Institute for the Material Culture History RAS
Institute of Archaeology RAS
Southern Scientific Centre RAS
Institute of Archaeology and Ethnography,
Siberian Branch of the RAS
Department of Historical and Cultural
Heritage Protection, Restoration,
and Exploitation, Krasnodar Region

EARLY PALEOLITHIC OF EURASIA: NEW DISCOVERIES

International Conference Program and Abstracts
Krasnodar – Temriuk,
1–6 September 2008

Rostov-on-Don
2008

Supported by RFBR, grant nos. 08-06-06053, 07-06-00127a, by Programme of basic Researches of the Presidium of RAS «The adaptation of nations and cultures to changes of the natural environment, social and man-caused transformations» and by Programme of basic Researches of the RAS Department of Earth Sciences «Development of Monitoring Technologies, Ecosystem Modeling and Forecast while Natural Resources' Studying under the Arid Climate Conditions»

Early Paleolithic of Eurasia: New Discoveries: Abstracts of the International Conference (Krasnodar – Temryuk, September 1–6, 2008). Rostov-on-Don, 2008. 208 p. Fig.: 16. Tab.: 2.

The book presents the materials of the International Conference held at Temryuk (Krasnodar Region, Russia) and devoted to the latest investigations in the Early Paleolithic of Eurasia. The papers cover a wide range of topics related to the initial peopling of Eurasia. Special attention is given to the distribution and chronology of the Early Paleolithic sites, and to the problem of human adaptations to different paleoenvironmental conditions.

Addressed to archaeologists, paleontologists, geologists, paleogeographers.

Fig. – 16. Tab. – 2.

Materials are published with the highest reservation of authors' editing

ISBN 978-5-902982-43-2

In memoriam of Professor Andrey E. Dodonov, Director of the Laboratory of Quaternary Stratigraphy, Geological Institute of the Russian Academy of Sciences, one of the organizers of Interdisciplinary Studies of the Oldest Paleolithic on the Taman Peninsula

FOREWORD

The recent discovery by the Taman Expedition from the Institute for the History of Material Culture RAS of unexpectedly old Early Paleolithic sites at Bogatyri/Sinyaya Balka and Rodniki 1-2 has become on of the most startling events in Russian archaeology. At both sites archaic stone tools occur in association with numerous mammal bones, belonging to representatives of the Taman faunal complex dated to the Eopleistocene. These discoveries together with the data obtained in other parts of the Northern Caucasus by researchers from the Institute of Archaeology RAS and Institute of Archaeology and Ethnography (Siberian Branch of RAS) call for a radical reconsideration of traditional ideas regarding the time and routes of the initial peopling of Southern Russia and adjacent regions. As a result a necessity has arisen to discuss the problem of the earliest human colonization of Eurasia in the light of new evidence and with participation of natural scientists and archaeologists from different countries. Such a meeting, organized by the three leading archaeological institutions of Russia, will contribute to our better understanding of regularities and peculiarities in the formation and cultural development of the Early Pleistocene human societies, as well as their environmental adaptations. In addition to presentations and discussions during scientific sessions, the participants of the conference will have an opportunity to visit some sites and to examine the most interesting finds. Among those who have submitted their papers are scholars from Russia, Ukraine, Georgia, France, Italy, Germany and other countries.

S. A. Vasil'ev
V. E. Shchelinsky

OPENING ADDRESS

Dear conferees! Dear guests!

Kuban is a unique territory of our motherland. We are proud of our compatriots. They are U. V. Kondratuk – one of the foundators of missilery, S. F. Bondarchuk – a wonderful Russian cinema director and actor, A. Netrebko – an opera singer, a pride of Mariinsky Theater, N. V. Mordjukova – the great Russian actress. A. I. Pokrishkin, a military pilot, who has become three times a hero of the Soviet Union.

Kuban nature also expresses us: the rich Russian black earth and alpine meadows, seaside and ski resorts, steppes and covered with ice mountains of Caucasus.

But one of the most wonderful things in Kuban is the rich archaeological heritage. Different historical epochs has left here the evidences of their existence – the sites of ancient men of the stony age, cave Eneolithic forts, the objects of megalithic architecture, step barrows of ancient nomads, towns and necropolises of antiquity, early Christian temples and medieval fortresses, the most ancient on the territory of Russia. Human existed here for more then one million years!

Now there are more then twelve thousands objects of archeology standing on the state security. Their types are very different. Some of them are unique for the territory of Russia and are known only in Kuban – such as, for example, the dolmens or the remains of ancient Greece forts and bartons.

Care for the historical and cultural heritage, popularization of Krasnodar territory as a region of cognitive tourism is one of the priority activities of the government of Krasnodar Region. Every year the earmarked budgetary funds are assigned for archaeological researches – one of them is archaeological complex lower Paleolithic site «Bogatiry». We are glad that our work was marked. In 2007 the fund «Archaeological heritage» has adjudged the government of Krasnodar territory an award «For responsible and careful attitude to archaeological heritage».

An old Turkmen proverb says: «The land where men didn't work has no name». It's because of your work that small piece of land called «The tract Bogatiry» has become world famous.

We wish you and further successes, luck, the realization of all projects in such hard and noble work on preservation of the world historical and cultural heritage for our children, grandsons and great-grandsons!

The governor of Krasnodar Region
A. N. Tkachev

ABSTRACTS

EARLY PALEOLITHIC SITES ON THE TAMAN PENINSULA (SOUTHERN AZOV SEA REGION)

V. E. Shchelinsky[1], A. E. Dodonov[2], V. S. Baigusheva[3], S. A. Kulakov[1], A. N. Simakova[2], A. S. Tesakov[2], V. V. Titov[4]

[1]Institute for the Material Culture History, Russian Academy of Sciences, St. Petersburg
[2]Geological Institute, Russian Academy of Sciences, Moscow
[3]Azov Archeology and Paleontology Museum-Reserve, Azov
[4]Southern Scientific Centre, Russian Academy of Sciences, Rostov-on-Don

The currently available evidence allows one to think that shortly after their appearance in the rift zone of East Africa, the first humans began to colonize other regions, including Eurasia. This is evidenced by the presence of Oldowan sites in the Arabian Peninsula (Amirkhanov, 2006), Northern and Eastern Mediterranean (Bosinski, 1996), the Balkans (Sirakov, Guadeli, 2004), and the Southern Trans-Caucasus (Gabunia et al., 2001). Recently they have also been discovered on the northern slope of the Caucasus, in Daghestan (Amirkhanov, 2007).

The problem of the initial occupation of the temperate zone of Eurasia, which includes nearly all regions in the south of Russia, provokes a particular interest. Of special importance in this respect are the Early Paleolithic sites, which have been discovered recently on the Taman Peninsula in the south of the Azov Sea region (Shchelinsky, Kulakov, 2005, 2007). It should be noted that some materials indicative of the presence of Early Paleolithic sites in this region were found in the last century. They came from the sand quarry of Tsymbal on the shore of the Taman Gulf. Initially this site attracted scholars owing to numerous finds of fossil animal bones coming from fluviatile cemented pebble beds and layers of ferrugineous sand. According to N.K. Vereshchagin (1957), bone materials belong to the Taman faunal complex. The complex is dated to the period of 1.1–0.8 Ma (Vangengeim et al., 1991). The faunal remains found at the site include fractured long bones, scull fragments, and isolated teeth of *Archidiskodon meridionalis*, *Elasmotherium caucasicum*, archaic horses, deer, etc. It is thought that the bones belong to animals, which died due to natural causes. At the same time, judging by the composition, preservation, and occurrence of the bones, one may assume that Early Paleolithic humans could have

played some role in their accumulation at the site (Shchelinsky, 2005). This is quite possible, as Vereshchagin (1957) also noted the presence of bones broken by man. Stone tools found at the site confirm this assumption. Some of them were found on the surface (Formozov, 1962). We have discovered several stone objects with apparent traces of intentional modification, which occurred together with animal bones. One may hope that in future this site will yield true Early Paleolithic materials.

Especially informative are two newly discovered Early Paleolithic sites: Bogatyri/Sinyaya Balka and Rodniki. They are situated on the northern shore of the Taman Peninsula, in 15 km SE of Tsymbal and 1 km west of the Peresyp settlement.

The archaeological site of Bogatyri/Sinyaya Balka is confined to the famous paleontological site of Sinyaya Balka, which serves as the stratotype of the Taman faunal complex dated to the Eopleistocene (Early Pleistocene). The absolute height of the site is 28–30 m, and it is associated with a coastal area strongly affected by landslides. The excavations have shown that the deposits containing cultural remains are in a dislocated position. However, the hypothesis of the mudflow origin of these sediments, widely accepted by earlier investigators, cannot be confirmed. It has been established that the culture-bearing deposits are sharply delimited from the south by dark gray Pliocene clays. The line of contact between these two different units is quite clear; it stretches from east to west. The observed thickness of the culture-bearing deposits does not exceed 5–6 m.

The deposits that encompass archaeological materials show a sequence of layers with subvertical occurrence. Probably, this is due to tectonic processes and mud volcanism, both of which are very active in the region under consideration. All in all, three layers can be distinguished.

The lowermost one (layer 3) is rich in clastic products and shows signs of water origin. It consists of rolled round and amorphous fragments (from 5 to 20–30 cm) of solid sand-detritus conglomerate, encompassing animal bone fragments and teeth, isolated blocks of dolomite, thin lenses of light-gray sand and silt with shell detritus. There are also thin streaks of dark-gray and brown clays. The contact with the dark-gray Pliocene clays is clear, uneven, with signs of displacement. The thickness of the basal layer is 0.4–0.9 m. It is overlain with layer 2, formed by light-gray and yellowish sand with small lenses of rubble, brown clay balls, rare rock debris, and isolated spheroid sand-carbonaceous concretions with inclusions of bone fragments. The thickness of this layer is about 2 m. Superposed on it is layer 1. It is remarkable for the abundance of big and small bone fragments, belonging mainly to *Archidiskodon meridionalis tamanensis* and *Elasmotherium caucasicum*. Many of the bones dip at a high angle or occur nearly vertically (dislocated together with the layer). There are many broken and almost intact skulls, teeth, pelves, scapulae, vertebrae (not infrequently in anatomical articulation), fragments of long bones and ribs. The

bones occur in the substrate of sand and small compacted rock debris, containing an admixture of dolomite fragments and inclusions of dark gray clay. The contact with the sands of layer 2 is clear, uneven, with erosion pockets. The observed thickness of this layer is 1.5 m. Its upper part seems to have been disturbed by hill slope erosion.

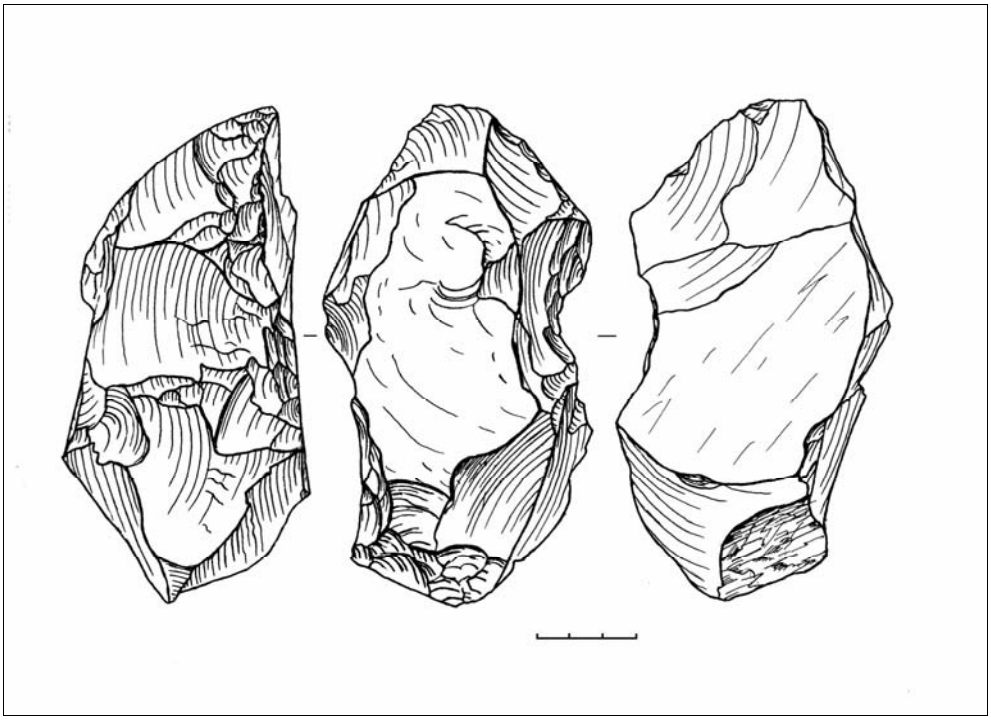

Fig. 1. Early Paleolithic site Rodniki. Pick of oviform-elongated form at the flinders of dolomite

Four main stages of the site formation can be reconstructed. In the first stage layers 3 and 2 formed in the conditions of a shallow estuary or lagoon. They contain isolated stone artifacts and bones, which experienced some rolling and partial ferrugination. They are covered with cemented sand cortex. The sands of layer 2 display no lamination, which points either to unevenness of the stream or reworking of the sand. Layer 1 formed in littoral conditions. Subsequently it was partly reworked and eroded by a mudflow (most probably of mud-volcanic origin). Finally, in the last stage due to tectonic processes and hillslope erosion all the strata were deformed by a diaper fold, slid down the slope, and overturned at about 100°.

The palynological analysis of the deposits has shown the presence of redeposited Pliocene pollen, which is particularly well represented in the bone breccia.

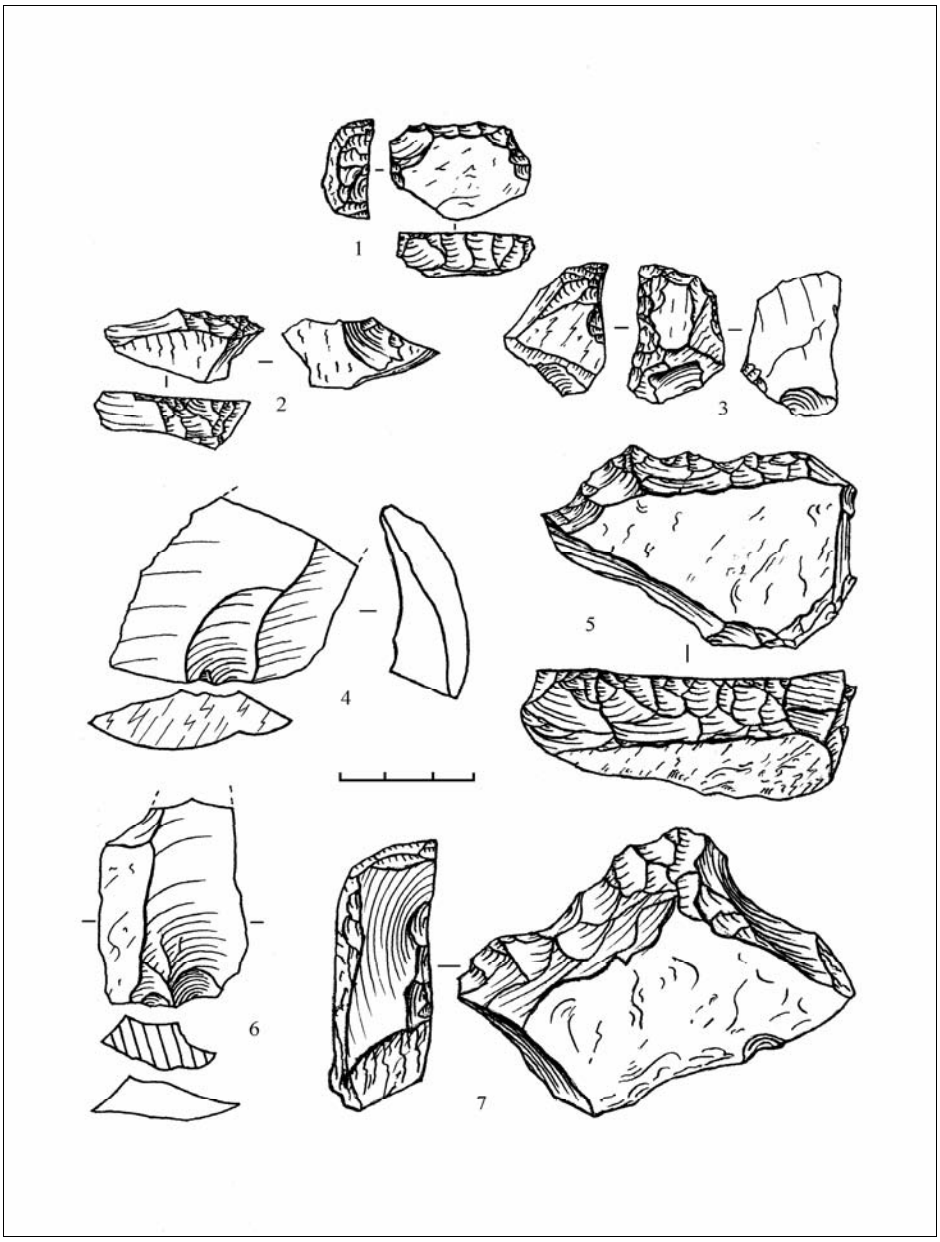

Fig. 2. Early Paleolithic site Rodniki. Dolomite tools: 1 – endscraper 2 – small tool with indented blade; 3, 7 – beaked tools; 4, 6 – flakes; 5 – scraper-like tool with a pike on blade

The pollen spectra from the basal part of the section (layer 3) are dominated by *Asteraceae* and *Chenopodiaceae*. The arboreal group is represented by single grains of *Pinus, Tsuga, Abies, Quercus, Betula, Salix, Corylus, and*

Carpinus. These spectra are indicative of forest-steppe and steppe landscapes, with herbs dominating on watersheds, and pine/small-leaved forests (with some participation of broad-leaved species) growing in river valleys. Layer 2 yielded no pollen.

The pollen spectra from the bone breccia (layer 1) are dominated by redeposited pollen of the Upper Pliocene age (up to 90 %). There is pollen of *Pinus* sp., *Tsuga*, Taxodiaceae/Cupressaceae, *Podocarpus*, *Picea* sp., *Abies*, *Ulmus pumila*, *U. suberosa*, *U. foliaceae*, *Juglans*, *Pterocarya*, *Platycarya*, *Engelhardtia*, *Fagus*, *Tilia*. The available palynological data and correlations suggest the Eopleistocene-Early Pleistocene age of this (Kuznetsova, 1964; Bolikhovskaya, 1995; Grichuk, 1989).

Small mammal remains were found in the course of our excavation in layer 3 (*Lagurodon arankae*) and 1 (*Mimomys* ex gr. *savini*, *Lagurini* gen.). They point to the Eopleistocene age of the encompassing deposits.

Cultural remains and animal bones were found in all three layers. Layers 3 and 2 produced sporadic bones and stone artifacts. Layer 1 yielded numerous bones, while stone artifacts were relatively rare. They occur in close association with the bones, and therefore the distribution of finds is reminiscent of the picture characteristic for occupation sites. In fact, it does not differ much from the pattern observed in open air Paleolithic sites.

The collection of indisputable stone artifacts coming from Bogatyri/Sinyaya Balka consists of some 200 objects. They are identical by raw material (solid varieties of brown and gray dolomite available in the form of plates and platy fragments) and degree of patination. Single cores represent fragments of plates with either no special preparation at all or minimal preparation of the striking platform. Well pronounced is the technique of fragmentation of slabs and plates with the purpose of obtaining massive blanks for tool manufacture. There are tools of different size and shape. Handaxes are absent, tools on flakes are very rare. Most conspicuous are high massive sidescrapers, core-like endscrapers, picks, beaked tools, small thick points, notches and denticulates. There are also sporadic choppers. In many of its typological and technological characteristics the industry of Bogatyri/Sinyaya Balka is similar to the Oldowan industry. At the same time it has a number of well pronounced specific features, too. Most of them seem to have been caused by the character of raw material. Thus the industry can be defined as the Taman variant of Oldowan.

