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Palaeolithic industries with bifacial technologies and Crimean Micoquian Tradition as one of their Middle Palaeolithic industrial examples

Yuri E. Demidenko

Abstract

This paper discusses various aspects of Palaeolithic industries having bifacial tool traditions, with an emphasis on Middle Palaeolithic Micoquian materials in Crimea (Ukraine). The described lithic artifact data and their complex analyses testify a great proportional variability of the same tool classes and types in various Crimean Micoquian Tradition assemblages, caused by a dynamic and many-sided Neanderthal group differences on flint reduction models as well as primary and secondary faunal exploitation at functionally variable sites. Also, there is a discussion on a genuine role of Micoquian bifacial backed knife ("*Keilmesser*") types in the Crimean Micoquian. These types appear to be not intentionally manufactured tool types, representing instead various reduction stages of bifacial side-scraper and point production sequences where natural platforms (backed areas) of plaquette and thick flake blanks did serve as necessary technological elements of the process.

Kivonat

Bifaciális technológiát használó paleolitikus iparok és a krími Micoquien tradíció, mint példa a középső paleolitikumból

A tanulmány kétoldali megmunkálású eszközöket használó paleolitikus iparok jellegzetességeit tárgyalja. Ezeken belül főleg a Krím-félsziget (Ukrajna) középső paleolitikus Micoquien leletegyütteseivel foglalkozik. A kőeszközvizsgálatok adatai alapján a krími Micoquien eszközkészlet lelőhelyenként nagy változatosságot mutat. Ennek okai az eszközöket előállító neandervölgyi embercsoportok eltérő, dinamikus kőmegmunkálási technológiái, valamint a többrétű fauna-hasznosítás a különféle rendeltetésű táborhelyeken. A tanulmány emellett foglalkozik a Micoquien bifaciális, tompított hátú késeinek ("*Keilmesser*") használatával a krími Micoquienben. E kések tipológiai sokfélesége nem eltérő eszközkészítési koncepciók eredménye, sokkal inkább különböző megmunkálási fázisok nyoma. Természetes ("kérges") hátú, bifaciális megmunkálású kaparókról és hegyekről van szó, melyek morfológiája még őrzi az eredeti nyersanyag – plakett vagy nagyméretű szilánk – eredeti felszíneit.

Keywords *Palaeolithic, Bifacial tools, Middle Palaeolithic, Micoquian, Crimean Micoquian Tradition, Bifacial Backed Knife*

Kulcsszavak *paleolitikum, bifaciális eszközök, középső paleolitikum, Micoquien, krími Micoquien tradíció, bifaciális kés*

Author / Szerző

Department of Crimean Archaeology, Institute of Archaeology, National Academy of Sciences of Ukraine, Geroyiv Stalingrada Av. 12 Kyiv 04210 Ukraine

Email: yuri.demidenko@voliacable.com

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This paper is dedicated to the memory of Vladislav N. Gladilin (1935 – 2015) – an outstanding Ukrainian & Soviet Palaeolithic archaeologist, my professor & extraordinary person

1. Introductory notes on some peculiar biface production situations in various Palaeolithic industries

My long experience on studies of Palaeolithic artifact assemblages having bifacial tool technologies led me to the recognition of some interesting technological features there. Traditionally, we know that Acheulean is characterized by a "bi-convex" manner of hand-axe production using hard-hammer technique; Central and East European Middle Palaeolithic Micoquian is known by a "plano-convex" manufacture manner of various knives, points and side-scrapers with again using hard-hammer technique; and coming to Upper Palaeolithic, for example, Solutrean, Szeletian and Streletskaya industries throughout different regions in Europe, it is seen a "bi-convex" manner of different point fabrication applying, however, soft-hammer technique. This is a general scheme that is used in many textbooks

for students and/or general publications (e.g. Bordes 1961; Bordes 1992; Debénath, Dibble 1994) and this is basically correct. But going deeper into some details for concrete lithic assemblages of the above-noted Palaeolithic technocomplexes, I always see some degree of bifacial technology variability that is very important not to overlook during our studies. Cases of such variability in bifacial technologies can be shortly described as follows.

1.1. An Acheulean example

I know personally to some extent lithic materials of Nadaouiyeh Aïn Askar, an Upper Acheulian multi-level site from Central Syria that was excavated between 1989 and 2003 by a Swiss team from Basel University headed by J.-M. Le Tensorer (e.g. Le Tensorer et al. 2007; Jagher 2011). Concerning the Upper Acheulean, this site has the world's richest biface assemblage, where the Swiss team excavated a part of a *Homo erectus* skull and more than 12 000 bifaces, although "*10 331 bifacials have been discovered in layers where the archaeological context was completely modified by geological phenomena*" (Jagher 2011: 213). A thorough morphological analysis of the differently shaped bifaces added by some technological data allowed the colleagues to differentiate seven subsequent Upper Acheulean "cultural evolutional" stages at Nadaouiyeh Aïn Askar. Very most of the recovered Nadaouiyeh Aïn Askar bifaces were produced by the basic for Acheulian "bi-convex" manner using hard-hammer technique. But taking a closer look at some Nadaouiyeh Aïn Askar bifaces from different archaeological layers, I see another sort of biface variability there. The "bi-convex" production manner still dominates but there are several "plano-convex" and "plano-convex-alternate" pieces (the latter bifaces are probably results of severe reshaping of "plano-convex" pieces) like the respective items in the Central and East European Micoquian. Accordingly, Acheulian "bi-convex" manner of hand-axe production was not the only (!) one during the end of Lower Palaeolithic.

1.2. Upper Palaeolithic examples

Taking Upper Palaeolithic industries with bifaces, again a "bi-convex" manner on bifacial tool production is present but at the very different level of its technological maintenance. First, the very basic produced tool types were variously shaped projectile bifacial points. Second, a soft-hammer technique was used for point manufacture. Third, as I well know, lithics of both Streletskaya industry (European part of Russia and Ukraine) and "Eastern Szeletian" Buran-Kaya III, level C (Crimea, Ukraine), as well as Central European Szeletian Moravany-Dlha points (Slovakia), a pressure technique was often additionally applied during the last phase of bifacial point production (Demidenko 2014c). So, there is an absolutely different and advanced variant of the "bi-convex" manner of bifacial technology in Upper Palaeolithic in contrast to the Acheulean. Curiously enough, in almost every concrete assemblage, there are always cases when a few Upper Palaeolithic bifacial points have been produced by "plano-convex-like" manner, like at Streletskaya sites of Kostenki 12, layer III in Russia (e.g. Anikovich et al. 2007: Fig. 116, 1) and Vys site in Ukraine (Zaliznyak et al. 2013: Fig. 9, 11-12; 10, 10). Moreover, even taking the chronologically much later French Solutrean record, for example, at Maîtreaux site, it was recognized a "*previously unknown asymmetrical scheme*" for production of large-sized ('Type J') laurel leaf bifacial points, shaped actually by the abovementioned "plano-convex" manner, and "*this asymmetrical approach may be applied to any raw material that has one flat face*", and the whole production process was often complemented by "*some pressure flaking technique towards the end of the shaping sequence*" (Aubry et al. 2008: 52-57). Thus, it is possible to note that sometimes when an Upper Palaeolithic flintknapper had a massive flake with flat ventral surface and curved thick dorsal surface or a morphologically similar lithic block / piece for bifacial point production, this person was quite naturally using the "plano-convex" treatment manner, although the dominant treatment manner for the Upper Palaeolithic bifacial points was still "bi-convex". The presence of a few bifacial "plano-convex" and "plano-convex-alternate" points among the prevailing "bi-convex" points within both Early Upper Palaeolithic (Szeletian *sensu lato* and Streletskaya industries in Central and Eastern Europe) and Late Middle Upper Palaeolithic (Solutrean industry in Western Europe) indicates a situational / *ad hoc* supplementary bifacial point treatment manner. Accordingly, such foliate pieces do not indicate generic industrial connections between these Early Upper Palaeolithic and Late Middle Upper Palaeolithic industries with bifaces and Middle Palaeolithic Micoquian industries, as it was again recently proposed by G. Bataille for Crimean Micoquian and "Eastern Szeletian" and Streletskaya industry in Ukraine and Russia (Bataille 2013).

