 ±150 BP, 8.840 ±110 BP and 8.770 ±180 BP (KOLTISOV, ZHILIN 1999b, p. 55). The remaining series of two dozen or so 14C dates for the same unit covers in whole the 9<sup>th</sup> and 8<sup>th</sup> millenia BP. The Tikhonovo site, which on the basis of pollen and geological analysis is considered to be some 100 - 200 years older than Butovo gave only a small number of microblades and should be rather connected with the Late Palaeolithic traditions (KOLTISOV, ZHILIN 1999b, p. 55).

### II.h. An episode of the Kukrek culture

The only unit with regular blade cores and the use of pressure technique well marked, which appears in the region North of Black Sea is the Kukrek culture (KOZŁOWSKI J.K., KOZŁOWSKI S.K. 1975, p. 344-346, Map 16). According to L.L. Zalizniyak (1998, p. 175) its assemblages "are characterized by a well developed microblade technique" while "the most important types of cores are regular conical and pencil-like forms". The author exemplifies his description by a number of illustrations (Fig. 66: 32, 50-51, Fig. 67: 14, 56-57).

O.O. Yanevitsh (1987) and L.L. Zalizniyak (1998, p. 179-180) date the beginnings of the Kukrek culture to the turn of the Pleistocene and Holocene, though the available 14C dates are not that early. A series of seven dates for the Igren' 8 site closes in a range of 9.290 ±110 BP – 6.930 ±130 BP (TELEGIN 1989, p. 115). The Kukrek site itself obtained three dates: 9.600 ±150 BP, 7.320 ±65 BP and 7.285 ±70 BP (TELEGIN 1989, p. 114), while Kamannaya Mogila site is 14C dated to the turn of 8<sup>th</sup> and 7<sup>th</sup> millenium BP (ZALIZNIYAK 1998, p. 179).

It has to be stressed that the Kukrek culture, keeping the Early Mesolithic chronology is located relatively far West and South of a chain of the East European cultures with bullet shaped cores, and as the only one does not seem to have any clear typological nor spacial connections with them. The other unit with bullet shaped cores in this region – the Donets culture, spread on the lower Donets, East of the Kukrek culture range, has much younger chronology – Early Atlantic period, contemporary to the Yanislavitsse culture (GORELIK 1984, 1987; SZYMCZAK 1995, p. 127; ZALIZNIYAK 1998, p. 198).