The site Rodniki is situated in less than 100 to the west from Bogatyri/Sinyaya Balka. It has, however, different geological settings. The layer, which encompasses archaeological finds, lies at the base of the series of deposits, forming a terrace-like surface with the absolute height of 32 m. The site is conventionally divided into two parts: the eastern part or Rodniki 1, and the western part or Rodniki 2. These parts have not yet been correlated with each other, and they differ in the character of the culture-containing layer.

The section of Rodniki 1 can be divided into three units. The upper one is formed by slope sandy loams and a weakly developed modern soil. The underlying unit (8-10 m thick) consists of yellow and yellow-gray laminated littoral sea sands. The lower unit (1 m) is formed mainly by coarse-grained materials. It can be subdivided into three layers. The basal layer, resting on the dark-gray Pliocene clays, is represented by poorly rounded rock debris with dolomite blocks and rare dolomite pebbles, and gray sand as a matrix. It is overlain with a layer consisting of rubble and rock debris with brown clay rolls and intermittent streaks of gray silt. The top of the unit is formed by a layer of brown clay with sand. Cultural remains come from the basal layer. Its age can be assessed on the basis of the small mammal fauna from the overlying layer. Among other species, this fauna includes *Allophaiomys* ex gr. *pliocaenicus* and *Lagurodon arankae*, which are characteristic of the Eopleistocene (Early Pleistocene) of South Europe.

The excavation area of 12 m^2 gave 40 indisputable artifacts. They lay in sand among blocks and rock debris and formed a horizon (15–20 cm thick) in the lower part of the layer. Some artifacts lay on the contact with the Pliocene clays. There are small and big tools (picks, high massive sidescrapers, choppers, core-like endscrapers, beaks, etc.) as well as cores and flakes (fig. 1–2). All these artifacts are made of the same raw material that was used at Bogatyri/Sinyaya Balka, and from the techno-typological point of view the two industries have much in common too.

Rodniki 2 was found thanks to a big landslide on the coastal slope, which created a high natural exposure. The absolute height of the brow of this section is 32 m. The section is very similar to that of Rodniki 1. Its basal layer, resting on the dark gray Pliocene clays, also is formed by weakly rounded rock debris with blocks, rare pebbles, and light-gray sandy matrix. It also contains cultural remains. However, as distinct from the basal layer of Rodniki 1 it is clearly laminated and consists of 2–3 sublayers separated by sand. Archaeological finds here are not so numerous. The layer yielded 28 stone artifacts (flakes, tools) and small bone fragments. The first impression is that the stone tools of Rodniki 2 show no substantial difference with those of Rodniki 1. It seems highly probable that Rodniki 1 and 2 are parts of the same Early Paleolithic site. As to the chronological correlation of this site with Bogatyri/Sinyaya Balka, the question still remains to be explored. The only thing one can say now is that the two sites date to the Eopleistocene (Early Pleistocene).

The discovery and study of the Early Paleolithic sites on the Taman Peninsula greatly contributes to our knowledge of the Early Paleolithic in Eurasia. It is becoming more and more obvious that the steppe regions of South-Eastern Europe were first populated by people as early as at least the middle of the Eopleistocene (Early Pleistocene). It appears that the initial occupation of the region was facilitated by favorable environmental conditions, which existed here in the beginning of the Quaternary period.

Supported by RFBR, grants nos. 07-06-00127a and 07-06-10006k.

COMPARATIVE TYPOLOGICAL AND STATISTICAL CHARACTERISTIC OF THE INVENTORY OF MUKHKAI 1 IN CENTRAL DAGESTAN (Based on the materials of 2007 excavations)

Kh. A. Amirkhanov

Institute of Archaeology, Russian Academy of Sciences, Moscow

The site of Mukhkai 1 is situated in the mid-mountain zone of central Dagestan (42°14'475"; E 47°21'400"). It was excavated in 2007, when a trench of 2 × 5 m^2 was cut into the slope. The trench reached the depth of 3.5 m. The area under study is confined to the surface of the ridge separating the Akush and Usish rivers. The elevation above the Akush water level is 235 m, and the absolute height is 1620 m. Geologically this water divide represents a well expressed relic of a planed surface predating the Upper Apsheron time.

The total thickness of unconsolidated deposits exposed by the Akush valley in the environs of the site is about 60 m. Archaeological materials represented by stone artifacts are associated with the upper part of these sediments, which formed at the time when the river drainage of Central Dagestan had not yet acquired its present state. Thus, both geological and geomorphologic data testify to the Eo-Pleistocene age of the archaeological remains.

Numerous flint artifacts come from nine lithological layers exposed by the trench. The total number of objects in the 2007 collection is 371 (4 more objects were found in the natural exposures nearby). Thus, we have a representative assemblage of stone tools coming from a clear geological context that does not allow for different interpretations of the stratigraphic position of archaeological finds.

To make comparisons the present author has analyzed a number of assemblages from the Oldowan Gorge, Arabian Peninsula, and the Caucasus. The former include typical Oldowan assemblages associated with different levels of Bed 1: DK (lower bed 1); FLK (middle bed 1); FLK north (layers 6, 4, 1; upper bed 1). The South Arabian materials are represented by the collection from layer 3 of Al-Guza. The Caucasian materials include the assemblages of Dmanisi (layer 3) and Mukhkai 1 (layers 8, 5, 3). All the data obtained as a result of this comparative analysis have been summarized in statistical and typological tables. They lead to some conclusions, which greatly contribute to our understanding of the archaeological materials from Central Dagestan studied by the author in recent years.

The comparative analysis shows that Oldowan assemblages from different sites are not identical. The collections of Al-Guza and DK display more common features than the collections of DK and FLK, despite the fact that the latter two are geologically coeval sites situated in the Oldowan gorge itself. The East African sites dated to the time about 2.0 mya and earlier also show a number of

specific features, regarded by some researchers as sufficient to distinguish these sites in a separate stage (Pre-Oldowan). At the same time, however, there are strong typological and statistical criteria, which allow one to recognize an Oldowan industry as such. These criteria have not yet been presented as a conventional typological formula, but their content can be inferred from the analysis of the assemblages that are considered classical for the Oldowan. These criteria can be formulated as follows:

a) the diversity of inventory and its typological structure;

b) the presence of the operational chain ‘core-blank-tool’, though for the given industry this technology is of secondary importance only;

c) the total number of tools in assemblages rarely exceeds 20 % ;

d) tools on fragments are always much more numerous than tools on flakes;

e) choppers of different modifications invariable play the role of index fossils;

f) choppers dominate among tools, making on the average from 50 % до 80 % of the tool set (while their part in the whole collection rarely exceeds 15 %);

g) proto-bifaces are found incidentally;

h) small tools (end-scrapers, notches, and thorned tools), including microtools, represent an organic part of the industry;

i) handaxes are totally absent.

These features characterize the typical, classical Oldowan industry. Some deviations from the described set of criteria can be noted both for the sites predating the Oldowan proper and for the assemblages attributed to Evolved Oldowan A and B. As to the industry of Mukhkai 1, it clearly fits the typological pattern characteristic of the classical Oldowan.

At the same time the inventory of the site demonstrates some peculiar features, too. One of them is the presence of a series of massive trihedral tools defined as picks. One can note also the absence at Mukhkai of such a coherent group of can tools as discoids-spheroids-subspheroids. Burins are absent too. However, these differences can by no means be an obstacle for attributing this industry to the Oldowan. Many Oldowan assemblages from other regions also contain few or no burins and/or discoids-spheroids. As examples one can mention Hadar, Koobi-Fora and Melka-Kunture in East Africa, as well as Sterkfontein and Swartkraans in South Africa. The abundance of these tools at different sites seems to depend on the site functions, on the activities that had been accomplished at the excavated part of the site, and on the specificity of tool manufacture in different regions.

EARLY PALEOLITHIC SITES ON THE HIGH TERRACES IN THE ENVIRONS OF DUBOSSARY (the Lower Dniester)

N. K. Anisiutkin

Institute for the Material Culture History, Russian Academy of Sciences,
St. Petersburg

The Early Paleolithic localities of Pogrebya and Dubossary are situated in the Lower Dniester region in the environs of the town of Dubossary (Moldova). They were discovered by N.K. Anisiutkin in 1982 and explored by him together with Moldavian colleagues in 1983, 1985 and 1986. The most extensive works were carried out in 1985 jointly with the team of Moldavian paleogeographers and geologists headed by O.M. Adamenko. Stone tools and two fragments of teeth of "*Archidiskodon*" *trogontherii* (after V.E. Garrut) were found in land-reclamation ditches, test pits, and on erosive surfaces of the 7th terrace of the Dniester.

The locality of Pogrebya is situated about 8 km downstream of the town of Dubossary. The collection of archaic stone artifacts consists of 268 objects, including 28 cores, 36 pebble articles, and 41 tools on flakes and pieces of shatter. The buried soil exposed in a melioration ditch yielded two fragments of teeth of *Archidiskodon trogontherii*.

The locality of Dubossary is situated in the south-western outskirts of the town in the Bolshoi Fontan suburb. The collection of archaic stone artifacts consists of 427 objects of flint, quartzite, and quartz, including 74 cores and 114 tools, as well as 17 pebble articles. Both in the character of raw materials and state of preservation the stone artifacts from Dubossary are analogous to those found at Pogrebya.

Judging by the totality of technological and typological characteristics the materials of the two localities should be regarded as a single assemblage. Its dating is based on the finds of stone artifacts associated with the Quaternary sediments of the 7th terrace. The earliest of these finds come directly from the Martanosh buried soil, which is correlated with the Günz-Mindel interglacial or OIS 17-19 (659-787 kyr bp). A flake with micro-denticulated retouch found in the Tiligul loess of the Pogrebya section marks the late chronological boundary of this assemblage (440-510 kyr bp). Isolated Levallois flakes associated with the Dnieper (Riss) loess (200-250 kyr bp) represent a late admixture.

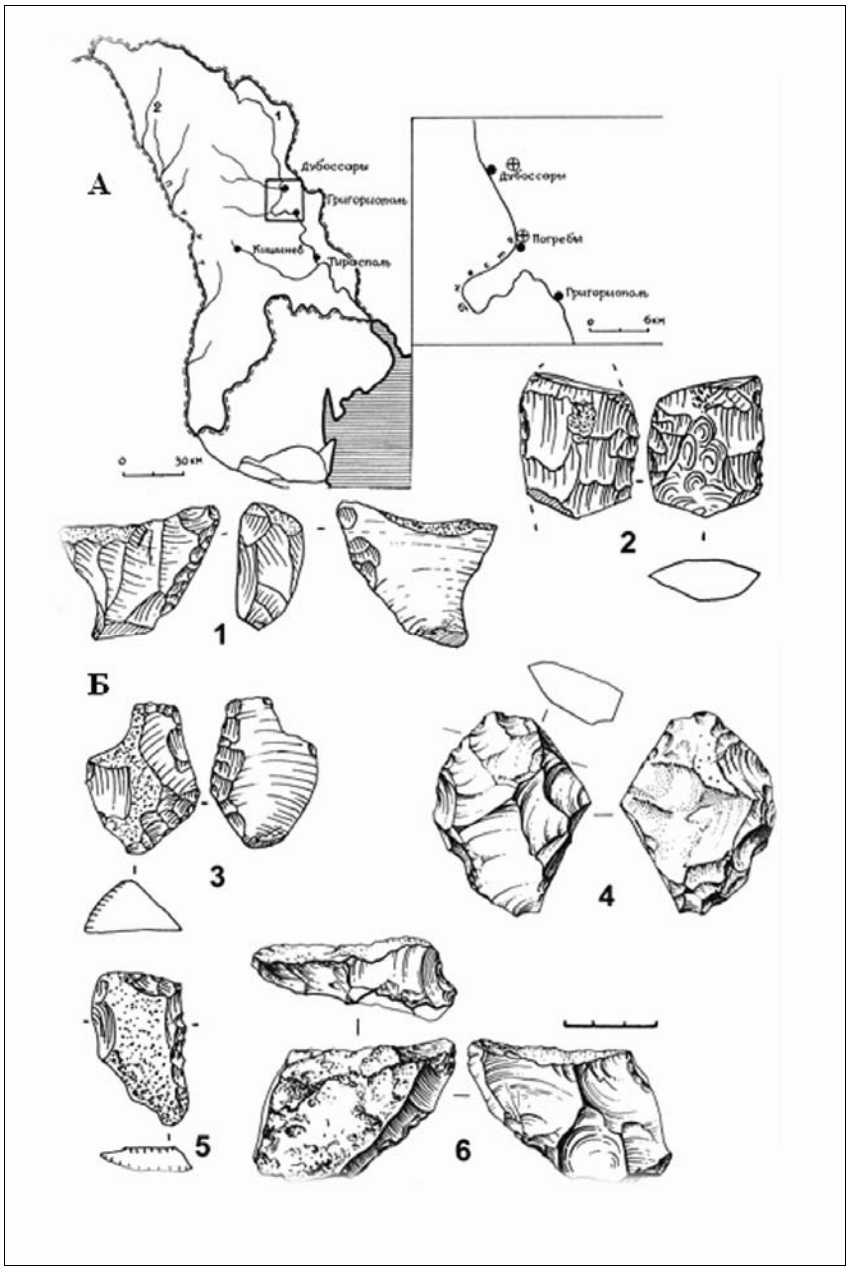

Fig. 1. A – map showing the location of the Early Paleolithic sites in the environs of the town of Dubossary (Moldova); B – Early Paleolithic stone tools. 1 – side-scraper with straight working edge (Dubossary, Martanosh buried soil); 2 – fragment of a bifacial tool (Dubossary, surface find); 3 – side-scraper with partially bifacial working edge (Dubossary, Martanosh buried soil?); 4 – backed biface (Pogrebya, surface find); 5 – side-scraper on a flat pebble (Dubossary, Martanosh buried soil); 6 – core (Pogrebya, buried soil)

EARLY PALEOLITHIC IN THE PIEDMONT ZONE OF THE CASPIAN SHORE OF DAGESTAN (with Particular Reference to the Materials from the Rubas Valley)

A. A. Anoikin

Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences, Novosibirsk

The study of the earliest stages of the Old World peopling is one of the main directions of research in modern Paleolithic archaeology. Since the discovery of 1,5 million-year-old human remains and stone tools in Dmanisi (Georgia), the Caucasus has been considered a transit land through which ancient human groups moved to Eurasia. However, until recently the materials dated to the early stages of the Paleolithic period have been known only in the Trans-Caucasian and on the Black Sea shore. At the same time, judging on the paleogeographic data, the Caspian depression could have been the most convenient passageway to the Northern Caucasus. Recently archaeological materials discovered in Dagestan have confirmed this hypothesis. They came from the sites of Darvagchai-1, Rubas-1, and a number of localities near the village of Ainikab.

Rubas-1 is situated on the right bank of the Rubas river (southern Dagestan), on a 30 m bench, which reveals the following geological structure. The basal part of the section is formed by marine deposits, which can presumably be dated back to the Akchagyl time ($N_2^3{}_{ak}$). Dark gray clays represent the deposits. The clays are overlain with a thin (up to 0,15 m) gravel-pebble layer with silt-sandy filler. Superposed on this layer are marine deposits represented by fine-grained sand with streaks of clay. The latter bear some imprints of plant leaves and stems. After that follows a gravel-pebble-boulder bed of river genesis overlain with alluvial sands. The section is crowned with a thick packet of sandy loams of complex genesis topped with the recent soil.

In 2006-2007 a complex of ancient artifacts has been found in the gravel-pebble layer, which appears to have formed in the breaker zone of the ancient beach during the initial stage of the sea transgression. Some of the angular flint fragments, constituting a small part of the gravel-pebble materials represented mainly by limestone and sandstone, were defined as artifacts. The identification of these objects is difficult due to the bad quality of raw material (strong inner jointing leading to natural splitting and formation of pseudo-artifacts) and to the fact that most flints are heavily rounded. The excavated area reached 50 m^2. The collection includes over 500 flint objects. Most of them are shorter than 5 cm, though single nodules can be 15 cm long. About 20 objects reveal signs of intentional flaking. The primary flaking is represented by the simplest techniques with minimal core preparation. Tools are represented by sidescraper-like

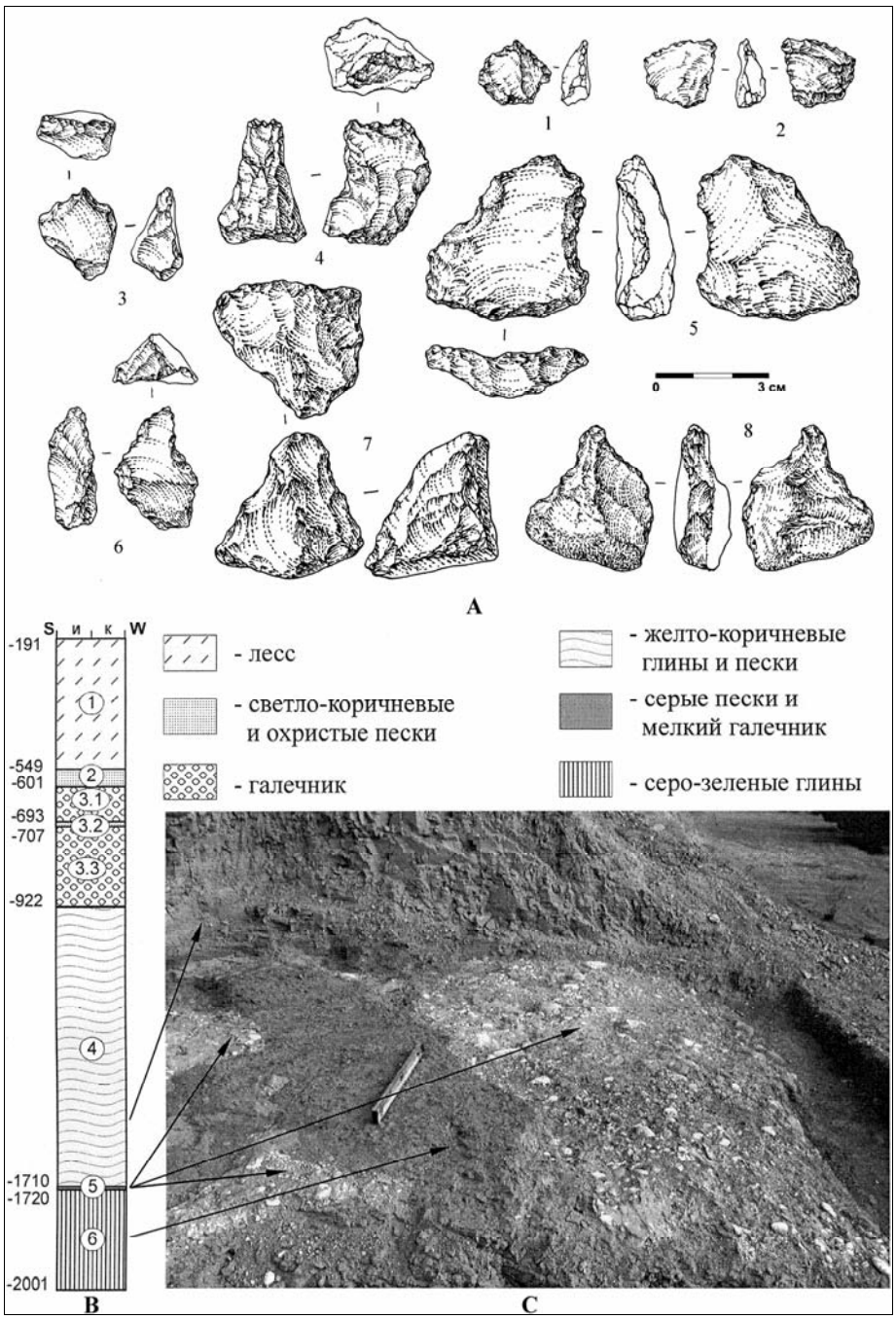

Fig. 1. Rubas-1. Trench 1. Stone artifacts (A), stratigraphic column (B) (heights measured from R_0, ~ 2 from the present surface) and the surface of the gravel-pebble layer (l.5) in the northwestern part of the excavation area (C).