There is also an interesting situation with bifacial leaf points for two Central European Initial Upper Palaeolithic sites. One of the in situ Bohunician industry sites, Brno-Bohunice (Bohunician – the Central European Early Emiran industry with Levallois bidirectional point primary flaking technology. Valoch 1976; Tostevin, Škrdla 2006), and also Korolevo II site, layer II (the Central European Early Emiran-like industry with similar bidirectional primary flaking technology but with no strictly speaking Levallois points. Gladilin, Demidenko 1989; Usik 1989; Demidenko, Usik 1993a; 1993b; 1995) also demonstrate production of bifacial leaf points with a soft-hammer technique, having mainly "plano-convex" pieces at Korolevo II and "bi-convex" pieces at Brno-Bohunice found together (*sic!*) with bifacial reduction debitage at both sites. The co-occurrence of bifacial points and their reduction debitage indicates bifacial point production at the sites. The problem, however, is that such Initial Upper Palaeolithic assemblages are now well known in the Near East, in Central and Eastern Europe, and as far away as in Russian Southern Siberia and Mongolia, and only the above-named two sites' assemblages from Central Europe do have bifacial points. It is theoretically possible that the discussed bifacial points represent an influence of Late Micoquian and/or Szeletian technologies onto Early Emiran ones in Central Europe during the Initial Upper Palaeolithic, when *Homo sapiens* spread throughout Eurasia. On the other hand, P. Škrdla proposed at the 2014 SKAM conference in Miskolc that even modern excavation methods are often not able to differentiate a palimpsest of two

industrially different human occupations within one archaeological level at a site why, in his opinion, it cannot be excluded that bifacial leaf points and their specific reduction debitage do in fact represent indicative "material remains" of a Szeletian occupation at a mostly Bohunician settlement, Brno-Bohunice. Following Škrdla's hypothesis, a similar palimpsest situation could be also suspected for Korolevo II site where bifacial components (tools and debitage) could testify a short-term Micoquian occupation within the mainly Early Emiran-like occupation. With such new hypothesis, it is clear that more work should be done for further discussion about important Initial Upper Palaeolithic sites and theirartefacts.

Finally, when we come to Middle Palaeolithic Central and East European Micoquian industries with bifacial tool technologies, mainly their "plano-convex" manner is seen with either hard- or soft-hammer technique.

2. Middle Palaeolithic and Micoquian identification in Central and Eastern Europe

2.1. The term "Middle Palaeolithic"

Since the time of Gerhard Bosinski's published PhD dissertation "Middle Palaeolithic in West Central Europe" (Bosinski 1967), it is possible to say that such terms as "Middle Palaeolithic" and "Micoquian" became more or less generally accepted in Palaeolithic Archaeology of Central and Eastern Europe, although the former term, "Middle Palaeolithic", only started to be in a real use in Eastern Europe from the early 1990s after the collapse of the Soviet Union.

The term "Middle Palaeolithic" for European Palaeolithic industries with prepared core reductions and a high proportion of various well-retouched tools on flakes, which was certainly the scientific merit and achievement of G. Bosinski with, of course, some other colleagues work, naming, first of all, Alain Tuffreau, actually became widely accepted after A. Ronen's Haifa (Israel) conference in 1980 (see articles of Bosinski and Tuffreau in Ronen (ed.) 1982). Since that time the following basic differences were underlined between the "Middle Palaeolithic" and F. Bordes' "Mousterian". First, instead of a mere geochronological limit of the "Mousterian" at the Last Glacial ("Würmian") time period, the "Middle Palaeolithic" has not got a geochronological limit. "*And for us, it is obvious that the Middle Palaeolithic begins before stage 5, at least to about 200,000 and there may be some Quina- or Ferrassie-like industries back to 300,000. There are few sites before 300,000 but quite a few for the 200,000 period*" (Bosinski 1988: 160) and also later – "*We got in Europe Middle Palaeolithic sites from 350,000 years and we include the late Acheulean as a part of the Middle Palaeolithic*" (Bosinski 2000: 227), not forgetting Tuffreau's indicative notion for Northern France as well – "*The Middle Palaeolithic covers a vast period of time comprising several glacials and interglacials from isotope stage 8 to the first half of stage 3*" (Tuffreau 1992: 59–61). Here we can also add an important remark on the subject acknowledging Bosinski's role for the "Middle Palaeolithic chronology" – "*Hence, in contrast to Bordes, G. Bosinski (1967) and others have considerably broadened the concept of the »Middle Palaeolithic« by including also the »pre-Eemian period«*" (Müller-Beck 1988: 233). Going further, there is also a good notion on the Middle Palaeolithic in southern France from 1988 – "*The time span involved ranges from the beginning of the Riss glacial complex up to the end of early Würm, following the French Alpine chronology applied to the region, perhaps from 200 – 500 Kyr up to 38 Kyr*" (Rolland 1988: 161). Second, it was also agreed that Middle Palaeolithic "*represents the final stage of the Early Palaeolithic in Western Europe*" and "*it consists of a predominantly flake-tool technocomplex made with prepared-core, or mode 3 (Clark 1969: 31), primary flaking techniques (Levallois or disc-core), resulting in more standardized toolkits. This broad definition encompasses pre-Würmian, later Acheulean, Pre-mousterian and »Tayacian« occurrences*" (Rolland 1988: 161).

It is again worth noting Bosinski's opinion on industrial characteristics for the Middle Palaeolithic. According to him, some industries lacking Levallois and/or some other developed primary reduction methods based on systematical core striking platform faceting and flaking surface preparation but, at the same time, having some bifacial tools and serial tools on flakes with well-elaborated retouched edges. Bosinski particularly well discussed Middle Palaeolithic industrial status for Late Acheulean and Yabrudian with Levantine colleagues during a conference also organized by A. Ronen, held in Haifa (Israel), but in 1996. He noted the following basic industrial features for such technocomplexes distinguishing them from Lower Palaeolithic: "*The Middle Palaeolithic is characterized by a marked variation of types including bifaces and flake types*", "*The Yabrud material is Middle Palaeolithic. The variability of scrapers and the presence of points make it a Middle Palaeolithic. How old – I do not know!*" and on Schäfer's straight question on Middle Palaeolithic industrial features, he again and again underlined: "*It is the variability of retouched flake tools*" (Bosinski 2000: 24). Accordingly, so-called developed and typologically varied tool-kits with well-retouched tools on flakes is a basic typological criteria to differentiate Middle Palaeolithic assemblages from Lower Palaeolithic ones but no site geochronology, that is why Bosinski did not care about the Yabrudian dates then, now known to be no younger than ca. 300,000 years ago. At the same time, Middle Palaeolithic includes some typologically specific technocomplexes / industries that were not recognized by F. Bordes as West European Mousterain, like, for example, the central topic of the present paper – Central and East European Micoquian Hence, the industrial spectrum of the Eurasian Neanderthal lithic assemblages are much variable, where Mousterian is just an integral part of Middle Palaeolithic.

Coming back to Bosinski's Middle Palaeolithic concept, it is also important to underline his differentiation of chronological and industrial criteria for establishing frames for Lower and Middle Palaeolithic epochs in favor of the "lithic criteria". Thus, Bosinski has actually broken chronological borders between Lower and Middle Palaeolithic. I even remember some of our personal discussions on the matter from the early 1990s in Kiev when he was also using an

example with a hypothetical assemblage coming from the surface having no dates. And if such an assemblage's lithics were of Middle Palaeolithic character, they had to be called Middle Palaeolithic ones. The industrial approach for distinction between Lower and Middle Palaeolithic assemblages / industries was also shared by my professor Vladislav N. Gladilin in the 1990s (e.g. Gladilin, Sitlivy 1990: 16-22). Accordingly, I grew up under this approach and that's why I, like Bosinski, also consider Yabrudian as an Early Middle Palaeolithic technocomplex in contrast to some other colleagues working in the East Mediterranean Levant, still discussing Yabrudian within Lower Palaeolithic.