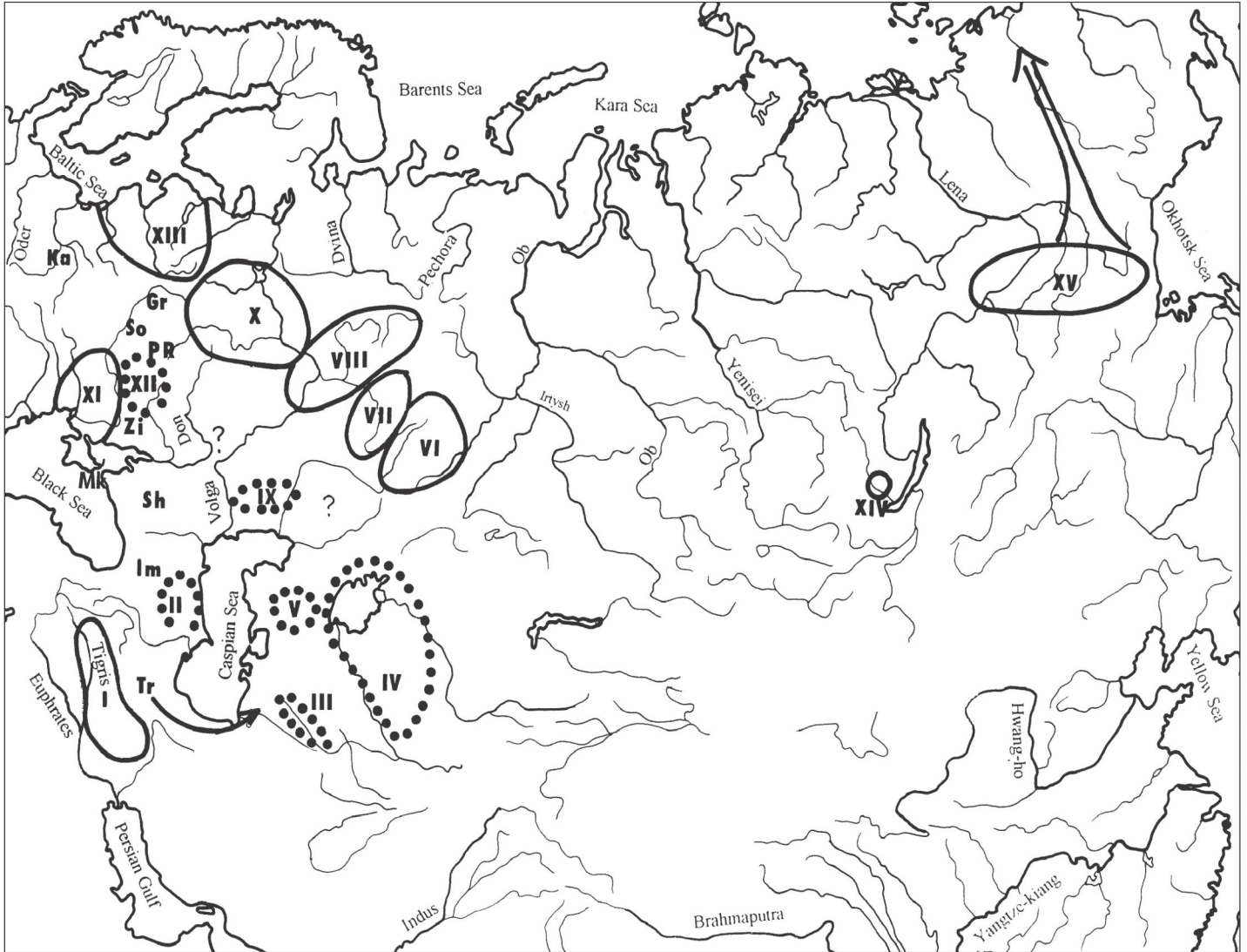


Fig. 3. Distribution of the Late Pleistocene/Early Holocene cultural units with bullet shaped cores in Eurasia:

- |  |   |
|--|---|
| I – the Eastern Wing of the Fertile Crescent | IX – the Seroglazovsk culture           |
| II – the Tchokh culture                      | X – the Butovo culture                  |
| III – the Dzheytun culture                   | XI – the Kukrek culture                 |
| IV – the Kelteminar culture                  | XII – the Donets culture                |
| V – the collections from Ustiurt plateau     | XIII – the Kunda culture                |
| VI – the Yangielsk culture                   | XIV – the assemblages of Badayskoi type |
| VII – the Romanovsk-Ilmursin culture         | XV – the Sumnaginsk culture             |
| VIII – the Kama-Petchora complex             |   |

(dotted lines mark the ranges of the younger units dated from the beginnings of the Atlantic period or the units of uncertain chronology)

The contemporary neighbouring units without bullet shaped cores:

- |                              |                                 |
|------------------------------|---------------------------------|
| Tr – the Trialetian culture  | Im – the Imeretian culture      |
| Sh – the Shankoba culture    | Mk – the Murzakkoba culture     |
| Zi – the Zimivikvisk culture | PR – the Pesotchniy Rov culture |
| So – the Sozh culture        | Gr – the Grensk culture         |
| Ko – the Komornitsa culture  |                                 |

Drawn by K. Szymczak and M. Różycka



### II.i. The Kunda culture

In the assemblages of the Kunda culture, described lately rather as “the sites of Pulli type” (BUTRIMAS, OSTRAUSKAS 1999, p. 270) the main core form is a classical bullet shaped one. It would be worth to cite a characteristic mentioned by S.K. Kozłowski (1971, p. 57), regarding also to the collections of Kama-Petchora complex: “the cores and half-products are identical... these are exclusively blade cores with single platform, conical or subconical... very slim in their final stages. The platforms are always right angled in relation to the surfaces, which are reduced around or almost around... The main and the most typical technique is blade technique connected with conical or subconical cores”. Such a description fits well the Estonian centers of the Kunda culture and the units East of them; in the south-western zone, down to North-Eastern Poland, the presence of bullet shaped cores is not marked that clearly (SZYMCZAK 1995, p. 93-97).