1 – retouched flake; *2* – flake; *3* – artifact with a centrally positioned thorn; *4, 6* – artifacts (?) with angular thorns; *5* – notch; *7* – pseudo-endscraper; *8* – artifact with an elongated thorn

forms and some varieties of notches and thorned artifacts. Often tools were formed on fragments and chips. Big artifacts are absent. According to the preliminary chronological assessments based on stratigraphic observations, the industry of Rubas-1 can be one of the oldest in the Caucasus. For the time being the closest analogies are seen in the materials of the Darvagchai-1 site, tentatively dated to the Baku (Q_1b) time, but the available data allow us to suppose that the Rubas-1 industry can be somewhat older. The materials of Rubas-1 and Darvagchai-1 testify to a long coexistence and development of Early Paleolithic micro-industries in the northeast of the Caucasus. Their study gives new data to the discussion about the existence of cultural differences at the earliest stages of human history.

THE FIRST PEOPLING OF ITALY IN THE MEDITERRANEAN CONTEXT

M. Arzarello, C. Peretto

Università degli Studi di Ferrara, Italy

New discoveries and research carried out during the lasts years allow us to get a clearer picture of the first peopling of Europe, that started about 1.5 Ma BP (Carbonell et al., 2008; Arzarello et al., 2007; Peretto et al., 1998; Martinez-Navarro et al., 1997; de Lumley et al., 1988).

In this context, the Italian peninsula plays a crucial role, because it shows the earliest evidence of human penetration into Europe as represented by the lithic industries found in 2006 in Pirro Nord, a paleontological site in southern Italy dated, on biochronological basis, to 1.3-1.6 Ma BP (Arzarello et al., 2007). More evidence comes from the site of Monte Poggiolo, dated to 1.0 Ma BP by ESR and paleomagnetism (Peretto et al., 1998). Let us mention also the skull cup of Ceprano dated to about 0.7 Ma BP by K/Ar and paleomagnetism (Ascenzi et al., 1996).

From the technological point of view all these lithic assemblages are characterized by a short reduction sequence, essentially aimed at producing flakes from local raw material, by direct or bipolar percussion. The oldest Italian sites attest one more time that the first colonization of Europe was probably done through the Levantine corridor between 2.0 and 1.5 Ma.

SOME PROBLEMS OF THE EARLY PALEOLITHIC AT TUVA

S. N. Astakhov

Institute for the Material Culture History, Russian Academy of Sciences,
St. Petersburg

Less than a hundred years ago the very thought of the possibility of existence of the Paleolithic in Tuva seemed too brave, though the hypothesis of the Central Asian origin of the humankind still continued to find some supporters. Then S.A. Teploukhov, S.I. Vainshtein, A.D. Grach, and the present author found a number of Paleolithic sites in this country, including an Acheulian assemblage with handaxes (Torgalyk).

Represented by surface finds, this assemblage was difficult to correlate with a certain geological period. However, taken together, the archaeological characteristics and geomorphological observations allow us to date this industry, which still remains the oldest one known in Tuva, either to the end of the Tobol interglacial (M/R) or to the Intra-Samarovo (R I) optimum (380-260 kya).

Now it seems to be established that first humans appeared in Africa. “About 2.0–1.8 mys ago *Homo ergaster-erectus* left his ‘cradle’ and went out of Africa, which marked the beginning of the first Great migration ” (Derevianko, 2005). This was a long and difficult process, which did not touch the region under discussion. However, in the Late Acheulian stage, some 450-350 kya, the second migration wave started from the Near East, reached the Altai-Sayan region (including Tuva) and penetrated into Mongolia.

How far did this invasion spread? No Lower Paleolithic sites with handaxes have yet been found in those parts of Mongolia that are adjacent to Tuva. Handaxes are known from eastern Mongolia, from the terrain called Gobi Bottom, but they are somewhat different from those of Torgalyk in their manufacture. Still more different are biface assemblages from China. To explain the difference it is possible to suggest that the industries in question were associated with two chronologically separate waves of colonization, though other factors should be taken into account, too.

THE TAMAN FAUNAL COMPLEX OF LARGE VERTEBRATES OF THE AZOV AND LOWER DON REGIONS

V. S. Bajgusheva[1], V. V. Titov[2]

[1]Azov Museum and Reserve, Azov
[2]Southern Scientific Centre, Russian Academy of Sciences, Rostov-on-Don

The Taman faunal complex was first recognized by V.I. Gromov (1948) on the basis of materials collected by I.M. Gubkin and N.B. Vassoevich on the Taman Peninsula in 1914 and 1923, respectively. In addition to the stratotype locality of Sinyaya Balka and the Tsimbal quarry, several other Eopleistocene (Early Pleistocene according to the West European scale) paleontological sites are known in the Azov and Lower Don Region. The sites of Port-Katon, Margaritovo, and Semibalki, associated with gray-green clays and sands exposed on the southern shore of the Taganrog Gulf, represent several stages in the development of the Taman complex. The site of Semibalki produced remains of *Marmota* sp., *Trogontherium cuvieri*, *Ursus* sp., *Pachycrocuta* cf. *brevirosris*, *Homotherium* cf. *crenatidens*, *Archidiskodon meridionalis tamanensis*, *Equus* cf. *major*, *Elasmotherium caucasicum*, *Eucladoceros* aff. *orientalis*, *Bison* cf. *tamanensis*, *Pontoceros* cf. *ambiguus* (Baigusheva, 2005).

The site near the village of Samarskoe (Rostov region) is situated on the right bank of the Kagalnik River in about 30 km from the mouth. Faunal remains, (*A. m. tamanensis*, *E.* cf. *major*, *Stephanorhinus* sp., *Elasmotherium* sp., Cervidae gen.) were found in 1963-1965 in a sand quarry. They came from the basal layer of white obliquely laminated sands (up to 2 m thick). Most remains belonged to elephants and were represented by skull fragments, teeth, and postcranial bones. The teeth variability is within the ranges characteristic of the Taman elephant: M^2 has 11-12 enamel plates, and the frequency of plates on M^3 is 4.5–6 (the thickness of enamel is 2.8-3.0 mm).

Some bones of *A. m. tamanensis*, *Elasmotherium* sp., and *E.* cf. *orientalis* were also found in fine micaceous sands exposed in the basal part of the second terrace of the Sredniy Egorlyk River near the village of Novodonskoe (Rostov Region).

Skeletal remains of *A. m. tamanensis* were collected in sand deposits of the Krasinsky quarry on the right bank of the Aksai River (near the Kamenolomni village). M^3 has 15 dental plates + talon, the plate frequency is 5-6, the mean enamel thickness is 2.6 mm.

Numerous bones of large and small mammals come from the Sarkel alluvial sediments, exposed by water abrasion near the village of Khoroshevskaya in the Lower Don Region (Dodonov et al. 2007). Large mammals are represented by *A. m. tamanensis*, *E.* cf. *major*, *E.* cf. *sussenbornensis*, *Stephanorhinus* sp., *Elasmotherium* sp., *Cervalces* sp., Cervidae gen., *Bison* sp., *Gazellospira* sp.

According to I.A. Dubrovo (1964), a number of finds from the northern (Ukrainian) shore of the Taganrog Gulf should also be identified as remains of the Taman elephant. Collections of local museums of Berdyansk and Mariupol include bones from the lower reaches of Kalmius River near Mariupol, near the metalworks "Azovstal'", and on the Azov Sea shore at the settlements Melekini, Lyapino, Shirokino, town of Nogaisk, Obitochnaya spit, mouth of Molochnaya River, Staryi Krym settlement, and in other sites. However, the geology of the source deposits require more studies.

Remains of large mammals are somewhat less informative for age determination of source deposits than rodents. The study of remains of the index species of the Taman faunal complex, *A. m. tamanensis*, permit us, however, to conclude a certain heterogeneity of the listedlocalities. For example, dental features of elephants from the stratotype locality Sinyaya Balka are more archaic as compared to elephants from Sarkel (the eastern shore of Tsymla reservoir). The stratygraphic position of site Sarkel was determined rather exactly. The deposits lay below the paleomagnetic Jaramillo Subchron and were dated to the upper part of Eopleistocene. It was correlated with regional zone MQR28 (by small mammals). This fauna was characteristic for advanced stage of Taman faunistic complex (Dodonov et al., 2007).

Supported by RFBR, grants nos. 07-05-00400-a, 07-06-00127-a.

BIFACIAL INDUSTRIES IN ASIA: VARIABILITY AND PEOPLING PATTERNS

E. Bodin

Université Paris X-Nanterre, France

While bifaces were produced in most of the Old World regions during more than one million years, they are considered as tools, which belong to a unique technical complex. It is thought they can be used as a guideline to understand *Homo erectus* population movements.

When handaxes were first found in China, the Movius line was challenged by the idea of "Chinese Acheulean", coming directly from Africa. This far too simplistic point of view fails to take into account that we are dealing with very long time periods and huge areas. Furthermore, even the content of the term "handaxe" is in fact still rather vague.

The techno-functional comparison of industries from different Asian sites shows that these bifacial industries can vary in many ways, from one site to another, but also within one site. This variability can be seen in the composition of the assemblages as in the types of the handaxes themselves.

It is now obvious that handaxes do exist in China, but they don't fit what is usually called "Acheulean phenomenon". Indeed, the character of these Chinese bifacial industries can be understood rather as a result of technical convergence than diffusion.

WAS *HOMO GEORGICUS* RUNNING AWAY? REFLECTIONS ON THE FIND-SITUATION AT DMANISI (GEORGIA)

Gerhard Bosinski

Universtät Köln, Germany

1.8 millions ago, at the time of Dmanisi, humans were an integral part of nature in a warm steppe environment. If, somewhere, a fauna including *Mammuthus meridionalis*, *Dicerorhinus etruscus etruscus*, *Equus stenonis*, *Cervus perrieri* and a bovid similar to *Dmanisisbos georgicus* together with *Megantereon megantereon*, *Homotherium crenatidens*, *Pachycrocuta perrieri*, *Ursus etruscus* and *Canis etruscus* occurs, we can assume that Man was also present.

Such a steppe environment existed south of the Eurasian high mountain chains and was inhabited by our ancestors during by far the longest period of our history. Much later – and probably linked with the control of fire – humans were able to occupy the temperate zones north of the mountains.

At Dmanisi humans and animals stayed close to water. The herbivores (elephants, rhinos, bovines, horses and deer) came to drink. The predators (sabre-toothed cats, hyenas, bears, wolves) came to hunt the herbivores. This explains the many bones of herbivores.

But why were many bones of carnivores also found? Mostly they do not represent old individuals and it can be excluded that they died due to natural causes.

Man was also present because of the herbivores. It may be discussed whether he himself was a hunter or whether he benefited from the carnivores' prey. Ever since humans owned stone tools, first of all flakes with sharp cutting edges, which enabled the dismembering of animal bodies, meat was an essential part of their food.

Humans were thus present for the same reason as the carnivores. But this does not explain why there are so many human bones. Mostly the bones are from young and strong individuals and nothing indicates a natural death.

It therefore seems possible that there were fights between humans and carnivores concerning the division of prey. The small wolves (*Canis etruscus*)

were not a serious danger. Bears (*Ursus etruscus*) were also not the problem; at Dmanisi they are partly represented by old animals. But there were the sabre-toothed cats (*Megantereon megantereon, Homotherium crenatidens*) and the hyena (*Pahycrocuta perrieri*), predators that even liked to kill humans as a welcome prey.

Such a scenario may explain the find situation at Dmanisi. The bones of sabre-toothed cats, especially the skull of a juvenile *Megantereon megantereon* with attached cervical and thoracic vertebrae, indicate that the carnivores did not always prevail. But human bones are also numerous.

How dangerous were humans at this time? The stone artefacts were not weapons but primarily tools used to cut up animal bodies. The muscular strength of *Homo georgicus* surely could not impress sabre-toothed cats und hyenas. So we may suppose that humans already had wooden weapons, perhaps already lances.

In any case, the situation at Dmanisi seems to prove that humans did not turn to flight when carnivores appeared.

THE EARLY PLEISTOCENE ARCHAEOLOGICAL RECORD FROM SIERRA DE ATAPUERCA (BURGOS, SPAIN)

E. Carbonell[1], A. Ollé[1], I. Cáceres[1], A. Canals[1], J. Carlos Díez[2], M. Dolores García-Antón[1], R. Huguet[1], C. Lorenzo[1], M. Lozano[1], M. Mosquera[1], X. Pedro Rodríguez[1], R. Sala[1], P. Saladié[1], J. Vallverdú[1]

[1] Universitat Rovira i Virgili, Tarragona, Spain
[2] Universidad de Burgos, Burgos, Spain

Sierra de Atapuerca, in Northern Spain, has become a key enclave for the knowledge of the prehistoric peopling of Western Europe. The systematic archaeological excavations developed at several Atapuerca sites for 30 years have led to the most continuous and wide spanning Palaeolithic record currently known in this continent. We will present here the data concerning the Early Pleistocene, coming from the lower levels of Sima del Elefante and Gran Dolina sites. Both cave infillings contain ancient deposits with a high archaeological interest, in which stone tools, faunal remains and human fossils appeared in close association. The composition of these archaeological assemblages will be analysed to shed light on the behavioural features of the first hominin occurrence of Europe.

EARLY PALEOLITHIC OF ALTAI

A. P. Derevianko, M. V. Shun'kov

Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences, Novosibirsk

Among the oldest archaeological sites of Altai of particular importance for its information content is the multilayer site of Karama, situated in the Upper Anui valley. The proluvial-alluvial deposits of the site, exposed by our excavations on the gentle valley slope 50–60 m above the water line, reveal four levels of occurrence of Early Paleolithic artifacts.

The upper level is associated with the layer of poorly rounded rubble-clumpy material with weakly sorted argillite loamy-sandy filler of red-brown colors, saturated with gravel and debris. The detrital rock is dominated by coarse-grained granitoids and effusive rocks with inclusions of flat, horizontally occurring blocks of light-gray granite. A part of them experienced intensive weathering, and some blocks decomposed to the state of debris or gray clay with grains of quartz. Both the character of sorting and granulometric composition of the deposits point to their proluvial genesis, though the basal part of the layer contains inclusions of heavily weathered small pebbles and gravels, which went through the stage of alluvial, transit. According to the results of paleontological analyses and RTL dating (Derevianko et al. 1992), the accumulation of the red-colored deposits on the upper levels of the Anui valley took place in the Early Pleistocene.

The lower part of the section, encompassing three levels with Paleolithic finds, is represented by alternating strata of subaqueous sandy loams and clays with lenses and streaks of weathered pebble and gravel materials. In addition it contains a well-expressed soil complex consisting of two horizons of flood-plain montmorillonite soils. Such soils form in warm climates (mean annual temperature 8–12 °C) with variable humidity (Classification…, 1997). They are not characteristic for the Pleistocene deposits of Siberia, which can be taken as indirect evidence in favor of a very old age of this soil complex.

The pollen spectra from the lower and middle part of the section are rich in exotic arboreal elements (Bolikhovskaya, Derevianko, Shunkov, 2006). The latter include nemoral European and Far Eastern taxa (heartleaf hornbeam, oriental hornbeam, Indian hornbeam, English oak, small-leaved lime, Amur lime, Manchurian lime, Chinese elm, mulberry), which had never been recorded in the region under consideration before. The deposits containing the pollen of such plants cannot be younger that the Early Pleistocene. Judging by the available stratigraphic observations and paleoclimatic reconstructions these deposits formed during four different paleogeographic stages of the Early Pleistocene, corresponding to two warm and two cold periods of interglacial

and glacial rank. Taken together the palynological materials and other analytic data give grounds to think that the accumulation of these deposits corresponds to MIS 16–19.

Archaeological materials of Karama are represented by Early Paleolithic pebble industries. They are characterized by irregular and parallel flaking. The primary flaking products include core-like pebbles with smooth or roughly prepared striking platforms, as well as flakes with sub parallel dorsal patterns and prepared platforms. The tool set is dominated by longitudinal, diagonal and transverse side-scrapers (as a rule naturally-backed or negative-backed), followed by massive-base choppers with straight, convex, or concave working edge. Next in importance are notches, denticulates and beaked tools formed mainly by Clactonian notches. The rest of the inventory is constituted by large pebble tools with an intentionally shaped thorn-like projection, core-like end-scrapers formed by steep or abrupt retouch, massive tools with wide-angle working part, knives on “citrus slices” with clear traces of utilization, flakes bearing intermittent retouch.

Thus the site of Karama contains a sequence of Early Paleolithic horizons occurring in clear stratigraphic conditions. They yielded an expressive pebble industry, which can tentatively be dated to the period of 600–800 kya. For the time being this is the oldest archaeological assemblage with reliable stratigraphic and palynological data known in Northern and Central Asia.

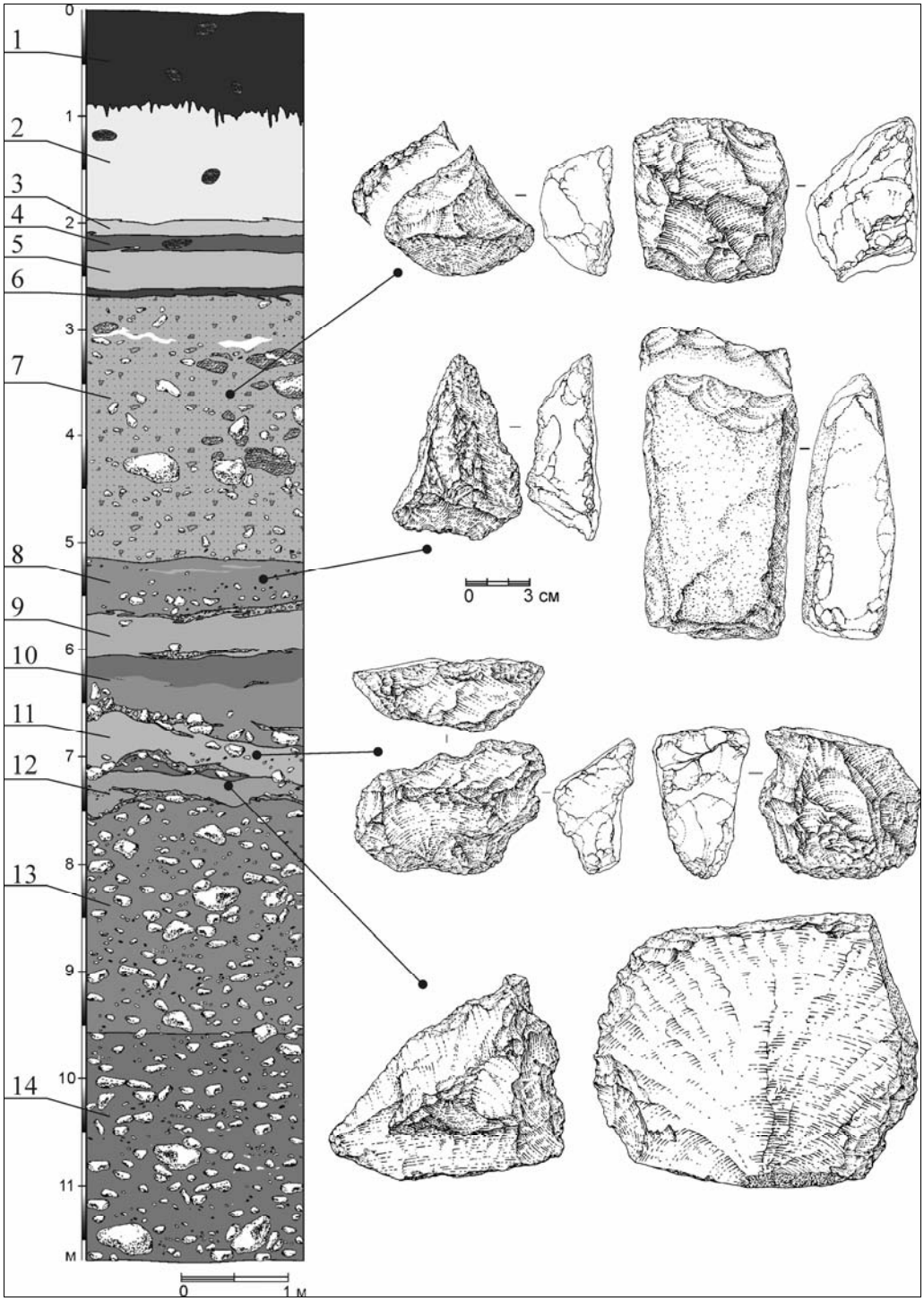

Fig. 1. Early Paleolithic site of Karama. Stone tools and section of Pleistocene deposits

MODE OF OCCURRENCE OF THE EARLY PALEOLITHIC INDUSTRIES AT THE SITE OF DARVAGCHAI IN DAGESTAN

A. P. Derevianko, V. N. Zenin

Institute of Archaeology and Ethnography, Siberian Branch of the Russian Academy of Sciences, Novosibirsk

Over 20 Paleolithic sites have been discovered in Dagestan since 2003. Most of them, including the oldest assemblages of Rubas-1 and Darvagchai-1, are confined to the sediments of the Early-Caspian terraces. The site of Darvagchai-1, situated on the Darvagchai River in the environs of the Gedzhuh water reserve, represents a multilevel complex containing a microlithic industry of the Early Paleolithic age. The oldest assemblages are associated with the deposits of the Baku terrace (Early Neo-Pleistocene).