There is one more basic feature that also very much unites Mousterian and Middle Palaeolithic throughout various regions of Eurasia. That is their humans, the technocomplexes' / industry types' makers, the Neanderthals. That's why we even see some well done published maps with sites where Neanderthal bone remains were found in different regions of Eurasia from Iberian peninsula in the West to Altai (Southern Siberia, Russia) in the East (e.g. Serangeli, Bolus 2008: Figs. 1 & 2). All physical anthropology data at hand do pint out the Neanderthal origin in Europe, their subsequent evolution and distribution within the Continent and also their dispersal into some but not all Asian regions. But Neanderthals have not been found in Africa, in that "*Homo sapiens* homeland" since ca. 200,000 years ago. By lithic artifacts, the time period in between ca. 200,000 and 40,000 years ago is called Middle Stone Age in sub-Saharan Africa. On the other hand, the respective lithic assemblages in Northern Africa have been usually named as Mousterian and/or Middle Palaeolithic ones. But the situation started to be changed in Northern Africa when the former Mousterian and Middle Palaeolithic industries some colleagues began to relate with Middle Stone Age due to the industries' real techno-typological differences from Eurasian Mousterian and/or Middle Palaeolithic, their close industrial affinity to African materials and also because of the same human makers, *Homo sapiens* (e.g. Kleindienst 2001; Van Peer, Vermeersch 2007; Garcea 2012; Dibble et al. 2013). All in all, it is needed to acknowledge some real differences in between Eurasian Mousterian / Middle Palaeolithic and African Middle Stone Age. The present author has no doubts that some special comparison studies of concrete Middle Palaeolithic and Middle Stone Age lithic assemblages (specially made tools on organic materials are well known for Middle Stone Age but about completely absent in Middle Palaeolithic) will certainly demonstrate their differences in a detailed way.

At the same time, remembering the absence of any Neanderthal bone remains and Middle Palaeolithic assemblages in Africa, it is also worth not to forget the presence of African Middle Stone Age sites in the East Mediterranean Levant (Tabun-C type Levallois-Mousterian with early *Homo sapiens* bone remains ca. 170,000 – 90/85, 000 years ago in Israel, Lebanon and Syria – Bar-Yosef 2000; a sort of Terminal Nubian Mousterian ca. 40,000 years ago in Central Syria – Demidenko 2013d) and in Arabian peninsula (Nubian Mousterian / Nubian Complex ca. 100,000 – 75,000 years ago in Oman and Saudi Arabia – Petraglia, Rose (eds.) 2009; Rose, Marks 2014). As a result, it will be possible to investigate several "penetration waves" of Middle Stone Age *Homo sapiens* into non-African Asian adjacent territories during different time periods between MIS 6–3. That's why it is methodologically not correct to lump together sites and their assemblages under the term "Middle Palaeolithic" for various European, Asian and African (*sic!*) regions that sometimes happens till now (e.g. Groucutt, Scerri (eds.) 2014). Thus, established since the early 1980s and correctly applied term "Middle Palaeolithic" for Eurasian Neanderthal lithic technocomplexes and industry types proved to be very useful for Palaeolithic Archaeology studies.

2.2. "Central and East European Micoquian" subject with a special reference to the Crimean materials

G. Bosinski also played a decisive role for understanding and studying the so-called Central and East European Micoquian lithic assemblages in the 1960s and 1970s. He (1967) defined Central European lithic assemblages having serial bifaces, and, namely, Micoquian hand-axes, elongated hand-axes with flat ventral surface ("*Halbkeile*"), pointed hand-axes shorter 6 cm ("*Fäustel*"), backed knives ("*Keilmesser*"), side-scrapers and leaf points ("*Blattspitzen*"), under the terminological umbrella "Micoquian". It is worth mentioning here that many so-called flat bifacial tools are now known as bifacial "plano-convex" tools. Also, the actual position of the present author should be underlined that bifacial backed knives, side-scrapers and leaf points do always dominate in various proportions at almost all Central European Micoquian assemblages. It was also quite logical at that time to name the assemblages as Micoquian because a number of tool types morphologically looked similar enough to the chronologically earlier French Acheulian Micoquian and there were also some ideas on generic connections between these West European and Central European industries. Also, Bosinski has defined four Micoquian inventory-groups (Bockstein, Klausennische, Schambach, Rörshain) with prevalence of particular bifacial tool classes and types for each of the groups. Moreover, in his 1967 book he showed that at least some East European Middle Palaeolithic materials and, first of all, Crimean ones (Ukraine) from sites of Kiik-Koba, Chokurcha I, Volchi Grot and Starosele are similar enough to the Central European Micoquian and even defined one more "*Keilmesser*" of Wolgograd type for the Sukhay Mechetka / Stalingradskaya site in southern Russia.

Bosinski's 1967 book also had some definite influence on Soviet Palaeolithic archaeologists working with East European Mousterian assemblages containing series of bifacial tools. Seeing obvious similarities between Eastern and Central European bifacial assemblages, some Soviet archaeologists also started to interpret respective East European materials as real Micoquian at the 2nd "understanding level" with more comparable materials available after the 1st one realized by the pioneering scientific work on the subject by Gleb A. Bonch-Osmolowski in the 1930s (Bonch-Osmolowski 1940; see also in Demidenko 2013a). For example, newly discovered and analyzed in the1960s and 1970s Khotylevo and Richta site materials were said to be Micoquian (Zavernyaev 1978; Smirnov 1979).

But I must admit that the most systematic and fruitful Micoquian studies in Eastern Europe were realized by my professor Vladislav N. Gladilin (Kiev) between the mid 1970s and late 1980s. Again, the investigations were conducted under some influence of Bosinski's work but also by Gladilin's own deep understanding of the East European material. Using his own artifact classification system, realdifferences became present in comparsion with the West European Mousterian / Middle Palaeolithic. However before, in the mid 1960s and the early 1970s (Gladilin 1966; 1971), he modified and used Bordesian terms, such as "*Levallois-Mousterian of Acheulean Tradition*" (Starosele; Antonovka II; Khotylevo I), "*Mousterian with Acheulean Tradition*" (Antonovka I; Sukhaya Mechetka; Volchi Grot, lower layer; Chokurcha I) and "*Micro-Mousterian with Acheulean Tradition*" (Kiik-Koba, upper layer; Volchi Grot, middle layer; Ilskaya, lower layer; Orel). This terminology was similar to the former attribution of Crimean Starosele materials as "*Mousterian of Acheulean Tradition*" in the 1950s (Formozov 1958). But since the mid 1970s, Gladilin (1976; 1985) started to apply different names for his "variants", "facies" and "industry types" of East European Middle Palaeolithic assemblages with bifacial tools. Particularly Crimean materials were grouped as "*Mousterian with bifacial tools*" and "*Micro-Mousterian with bifacial tools*" variants. Then, "*Mousterian with bifacial tools*" had representatives of two facies in Crimea: "*Eastern Micoquian facies*" with numerous and often asymmetrical (mainly crescent by shape) bifacial knives / side-scrapers (Starosele industry type) and "*Bockstein facies*" also having many bifacial asymmetrical knives but with a back / platform, like Bockstein, Klausennische and Prondnik / Pradnik knives ("*Keilmessers*") (Ak-Kaya industry type). Also, "*Micro-Mousterian with bifacial tools*" was represented in Crimea by "*Kiik-Koba facies*" and its Kiik-Koba industry type with numerous and small-sized bifacial and unifacial points and knives / side-scrapers. Gladilin even defined one archaeological culture for Crimean "*Micro-Mousterian with bifacial tools*" – Kiik-Koba culture.

A special note is need to be made here. In the 1970s and 1980s it was like a fashion to recognize archaeological cultures in Middle and even Lower Palaeolithic in the Soviet Union and Gladilin was one of the active advocates of Palaeolithic archaeological cultures at that time. Remembering the facies names, "*Eastern Micoquian*" and "*Bockstein*", Bosinski's data indeed influenced Gladilin's industrial studies. Accordingly, "*facies*" were introduced by Gladilin for the grouping of generically related industry types, while the latter term did serve for determining archaeological cultures. Also, the "*facies*" did serve for Gladilin as "*taxonomy bridges*" linking East European industries with the Central European ones and the "*Eastern Micoquian*" and "*Bockstein*" facies have been defined to connect particular industries between West and East, and even to show Micoquian Neanderthal migrations from Central to Eastern Europe. On the other hand, materials of "*Kiik-Koba facies*" (Kiik-Koba grotto, upper layer and Prolom I grotto in Crimea) were thought to be probably generically connected to Vértesszőlős materials in Hungary (Central Europe). This was mainly explained by a dominance of small-sized tools in both groups of industries.