The earliest 14C dates regarding the Kunda culture come from the Kunda – 9.780 ±620 BP, and Pulli sites – 9.675 ±115 BP, 9.600 ±120 BP, 9.300 ±115 BP and 9.285 ±120 BP (GURINA 1989, p. 49-50). Also quite early dates were obtained from the Miłuki 4 site (North-Eastern Poland) – 9.280 ±50 BP and 9.160 ±50 BP (BRZOZOWSKI, SIEMASZKO 1996, p. 233). The remaining mesolithic 14C dates for the Kunda, Narva, Osa, and Zvidzienaskrogs sites cover the period up to the end of the 6<sup>th</sup> millenium BP (GURINA 1989, p. 50-53).

### II.j. Siberia and the Far East

In the region North-West of the Baykal Lake, in the collections from a group of sites identified as “Badayskoi type” (e.g. the Sosnoviy Bor, Ust’ Bielaya, Baday I sites), some elements of bullet shaped core technique are noted (KOLTISOV, MIEDVIEDIEV 1989, p. 174-177, Table 103: 15, 17). The earliest horizons of this group are dated to the 10<sup>th</sup> millenium BP (KOLTISOV, MIEDVIEDIEV 1989, p. 184).

Very interesting are also the collections belonging to the Sumnaginsk culture, where “the main technique of core reduction is illustrated by the presence of big amounts of subconical and subprismatic cores for knife-like blades” (KOLTISOV 1989, p. 191, Table 114: 12, Table 116: 11-13). The sites of a similar character are also noted far to the North, at a mouth of the Indigirka river (KOLTISOV, MIEDVIEDIEV 1989, p. 185, Map 14).

The 14C dates obtained for the Sumnaginsk sites are relatively early: Ust’ Timpont, layer Vb – 10.740 ±100 BP, layer Va (?) – 9.400 ±90 BP, layer IVb – 9.000 ±100 BP and layer IVa – 7.000 ±70 BP. A series of 14C dates for the multilayer site Bielkatchi I covers a period between 9.190 ±80 BP (XXVII<sup>th</sup>, the lowermost layer) and 5.990 ±70 BP (VIII<sup>th</sup>, the uppermost layer; cf.

KOLTISOV 1989, p. 187-190).

### III. On the other side of a borderline: the Early Holocene cultural units without bullet shaped cores

The Euroasian Early Holocene archaeological cultures using bullet shaped cores shown on Fig. 3 mark a distinct borderline, on the other side of which the use of bullet shaped cores is practically unknown.

Contrary to O. Bar-Yosef’s opinion (1996, p. 208), the conical blade cores exploited with the pressure technique are not too numerous in the Caucasus region. They are not present in the Imeretian nor Trialetian cultures (BADER, TSERETELI 1989, p. 97-98; KOZŁOWSKI 1996, p. 163). As we have mentioned above, the pencil-like (bullet shaped) cores were noted only in the Tchokh culture, especially in layer 3 of the Tchokh site, dated probably to some (not the earliest) phase of the local Mesolithic (BADER, TSERETELI 1989, p. 102).

Further North, on the Kuban Lowland we find the Shankoba and in Crimea – the Murzakkoba cultures, dated to the Pleistocene/Holocene turn (KOZŁOWSKI J.K., KOZŁOWSKI S.K., 1975, p. 338-342; ZALIZNIYAK 1998, p. 128-132, 169-173; JANCEVIC 1999, p. 44). In the territory between the Dnieper and Donets rivers, L.L. Zalizniyak (1998, p. 150-159) places the Zimivnikivsk culture and dates it to the Early Mesolithic. On the Middle Russian Upland and upper Dnieper the Desna culture is differentiated (KOZŁOWSKI J.K., KOZŁOWSKI S.K. 1975, p. 272), divided by particular authors into smaller units: Pesotchniy Rov, Sozh, Grensk etc. (KAPITSIN 1997; KAPITSIN, KALETCHITS 1997; ZALIZNIYAK 1998, p. 145-150). On the majority of the territory of Poland in the Early Mesolithic times the Komornitsa culture was spread (SZYMCZAK 1995, p. 107-110).