The description of the section has been done from the water line upwards (the altitude ~ 117 m). The section is divided into three depositional units, separated by stratigraphic hiatuses with clear traces of washout (fig. 1). All the sediments have a positive reaction, with HCl of 5-10 %.

Unit 1 (layer 1) corresponds to the intermediate zone between shelf and coast. Thin-laminated flat-lying silts and fine-grained sands form it. Its apparent thickness (hereafter a/t) exceeds 2.6 m.

Unit 2 (layers 2–9) is formed by littoral deposits. The basal conglomerate (layer 2, a/t up to 0.2 m) contains an admixture of boulders. Superposed on it is fine-grained horizontally laminated sand (layer 3.0 a/t/ up to 0.35 m). It is overlain with bioaccumulated fragmental limestone-coquina (layer 4; a/t 0.1–0.22 m) with gravel. The foot of layer 4 is even; the roof is wavy (agitation ripple). On top of it are thin-laminated argillo-arenaceous sediments (layer 5; a/t ~ 0.2 м) with interbeds of coquina (according to T.A. Yanina from Moscow University, the identified shall species include *Didacna rudis Nal.*, *D. eulachia* (Bog.) Fed., *D. lindleyi* (Dash.) Fed.). The coquina detritus contains rare Paleolithic artifacts According to A.L. Chepalyga (Institute of Geography RAS) layers 4 and 5 contain shells of *Didacna parvula* Nal., *D. rudis* Nal., *D.* sp., *Monodacna* sp., *Dreissena rostriformis*. Layer 5 is overlain with massive coquina of layer 6 (a/t/ up to 1.4 m), which contains also artifacts and mammal bone fragments. This layer represents a buried offshore bar, destroyed due to the rise of sea level. It is superposed with multiple-bedded sediments of layer 7 (a/t ~ 1.4 m), showing a rhythmic alteration of thin-, wavy-, flat-laminated sands, argillaceous silts with an admixture of coquina detritus, and interbeds consisting of coquina blocks and debris (they were stripped from the top of the offshore bar and dislocated to its foot). This layer too contains artifacts and animal bones. It can be subdivided into at least 5 horizons: 1) silt-sandy thin-laminated wavy sediments (a/t 0.55 m) with lenses of coquina; 2) sediments (a/t 0.4 m)

represented by coquina blocks and debris; 3) sediments (a/t 0.55 m) analogous to horizon 1; 4) sediments (a/t 0.2 m) analogous to horizon 2; 5) sediments (a/t 0.8 m) analogous to horizons 1 and 3. Horizon 5 yielded shells of *D. rudis Nal., D. eulachia (Bog.) Fed., Dr. polymorpha Pall., Dr. rostriformis (Desh.), Unio sp.* (according to T.A. Yanina). Layer 7 gradually turns into overlying layer 9. Layer 8 (a/t 0.5 м) represents a conglomerate lens with artifacts and bone fragments. It formed in the surf zone of the beach before the inundated offshore bar, which explains why its contact with layer 7 is uneven and vertical. The top of unit 1 is formed by thin-laminated inequigranular sands and silts (layer 9; a/t > 2.7 m), which is indicative of an increase in the basin depth.

Unit 3 (layers 10–13) is formed by subaerial deposits. Its basal part (layer 10; a/t > 3 m) consists of inequigranular sands with gravel. It is overlain with sandy loam of layer 11 (a/t – 1.2 m) intercalated with sand, and sandy-gravel-pebbly sediments of layer 12 (a/t > 1.7 m), which contains also bone fragments and rare Paleolithic artifacts. The sequence is crowned (in the excavation area) with the recent soil (layer 13; a/t ~ 0.2 m).

The collection obtained during the period of excavations (2005-2007) consists of 4736 stone artifacts, including 1201 objects with traces of secondary treatment and utilization. Most (over 99 %) artifacts are made of flint, which was available in the form of nodules and pebbles. The size of the latter (up to 12 cm) was sufficient to make big artifacts. Nonetheless, the assemblage is dominated by objects less than 30 mm long (over 80 %), which might have been due to a cultural tradition.

In their state of preservation the artifacts vary from heavily rolled to “fresh”. Not infrequent are rejuvenated objects. The finds certainly experienced some displacement and intermixing. The artifacts form layer 5 should possibly be considered redeposited. For the time being they constitute the oldest part of the archaeological collection. Next stage of human presence is associated with the offshore bar deposits (layer 6) and clumpy-detrital interbeds of layer 7. The offshore bar, containing terrigenous fragments, artifacts, and animal bones, was cemented. The transgression led to its destruction. As a result of this the coquina blocks, alternating with silt-sandy layers, slid to is base. Consequently, the stone inventory and faunal remains from layer 6 and horizons 7/1, 7/2, and 7/4 are coeval and constitute a single assemblage. The final stage of human habitation is recorded in layer 8 (conglomerate). In addition to pebbles it contains rounded fragments of coquina, lenses of silt and clay. It appears that the formation of layer 8 took place synchronously with the final stage of the deposition of layer 7.

Thus, the stratigraphy of the site is indicative of the existence of at least three separate stages in the deposition of cultural remains during the Baku time. It is reasonable to suggest that this should be reflected in the character of the industries. Their similarity is manifested in the character of raw materials, small size of artifacts, active use of angular fragments, scarcity of cores and pebble

tools, absence of Levallois products. The first appearance of handaxes (with butts covered with pebble cortex) and biface preparation flakes takes place in layer 8.

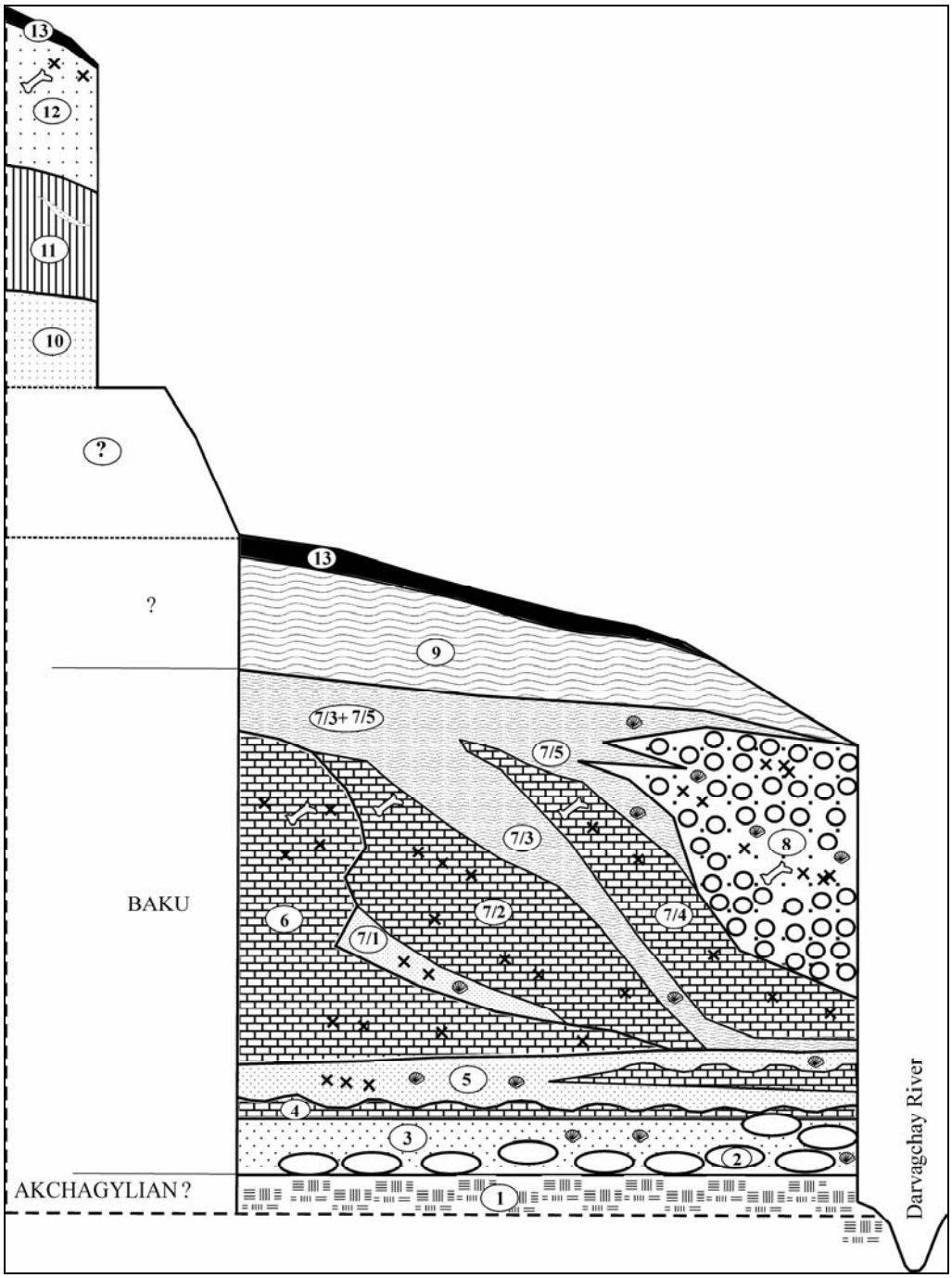

Fig. 1. Principal scheme of layers interrelation at the site Darvagchai-1 region

SITES OF LOWER PLEISTOCENE IN THE BASIN OF THE MIDDLE LOIRE RIVER (CENTRE REGION) IN FRANCE

J. Despriée [1], P. Voinchet [1], J-J. Bahain [1], C. Falguères [1], M-H. Moncel [1], M. Arzarello [2], S. Robin [1], R. Sala [3]

[1] Institut de Paleontologie Humaine, Paris, France
[2] Università degli studi di Ferrara, Italy
[3] Universitat Rovira i Virgili, Tarragona, Spain

The basin of Middle Loire River in France yielded Lower Pleistocene open air sites located at the base of the highest alluvial formations along the Loire tributaries (Cher, Loir, Creuse Rivers). They are dated of 1.1 Ma by ESR method applied on optically bleached fluvial quartz. Two sites can be taken as examples: the site of Lunery in Cher Valley and the site of Pond-de-Lavaud in Creuse Valley. In Lunery, around 500 pieces have been collected and can be related to a human action, flakes, and blocs with removals and broken blocs, in flint, limestone and millstone. The debitage is mainly unipolar or centripetal. The blocs show removals on one face, two orthogonal faces, two secant surfaces or multidirectional removals.

In Pond-de-Lavaud, the artefacts are very numerous (around 5000 pieces) in quartz (pebbles and hyaline fragments). A large variety of pieces is observed on pebbles or fragments with transversal fractures (direct or bipolar technique) and removals. They show linear or pointed cutting edges. Numerous pebbles are also broken by bipolar or direct techniques. Cores show removals on one, two orthogonal faces or are multidirectional. Studies of other sites located at the same position are in progress, yielding flint or quartz artefacts.

VÉRTESSZŐLŐS – NEW RESULTS

V. Dobosi

Hungarian National Museum, Budapest, Hungary

As regards Lower Palaeolithic sites, there is only one authentic settlement conforming to all of the classical archaeological criteria in Hungary: Vértesszőlős. In the time of excavation, the site could boast of several records concerning the quantity, quality and character of the finds. Our knowledge on the Middle Pleistocene was essentially enlarged and enriched by the evidences from Vértesszőlős. The most important scientific results obtained were the following:

1. New information on the settlement strategy of a given population of prehistoric men (*H. erectus*) was acquired: they used to settle in the calcareous tuff basins ranging along the river terrace, occasionally several times on the very same spot over wide geological time span.

2. The biological environment of the Middle Pleistocene could be reconstructed, based on:

- Palaeontological evidence: Ostracodes, molluscs - Vértesszőlős became a stratotype for the Quaternary malacology of the period - small and large mammals; skeletal remains and footprints;

- Paleobotanical evidence: plant remains embedded in calcareous tuff (leaves, fruits, cones) as well as pollen and spores.

3. The reconstruction of the natural environment became possible by the investigation of the terraces and calcareous tuff basins hemming the valley of the Átalér stream.

4. The most important archaeological results include:

- The excavation and documentation of more than 230 square meters of undisturbed cultural layer;

- Separation of various settlement forms by different function;

- Evidences on the use of fire;

- The more than 8000 worked artefacts could be divided into two groups, standard and non- standard tools. Observing the way and location of intentional working on the main types, about 50 different tool types could be established;

- Throughout the different cultural layers it was possibly to detect changes and development in the size and type spectrum of the tools.

5. Among the anthropological finds, the teeth are clearly connected to the cultural layer whereas the occipital bone indicated the asymmetry in human evolution.

Since the publication of the Vértesszőlős monograph, several aspects of the site and the finds were further investigated:

- New dating of the calcareous tuff basin series of NE Transdanubia;

- New chronological sequence of the Danube terraces, modifying the age of the terraces belonging to the tributaries as well;

- The burnt bones were tested by archaeometrical methods, further supporting the use of fire;

- Microfauna obtained from the nearly contemporary Buda-Várhegy Calcareous tuff m was investigated and compared to Vértesszőlős;

- Further technological studies were successfully applied on the Vértesszőlős stone tools.

THE TAMAN FAUNA TYPE LOCALITY OF SINYAYA BALKA: NEW DATA ON ITS GEOLOGY AND BIOSTRATIGRAPHY

A. E. Dodonov, A. S. Tesakov, A. N. Simakova

Geological Institute, Russian Academy of Sciences, Moscow

The locality of Sinyaya Balka, situated east of the homonymous ravine on the northern shore of the Taman Peninsula, is one of the richest and most famous Early Pleistocene burials of fossil mammals. It was its study that led to the recognition of the Taman faunal complex with Sinyaya Balka as the stratotype (Gubkin, 1914, 1950; Belyaeva, 1925; Gromov, 1948; Vereshchagin, 1957; Dubrovo, 1963; Lebedeva, 1972, 1978; Vangengeim et al., 1991). This locality is one of the key objects for of Quaternary geology in the south of Russia. New materials concerning the biostratigraphy of Sinyaya Balka (=Bogatyri) have been obtained in course of the fieldwork in 2006-2007.

The Upper Pliocene and Quaternary deposits east of the Sinyaya Balka ravine mouth occur in dislocated position and complicated by diapir folds. Structurally, this is the left limb of the Tizdar brachyanticline. The dislocated occurrence of the Upper Cenozoic deposits is mainly caused by mud volcanism and diapirism, which is characteristic for the whole of the Kerch-Taman region (Shnyukov et al., 1992). At the locality of Sinyaya Balka, the bed containing remains of large mammals is dislocated by a diaper fold in the central part of the exposure (Fig. 1, A). The bone-bearing breccia is overturned to the north and has a tectonic contact with the dark-gray brecciated Kujalnik clays. The reconstruction of the original position of these strata shows that they formed in the littoral part of a shallow basin. The subaqueous type of sedimentation is evidenced by the lamination of the bone-bed, the presence of dark-gray clay balls and dinoflagellates, and the occurrence of shell detritus in the basal part of these layers. The sedimentary conditions were associated either with a small lake or a shallow part of a lagoon.

Three main scenarios were put forward to explain the burial conditions of the Sinyaya Balka mammal remains. According to one of them, the bone-bed formed in a lake-like basin and was originally situated at the top of the present day sea cliff, and then was displaced downslope by an ancient landslide for some 20 m (Vereshchagin, 1957). According to another hypothesis, the bone material is contained in mud-stone breccia that filled an erosional depression (Dubrovo, 1963; Lebedeva, 1972; Vangengeim et al., 1991). According to the third scenario, prior to the deformation of the entire bone-bearing member, bones accumulated in a shallow basin of the lagoonal type (Shchelinsky, Kulakov, 2007).

It is necessary to note, first, that the concentration of bone materials is very dense, and second, that only bones of large mammals are present. Archaeologists suggest that ancient human activity might have been an important factor of bone accumulation (Shchelinsky, Kulakov, 2007).

However, taking into account the geological structure of the given region and the role of mud volcanism, a different scenario can be proposed. The high concentration of bones may be accounted for their initial accumulation in a crater lake depression of a mud volcano. Large mammals used this lake as a watering place and, probably, as a sort of "mud-bath". The volcanic mud dragged them in and they died. As a result of eruptions, the mud with bones flowed to the nearest lake or lagoon and accumulated there in the brecciated form. The position of this volcano is uncertain and it could be located seawards from the modern shoreline.

Screen washing operation produced rodent remains from seven sites (fig. 1) (Pevzner et al., 1998; Tesakov, 2004). The studied associations of small mammals can be divided into three groups. The first and oldest one includes faunas of Tizdar-1 and the "fish" lens. They are characterized by a combination of *Allophaiomys deucalion* with *Borsodia* and *Mimomys*, with the presence of *Lagurodon arankae*. The second group includes Tizdar-2. It is dominated by *Allophaiomys deucalion* and *Lagurodon arankae*, while a strongly reduced role of *Borsodia* and *Mimomys*. Faunal associations of Vostochnaya and Rodniki-2 are similar in composition to this group too, as well as the fauna of the basal layer of Sinyaya Balka. The first two groups of small mammals date to the Late Pliocene – Early Pleistocene. The third group includes the fauna of Rodniki-1 and likely also that from the bone breccia of Sinyaya Balka. Preliminary data show the presence of *Allophaiomys* ex gr. *pliocaenicus*. The third group seems to be not younger than the mid Early Pleistocene. In this connection let us remind that the Taman faunal complex was dated to the period of 1.1–0.8 Ma (Vangengeim et al., 1991).

The pollen spectra obtained for the section of the Sinyaya Balka/Bogatyri excavation pit reveal the presence of redeposited Pliocene pollen, which is particularly characteristic of the bone breccia. N.Yu. Filippova (personal communication) has also noted the presence of dinoflagellates, which are characteristic of shallow brackish-water basins.

The pollen spectra from the basal part of the section are dominated by *Asteraceae* and *Chenopodiaceae*. Arboreal plants are represented by single grains of *Pinus, Tsuga, Abies, Quercus, Betula, Salix, Corylus,* and *Carpinus*. These spectra are indicative of forest-steppe and steppe landscapes, with herbal coenosis on water divides and pine/small-leaved forests (supplemented with some broad-leaved species) in river valleys.

The spectra from the bone breccia are dominated (up to 90 %) by the redeposited Pliocene pollen (*Pinus* sp., *Tsuga*, Taxodiaceae/Cupressaceae, *Podocarpus, Picea* sp, *Abies, Ulmus pumila, U. suberosa, U. foliaceae, Juglans, Pterocarya, Platycarya, Engelhardtia, Fagus, Tilia*).