3. The Crimean Micoquian Tradition

Gladilin has been only partially involved into Crimean Middle Palaeolithic studies by giving theoretical and methodical advices to his friend and colleague Yuri G. Kolosov (Kiev), who was actually excavating Middle Palaeolithic sites in Crimea since the late 1960s up to mid 1990s. Namely, Kolosov found and excavated a group of now-famous Zaskalnaya and Ak-Kaya sites in buried rock-shelters in Eastern Crimea. This work ended up by his recognition of one further Middle Palaeolithic culture with bifaces – the Ak-Kaya Mousterian culture that was considered, following Gladilin's ideas, as a genuine Micoquian culture similar to Bosinski's Bockstein and Klausennische inventory-groups in Central Europe (Kolosov 1983; 1986). Also, Kolosov with his two pupils, Vadim N. Stepanchuk and Victor P. Chabai, published a book on Crimean Middle Palaeolithic in 1993 where they also additionally defined Starosele Mousterian culture with bifacial tools (Kolosov et al. 1993).

Starting from 1993, it is possible to say that two Ukrainian archaeological teams have been working on Crimean Palaeolithic. The first team was of Kolosov and Stepanchuk who were continuing both the excavations and the elaboration of the archaeological culture paradigm for the interpretation of Middle Palaeolithic industrial variability. The cultural paradigm was based on a strong assumption that almost all tools, their classes and types were deliberately produced for specific labor tasks. The cultural paradigm for Middle Palaeolithic studies has been driven by Stepanchuk until real absurdity with some "*syncretic Middle Palaeolithic traditions*" when literally each culture with bifacial tool production was inhabited a clearly delimited area in either Western or Eastern Crimea. Culturally distinct groups of Neanderthals had been living there, sharing "*common features of material and spiritual culture*", "*primitive thoughts peculiarities*", and "*social structures of Neanderthal communes*". Concrete Distinct Neanderthal population size was calculated for the Crimea in 240 individuals, with a possible minimal number of 175, endogamous and, at the same time, exogamous Neanderthal groups were hypothesized, various artistic, non-utilitarian, utilitarian objects, etc. were identified although these were not based on any use-wear analysis (see in Demidenko 2013b: 49-51).

The second team was headed by Chabai and, from the archaeological side, was also supplemented by Alexander I. Yevtushenko (1959-2009), the present author and since 1999 Andrei P. Veselsky. The second Ukrainian archaeological team worked together with archaeologists from the West (thanks to the fall of Soviet iron curtain) – Tony Marks (USA) and Marcel Otte (Belgium) and their associates and students who were than complemented since 2000 year by Jürgen Richter and Thorsten Uthmeier (Germany) together with their associates and students. Our archaeological team was also added by a number of natural sciences specialists from Russia, Moldova, USA, Canada, France, and England.

As a result of 20 years work, we've got "two tracks" of flint and fauna materials from nine newly excavated, functionally variable multi-level stratified sites with Middle

	Ak-Kaya etalon-like	Ak-Kaya-genuine	Ak-Kaya-Starosele	Starosele	Kiik-Koba
simple unifacial tools	52.5 – 58%	41 – 57.5%	43 – 52%	44.3 – 48.1%	24.1 – 38%
convergent unifacial tools	21.3 – 23.8%	16 – 35%	37 – 43%	38.9 – 43.4%	51.2 – 63.8%
identifiable bifacial tools	23.6 – 28.7%	16 – 27%	9 – 17%	12.2 – 13.3%	10.8 – 15.5%

Table 1. Crimean Micoquian Tradition's 5 industry types and their basic typological indices, according to 3 tool groups (modified after Chabai et al. 2000: Table 10; Demidenko 2015: Table 2) // **1. táblázat.** A krími Micoquien tradíció öt ipara és alapvető tipológiai indexeik három eszközcsoportra vonatkozóan (Chabai et al. 2000: Table 10; Demidenko 2015: Table 2 nyomán).

Palaeolithic and Early Upper Palaeolithic materials (Starosele, Kabazi II, Kabazi V, Buran-Kaya III, Siuren I, Karabi Tamchin, Karabai I, Chokurcha I, Sary-Kaya sites). Aside of many articles, our international team published four books in English in Belgium (Marks, Chabai (eds.) 1998; Chabai et al. 1999; Chabai et al. 2004; Demidenko et al. 2012), five books in English in Ukraine (Chabai et al. (eds.) 2005; 2006; 2007; 2008; Yevtushenko, Chabai (eds.) 2012), one book in English in Germany (Demidenko, Uthmeier 2013) and three books in Russian in Ukraine (Chabai et al. 2000; Chabai 2004; Demidenko (ed.) 2004), with new data and new interpretations of previously investigated assemblages from different sites.

The first scientific goal of our investigations was the establishment of a Crimean Palaeolithic geochronology through receiving various absolute dates, fauna, small mammal and pollen data because there was not any well established chronological data for the Crimean Palaeolithic during Soviet times. Simultaneously, the second goal was to understand industrial variability of Crimean Middle Palaeolithic, first and foremost those assemblages having serial bifacial tools.

Delegating some assemblages into one of the previously recognized three cultures – Ak-Kaya, Starosele and Kiik-Koba posed a problem, because all three have the same tool classes and types, and reasons of cultural subdivision was actually the different proportional distribution of the same tools. That's why it had to be taken into consideration some non-cultural reasons for the Middle Palaeolithic industrial variability. Also, Crimean assemblages with bifacial tools had not been named Mousterian anymore being indeed much different from West European Mousterian. Since 1993 they are called Middle Palaeolithic, being related to the Micoquian technocomplex. There is also a good personal example of the Crimean Middle Palaeolithic assemblages' difference from the West Eurasian Mousterian that is worth to note here. When we have started our work with Tony Marks, there was a question what typological system are we going to use for classification of Crimean lithic artifacts. Of course, Tony was always using the well-known type-list of F. Bordes (1961). On the other hand, Chabai and Yevtushenko were using classification of my professor Gladilin that I was also already using for my studies of Palaeolithic assemblages in the Ukrainian Transcarpathian region (Gladilin 1976). And when Tony looked through several Crimean flint assemblages with bifacial tools, he agreed that the existing great variety of both bifacial and unifacial convergent tools is impossible to put into Bordes' tool types, while Gladilin's system with a great diversity of tool shapes will really allows us the detailed classification of Crimean tools (see Chabai, Demidenko 1998).

As a result, our 2nd team replaced the "cultural paradigm" by an approach in which all in situ Crimean Middle Palaeolithic assemblages with bifacial tools are viewed within the framework of a single Crimean Micoquian Tradition (Chabai et al. 2000). The approach is based on a data synthesis from interdisciplinary studies and varied archaeological methods on sites, and the classification and interpretation of their finds. That's why, the Crimean Micoquian is now conceived as three basic industry types (Ak-Kaya-etalon-like, Kiik-Koba and Starosele ones) and it is best described as "*uniformity in diversity*" (Demidenko 2003; 2015). Moreover, industrial diversity in the Crimean Micoquian is not limited to the three basic types two more "*intermediate types*", "*Ak-Kaya – genuine*" and "*Ak-Kaya – Starosele*" ones, were also added by Chabai using Micoquian materials from Zaskalnaya and Prolom sites (Chabai et al. 2000: 76-78). Moreover, the late 1990s and the early 2000s excavations at sites of Buran-Kaya III, Siuren I, Chokurcha I, Kabazi II and V and Karabi Tamchin have brought to light more Micoquian materials, making Crimean Micoquian typological diversity and their Neanderthals' settlement system even more mosaic. The result virtually erases any quantitative "index gaps" between known industry types, making for a large group of find complexes with more or less "smooth and continuous" typological variation that originated from functionally variable site types (**Table 1**). Here it is needed to note that although Chabai initiated the recognition of five industry types within the Crimean Micoquian Tradition in 2000, since 2004 he uses just three types (Ak-Kaya, Starosele and Kiik-Koba, Chabai 2004) thinking that the traditional tripartite division is better structured typologically.