### IV. Discussion

According to some authors, the earliest use of the bullet shaped cores could be traced in the Tchokh culture in the eastern Caucasus, if we only agreed that layer 3 in the Tchokh site, characterized by the presence of “pencil-like” cores, could be dated to the Late Palaeolithic, as suggests V. G. Kotovitch (1964, p. 119; 1982). However, such a chronology is rather hard to be accepted, if we realize that other researchers expressed quite different opinions in this matter: A. A. Formozov (1963) dated layers 5 - 1 to succeeding phases of the Mesolithic, while Kh. A. Amirkhanov dated layers 5 - 3 to the Mesolithic and suggested their absolute chronology in a range of 10<sup>th</sup> - 8<sup>th</sup> millenium BP (cf. BADER, TSERETELI 1989, p. 102). I did not find any reliable data confirming a significantly earlier appearance of the bullet shaped cores

in the area of Caucasus. Also the M.L. Inizan's (1985) theory about the origins of the pressure technique somewhere in eastern or north-eastern Asia and its way across the Central Asian lowlands cannot be confirmed, simply because the oldest Central Asian assemblages with the bullet shaped cores index well marked cannot be dated earlier than the second half of the 8<sup>th</sup> millenium BP.

In such a situation we are left with a very vast area from the Near East to the eastern Baltic Sea where the units with bullet shaped cores appeared nearly at the same moment – the first half of the 10<sup>th</sup> millenium BP. Looking at the map presented on **Fig. 3**, we can clearly see that this phenomenon has three main centers; in the Near East, in the East European Lowland and in the Far East. These centers does not seem to have any direct spacial connection. Although e.g. G.N. Matiushin (1976, p. 230, Fig. 51) strongly emphasises the possibility of the Near Eastern influence on the Yangielsk culture through the Ustiurt plateau, but no clear archaeological evidence confirms this so far. I am still not sure why we do not have in the Central Asian lowlands any sites from before the second half of the 8<sup>th</sup> millenium BP: either the area was inaccessible at that time, or all the sites were somehow destroyed. The Caucasian way seems to be rather excluded, because North of Caucasus we also do not have any units with bullet shaped cores.

In the East European Lowland we can observe a chain of cultural units perfectly marking a parallel of latitude borderline of the southern range of bullet shaped cores. These units were included by S.K. Kozłowski (1971)

to the North-Eastern Technocomplex of the European Mesolithic. The only acception in this picture is the Kukrek culture on Crimea and the Black Sea Lowland. Besides the use of bullet shaped core technique this unit is rather connected with the local Crimea-Caucasian archaeological cultures (KOZŁOWSKI J.K., KOZŁOWSKI S. K., 1975, p. 344-346).

We still have too little data for the territory of Siberia to draw a more complete picture of a distribution of the units with bullet shaped cores, and to discuss their connection with the western ones, but we may be sure that such units are present in the Far East and that they are contemporaneous or even a little older than their western equivalents.

The basic question which needs to be answered is: whether we have to do with the same phenomenon of spreading the pressure technique idea over a very vast territory of Eurasia? The environmental, economical and cultural differences between particular units described above would suggest that the answer is: "no", while the appearance of this phenomenon everywhere nearly at the same time would suggest: "yes". Although the mechanism of spreading of such ideas during the Stone Age so widely remains unknown, but we certainly can give other examples of the similar processes, like an expansion of the microlithic trapezes over nearly whole Europe at the beginnings of the Atlantic period (KOZŁOWSKI 1967). Thus, we cannot exclude that we have to do here with some global phenomenon which could not be (or maybe could?) explained in a present state of our knowledge.

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**PROBLEM RDZENI STOŻKOWATYCH: PERSPEKTYWA GLOBALNA**

STRESZCZENIE

Autor zajmuje się kwestią rdzeni stożkowatych, szeroko rozprzestrzenionych na terenie Eurazji w epoce holocenu. Pierwszym etapem studiów była kwestia terytorialnego zasięgu i chronologii jednostek kulturowych, w których występują rdzenie stożkowate. Ich obecność oznacza jednocześnie znajomość techniki naciskowej, stosowanej przy wytwarzaniu krzemienych ostrzy. Według sugestii autora umiejętność stosowania tej techniki pojawiła się we wczesnym holocenie, czyli w pierwszej połowie X tys. p.n.e.

Analiza chronologii zespołów, w których mamy do czynienia ze znaleziskami rdzeni stożkowatych, bądź też uzyskiwanych z nich narzędzi wskazuje, że technika naciskowa była stosowana na olbrzymim obszarze: od Europy Wschodniej poczynając, poprzez Bliski Wschód po Syberię. Szczególnie na terenie Nizy Wschodnioeuropejskiego oraz w pasie Żywnego Półksiężycza można pokusić się o wydzielenie wyraźnych granic, wyznaczających zasięg tego zjawiska.

Jednak w dalszym ciągu niejasna pozostaje geneza mechanizmu stymulującego tę dalekosiężną ekspansję.