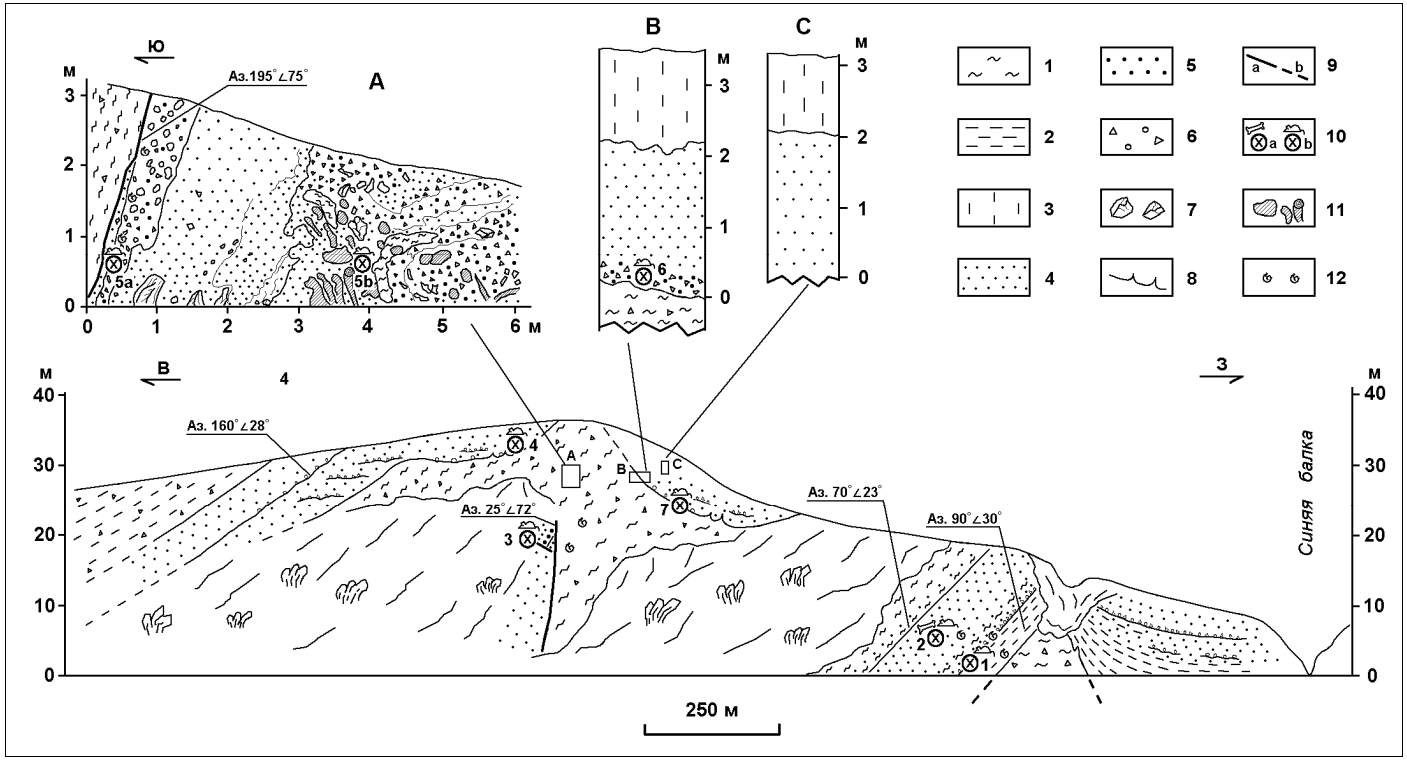

Fig. 1. Geological profile along the seashore in the vicinity of Sinyaya Balka, northern coast of the Taman Peninsula.

A. excavation area with the bone breccia, western wall; B. archaeological trench (Rodniki-1); C. archaeological test-pit.

Sites of fossil rodent remains: (1) Tizdar-1; (2) Tizdar-2; (3) “fish” lens; (4) Vostochnaya; (5a) Sinyaya Balka, basal layer; (5b) Sinyaya Balka, bone breccia; (6) Rodniki-1; (7) Rodniki-2.

1. brecciated dark-gray clays; 2. clays; 3. loess-like sandy loams; 4. sands; 5. gravels; 6. rock debris, beach gravel; 7. rock fragments; 8. lithological boundaries with manifestations of diapirism; 9. tectonic faults: (a) established, (b) supposed; 10. bone remains: (a) large mammals, (b) small mammals; 11. large bone fragments; 12. shells of mollusks

The analysis of the newly obtained data allows us to conclude, that the large mammal bones found at Sinyaya Balka were buried as a result of mud volcanism and sediment accumulation that took place in the subaqueous conditions. The small mammal fauna is indicative of the Early Pleistocene (=Eopleistocene) age of the bone-bearing bed, suggesting at the same time that the chronological limits of the Taman faunal complex could be broader than it had been believed before. Judging from the palynological and microtheriological evidence, the Taman fauna was primarily associated with steppe and forest-steppe landscapes.

Supported by RFBR, grants № 06-05-64049a and № 07-06-00127a.

PALEOMAGNETISM OF BONE-BEARING DEPOSITS OF THE SITE SINYAYA BALKA/BOGATYRI

A. E. Dodonov, V. M. Trubikhin, A. S. Tesakov

Geological Institute, Russian Academy of Sciences, Moscow

Controversial hypothesis on geological structure of the Sinyaya Balka type locality of the Tamanian mammal complex have been put forward in the past (see Dodonov, Tesakov, Simakova, this volume). In this situation no paleomagnetic research of the locality's sediments was possible. Due to careful archaeological excavations of V.E.Schelinsky and his colleagues during field seasons of 2005-2007, fossiliferous deposits have been exposed with unprecedented quality, including contact zones with host deposits (see Shchelinsky, Koulakov, 2007; Shchelinsky et al., this volume). Stratification of the site became evident for the first time. The section is interpreted as an allochthonous block, overturned to the north (dipping 195° at the angle 75°).

In 2007, three oriented samples for paleomagnetic study were taken from the least disturbed part of the Sinyaya Balka section directly below the bone breccia, at 0.45, 1.1, and 1.9 m above the unconformable contact with dark-gray clays (fig. 1). Samples 1 and 2 were taken from the lower and middle part of yellow, fine-grained poorly cemented sands, the sample 3, from the upper part of this bed, where the sand grades to light-gray. All samples processed according to the standard technique and subjected to step-wise thermal demagnetisation up to a maximum of +500 °C. The original magnetisation of all three samples can be unambiguously interpreted as reversed. The obtained paleomagnetic data can indicate the formation of the section's deposits during Matuyama reversed polarity chron (2.58-0.78 Ma). Taking into consideration the widely accepted correlation of Tamanian faunal unit localities with the later part of Early Pleistocene (1.1–0.9 Ma), the correlative time interval can be narrowed to the

chron C1r.1r (0.99–0.78 Ma), version (1) in the fig. 1. New biostratigraphic data on large mammals (see Bajgusheva, Titov, this volume) can, however, indicate an older age of the Sinyaya Balka deposits and suggest their correlation with chron C1r.2r (1.77–1.07 Ma), version (2) in the fig. 1.

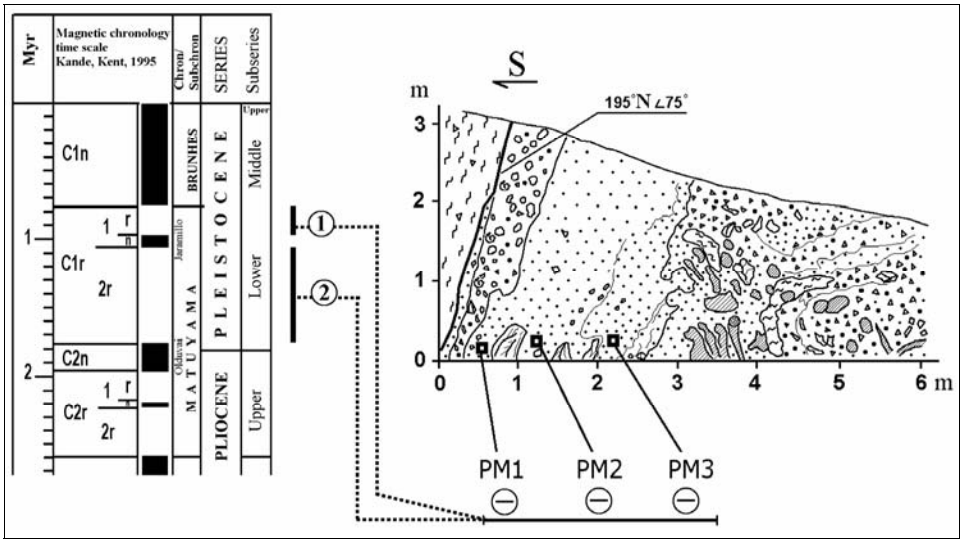

Fig. 1. Location of paleomagnetic samples in the section of Sinyaya Balka and their correlation with magnetic polarity time scale

This work is supported by the Russian Foundation for Basic Research, projects nos. 06-05-64049a, 07-06-00127a.

THE EARLY PALEOLITHIC OF ITALY: METHODOLOGICAL PROBLEMS, CASE STUDIES, AND TECHNOLOGICAL VARIETY

O. Filippi, A. Galiberti

Università degli studi di Siena, Italy

The Early Palaeolithic of Italy is documented by several sites, mainly represented by surface evidences, distributed in many regions of the peninsula. We present the results of a new analysis of five lithic industries: Bibbona (Tuscany), Montauto, Arce, Montenero – Castro dei Volsci (Latium) and Vadivina (Apuly). All these assemblages have already been attributed to the Early Palaeolithic in previous studies.

As it's known, the Mode 1 industries are characterized by the presence of artefacts made from pebbles or other natural blanks, a category which presents

some specific problems in terms of analytical methodologies. For this component, we have developed a specific analytical record.

Generally speaking, the technological and typological qualities of the five industries studied are similar: they present a substantial quantity of pebble artifacts and flakes, which are usually not large in size. Flaking is generally monodirectional and bidirectional, sometimes polydirectional, rarely centripetal. The flaked pebbles (cores and choppers) tend to present circumscribed working, concentrated on a single margin. There is no data to suggest the existence of different work cycles for different raw materials.

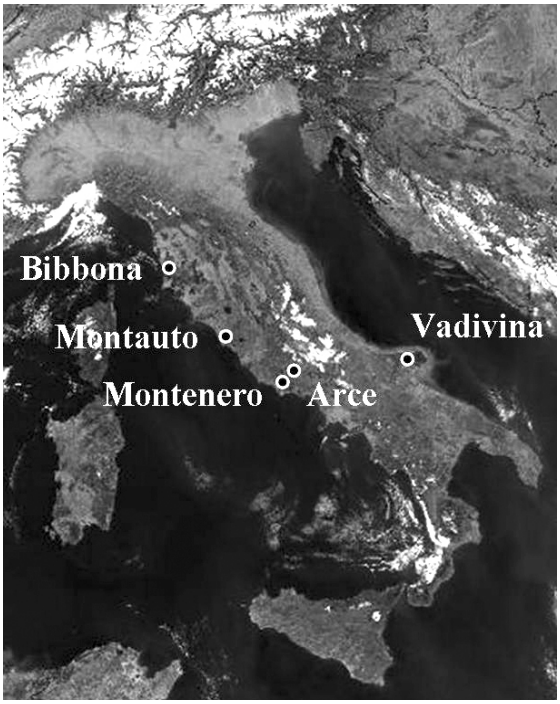

Fig. 1. Localities of Early Paleolithic in Italy

The application of a homogeneous method has also made it possible to identify some differences and indicated the existence of a degree of technological variety within the various assemblages.

The *Arce industry* is that with the simplest techno-typological features and presents a degree of discontinuity with respect to the other industries.

The *Bibbona*, *Montenero* and *Vadivina* complexes present technological diversifications, including among a limited use of some types of predetermined flaking.

The *Montauto* industry shows some characteristic features, like the abundance of unifacial flaking and the large number of scars on the artefacts.

Are all these differences indicative of an evolutionary tendency through the various complexes?

It is difficult at the moment to observe a diachronic evolution inside the Early Paleolithic of Italy, and of Europe too. In Africa, during the Oldowan, a technological differentiation takes place that gradually develops into the formation of the Acheulean, which is well characterized at about 1.5 Ma; in Europe similar dynamics are not seen, even if some industries show some characteristics that appear more "evolved" than others.

MUD VOLCANISM ON THE TAMAN PENINSULA DURING THE PLIOCENE-QUATERNARY PERIOD AND ITS INFLUENCE ON ANCIENT HUMANS

I. N. Gusakov

Mud volcanoes are widely spread on the Taman peninsula. The diversity of their types and morphogenetic characteristics enables us to reconstruct the main stages of their formation and development. According to the available data, the first mud volcanoes appeared on the peninsula in the Tarkhan and Chokrak stages of the Pliocene. There are some grounds to think that east of Taman, in the Caucasus foothills, mud volcanism existed as early as the Upper Paleocene or even the Cretaceous time. The roots of volcanic structures can reach Lower Cretaceous and Jurassic strata.

Our reconstructions are based first of all on the geology of bulged-in synclines and anticlinal limbs of mud-volcanic ridges, with particular reference to the mud volcanoes of Tizdar, Bogatyri, Karabetova Mountain, and Cape Kamenny. An attempt has been undertaken to understand how the existence of mud volcanoes influenced the development of human populations in this region. It is no chance archaeological finds dated both to prehistoric times (Tizdar, Bogatyri) and classical antiquity (Shapurskoi, Karabetova mountain) are found near the main volcanic edifices, as reflected in ancient Greek myths and legends.

It is obvious that volcanic products were used by humans in many ways, from modifying volcanic breccias fragments into primitive tools to using oil sources to prepare “Greek fire“. Flows of volcanic gas served to make ritual fire in ancient temples and shrines.

At the same time, big eruptions negatively affected human populations and their environments, as is evidence, for example, by the eruption of the Shapursky volcano, which led to the destruction of a part of the ancient town of Phanagoria.

PROBLEMS OF THE EARLY AND MIDDLE PLEISTOCENE OF THE AZOV-BLACK SEA REGION

Ya. A. Izmailov

Kubangeologiya, Sochi-Lazarevskoe

Of primary importance for the region under consideration are marine, fluvial, and subaerial sedimentary formations. Less spread are mud-volcanic and other sediments. Especially well studied is the biostratigraphy of marine deposits, based first of all on malacological evidence. Recent decades have witnessed an intensive development of geochronological studies, including paleomagnetic, TL and ThU analyses. The main difficulty impeding the adequate understanding of the stratigraphy and geological history of the Azov-Black Sea Region is its intermediate position between the Mediterranean and Caspian seas. During the whole of the Eopleistocene and Pleistocene the endemic biocenoses of the brackish-water Black Sea basin were either influenced or even replaced by the biocenoses of the brackish-water Caspian or marine (Mediterranean) types.

Eopleistocene. Marine Eopleistocene deposits of Southern Georgia have been studied especially extensively. The Guri “stage” includes Guriant (lower), Natanebi (middle), and Tsvermagali (upper) layers. While the latter show the dominance of the Chaudin fauna, they are dated still to the upper part of the Matuyama chron. In the Russian part of the region marine Eopleistocene deposits are less spread and studied inadequately. The Apsheronian stage is thought to be analogous to the Guri one. Single finds of *Apscheronia propingua* and *Monodacna sjogreni* in the eastern part of the Azov region and on the Taman peninsula allow us to suggest the existence of a deep gulf or strait of the Caspian Apsheron basin during the time of transgression maximum.

Pleistocene. Lower and Middle Pleistocene deposits have been studied in the region under consideration in detail. Lying above the Brunhes-Matuyama boundary are Lower Chaudin, Upper Chaudin, and early Old-Euxin layers, constituting the Lower Pleistocene part of the marine section. The Middle Pleistocene is represented by late Old-Euxin, Uzunlar, and Ashei layers. The upper parts of each of these formations contain Mediterranean faunal elements, which became dominant in the second half of the Middle Pleistocene. According to one of possible correlations, the Lower Pleistocene transgressive complexes may correspond to OIS 17, 15, 13, and Middle Pleistocene ones to OIS 11, 9, 7.

IN SEARCH OF THE EARLY PALEOLITHIC SITES AT DONBASS

A.V. Kolesnik

Donetsk Regional Museum, Ukraine

Systematic search for the Early Paleolithic sites started in the Donbass-Azov Region in the 20es-30es of the last century. According to the periodization proposed by P.P. Efimenko in the 1910es and accepted by many archaeologists of that time, the Paleolithic was subdivided into two main stages: the Early and Upper ones. The group of the Donbass-Azov finds attributed to the Early Paleolithic included quartzite handaxes found in 1926 near Lugansk (Loktyushev, 1930; Kolesnik, 2003); a small flint handaxe found by V.M. Evseev in 1935 in the environs of Amvrosievka (Zamiatnin, 1951); and a flake from the vicinity of Taganrog (Zamiatnin, 1937). A great antiquity was proposed also for some finds from the vicinity of the town of Matveev Kurgan and village Lakedemonovka (Gromov, 1940, 1948), but no sites predating the Mousterian were found in this area (Zamiatnin, 1953; Boriskovsky, 1953, 1957; Praslov, Boriskovsky, 1962; Boriskovsky, Praslov, 1964). In the post-War time P.I. Boriskovsky put forward an idea that the Azov region was a part of the broad zone of human formation (Boriskovsky, 1953). In the early 50es the geologist G.I. Goretsky found Early Paleolithic artifacts near Mikhailovskoe and Khryashchi in the Seversky Donetz river mouth and on the Don (Goretsky, 1952). It was then that the Donbass-Azov area was recognized as a distinct region of the Paleolithic East Europe (Zamiatnin, 1953).

According to modern criteria, the Early Paleolithic includes the Early and Middle Pleistocene assemblages rich in large tools for chopping (so called “base-preserving” technique) and poor in flake blanks obtained by means of special flake-producing technologies (Bosinski, 1982; Tuffreau, 1982; etc.). There are also some other definitions. In the late 70es the periodization of the Paleolithic acquired its present tree-partite form (Lower, Middle, Upper).

Strictly speaking, of all the sites of the Donbass-Azov Region mentioned above only relatively not numerous finds from Mikhailovskoe and Khryashchi, carefully studied by N.D. Praslov (Praslov, 1968; 1995, 2001; Bosinski, 1992; 1996) can be attributed to the Early Paleolithic. The archaeological validity of the assemblage from Gerasimovka was called by some scholars in question (Roebroeks, Kolfschoten, 1995; Doronichev, 2001; Doronichev et al., 2007). Isolated finds of large bifaces and side-scrapers from Lugansk, Amvrosievka, Izyum, Artemovsk, Korneev Yar, and so on should probably be dated to the onset of the Middle Paleolithic, connected in this part of East Europe with the beginning of the “Micoquian invasion” (Kolesnik, 1998, 2003). Put in other words, there are no indisputable traces of Early Paleolithic in the Ukrainian part of the region. Nonetheless,

there are some paleontological and geological localities here, which appear promising for the search for Early Paleolithic materials.

A unique geological section is presented by the bluff of the northern Azov seacoast. It stretches for almost 200 km. A part of the section lies within the administrative borders of the Donetsk and Zaporojie oblasts (South-Eastern Ukraine). The bluff is being constantly rejuvenated as a result of sea encroachment (New Azov transgression). Its height in some places reaches 40 m. Exposed are both marine and continental deposits. During many years they have been studied by representatives of different disciplines. Associated with these deposits are numerous paleontological localities and Middle Paleolithic sites (Praslov, 1962, 1964, 1968, 1984, 2001, etc.). The westernmost Paleolithic find from the sea bluff is a flake from village Bezymennoe of the Novoazovsk district (Donetsk oblast), found by V.F. Petrun' (the author's archive). The stone tools housed in the Kamennye Mogily museum-reserve, labeled as "choppers" and said to come from the sea bluff, are in fact small narrow faced flint cores of the Final Paleolithic of Early Mesolithic age.

There are also a number of big quarries and natural exposures in Donbass with geological record spanning the period from about 0.3 to 2.5 mya. The most important of them are connected with the Seversky Donetz and its tributaries, like the exposure near Krivaya Luka and the quarries near the towns of Druzhkovka, Artemovsk, Konstantinovka, etc. The biggest of them display typical loess-soil continental sediments reaching several tens meters. Almost all of them have been studied by N.P. Gerasimenko (1993, etc.).

Of special interest are paleontological localities near the village of Il'ichevka and town of Krasnyi Liman in the Seversky Donetz basin. They are associated with sand quarries. Hydraulic dredges lift alluvial sand from a considerable depth from under the water of newly formed lakes. In both cases the alluvium contains bone lenses with Pleistocene faunal remains of different age. Most numerous are representatives of the Upper Paleolithic faunal complex. Bones are heavy, fossilized, of dark gray color. There are found also rolled flint tools, including some objects of archaic aspect. It appears that the hydraulic dredges dissected several alluvial lenses of different age. Paleontological and archaeological sites associated with the alluvial deposits of the Donetz basin (Krasnyi Yar, Rubezhnoe, Druzhkovka, Lisichansk, alluvial assemblage of Kurdyumovka, etc.) represent a particular type of taphonomic objects. Nearly all of them are dated to the Middle Paleolithic (Loktyushev, 1940; Kolesnik, 2003; etc.).