The data for each of the five industry types show an indicative pattern of change for three basic tool group indices in the following order: from Ak-Kaya-etalon-like through Ak-Kaya-genuine – Ak-Kaya-Starosele – Starosele to Kiik-Koba industry types. Simple unifacial tools (simple, transversal and double side-scrapers) decline from almost 60% down to ca. 25%. Convergent unifacial tools increase from a little more than 20% up to ca. 60%. Identifiable bifacial tools decline from almost 30% down to 11 – 15%. Accordingly, only Ak-Kaya-etalon-like and Kiik-Koba industry types' flint assemblages, situated at the extremes of these index variability, can be actually well recognized, while the three "intermediate" industry types do in fact represent "transitional varieties" of the Crimean Micoquian Tradition

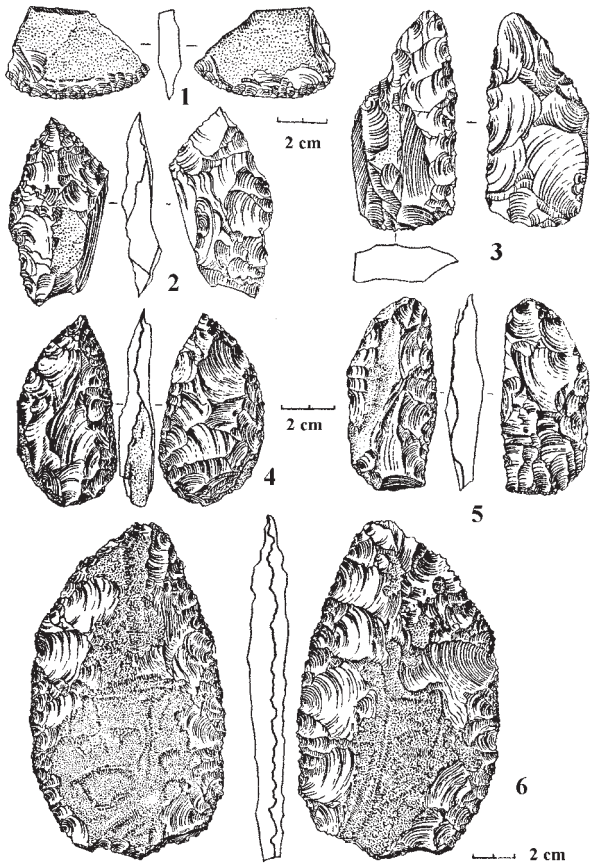

Figure 1. Various Zaskalnaya V and VI sites' Micoquian bifacial "backed knives": 1: *Bockstein* type; 2–3: *Klausennische* type; 4–5: Prondnik / Pradnik type; 6: Ak-Kaya type (modified after Kolosov 1978). //

1. ábra. Különféle Micoquien „tompított hátú kések" Zaskalnaya V és VI lelőhelyekről. 1: *Bockstein* típus; 2–3: *Klausennische* típus; 4–5: Prondnik / Pradnik típus; 6: Ak-Kaya típus (Kolosov 1978 nyomán).

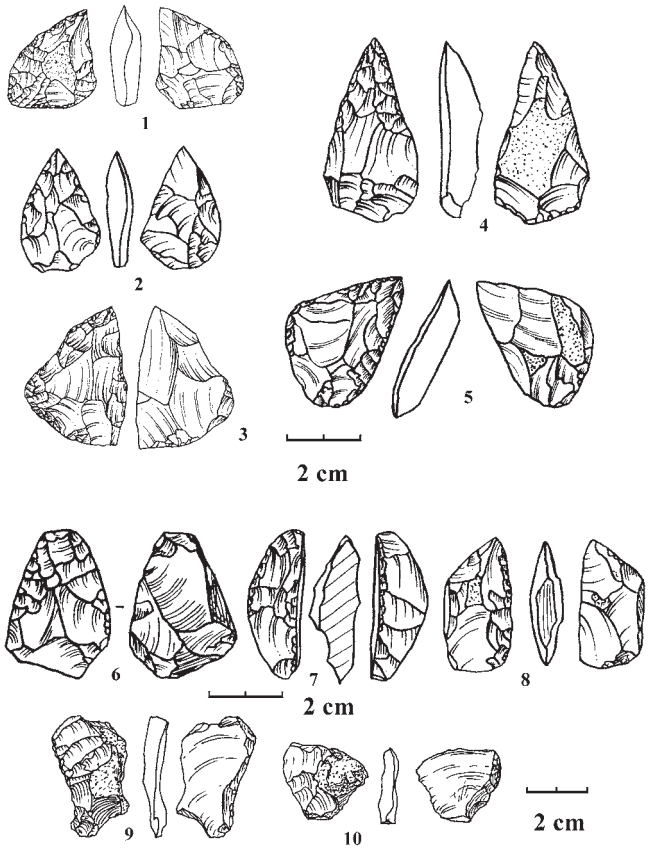

Figure 2. Kiik-Koba grotto, Micoquian layer IV bifacial tools and specific spalls: 1–5: bifacial "plano-convex" points; 6–7: single-edged "plano-convex" bifacial side-scrapers / similar to *Bockstein* knife type; 8: subtrapezoidal elongated "plano-convex" bifacial side-scraper naturally backed / similar to *Klausennische* knife type; 9–10: Prondnik-like / Pradnik-like para-burin spalls (modified after Demidenko 2013c). //

2. ábra. Kiik-Koba-barlang, Micoquien IV réteg, bifaciális eszközök és speciális pattintékok. 1–5: bifaciális „plánkonvex" hegyek; 6–7: egy élű „plánkonvex" bifaciális kaparók / a *Bockstein* típusú késekhez hasonlítanak; 8: nyújtott trapéz alakú, „plánkonvex" bifaciáls kaparó kérges háttal / a *Klausennische* típusú késhez hasonlít; 9–10: Prodink-szerű / Pradnik-szerű álvéső pattintékok (Demidenko 2013c nyomán).

industrial variability. The internal typological ranges for the three tool groups vary between 2.7 and 4 times, with such variation for the different Crimean Micoquian Tradition assemblages reflecting diversity in site function that, in turn, results from differences in the use of flint reduction models and primary and secondary faunal exploitation.

Some more observations have led me to the following two conclusions.

First, both unifacial and especially bifacial tool reduction data in the Crimean Micoquian flint assemblages do additionally demonstrate the following tendency: "*the greater the proportion of convergent side-scrapers and points, the greater is the intensity of tool reshaping and rejuvenation in a tool-kit*" (Demidenko 2003: 153; 2004a: 147; 2013c: 127; 2015: 148). This tendency explains the high number of convergent tools in Kiik-Koba type industry and their more moderate occurrence in other industry types, not in a cultural sense, but in terms of Neanderthal groups' life histories at different sites and for different activities.

Second, one of the consequences of the first conclusion is that complex analyses of sites and their bifacial tools allow us to doubt the often discussed, so-called bifacial backed knife ("*Keilmesser*") types as real, intentionally manufactured tool types. Instead they probably just reflect various reduction stages of bifacial side-scraper and point manufacture and reshaping / rejuvenation in the Crimean Micoquian (e.g. Demidenko 2013c).

Generally speaking, the following intercorrelation pattern for some specific tool types and site types could be also traced. On one hand, taking sites near high quality flint outcrops either representing short-term home camps in rock-shelters (Ak-Kaya and Zaskalnaya) or primary killing/butchery sites (Sary-Kaya, Kabazi II, Units III, V - VI). Their flint assemblages are characterized by many large-sized bifacial backed knives and a few bifacial points and convergent side-scrapers. On the other hand, analyzing primary and secondary butchery short-term camps situated far away from high quality flint outcrops with evident indications on high intensity and extended flint exploitation (Buran-Kaya III, Kiik-Koba) and various short-term sites with not just primary killing/butchering activity (Starosele, Kabazi V, Karabi Tamchin I), as a rule, there are a few, if any, of small-sized bifacial backed knives and many bifacial convergent tools – points and side-scrapers. Also, taking

a closer morphological look at Crimean bifacial backed knives, another regularity becomes surprisingly evident. Quite a few of Crimean "*Keilmesser*" types are indeed similar to Central European Bockstein and Klausennische bifacial backed knives but such pieces usually produced on flint plaquettes probably often have to be understand as partially treated bifaces with natural platforms – the plaquette's flat edges covered by primary cortex (**Fig. 1: 1-3**). When bifacial treatment spread over the previously unworked parts of the plaquette / thick flake support, morphology of the piece changes from backed knife to convergent side-scraper or point, without natural back (**Fig 2: 1-5**). For this reason the Crimean Bockstein and Klausennische-like bifacial pieces probably should not be considered as genuine special bifacial backed knife types. It is also confirmed by absence of Central European Prondnik / Pradnik bifacial knives with technologically important, so-called para-burin resharpening spalls along the knives' cutting edge (e.g. Krukowski 1939-1948; Kowalski 1967; Chmielewski 1969; Kozlowski 1972; Sobczyk 1975; Kulakovskaya et al. 1993; Sudol 2013; 2014) in the Crimean Micoquian and in the whole East European Micoquian record. This absence contributes to the view of the present author, that according to morphological, technological, rejuvenation / resharpening and functional characteristics, Prondnik / Pradnik bifacial knives are indeed the only strictly speaking knives known in European Middle Palaeolithic Micoquian. Kolosov recognized some Prondnik / Pradnik bifacial knives for Zaskalnaya sites in the 1970s and 1980s but the illustrated pieces are not real Prondniks / Pradniks (**Fig. 1: 4-5**) and he never identified any Prondnik / Pradnik para-burin resharpening spalls. Nevertheless, it is important to note my recent identification of three Prondnik-like / Pradnik-like para-burin spalls (**Fig. 2: 9-10**) among the Kiik-Koba grotto, Micoquian layer IV materials (Demidenko 2013c: p. 112 and Fig. IV-16: 10-11). These pieces are definitely pseudo-Prondnik / Pradnik spalls reflecting very intensive and multiple but only general reshaping and rejuvenation of bifacial tools at Kiik-Koba, as Prondnik / Pradnik knives have not been recognized at the site. Thanks to my Polish colleagues Krzysztof Sobczyk and Stanislaw Kowalski I had an opportunity to study briefly Ciemna cave Prondnik / Pradnik bifacial knives and their specific resharpening spalls in 1992 at Krakow Archaeological Museum and I know how such pieces look like and serially go together (*sic!*) – that is not the case in Crimean nor in East European Micoquian industries and their assemblages. Thus, the discussed typologically bifacial backed knives from Crimea do not seem to be specifically produced on purpose as backed knives. Instead they are either mostly just initially / partially treated large-sized bifaces in Ak-Kaya-etalon-like and Ak-Kaya-genuine industry type assemblages or usually exhausted recurrently reshaped small bifaces in assemblages particularly belonging to Kiik-Koba industry type (**Fig. 2: 6-8**).

The proposed suggestion for rejection of the "type status" of bifacial backed knives in Crimean Micoquian can be also well demonstrated by eight so-called specific bifacial knives in assemblages of Zaskalnaya and Ak-Kaya sites, defined by Kolosov in the 1970s and 1980s (Kolosov 1978; 1983; 1986). In addition to the above-noted Bockstein, Klausennische

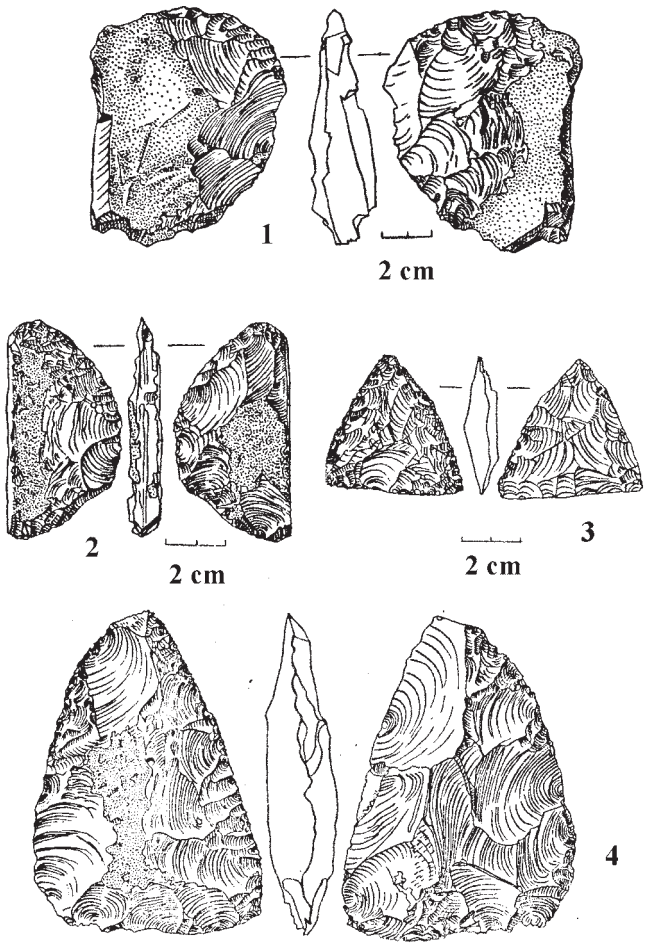

Figure 3. Various Ak-Kaya III, Zaskalnaya V and VI sites' Micoquian bifacial "backed knives": 1–2: Semi-Discoidal type; 3: Triangular type; 4: Crescent type (modified after Kolosov 1978). //

3. ábra. Különféle Micoquien „tompított hátú kések" Ak-Kaya III, Zaskalnaya V és VI lelőhelyekről. 1–2: félkör alakú típus; 3: háromszög alakú típus 4: félhold alakú típus (Kolosov 1978 nyomán).

and Prondnik / Pradnik types, he recognized knives of Ak-Kaya, Semi-Discoidal, Triangular, Crescent Types and also Knives with a Handle. Looking at the knife types' definitions with their illustrations, the following situation definitely appears.

Ak-Kaya knife type with two retouched converging edges but no back (**Fig. 1: 6**) was defined after the presence of the plaquette support's original cortical areas at both surfaces, that the knapper supposedly left out intentionally "*to avoid a sliding of a human's fingers while working by a knife*" (Kolosov 1978: 12). But in our opinion, such bifaces should be regarded as simply crescent side-scrapers, escaping such modern subjectivity in typological analysis of Palaeolithic artifacts.

Semi-Discoidal knife type has convex retouched edge and another edge which is naturally backed. Taking Kolosov's illustrations, it is seen that some of such pieces are either pre-cores or bifacial pre-forms (**Fig. 3: 1**), while other pieces are just partially treated flint plaquettes, partly similar to the Bockstein knife type, but having a strongly convex retouched edge (**Fig. 3: 2**).

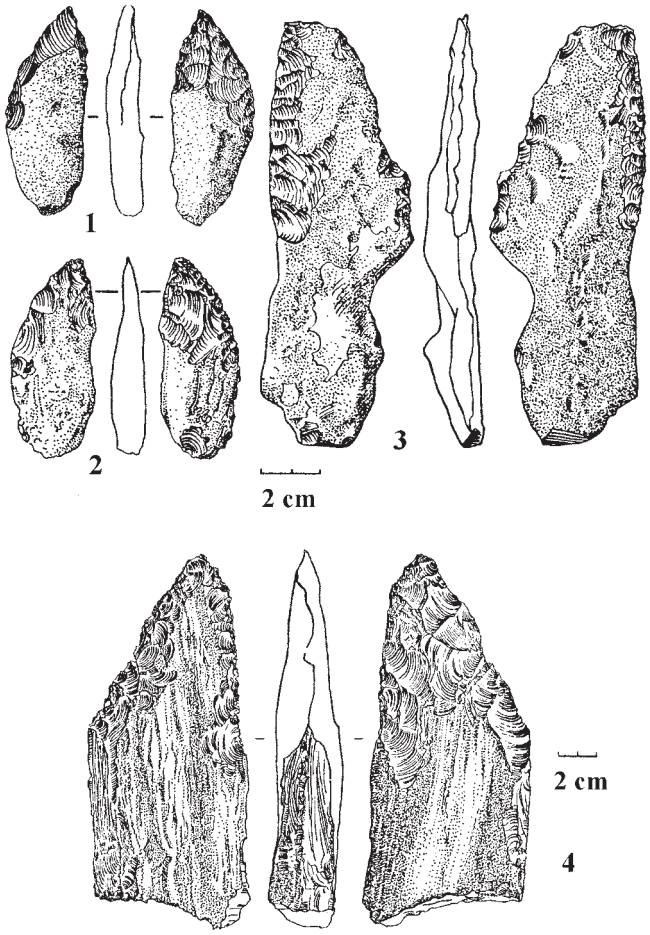

Figure 4. Various Chokurcha I, Zaskalnaya V and IX sites' Micoquian bifacial knives with a handle (modified after Kolosov 1978). //

4. ábra. Különféle nyelezett Micoquien „tompított hátú kések" Chokurcha I, Zaskalnaya V és IX lelőhelyekről. (Kolosov 1978 nyomán).