In addition to those described above, there are other interesting geological and paleontological sites in Donbass dated to the Eopleistocene, Early Pleistocene, and Middle Pleistocene periods. Most of them gravitate towards the margins of the Donetz ridge and the Azov shore.

Thus, while no indisputable Early Paleolithic materials have by far been found in the Ukrainian part of Donbass, their discovery in future seems highly probable.

BIOSTRATIGRAPHICAL EVIDENCE FOR DATING PALAEOLITHIC SITES

Thijs van Kolfschoten

Leiden University, The Netherlands

There is an ongoing debate on the age of the earliest occupation of Europe. New discoveries triggered new discussions and the biostratigraphical evidence still plays a major role in the debate. A reappraisal of the artefactual and chronological evidence for the earliest occupation of Europe in the early nineties led to the so-called *"short chronology hypothesis"* and (Roebroeks and Van Kolfschoten, 1995) and a clearance of the list of the earliest Palaeolithic sites. There appeared to be no undisputable proof for human occupation of Europe prior to about 500 ka BP. And the first solid traces of hominid activities in Europe are around 500.000 years old and found in association with an *Arvicola* mammalian faunal assemblage.

Mammalian biostratigraphical data and in particular the evolution in the water voles of the *Mimomys – Arvicola* lineage play an important role in dating of Paleolithic sites. An important stratigraphical marker is the transition of *Mimomys savini* to *Arvicola terrestris*, which corresponds to the Biharian-Toringian boundary, in the early Middle Pleistocene. The transition is well documented in western, central and Eastern Europe. The mammalian faunal record of a sequence exposed at Kaerlich (Germany) combined with data from neighboring localities indicates that the *Mimomys – Arvicola* transition dates back to around 500 ka. In 1995, at the time that Roebroeks & Van Kolfschoten launched their *short chronology* hypothesis, all the known early Paleolithic sites of Europe yielded an *Arvicola*-mammalian faunal assemblage and not a single unequivocal Paleolithic site yielded a *Mimomys savini* fauna.

Soon after the launch of the *short chronology* hypothesis new sites were discovered disproving the hypothesis in a sense that these localities shows that at least for Spain the 500 ka date should be questioned. The locality Atapuerca-TD6, in northern Spain, yielded artifacts and fossil human remains (referred to a new defined species *Homo antecessor*) in association with a mammalian faunal assemblage including *Mimomys savini*. Moreover, the remains are found in sediments with a reversed magnetic polarization indicating a correlation with the Matuyama Chron and hence, an age of more than 780 ka (Carbonell et al., 1995). Artifacts, predating the Atapuerca-TD6 record are discovered in southern

Spain, in sites on the Orce basin (Baranca Leon and Fuentenueva 3) and recently also in Atapuerca – Sima del Elephante. In Italy, at a site called Ceprano a human skull was found with an assumed age of 800 ka. The newly discovered sites in Spain and Italy indicated that the short chronology in a strict sense "i.e. *no human occupation before about 500 ka*" was only valid for the northern latitudes of Europe, for the area north of the Pyrenees and the Alps (Dennell & Roebroeks, 1996).

However, Parfitt and co-authors (Parfitt et all, 2005) published recently a paper in Nature about *the earliest record of human activity in northern Europe*. They reported flint artifacts from the Cromer-Forest-bed Formation at Pakefield, from an interglacial sequence yielding a diverse range of plant and animal fossils including a *Mimomys savini* – mammalian assemblage. Different lines of evidence including palaeomagnetism and biostratigraphy indicate that the unequivocal artifacts date to the early part of the Brunhes Chron and the archaeology at Pakefield could be as old as the later part of MIS 19 (about 750 kyr ago). The discovery at Pakefield demonstrates also a much longer human occupation of Europe north of the Pyrenees and the Alps, pre-dating previous evidence by as much as 200 kyr.

These recent discoveries in England and Spain indicate that the age of the earliest Palaeolithic sites in Europe dates back to the Late Biharian or even in case of the sites in southern Spain and Atapuerca-Sima del Elephante back to the Early Biharian. Accurate dating of these sites requires detailed knowledge about the Mid-Pleistocene mammalian faunal evolution (Kolfschoten & Markova, 2005). Taxa such as *Microtus (Allophaiomys)* with a geographically wide distribution show a rapid evolution during the late Early Pleistocene and are therefore an important biostratigraphical marker.

The reliability of the age estimations of the earliest Palaeolithic sites in Europe depends strongly on the accuracy of our biostratigraphical data. However, we have to accept that our knowledge of the early human history is most probably still incomplete. The early Paleolithic record is still scarce despite the new discoveries and our capability to date the sites properly has to be improved.

BASTUN CAVE IN THE BARADOST MOUNTAINS IN SOUTHERN KURDISTAN

V. G. Kotov

Institute of History, Language and Literature, Ufa

On 4 May 2007 a group of Russian archaeologists (Dr. Stanislav Grigoriev, Dr. Vyacheslav Kotov, Lada Ivasko, Dimitri Pirbari) visited the Bastun cave. The group was invited to Kurdistan by the Department of Archaeology of the

Ministry of Tourism and Archaeology (headed by Mr. Abdullah Karadagi). We are thankful to Mr. Abdullah and Minister Mr. Namrud Bitto for this. During this work Mr. Najat Nawi organized a trip to some archaeological and historical objects and especially to the Bastun cave, and we are very thankful to him for such a possibility and excellent organization of our work.

The cave is situated in the Baradost mountains (Kaza Diana, Pakhia Mergasor), at the height of 1 km above the valley that had been formed by the Bakhma River (a tributary of the Great Zab River). The entrance to the cave (10 m wide and about 2 m in height) is oriented eastward. The cave belongs to the so-called corridor type of caves, and it had been eroded by water in layers of Devonian limestone. The mean height of the cave is about 10 m, the average width being 12 m; the length is more than 300 m. The name of the cave translated from Kurdish into English means “A lot of pillars”.

The cave was explored in 1950 by Dr. H. Field (Peabody Museum of Harvard University) with participation of R.Bradwood (Oriental Institute) and F.Safar (Directorate-General of Antiquities of Iraq). Here he expected to find artifacts and remains of the Stone Age man. Two soundings in the form of trial trenches were made: at the center of its first chamber and in the eastern side of the first chamber leading to a small room. Both trenches were excavated to a rock floor at a depth of 10 and 14 feet, but traces of Paleolithic periods had not been found (Field, 1955, p. 419; Safar, 1950, p. 118).

In front of the entrance to the cave there is an open area with the size of about 3 × 16 m. Archaeological materials is found here on the surface. A mortar for crushing grain cut in the rock has been partly destroyed.

The survey of the area in front of the entrance and a debris stream below revealed a lot of archaeological materials of different periods. We have collected a lot of ceramic pieces (dated from the Neolithic to the Bronze Age).

The siliceous limestone used was darker than the limestone of the rock walls. Its outcrops are revealed as inclusions of small blocks in the cave walls at the height of 1 m from the modern cave’s floor.

Stone artifacts are represented by several complexes. The Upper Paleolithic is represented by a conical core, a scraper, and a flat core from the pit, and a piece of a stone plate. Some tools belong to the later Mousterian (Neanderthal) epoch: a retouched point, chips with a retouch, a piece of an amorphous plate, a crude prismatic core.

The collection of archaic wares is differentiated by technique and form into two parts: the core tools and worked pebbles. The core-shaped artifacts from the debris stream may belong to the Acheulian period: a cube-shaped core of orthogonal and unsystematic chipping, several pick-shaped cutting tools, and a core-scraper. The preservation of surface of the pebble tools differs from that of core’s tools, which most probably is indicative of a greater antiquity of pebble artifacts. The earliest of them are pebble tools: 2 chopping-tools and a pebble with a retouch.

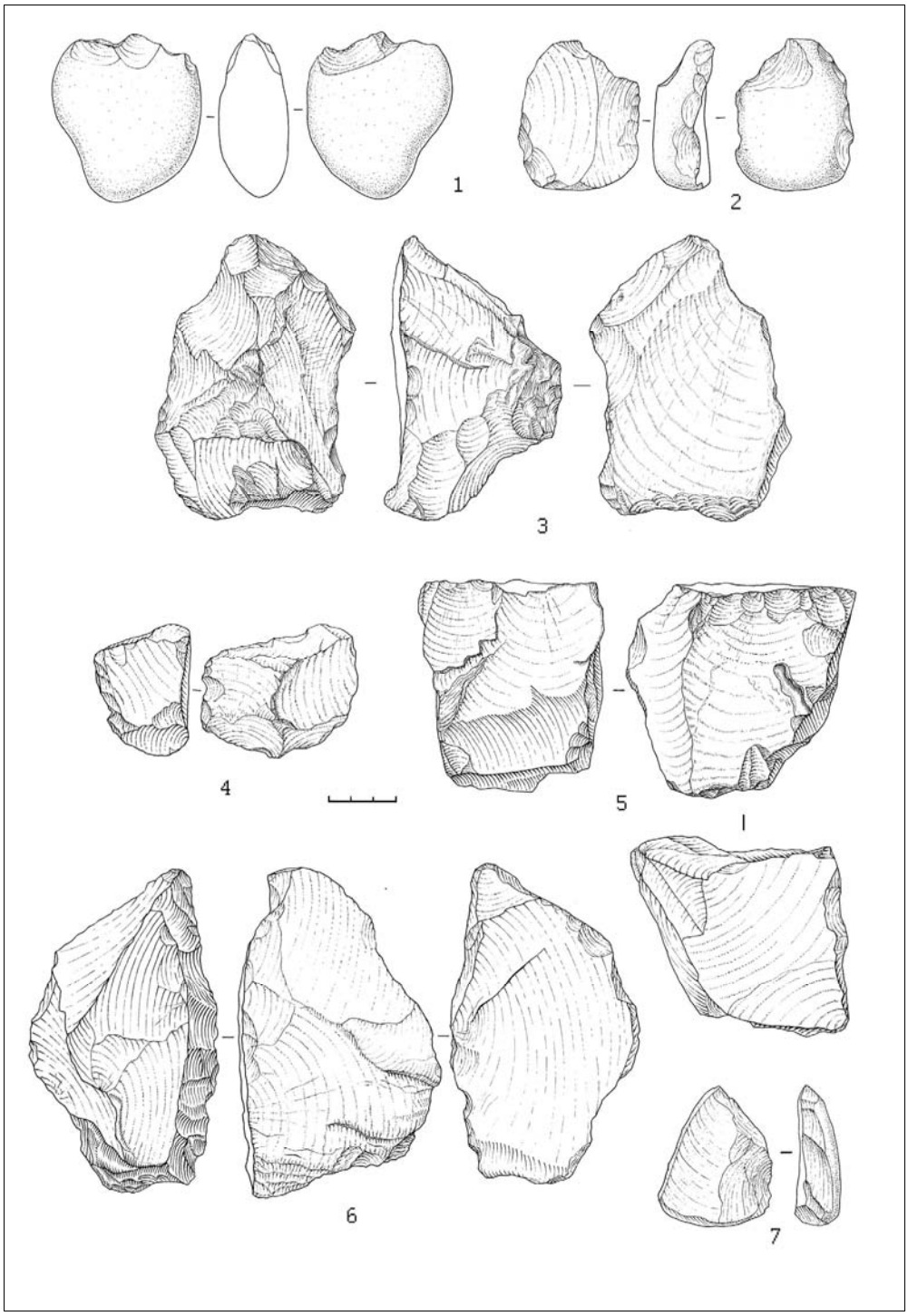

Fig. 1. Stone artifacts from the Bastun cave (Southern Kurdistan)

It is probable that the ballast residue contained the ancient most deposits in the cavern. Since the formation of the cave had stopped at least 1 million years ago, from that period on silt and pebbles started accumulating in the stream-cut. Afterwards there appeared the first Paleolithic sites.

Thus, the survey of the cave and materials collected from the surface demonstrate the cave to be one of the earliest archaeological objects in the whole of Iraqi Kurdistan.

PALEONTOLOGICAL AND STRATIGRAPHIC STUDIES IN THE ENVIRONS OF THE EARLY PALEOLITHIC SITES IN SOUTHERN DAGESTAN

S. V. Leshchinsky, V. A. Konovalova, E. M. Burkanova,
S. N. Babenko

Tomsk State University, Tomsk

The wide-scale paleontological and stratigraphic investigations started in Southern Dagestan in 2006, in conjunction with the complex study of the Early Paleolithic sites of Darvagchai-1 and Rubas-1. By now these investigations have embraced a large part of the Darvagchai and Rubas basins, including the Shordere ravine and former Lake Adjinour. This area is interesting first of all for the presence of widely spread and well-exposed Upper Pliocene (Aktchagylian), Eopleistocene (Apsheronian), and Lower Pleistocene (Baku) deposits.

Darvagchai-1 has been studied most thoroughly. A series of Baku sections obtained at this site and along the coasts of the Gedjuh water reserve shows the whole complex of littoral facies, from that transitional to the prefrontal zone to those associated with the breaker zone of the beach and offshore bars. The section of the site itself reveals three units of deposits (from bottom to top), separated by angular and stratigraphic disconformities. Unit 1 (layer 1) – thin-lamellar silt and fine-grained sand formed in the intermediate zone between the shelf and shore in the Akchagylian (?) time, apparent thickness (hereafter a/t) > 2,6 m. Unit 2 formed under subaerial conditions of the littoral zone and at the depth of 10-15 m (maximum – 30 m). Its base represents a conglomerate with boulders (layer 2; a/t up to 0.2 m). It is overlain with fine-grained sands (layer 3; a/t reaches 0.35 m) with streaks of aleurite. Superposed on this layer is coquina (layer 4; a/t 0.1 – 0.22 m) with rock debris and a pebble, its roof is wavy (agitation ripple). On top of it are thin-laminated argillo-sandish sediments (layer 5; a/t ~ 0.2 м) with horizons of coquina, encompassing rare Paleolithic artifacts. Layer 5 is overlain with compact coquina of layer 6 (a/t/ up to 1.4 m),

which contains also artifacts and mammal bone fragments. This layer represents a buried offshore bar, destroyed due to the rise of sea level. It is superposed with multiple-bedded sediments of layer 7 (a/t ~ 1.4 m), showing a rhythmic alteration of thin-, wavy-, flat-laminated sands, argillaceous silts with an admixture of coquina detritus, and horizons consisting of coquina blocks and debris from layer 6. This layer too contains artifacts and animal bones. Layer 8 (a/t 0.5 m) represents a conglomerate lens with artifacts and bone fragments. It appears to have formed in the breaker zone of the beach. The top of unit 2 is formed by thin-laminated sands and silts (layer 9; a/t > 2.7 m) indicative of an increase in the basin depth.

Unit 3 (layers 10–13; a/t > 6 m) probably formed in post-Baku time under subaerial conditions. It contains coquina and bone fragments as well as rare Paleolithic artifacts.

The deposits are rich in microfauna; many specimens include hundreds of shells and valves of ostracodes and foraminifera. They are characterized by excellent preservation, which rules out the possibility of redeposition. The analysis of the stratigraphic distribution of *Ostracoda* has demonstrated that some of their species appeared as early as the Pliocene (*Leptocythere andrussovi* Livental, *L. striatocostata* (Schweyer), *L.* aff. *cellula* Livental, *L.* aff. *bosquetti* Livental etc.) and the other in the Baku time (*Cytherissa bogatschovi* (Livental) var. *triformis* Livental, *Loxoconcha lepida* Stepanaitys, *L. gibboides* Livental, *L. immodulata* Stepanaitys, *Leptocythere* aff. *agninae* Stepanaitys, *L. gracilloides* Schornikov (=*resupina* Stepanaitys). The changes in the species composition allow us to divide the Baku deposits of Darvagchai-1 into two complexes: 1) complex dominated by *Cyprideis littoralis* (Brady) and *Tyrrenocythere pseudoconvexa* Livental (layers 3 и 5); 2) complex dominated by *Leptocythere* with participation of some fresh-water taxa (layer 7). The top of the section (beginning with layer 9) shows the replacement of ostracodes with foraminifera. If to compare these materials with the Baku stratotype locality, complex 1 displays similarity with the Lower Baku microfauna, while complex 2 contains species characteristic both of the Lower and Upper Baku horizons.

The palynological analysis has shown that Darvagchai sediments are poor in spores and pollen. Nonetheless, 129 grains were extracted from a sample taken from the middle part of layer 3. Most of them (~ 87 %) belong to grasses. This group if dominated (up to 70 %) by *Chenopodoaceae* (*Cyclolobeae* C.A. Mey. and *Spirolobeae* C.A. Mey.), followed with *Cyperaceae*, *Poaceae*, *Apiaceae*, and *Cichoriaceae*. Arboreal plants (13 % of all grains) are represented by *Pinus*, *Betula* sect. Albae Rgl., *Betula* sp., and *Quercus* sp. Such a spectrum is indicative of open, arid and, probably, strongly dissected landscaped.

In the section of Rubas-1 Early Paleolithic artifacts are associated with gravel-pebble layers and lenses (layer 2, a/t from 0 to 0.25 m) filled with inequigranular sands and silts. These sediments lie on marine Akchagyl (?) thin-layered clays, silts, and fine-grained sands (later 1; a/t > 3 m). The cultural hori-

zon is overlain with thin-layered argillaceous sands, enriched with vegetable detritus with a relatively high content of spores and pollen (120 grains). Most grains belong to grasses: *Cyperaceae*, *Artemisia* sp., *Cichoriaceae*, and *Chenopodiaceae* (the latter dominate making up to 70 % of the group). Trees and shrubs (12 % of all grains) are represented by *Pinus* s/g Diploxylon, *Betula* sect. Albae Rgl., *Quercus* sp., *Carpinus* sp., and *Juglandaceae.* Such a composition is indicative of forestless and rather dry landscapes.

It should be noted the region under consideration is a part of the Arabic-Caucasian country characterized by intensive recent volcanism. Moreover, the Pleistocene-Holocene phase of neotectonics in the most active one. The authors have found a number of volcanic ash and tephra layers (particularly well marked in the exposures of Shordere and Adjinour), which opens very good perspectives for detailed geochronological correlations and presents us with a unique opportunity to determine both the relative and absolute age of the Early Paleolithic industries of Southern Dagestan.

Supported by the President of Russian Federation grant НШ-7646.2006.6 and RFBR grant №07-06-00096).

END OF MATUYAMA AND BEGINNING OF BRUNHES EPOCHES IN KOROLEVO-1 GEOARCHAEOLOGICAL REGION (TRANSCARPATHIA): ISOTOPE CHRONOLOGY AND PALAEOGEOGRAPHY OF SEDIMENTS AND PALAEOLITHIC LAYER VII

G. M. Levkovskaya[1], P. Haesaerts[2], O. M. Adamenko[3]

[1]St. Petersburg, Russia
[2]Brussels, Belgium
[3]Ivano-Frankivsk, Ukraine

Introduction

Multilayered Palaeolithic site Korolevo 1 is situated in Transcarpathia by the border of the Central and Eastern Europe. The surrounding territory is covered by the broadleaved forests of the central European type, though the nearby area is occupied by the flood lands of river Tisa covered by meadows. The site is located on the spot where the river leaves the antecedent part of the valley to the plain. Due to such geomorphologic position the sections of Korolevo 1 are characterized by full stratigraphy. Korolevo 1 is a unique multilayered Palaeolithic site because conditions necessary for the life of ancient hunters and gatherers as well as for the wild animals and birds were available in Korolevo 1 geoarchaeological region in the periods of all climatic extremes. In the bottom

of the antecedent valley there were always refugium for trees (including solitary broad-leaved elements) and mesophilous plants. On the wide flood land in the periods of Pleistocene glaciations or development (even in southern regions of Eurasia) of permafrost there were taliks where trees could survive.