Triangular knife type, according to Kolosov's data, is mostly represented by real unifacial points and side-scrapers on flakes without any additional treatment or with various ventral thinnings. Several pieces are small-sized bifacial triangular points and side-scrapers with retouch all around their edges (**Fig. 3: 3**). In our opinion, the latter bifaces do represent extremely and repeatedly reshaped and retouched items, being in the end of a reduction sequence of many bifacial tools in Crimean Micoquian.

Crescent knife type is actually all around convergently retouched biface with one lateral edge being convex and another lateral edge is straight (**Fig. 3: 4**). In our opinion, depending on thickness and sharpness of the pieces'terminations, such pieces should be classified as crescent points or side-scrapers.

Knives with a handle are "*one of the most specific tool types at Ak-Kaya culture*" (Kolosov 1978: 14). They are large-sized pieces (ca. 7–20 cm long) on flint plaquettes and a handle (natural part of a plaquette) occupies ca. half of the knives' length. But taking a closer look at the illustrations, it is obvious that they are only partially retouched bifacial side-scrapers or even bifacial pre-forms (**Fig. 4: 1-4**).

Thus, summing up Kolosov's Crimean Micoquian data about "*specific bifacial knife types*", it is reasonable to make the following tripartite conclusion now. First, some of the types are not morphologically and technologically knives at all (Ak-Kaya, Crescent and Triangular ones) lacking any specific back and/or resharpening spall negatives. These are crescent / trapezoidal and triangular bifacial side-scrapers and points representing either advanced (crescent / trapezoidal) or even exhausted (triangular) tool reduction stages when all flint plaquettes' edges were already retouched and the resulting tools are well shaped and even reshaped. Second, so-called Semi-Discoidal pieces and Knives with a Handle types are really initially treated bifacial tools, being, typologically speaking, either only initial pre-forms or only partially retouched side-scrapers. Third, coming back to the Bockstein and Klausennische bifacial knife types, their intermediate position is obvious between the above-discussed initial / partially treated bifaces and bifaces with advanced / exhausted characteristics. These so-called typical Central European "*Keilmesser*" types of basic triangular (Bockstein) and crescent / trapezoidal (Klausennische) shapes among the Crimean Micoquian bifacial tools could be even often regarded as large-sized bifacial semi-products (*sic!*) at Zaskalnaya and Ak-Kaya sites, due to the still preserved natural platform covered by primary cortex on one lateral edge of a plaquette support. If extensive secondary treatment occurs on the "backed knives" their natural platforms disappear, the "Bockstein and Klausennische" are transformed into triangular and crescent / trapezoidal bifacial side-scrapers and points. At the same time, "Bockstein and Klausennische" backed bifaces but of a small-size (less than 5 cm long) are represented by a few examples at Kiik-Koba industry type assemblages, like Buran-Kaya III, layer B and Kiik-Koba, layer IV (Demidenko 2004a; 2004b; 2013c), where they show clear exhausted secondary treatment characteristics but still with a natural platform. The platform presence at these small-sized "bifacial knives" is explained by particular physical properties of the flint raw material and treatment circumstances, that obscuring removal of the natural platform around the tool edges. It must be again and again underlined that the platform presence at Crimean Micoquian "bifacial knives" is technologically connected to a whole process of bifacial "plano-convex" and sometimes "plano-convex-alternate" secondary treatment processes when a platform was needed for the transformation of a bifacial pre-form into a bifacial tool. The platform need also explains involvement of thick flakes into the Micoquian bifacial tool production. The technological "platform necessity" for the Middle Palaeolithic Micoquian bifacial "plano-convex" tool production is, however, not present in West European Mousterian of Acheulean Tradition bifacial "bi-convex" (*sic!*) manufacture, this is why backed bifaces occurs there rarely. Accordingly, the already noted intercorrelation pattern for the Crimean Micoquian appears:

1) the occurrence of many large-sized bifacial backed knives and a few bifacial points and convergent side-scrapers at sites near high quality flint outcrops with no high indices of both flint and ungulate carcasses exploitation (Ak-Kaya / Zaskalnaya, Sary-Kaya sites and Kabazi II site, Units III, V - VI), and

2) presence of a few, if any, of small-sized bifacial backed knives and many small-sized bifacial points and side-scrapers with any backs at sites located far away from high quality flint outcrops having high indications of both flint and ungulate carcasses exploitation (Buran-Kaya III, Kiik-Koba).

Being aware of the Crimean Micoquian bifacial backed knife problems already in the beginning of our 1990s studies, it was proposed to view such bifacial backed tools as various bifacial side-scrapers and points, similar to the well-known Central European "*Keilmesser*" types (Chabai, Demidenko 1998: 46). In the light of new investigations and analyses summarized in the present paper, it is clear that the 1998 approach was correct and it is useful to continue its application for both typological classification of various bifacial side-scrapers and points similar to some particular "*Keilmesser*" types and *chaîne opératoire* / tool reduction sequence secondary treatment process understanding.

3.1. Crimean Micoquian Tradition: basic industrial characteristics

In spite of the evident typological variability of Crimean Micoquian Tradition assemblages, it is still possible to link them through three very characteristic features (Demidenko 2003; 2015).

First, the flint treatment 'foundation' of the Crimean Micoquian was the systematic and intensive production and re-utilization of bifacial tools using a characteristic Micoquian "plano-convex" technique. It is worth noting here that the term "*bifacial tool plano-convex technique*" and its technological features were introduced into Palaeolithic Archaeology by Russian archaeologist Gleb A. Bonch-Osmolowski in his famous Kiik-Koba grotto book, by his analyses of the grotto's Micoquian upper layer flint artifacts (Bonch-Osmolowski 1940; see also in Demidenko 2013a). This technique was sometimes modified, leading to creation of "plano-convex-alternate" (Demidenko 2004a: Fig. 9-11, 6 at Buran-Kaya III, layer B; Demidenko 2013c: Fig. IV-11, 6; IV-13, 4) or even almost "bi-convex" pieces (e.g., a semi-leaf / triangular point with a concave base from level Gc1-Gc2 in the 1990s excavations at Siuren I rock-shelter due to the tool's multiple and intensive re-treatment and transformation. See Demidenko 2000: Fig. 8, 2; Demidenko 2001-2002: Fig. 10, 2; Demidenko, Chabai 2012: Fig. 6, 10).

Second, as for the primary reduction processes, Crimean Micoquian is characterized by a clear dominance of bifacial tool treatment and re-treatment debitage products over proper core reduction debitage for almost any given assemblage. Accordingly, most of the debitage blanks for unifacial tool production were products of bifacial tool reduction, multiple re-shaping and rejuvenation. Sets of unifacial tools are, first of all, characterized by a large number of various convergently shaped forms, often with many points present. Third, Crimean Micoquian Neanderthals have been almost exclusively using high quality flints for their various lithic treatment and re-treatment processes, even for sites really distant from such flint outcrops (c. 20 km or more in a straight direction), like at Kiik-Koba and Karabi Tamchin I.

These three fundamental features makethe Crimean Micoquian quite distinct from other Central and East European Micoquian industries, leading to the designation Crimean Micoquian Tradition (Chabai et al. 2000; Chabai 2004; Demidenko 2003; 2004b; 2015). Other typological features Palaeolithicand differences in various tool class and type frequencies of the Middle Palaeolithic Micoquian tradition reflect variability in site function and some specific bifacial and unifacial multiple tool reduction models and rejuvenation processes.

3.2. Crimean Micoquian Chronology

The Crimean Micoquian Tradition chronology extends for most of the Upper Pleistocene from the beginning of the Last Interglacial (ca. 120 000 BP) to the Interpleniglacial period of the Last Glacial (up to Arcy interstadial, ca. 28 000 BP uncalibrated – Chabai et al. 2000; Chabai 2003; 2004; 2008; 2011 or to Huneborg interstadial, 36 – 35 000 BP uncalibrated – Demidenko 2012; 2014a; 2014b; 2014c) when Micoquian Neanderthals were occupying Crimea. Keeping in mind such an extended chronology, the Crimean Micoquian is again set apart by another characteristic: persisting for no less 80 000 years, the tradition preserved its basic industrial features with no obvious technological changes. This unchanging and long-lasting existence has several important implications.

Flint treatment habits and components were conservative in form but, at the same time, well adapted to the changing palaeoenvironments of the Crimean Upper Pleistocene. If they had not been so adapted, they would either have changed over time or the Crimea would have been depopulated by Micoquian Neanderthals during certain periods. Indeed, pollen data for the Crimean sites (Gerasimenko 1999; 2004; 2005), indicates that Micoquian Neanderthals lived in quite variable and changing landscapes, with the palaeoenvironmental evidence structured into two basic groupings over the 80 ky interval. The Last Interglacial and different interstadials are mainly characterized by varying southern-boreal forest / forest-steppe, whereas stadial intervals are represented by boreal / southern-boreal forest-steppe – boreal forest-steppe – boreal xeric forest-steppe – boreal xeric grassland. The range of main hunted ungulates remained constant during the Upper Pleistocene, focusing primarily on *Equus hidruntinus*, *Saiga tatarica*, *Bovinae*, *Cervus elaphus* and *Mammuthus* (see Chabai, Uthmeier 2006). The only exception for the fauna structure was during the Last Interglacial (light pine forests with an admixture of broad-leaved trees for MIS 5d) when saiga and mammoth are not recorded.

The conservative nature of the Crimean Micoquian Tradition is well evidenced by the fact that no techno-typological changes occurred even when it coexisted with another Middle Palaeolithic, Levallois-Mousterian industry, and with two Early Upper Palaeolithic ("Eastern Szeletian" and Proto-Aurignacian) industries in the Crimea during the Interpleniglacial period of the Last Glacial (Chabai et al. 2000; Chabai 2003; 2004; 2011; Demidenko 2000; 2004b; 2008; 2014c). As a result, we have no evidence of Micoquian

Neanderthals borrowing any aspects of these three industries. Thus, it is possible to postulate universal characteristics of the Crimean Micoquian Tradition that reflect the ability of its makers to survive and adapt for at least 80 000 years in the Crimea. The earliest known in situ Micoquian complexes are from the Last Interglacial levels of Unit VI at Kabazi II site (see Chabai, Richter, Uthmeier, eds., 2005), and Crimea's then island geography should be kept in mind. If we do not support Neanderthal boat use during the Last Interglacial, we have to conclude that the first appearance of Micoquian Neanderthals in the Crimea occurred before it was an island, during OIS 6, when the Black Sea was much lower and the Crimea was an integrated part of the East European southern territories. This implies an even longer duration for the Crimean Micoquian, assuming a probable initial settlement during at least OIS 6.

3.3. Crimean Micoquian Tradition site function types

Our team's analysis of Crimean Micoquian sites took several factors into account, including: topography and location within the surrounding environment, i.e., open-air, rock-shelter and grotto / cave sites; distance from high quality flint outcrops; identification of sediment accumulation rate & geological characteristics; site taphonomy; archaeological materials; find density and cultural level thickness; structure of archaeological levels, e.g., hearth, organic remains and presence/absence of construction elements; palaeontological and archaeozoological data on Neanderthal primary and/or secondary butchering processes of ungulate body carcasses; seasonality data. Lithic use models were defined through primary core reduction data and initial tool production processes on- and off-site; artefact class and group occurrence within a given assemblage (pre-cores, cores, tools, debitage, chips, as well as the occurrence of specific items, e.g., primary elements, lateral overshot & crested pieces and bifacial & unifacial tool shaping and especially rejuvenation artifacts) and their mutual correlation, with an emphasis on different combinations for debitage – core-like pieces, tool – core-like pieces, and specific tool shaping and/or rejuvenation items – tools. Such flint model treatment data allow consideration of raw materials and artifacts brought to the site, the use of imported and local pieces on-site, and pieces exported from the site. In combination with other data, particularly archaeozoological evidence, it is then possible to identify "ephemeral killing / primary butchering stations", "ephemeral and short-term primary and/or secondary butchering camps" and possibly "base camps". As a result of such studies, a complex and mosaic-like Crimean Micoquian Neanderthals' site radiating system appears, explaining the broad typological variability of the flint assemblages (see Chabai et al 1995; 2000; Chabai, Marks 1998; Marks, Chabai 2001; Chabai 2004; Chabai, Uthmeier 2006).

4. Concluding considerations

The above-represented data and ideas on different Palaeolithic industries with bifacial tool production traditions with an emphasis on the Crimean Micoquian lead us to the following considerations.

The thorough morphological and technological analyses of bifacial tools and various debitage associated with them allow us to recognize not only a basic reduction method for production and rejuvenation of bifacial tools at any given Palaeolithic assemblages and its industry, but also some special treatment and re-treatment methods caused either by blank type peculiarities or by some tools' reshaping / rejuvenation traits. Accordingly, it is possible to trace some bifacial tool variability at each assemblage / industry and then to understand and explain the recognized variability.

The particular example of the Crimean Middle Palaeolithic industries with bifacial tools demonstrates well causes and processes of a traditional "cultural paradigm" replacement by a synthesis approach, based on a combination of various interdisciplinary studies and archaeological methods on sites and the classification and interpretation of their finds. This change in approach explains why the variability of industries' is understood now in the frames of just one Crimean Micoquian Tradition reflecting "uniformity in diversity" principles. According to the data analyzed, it clearly appears that Crimean Micoquian industrial variability should be not explained by strictly delimited areas of several culturally distinct Neanderthal tribes but, instead, by a dynamic and many-sided Neanderthal groups, differentiated by lithic reduction models and primary, as well as secondary faunal exploitation at functionally variable sites. Aside of the three basic industrial features of the Crimean Micoquian Tradition that make it distinct from other Central and East European Micoquian industries, there have been recognized two more interesting trends that explain its "industrial variability fluctuations".

First, it has been traced that "*the greater the proportion of convergent side-scrapers and points, the greater is the intensity of tool reshaping and rejuvenation in a tool-kit*" indicating Neanderthal economic activity at different sites. Such an "indicative tool key" certainly helps to understand different proportional representation of the same tool classes and types in various Crimean Micoquian industry types and their assemblages. Also, the Central European Middle Palaeolithic Micoquian bifacial backed knife ("*Keilmesser*") types appear to be not real, intentionally manufactured tool types in the Crimean Micoquian. They probably demonstrate various reduction stages of bifacial side-scraper and point manufacture, where natural platforms (backed areas) of plaquette and thick flake blanks did serve as a necessary technological element in fabrication and reduction of bifacial side-scrapers and points. As a result of different manufacture / reduction stage situations for various bifacial tools at Crimean Micoquian sites, more large-sized "backed bifacial knives" are known for short-term home camps in rock-shelters and primary killing/butchery sites near high quality flint outcrops (Ak-Kaya-etalon-like and Ak-Kaya-genuine industry types), whereas only a few, if any, small-sized "backed bifacial knives" are present at primary and secondary butchery short-term camps situated far away from high quality flint outcrops, with evident indications on high intensity and extended flint exploitation (Kiik-Koba industry type) and various short-term sites with not just primary killing/butchering activity (Ak-Kaya – Starosele

and Starosele industry types). Accordingly, the former site assemblages have a lesser number of not backed bifacial convergent side-scrapers and points, while the latter site assemblages are characterized by much more numbers of the not backed bifacial convergent side-scrapers and points, achieving its numerical climax namely at Kiik-Koba industry type assemblages known about the most intensive lithic reduction characteristics.

5. Final suggestion

Keeping in mind that Central European Middle Palaeolithic Micoquian is usually now called "*Keilmessergruppe*" (since Veil et al. 1994; see for an overview Conard, Fischer 2000; Jöris 2006), due to a common occurrence of different "*Keilmesser*" / "bifacial backed knife" types in the technocomplex's assemblages, it is worth to make a special investigation on their reduction stage position within the whole set of bifacial tools for Micoquian / "*Keilmessergruppe*" assemblages, aside of the ones with Prondnik / Pradnik bifacial knives. If "bifacial backed knives" play in many non-Prondnik / Pradnik Central and East European Micoquian / "*Keilmessergruppe*" assemblages mainly the same initial / partial reduction role for production of various bifacial tools as in the Crimean Micoquian, then the term "*Keilmessergruppe*" is in danger, and the term "Middle Palaeolithic Micoquian" for the related Central and Eastern European assemblages is still valid but with a need of more specifications. This is, however, subject for a next separate paper that is beyond the scope of the present paper. As usual, when more work is done, more work is needed to be done and, paraphrasing one of the famous expressions of Claude Lévi-Straus, it is possible to say that the present paper does not only provides some answers, but also gives some new questions for future studies.

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