Archaeologist V.N. Gladilin, who discovered the site Korolevo 1 in 1974 proved its uniqueness (11 well stratified Palaeolithic layers and some complexes with good stratigraphy were discovered) and antiquity (Gladilin, 1978, 1980, 1982 a, b; 1985, 1989). The archaeological investigations held by the researchers of the Archaeological Institute of the National Academy of Science of Ukraine V.N. Gladilin, L.V. Koulakovska (L.V. Soldatenko), V.I. Tkachenko, Y.V. Kukharchouk, V.I. Usik and V.I. Sitlivij showed the key role of the site for the studies of Acheulean, Mousterian and Early Upper Palaeolithic of Eurasia. The latest studies (Koulakovska, 2003, 2006; Haesaerts, Koulakovska, 2006; Usik, 2006) confirmed the excellent stratigraphy of the following archaeological complexes: two Early Palaeolithic layers (VII in alluvium and VI in palaeosoil VII), eight Middle Palaeolithic layers (Va in the upper part of palaeosoil V and V in the sediments immediately over it; IVa and IV in the down part of soil IV; III in the top layer of soil IV and down part of loess above it; IIb, IIa and II in loess dividing soils IV and III) and one Upper Palaeolithic layer Ia. This layer is found in the contact of loess and soil III of the composite generalized stratigraphic section of Transcarpathia. In Korolevo 1 section this layer is covered by the Holocene soil. The characteristics of some complexes were also defined more exactly. Those studies have shown that there are some discussions in the interpretation of separate archaeological complexes or its stratigraphy. But they could be resolved in the result of new excavations, archaeological studies and multidisciplinary research.

On the site Korolevo 1 were held integrated archaeological, palaeopedological, geological, palaeomagnetic and published only partly palynological studies (Gladilin, 1978, 1980, 1985, 1986; Soldatenko (Koulakovska), 1981; Adamenko et al., 1981; Adamenko et al., 1981, 1989; Pashkevich, 1984; Adamenko, Grodetskaya, 1987; Gladilin, Sitlivij, 1990; Koulakovskaya, 1989, 1990; Tkachenko, 1989, 1994, 2003; Kukharchouk, 1989; Adamenko, Gladilin, 1989; Levkovskaya, 1990; Demidenko, Usik, 1994; Gladilin et al, 1995; Koulakovska, Haesaerts, 2000; Koulakovska, 2001; Demidenko, 2001; Koulakovska, 2002, 2003; Usik, 2003, 2006; Haesaerts, Koulakovska, 2006; Geneste et al., 2006). The article contains short list of references used for the table. It is not possible to give full list of references is such short publication. See it in: Adamenko et al., 1989; Koulakovska, 2003; Haesaerts, Koulakovska, 2006.

The sediments of the section are presented by alluvium of the buried Tisa terrace IV and seven complicated pre-Holocene palaeosoils. According to palaeomagnetic data obtained by G.A. Pospelova [1981; Adamenko et al.,

1989] and later by group of Belgium investigators (Haesaerts, Koulakovska, 2006) their sedimentation started in palaeomagnetic epoch Matuyama. The studies of G. Pospelova have shown that it lasted during five anomalies of Brunhes and finished soon after palaeomagnetic excursion Kargopolovo-Lashamp. According to pollen data pedocomplex IV of Transcarpathian stratigraphic scheme (the buried soil 2 in Korolevo 1 sections) with palaeomagnetic episode Blacke was formed in Riss-Wurm (Pashkevich, 1984; Adamenko et al., 1989, unpublished data of G. Levkovskaya) and pedocomplex VI (the buried soil 4 of Korolevo 1 sections) in Holstein (Adamenko et al., 1989; Levkovskaya, 1990).

The latest investigations allowed to correlate sediments of Korolevo I archaeological layers VII, VI, Va, V, III, IIb, IIa, II and Ia with ^{18}O isotope stages 25-2 (Haesaerts, Koulakovska, 2006) of marine scale (Shackleton et al., 1990). Now all these isotope stages have palynological characteristics that were obtained by G.M. Levkovskaya. The article presents new pollen materials only on the most ancient sediments of Korolevo 1 – on the late climatic stages of Matuyama and early stages of Brunhes epoch (isotope stages 24-16).

The results of these studies proved that Korolevo geoarchaeological region may be considered as a key region for determination palaeogeographical specificity of pre-Mindel, Mindel, Mindel-Riss, Riss, Riss-Wurm, some periods of Wurm. Also these results may help in studies of Early and Middle Palaeolithic as well as Early part of Upper Palaeolithic. Materials of Korolevo 1 site are especially important for studies of the early population of Eurasia and palaeogeography of the end of Matuyama epoch (Eopleistocene of Russia or Early Pleistocene of Europe) because only solitary well stratified sections contain so ancient Palaeolithic layers in combination with palaeomagnetic, palaeopedologicalal and pollen data.

The results of the studies

This article discusses materials only of the lower part of the section – of buried flood land alluvium with ancient Korolevo 1 Palaeolithic layer VII, palaeosoils IX and VIII under alluvium, sediments between these pedocomplexes and loess above the soil VIII. It contains new information on regional palaeogeographical events for chronological interval about 960-620 kyr BP (^{18}O stages 24-16). The results of these research are shown in Table 1. The Korolevo 1 regional pattern is correlated in it with the ^{18}O stages on the bases of sedimenthological data and new pollen data on bore pit 26 which are in good agreement with each other.

This article presents palaeoenvironmental reconstructions for ^{18}O stages 24-16 based on pollen analyses of layers 24-19. 98 samples from the bore pit 26 of 11.2 m deep (excavations were held by V.N. Gladilin in 1982) were studied by G.M. Levkovskaya. The altitude of the bore pit is 244.6 m above

the sea level. The stratigraphy of this section repeats the one published by O.M. Adamenko (Adamenko et al., 1989) and P. Haesaerts (Haesaerts, Koulakovska, 2006) for the bore pit 18.Only two additional layers are registered in it. These are the layers 22a and 26a. The layer 22a is the loam with solifluction between the pedocomplex IX and Fe-Mn horizon (the Fe-Mn level was earlier specified by O.M. Adamenko as part of PKIX (see: Adamenko et al., 2006, p.15). The layer 26a is the level of sand lenses (between loam layes 26 and 25 of buried flood plain) and of the finds of solitary pollen grains with traces of burning. It is the marker of Palaeolithic layer VII in the bore pit 26 where sand alluvium is absent. Both sections have sediments of isotope stages 25-2 because stratigraphic lacunas are practically absent in them.

The Table 1 showes that only one short stratigraphical lacuna was registered. It is located in the down part of the studied Korolevo 1 section: between the upper part of buried flood-land sediments with Palaeolithic layer VII and bottom part of pedocomplex IX. This lacuna corresponds to the transitional phase form (the transition from *Dryas* tundra to *Picea* forests with broad-leaved elements is absent) and possibly to the time of late Matuyama palaeomagnetic excursion Kumikatsura (about 850 kyr B.P.) sediments. The sediments of Matuyama epoch were found in Korolevo 1 bore pit 26 in the sections of different years by scientists from Moscow (Adamenko et al., 1989) and from Brussels (Haesaerts, Koulakovska, 2006). G. Pospelova studied large series of the cubic samples that were collected with spacing of 1-1.5 cm.

The former pollen research held by G.Levkovskaya (Adamenko et al., 1989; Levkovskaya, 1990) for the sediments that are discussed in the article allowed reconstructing only four cryomers and three thermomers because rare samples were studied. Now 23 palaeoenvironmental phases are differentiated (table 1). They reflect regional dynamics of palaeoenvironments that were the result of global rapid climatic oscillations. These oscillations belong to different climatic phases of three large thermochrons – interglacials A, B and C and four large cryochrons which belong to glaciations epochs (CRH1 with interphasial iside it, CRH3, CRH4) and to the cold permafrost stage with continental climate (CRH2).

Conclusions

Materials of the Table 1 are the bases for different conclusions on palaeoclimate, palaeovegetation, flora exotics, climatic stratigraphy of the sediments and their isotope chronology. The present conclusion discusses the problems which are important for archaeology. It is concentrated on the problems of climatic stratigraphy and isotope chronology of flood plain buried alluvium in which ancient Acheulean complex VII was found and on

some transcontinental correlations of Korolevo 1 palaeoenvironmental refugium and key geoarchaeological region.

Korolevo 1 Palaeolithic complex VII belongs to the Carpathian facies of the unilateral Acheulean industry (Gladilin, Sitlivij, 1990). It have been found in the Tisa flood land buried alluvium terrace VII. The facial change of the flood-plain sediments with complex VII is registered in different sections. This complex is found in the sand layer with small pebbles which is lying above the layer 27 with large pebbles (Adamenko et al., 1989) or in the border of silt layer 25 and more sandy (especially in its down part) clay layer 26 (Haesaerts, Koulakovska, 2006) or (in the bore pit 26) on the border of two clay layers 25 and 26 which are devided by the level of sand lenses. The solitary pollen grains of pine (*Pinus sp.*) from one of these lenses have traces of burning that could be the result of human activity (is so- then ancient people already used fire) or natural means. The mentioned above data shows that the life strategy of Korolevo 1 Acheulean hunters and gatherers was connected with the shore of Tisa river.

Pollen data presented in the table shows that alluvium was formed before three termochrons (A, B, C) of interglacial range and three cryochrons (2, 3, 4) with glacial types of the climate of ^{18}O stages 21-16 (span 860-620 kyr B.P.) with maximum of exotcs (*Pterocarya, Pistacia, Zelkova, Celtis, Juglans, Ostrya, Betula sect., Costatae, Buxus, Pinus strobus, Pinus sg. Haploxylon, Picea omorica, Osmunda*). It differs from termochrones B and C by the role of these exotics in the vegetation. They were the co-dominants (together with *Ulmus*) in polydominant forests during termochrone A only. This termochron is correlated with the complicated (with several optima) very warm and wet intrglacial Prosolsani I-II (^{18}O stage 21 on pollen standard Tenaghi Phillipon in Greece) and Petropavlovskij interglacial (^{18}O stage 21 on pollen standard Streliza, Don river basin, Russian plain) (Van der Weil, Wijmstra, 1987; Bolikhovskaya, Molod'kov, 1999). Termochrone A is correlated with Balashovsky pedocomplex of Streliza with some evidences of wet subtropical climate (Velichko et al., 2002) and with Matuyama interglacial 1 of Cromer in Nothern Europe (Zagwijn, 1996).

Thermochron A was replaced by cryochron 2 with continental type of climate, solifluction processes and geobotanical crises when most plants (AP and NAP) produced teratomorph pollen grains. This cryochron of Matuyama epoch is correlated with cold phase registered immediately under Matuyama-Brunhes border in Tenaghi Phillipon and Streliza. The other studied cryochrons are correlated with the following glaciations: cryochron 3 is correlated with Cromer glaciation A of Northern Europe and Setunski glaciation of Don basin and cryochron 4 with Cromer glaciation B of Northern Europe and Donskoj glaciation.

According to palaeomagnetic data Korolevo 1 buried alluvium was formed before 790 kyr B.P. during paeomagnetic epoch Matuyama.

Matuyama - Brunhes border was found by G. Pospelova (Adamenko et al., 1989) and J. Hus (Haesaerts, Koulakovska, 2006) above the Fe-Mn horizon (layer 22a in tab.1) in three sections of Korolevo 1. But the interpritation of stratigraphic position of this Fe-Mn horizon is different. It is considered as part of pedocomplex IX or a marker wich can be included in PK IX or PK VIII. The latest studies show that the Matuyama anomaly is registered even above the Fe-Mn marker at the down part of PK VIII. The discovery of Matuyama – Brunhes border in the down part of pedokomplex VIII is coordinated with the modern general geomagnetic concept of connecting reversals with the warm climatic stages (Pospelova, 2002). The Matuyama - Brunhes border is usually correlated with 18O stage 19 (see as example correlation schemes of some geological evidences of the Russian plain, northern Europe, Azov sea, Mediterranean regions, etc in: Haesaerts, Koulakovska, 2006; Iosifova et al., 2006; Zubakov, 2006, etc.).

Connection of Matuyama - Brunhes border with pedocomplex VIII is coordinated with pollen data presented in the table 1. The Korolevo 1 termochron B of interglacial range is reconstructed for the down part of palaeosoil VIII. The border of Matuyama - Brunhes corresponds to the beginning of optimum of warm and complicated (with many phases) intreglacial of ^{18}O stage 19 in Korolevo 1, in pollen standarts from the Mediterranean (Van der Weil and Wijmstra, 1987) and Russaian plain (Bolikhovskaya, Molod'kov, 1999). These are the interglacials Polistilos in Tenaghi Phillipon, Gremiatchinsky in Streliza and termochron B in Korolevo 1. All the data mentioned above showes that archaeological complex VII is very ancient.

The Table 1 showes that the studied part of alluvium was formed during the cryochron 1 which is older than 18O stages 21-16 (span 860-620 kyr B.P.) Inside this cryochron three phases have been differentiated:

CRH1a (layer 26) – cryohydrophilous stage of the glacial cycle; the phytophase of mossi *Bryales* tundra. In CRH1a phase solitary trees were presented by *Picea sp., Pinus sp.* and *Betula nana*. Most trees, bushes and even grasses produced ultra dwarf pollen grains. The ultra dwarf palynomorphs are not found in the subfossil sediments of most modern suzbones of West Siberia (Levkovskaya, 1971) including bushy tundra and southern part of mossy tundra zones because modern Holocene tundras have the interglacial types of climate. The maximum of dwarf pollen finds is registered now in the most northern regions of tundra only (Levkovskaya, 1971; Sokolovskaya, 2002).

CRH1b (layer 25) – cold and wet interphazial inside glacial cryochron 1: periglacial forest tundra with some mountain subalpine and alpine elements in the flora of exotics. The aforestation of the area was higher than in CRH1a (quantity of AP in CRH1a – 5 % and in CRH1b – 48 %). The vegetation of this interphasial was co-dominated by angiosperm societies: 1. wet meadows; 2.forests (*Betula pubesens + Pinus sylvestris + Pinus cembra)*; 3.

microterm shrub societies (*Betula nana* + *Betula humilis* + *Alnus viridis*), *Pinus sf. mugo* subalpine societies.

CRH1c (layer 25). It is a cryoxerophilous stage of the glacial cycle though almost no *Artemisia* + *Chenopodiaceae* societies were registered in the region opposite to the later cryochrons. So the climate of this cryochron was less dry than of the cryochons CRH2-CRH4. CRH1a is characterized by appearance of dry treeless *Dryas* plant societies. Solitary pollen grains of alpine *Pinus mugo* were found. During this phase most plants produced only single pollen grains. Annual average temperatures of this phytophase were lower than 13 ^{o}C. The materials presented in the table show that layer 26a were generated during transition to wet and cold forest-tundra interphasial inside cryochron 1.

The buried alluvium corresponds to the upper part of VII (Kopan) terrace of Tisa. The Taman complex of microteriofauna has been discovered by R.S. Adamenko in this terrace of Sosnovyj Gaij section: *Ochotona* sp., *Citellus* sp., *Villanyia* sp., *Mimomys* ex. gr. *coelodus, M. sp., Microtinae* gen. indent., *Allophaiomys* sp., *Lagurini* gen. ident. It was correlated (Adamenko et al., 1989) with Gunz, Apsheron. Final stage of Taman fauna complex corresponds to the cold phase of isotope stage 22 (Agadjanian, 1992; Iosifova et al., 2006) which is about 910-860 kyr B.P. This complex is correlated with isotope ^{18}O stages 34-22 (1 115 – 860 kyr B.P.) (Bozinski et al., 2003). But Korolevo 1 layer VII could correspond only to the time of the second half of Taman complex (after palaeomagnetic episode Jramillo the age of which is about 1 070-990 kyr B.P.) because Matuyama anomalies were not found in Korolevo 1, though palaeomagnetist G. Pospelova studied the samples that were collected with spacing of 1-1.5 cm. The span after Jaramillo corresponds to to the Cunz II and end of warm phase before it (Zubakov, 2006). The latest Matuyama anomaly (Kimakatsura, about 850 kyr) was possibly not found because the short lacuna in sedimentation was registered between the glacial and interglacial phases of the buried alluvium IV and the down part of soil IX. It corresponds to transitional stage between the *Dryas* tundras and Picea forests phases. Cryochrochron 1 is correlated with Gunz II glacial cycle of ^{18}O stages 24-22 (about 940-860 kyr B.P).

Korolevo 1 layer VII corresponds to the following caucasian sites that are correlated (Amirkhanov, 2007) with the second part of Taman fauna complex: Sinaja Balka (Bogatyri), Achalkalaki (?), Kapustin a Balka, Achatanizovskaja, Fontalovskaja, Port-Katon and Margaritova, but it is younger than sites Ainikab I and Dmanisi. The obtained pollen data showes that layer VIIb of Treugolnaja cave site from Caucasus was formed during

Table 1. Transcarpathia. Korolevo 1 key geoarchaeological region. Palaeoenvironments of ^{18}O marine stages 25-16 and Palaeolithic layer VII of Matuyama epoch. Page 1.

Magnitostratigraphy	^{18}O Schackleton et al., 1990		Layers [1,2]	Termochrons (A, B, C) and cryochrons (CRH)		Dynamics of vegetation and climate	AP %	Q-M %	AP: dominants (+) co-dominants [ ] sub-dominants	Regional exotics: Composition	Regional exotics: %	Geological correlations (see ref. in the legend)	Acheulean complex VII: correlations – **I**; level of finds – **II**.
B R U N H E S	620	16	19 Loess	CRH4	c	Crisis. Underdeveloped and dwarf *Artemisia* pollen – 80%				*Alnaster*	3	Morains: Donskaja [3, 4]; Cromer B [5]	**I.** The possible level of industry VII is layer 26a. Korolevo 1 Palaeolithic compex VII belongs to the Carpathian facies of the unilateral Acheulean industry [17, 18]. It is correlated with alluvium and cryochron 1 – Gunz II glacial cycle (^{18}O stages 24-22 about 940-860 kyr). Layer 26a was formed during transition to wet and cold forest-tundra interphazial inside Gunz II. In Trans carpathia [1] terrace VII with Gunz II sediments has Taman fauna complex which is correlated with ^{18}O marine stages 34-22 (about 1 150-850 kyr). Two palaeo magnetic anomalies of Matuyama epoch (Jaramillo about 1 150-1 000 kyr and Kamikatsura about 850 kyr) are known inside Taman fauna complex span.
					b	50% Fungi spores. Low level of pollen production.							
					a	Periglacial forest-steppe.							
		17	20 PK VIIIb Mn	C	OP1 b	Interglacial. Forest-steppe. Wet meadows. Forests: mixed and broad-leaved.	30	10	*Alnus* [*Betula*]			Thermochrons: Tenaghi Phillipon: Nicki [6]; Don: Semilukskij [8], Upper Ilijinskij [3,4]	
					OP1 a		40	20	Q-M: *Corylus* + *Ulmus* + *Carpinus betulus* + *Quercus* [*Betula*]	*Pterocarya, Juglans*	1		
	700	18	20a	CRH3	c	Periglacial steppe. AP 20%, Q-M 1%. Cryoxerophilous glacial stage. Domination of *Chenopodiaceae*. Solitary *Betula nana*, *Alnaster*.				*Microtherm Alnaster*	1	Morains: Don: Setunskaja [4]; Northern Europe Cromer A [5]; Belarus: Narevskaja [7] Cryochron: Don: Devitskij [8]	
			SS		b	Geobotanical crisis. Most plants of all taxa produced teratomorph pollen grains. Tundra-forest-steppe. AP 39%, Q-M 5% (underdeveloped pollen only). Co-domination of *Alnus*, *Alnaster*, *Cyperaceae*, *Chenopodiaceae* societies.				*Microtherm Alnaster*	29		
					a	Periglacial forest-steppe. AP 32%, Q-M 14%. Combination of: 1. wet meadows; 2. forests (mixed) and societies of: *Artemisia* + *Chenopodiaceae*; *Betula humilis* [*Betula nana* + *Alnaster*].				*Alnaster, Larix*	16		
		19	21	B	FIN	End of interstadial. Wet forest-steppe: mixed forests and wet meadows.	60	20	*Alnus* + *Betula* + Q-M [*Picea*, *Pinus*]		0	Thermochrons: Don: Gremiatchenskij [8]; Tenaghi Phillipon: Polistilos [6]; Northern Europe: Cromer: OP2 [5], and dry Artemy [10].	
					OP2	Phase of forests: 1. broad-leaved; 2. mixed.	85	33	Q-M: *Corylus* [*Ulmus* + *Quercus* + *Carpinus*]		9		
			PK VIIIa		CRI	Phase of forest-steppe: broad-leaved forests and *Poaceae* steppes.			Domination of *Ulmus*. Most *Ulmus* produced underdeveloped pollen grains.	*Brasenia, Picea omorica*	3		
			21		OP1	Forest-steppe with Mediterranean exotics - savanna. Xerophilous Q-M forests (polydominant) with exotics. Societies of *Artemisia* + *Chenopodiaceae*. Flood plain *Ulmus* forests, meadows.	40	17	Q-M: *Ulmus* + *Quercus* + *Carpinus orientalis* + *Juglans* + *Celtis* + *Pistacia* [*Betula*]	*Betula sect. Costacae, Juglans, Celtis, Pistacia, Ostrya*	6	Pedocomplexes: Don: Rzhaksinskij [9] of brunizem preria type and Troitskij [4] with tortoise shells, *Micromelania*; Ukraine: [8, 11, 12] Shirokinskij (?) or Martanoshskij (?)	
+		19	PK VIIIa	B									

Table 1. Transcarpathia. Korolevo 1 key geoarchaeological region. Palaeoenvironments of ^{18}O marine stages 25-16 and Palaeolithic layer VII of Matuyama epoch. Page 2.

Magnito stratigraphy	^{18}O Schackleton et al., 1990		Layers [1,2]	Termochrons (A, B, C) and cryochrons (CRH)		Dynamics of vegetation and climate	AP %	Q-M %	AP: dominants (+) co-dominants [ ] sub-dominants	Regional exotics: Composition	Regional exotics: %	Geological correlations (see ref. in the legend)	Acheulean complex VII: correlations – **I**; level of finds – **II**.
—	790	20	22 22 Mn Mn	B	TR b	Transition to optimum.	76	14	*Pinus* + *Betula* [Q-M]		0		The last Matuyama anomaly is sinchronous to the time of short lacuna between formation of flood plain alluvium and palaeosoil IX. But Jaramillo anomaly is not found in Koro-levo 1. Acheulean layer VII corres-ponds only to the time of Taman complex after palaeomagnetic episode Jaramillo like Caucasian archaeological complexes [14, 16] Sinaja Balka (Boga-tiry), Achalekalaki (?), Kapustina Balka, Fontalov-skaya, Port-Katon and Margaritovka. Layer VII is younger than Caucasian sites Dmanisi, Ainikab 1, layer C:B2 of Vallone [15] cave site in France with pebble industries which were formed
						Phase of mixed forests.	73	8	*Pinus* + *Betula* [*Alnus*]		0		
					TR a	Pioneer *Betula* forests and wooded swamps.	72	10	*Betula pubescens* + *B.humilis* [*Pinus*, Q-M]	*Juglans*	3		
M A T U Y A M A		20	22 a SS	CRH2 (dry cold)		Solifluction. Periglacial forest-steppes. AP 19%, Q-M 9%, exotics – 5%. Combination of: 1. wet meadows; 2. *Artemisia* + *Chenopodiaceae* societies; 3. microtherm bushes (*Betula nana* + *B. humilis* + *Alnaster*); 4. forests in refugium. Climate cold, continental, geobotanical crises: most AP and NAP produced teratomorph pollen grains. Permafrost.				*Alnus viridis* (subalpine Carpathian element)	5	Under Matuyama-Brunhes border: Tenaghi Phillipon [6]: cold phase of ^{18}O stage 20; Don [8]: extraglacial steppes.	
	820	21	23	A	FIN-OP3	End of interglacial. Forests (broad-leaved).	86	75	Q-M: *Ulmus* [*Juglans*]. Most pollen grains of AP are underdeveloped.	Mediterranean or Colchic exotics: *Pterocarya, Pistacia, Zelkova, Celtis, Juglans, Ostrya, Buxus, Picea omorica*	19	Tenaghi Phillipon: Prosolsani I and II [6]; Nothern Europe [5]: interglacial 1 of Cromer (Matuyama). Don : Petropavlovskaya suite [3, 4, 8] and Balashovskij pedocomplex [9] (Matuyama) with evidences of wet subtropical climate.	
			PK IX		OP2 b	Savanna. Combination of: 1. *Ulmus* forests (with subtropical exotics); 2. dry forests of Mediterranean type; 3. meadows.	70	40	Q-M: 1. *Ulmus*; 2. *Juglans* (*Celtis* + *Ostrya* + *Carpinus orientalis* + *Pistacia*)		30		
					OP2 a	Phase of polydominant wet forests with subtropical elements.	94	52	Q-M: *Pterocarya* + *Ulmus* + *Juglans* + *Carpinus* + *Quercus* + *Fagus* + *Morus* [*Alnus*]		30		
					CR I b	Meadows (mesophilous), mixed forests with exotics.	42	16	Q-M [*Betula* + *Pinus*]	*Juglans Betula sect. Costatae, Pinus strobus, P. sg. Haploxylon*	4		
					CR I a	Forests (mixed).	72	15	*Pinus* + Q-M [*Juglans*] + *Betula*		8		
		21		A	OP1	Forests (broad-leaved).	73	50	*Ulmus* [*Alnus* + *Juglans*]		14		
	860		23-24		TR	Forests (dark coniferous).	90	5	*Picea*		5	Level sinchronous to Kamikatsura excursion	
		22	LACUNA			Dryas tundra. Cold climate. Average July temperatures were lower than 13°C.				*Dryas, Pinus mugo*			
			25	CRH1	c								

Table 1. Transcarpathia. Korolevo 1 key geoarchaeological region. Palaeoenvironments of ^{18}O marine stages 25-16 and Palaeolithic layer VII of Matuyama epoch. Page 3.

Magnito stratigraphy	^{18}O Schackleton et al., 1990		Layers [1,2]	Termochrons (A, B, C) and cryochrons (CRH)		Dynamics of vegetation and climate	AP %	Q-M %	AP: dominants (+) co-dominants [] sub-dominants	Regional exotics		Geological correlations (see ref. in the legend)	Acheulean complex VII: correlations – **I**; level of finds – **II**.
										Composition	%		
MATUYAMA	900	23	25 Al b	CRH1 wet cold, glacial climate	b wet interphasial inside glacial	Interphasial inside cryohydrophilous stage of glacial. Forest – tundra with mountain subalpine elements. Combination of: 1. wet meadows (dominants); 2. forests (mixed, but broad-leaved elements are absent); 3. wet dwarf shrub societies of microtherms; 4. *Pinus mugo* subalpine societies.	48	1	Dominants: 1. in forests – *Pinus sylvestris* + *Betula pubescens* on swamps and; 2. in microtherm – shrub societies: *Betula nana* + *B. humilis* + subalpine *Alnus viridis*. Solitary *Picea* and *Pinus cembra*. All *Pinus* produced dwarf pollen.	Microtherm exotics: *Pinus mugo* (subalpine element). *Pinus cembra* (recently grows at Carpathian subalpine and forest belts border). Some species of *Myriophyllum, Alnus viridis*.	12	Morain horizons: Dorst [6]; Nothern Europe: moraines Gunz II [13]; Azov (Zocur): loess under soil 12 [13]; Tenaghi Phillipon: [6] cold Bavelij.	during Jaramillo episode and the earliest Palaeolithic layer in cave site Al-Guza from South Arabia which is correlated with sea Pliocene-Early Pleistocene regression of 150 m [16].
		23-24	26a Al b		b+a	Transition to wet interphasial inside glacial cycle. Traces of some pollen grains burning.							**II. Industry VII Layer 26a**
	940	24	26 Al b		a	Climate cold and very wet. Solitary *Pinus*, *Picea*. All *Pinus* produced dwarf pollen. Mossy *Bryales* tundra. AP 5%, *Bryales* 90%.							
		25?	27 Al a	?		Climatic phase of the time of Taman fauna complex in Transcarpathia and period of formation of VII buried Tisa terrace [1].						Zakopan terrace [1]	

I. Table 1. Legend

1. [–] ; 2. [+] ; 3. [A-C] ; 4. [CRH] ; 5. [TR] ; 6. [OP] ; 7. [CRI] ; 8. [FIN] ; 9. [AP] ; 10. [Q-M] ; 11. [PK] ; 12. [SS] ; 13. [Mn] ; 14. [Ala] ; 15. [Alb] .

1. palaeomagnetic excursion Matuyama; 2. palaeomagnetic excursion Brunhes; 3. thermochrons (A, B, C) of intrglacial climatostratigraphic range; 4. cryochrons (1-4) of glacial climatostratigraphic range; 5. transitions to thermchrons or phases before first optima of thermochrons; 6. optima of thermochrons; 7. cryomers of interglacials (stages of deteriorations of the climate between the optima of thermochrons which did not change the interglacial zonal types of vegetation); 8. final phases of thermochrons; 9. sum of arboreal pollen (indicator of the highs or low level of aforestation of the area); 10. sum of the thermophilous broad-leaved pollen; 11. pedocomplex; 12. level with evidences of permafrost: with wedges or solifluction; 13. Mn-Fe horizons of palaeosoils; 14. channel alluvium of IV buried terrace of Tisa with Taman fauna complex (after Adamenko, 1989); 15. flood-land alluvium of IV buried terrace of Tisa with finds of Palaeolithic complex VII (after Gladilin, 1985).

II. References used in Table 1

[1] Adamenko, et al. 1989; [2] Haesaerts, Koulakovska, 2006; [3] Shick et al., 2006; [4] Iosifova et al., 2006; [5] Zagwijn 1996; [6] Van der Viel and Wijmstra, 1987; [7] Elovitcheva, 2006; [8] Bolikhovskaya, Molod'kov, 1999; [9] Velicko et al., 2002; [10] Erd., 1976; [11] Veklitch 1995; [12] Matviishina et al., 2007; [13] Zubakov, 2006; [14] Bozinski et al., 2003; [15] Renault-Miskovsky, 1976; [16] Amirkhanov, 2006, 2007; [17] Gladilin, 1985; [18] Gladilin, Sitlivij, 1990; [19] Shackleton et al., 1990.

the termochron after very cold phase according to our pollen data (Doronitchev et al., 2007). This cold phase is correlated with ^{18}O stage 16 (about 620-660 kyr B.P.). Data on very important palaeolithic site Al-Guza shows that the first population appeared in the South Arabia from Africa before the Gunz interglacial, about 1 650–1 350 kyr B.P.(Amirkhanov, 2006).

So, layer VII of Korolevo 1 is younger than most ancient palaeolithic layer of this site. Layer VII is younger than layer C:B2 of Vallone cave site in France with pebble industries, because C:B2 was formed during palaeomagnetic episode Jaramillo of Matuyama epoch (Renault-Miskovsky, 1967).

NEW DATA ON THE EARLY PALEOLITHIC OF ARMENIA

V. P. Liubin, E. V. Belyaeva

Institute for the Material Culture History, Russian Academy of Sciences,
St. Petersburg

Since the time of J. de Morgan, who was the first to discover Paleolithic in Armenia (at the end of the XIX century), the search for the Early Paleolithic sites in the region has been rather passive. During a century five generations of archaeologists restricted themselves with collecting surface finds, represented by spectacular Upper Acheulean artifacts made of obsidian. These works were carried out in Central Armenia only, in the areas with outcrops of high quality obsidian, near the volcanic cones of Arteni, Atis, Gutansar, etc.

In 2003-07 the Armenian-Russian archaeological expedition headed by S.A. Aslanyan worked in the medium-altitude mountains of the Lori area in the north of the Armenian volcanic upland. The discoveries done in the course of this work have sharply extended our knowledge of the early prehistory of Armenia. A new area rich in raw materials has been found: local Acheulean industries were based on volcanic rocks like dacite and andesite. The surface finds, while being as numerous as they are in central Armenia, included not only Upper Acheulean tools, but also much more archaic forms. Finally, stratified Acheulean sites have been found for the first time in Armenia.

Both surface and stratified occurrences were found in the environs of dacite outcrops at the foot of the eastern slope of the Djavakhetsky ridge, near the villages of Blagodarnoe, Noramut, Dashtadem, Pahgahpyur. The collection of surface finds is dominated by Upper Acheulean handaxes and Levallois products, but there is also a number of conspicuous archaic forms, including big massive handaxes without any traces of fine retouching on their edges, primitive pick-like forms, large chopping-cutting tools on plates, as well as unusual big beaked tools. These artifacts are of clear pre-Upper Acheulean appearance. They represent the first evidence for the presence of much older Acheulean industries in the southernmost part of the Caucasus.

Even more important is the discovery of stratified Acheulian sites, including both single-layer (Dashtadem 3) and multilayer (Muradovo, Kurtan) ones. The site of Dashtadem 3 (1902 m above sea level) yielded Upper Acheulean of the Levallois facies. The artifacts were confined to a thick (up to 1 m) layer with traces of soil formation and formed a compact accumulation. The area of 30 square meters excavated by E.M. Kolpakov gave over 2500 artifacts represented by various tools (including 49 handaxes) and numerous waste products.

Muradovo (1649 m above sea level) is a multilayer site, discovered due to the fact that the Pleistocene deposits containing Acheulean artifacts have been washed out by a recent streamlet. The excavations conducted by V.P. Liubin and

E.V. Belyaeva exposed these deposits for the depth of 3 m, revealing 6 lithological layers. Layers 1-2 yielded Upper Acheulean materials of the Levallois facies; layer 3 gave an Acheulean assemblage which appears to be somewhat less developed (non-Levallois flaking, presence of choppers alongside with handaxes and side-scrapers); and layers 4-5 gave single artifacts of an even more archaic type: a chopper, a pick, a core-like end-scraper (fig. 1).

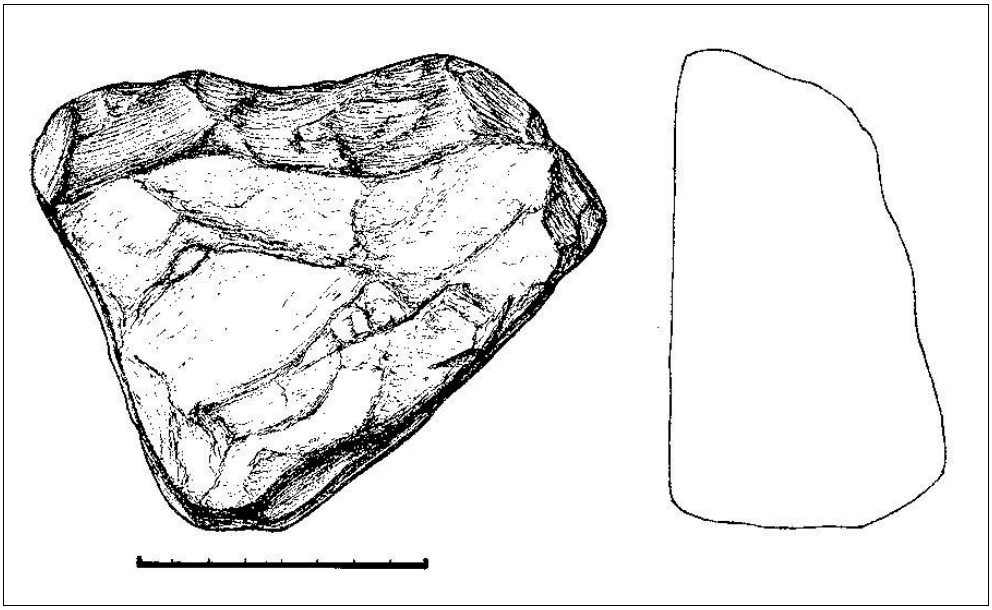

Fig. 1. Muradovo, layer 5 – core-like scraper

Kurtan is situated in the southeastern corner of the Lori plateau (about 1300 m above sea level). This is a vast clay-sand quarry, revealing 15 m of Pleistocene deposits underlain with doleritic basalts (as in Dmanisi). A step-like probe done in 2007, exposed 5 m of these deposits and revealed 7 lithological horizons. Two of them gave artifacts of the Acheulean aspect made of local rhyolite.

In addition, the expedition explored the environs of the Nurnus village in Central Armenia, where the Early Pleistocene faunal remains (Etruscan rhinoceros, late hipparion) confined to diatomic sediments overlain with a basalt flow were found in the 30es-40es of the last century. Some very archaic tools were found in an old diatomic quarry. They include a chopper and a core of opoka, as well as a core-like scraper and a pick of basalt). This discovery shows that traces of early hominid presence in Armenia should be sought for even in the deposits buried under lavas.

THE CONTRIBUTION OF FUNCTIONAL ANALYSIS TO TOOL DEFINITION IN LOWER AND MIDDLE PLEISTOCENE ASSEMBLAGES

L. Longo
Università degli studi di Siena, Italy

The emergence of the concept that a piece of modified stone became a "tool" is already acknowledged by archaeologists and its earliest evidences date back to 2.6-2.34 My in Africa, Gona River and Lokalalei 2C – West Turkana (Semew et al. 1997; Delagnes, Roche, 2005).

The development of production strategies interacts and drives human groups in the management of raw materials influencing the way they transformed lithic resources for their productive cycle.

The archaeological sites related to Mode 1 techno-complexes played a most significant role in the definition of the boundary between human intentional tools production and non-human recognised behaviour (Henzelein et al., 1999).

Even though the gap between the oldest African lithic production and oldest European industries ranges around five to eight hundred thousands years, the paper is focused on the investigation of the oldest European humans intentional production by means of functional analysis, considering very carefully the preservation state of the working edges surface in order to apply wear traces analysis (Crovetto et al., 1994; Longo, 1994; Longo et al., 1997; Peretto et al., 1998; Carbonell et al., 1999; Marquez et al., 2001; Verges et al., 1999).

Functional analysis allows investigating the fundamental issue of early Europeans intentional tools production, which colonised our continent well before the timing acknowledged by the supporters of the "*Short chronology vs. Long chronology*" dispute (Roebroeks et al., 1992; Roberts et al., 1994; Dennell, 2003). Finally the discussion raised by some northern European scientists who claimed for a review of the oldest European tools production (Gamble, 1995; Roebroeks, van Kolfschoten, eds. 1995) ended up with the recognition of the high antiquity of such sites and the assemblages accompanying early human fossils (Lumley et al., 1988; Bonifay, Vandermeersch, 1991; Thieme, 1997; Goren-Inbar et al., 2000; Lordkipanidze et al., 2000).

Since the 1990s my research focused on the wear traces analysis of the oldest lithic assemblages like Monte Poggiolo (Forlì, Northern Italy) and Isernia La Pineta (Central Italy). New data are coming in the last few years from the oldest European site of Dmanisi (Georgia).

During the study of these assemblages it was realized how important is to discriminate among the different features (both natural and anthropogenic ones), which can affect such old tools.

Other arguments will be developed considering the results of the same study applied to other sites such as: Atapuerca (Spain) and Grotta Paglicci (Italy) (Ollé, 2003; Verges; 2003).

The great antiquity of the first European settling, definitely acknowledged thanks to discoveries like Dmanisi (Gabunia et al., 2000; Lordkipanidze et al., 2007) Orce (Palmqvist P. et al., 2005) Atapuerca – Sima de l'Elefante, TD4 and TD6 (Carbonell et al., 1995; 2008) and the second wave represented in Mediterranean Europe by stratified sites like Monte Poggiolo (Peretto et al., 1998) Isernia (Peretto, 2005) Arago, Sol P (Barsky, Lumley 2005) or the calvarium recovered at Ceprano (Ascenzi et al., 1996) will be considered in the light of a better integration between the role played by environmental/ecosystem dynamics in Pleistocene hominins dispersal out of Africa towards Europe (and particularly the Mediterranean area) which requires the linking to a great variety of data gathered in different fields.

PRE-MOUSTERIAN SITES OF THE LOWER DON REGION

A. E. Matiukhin

Institute for the Material Culture History, Russian Academy of Sciences,
St. Petersburg

The oldest sites of the Paleolithic period known in the Lower Don region are the localities of Khryashchi and Mikhailovskoe at the Seversky Donets river mouth. They are confined to the 3rd river terrace, which is thought to be adjacent to the older 4th terrace. The geological and palynological evidence together with the results of the study of mollusks and small mammals show that the pebble-bed of the 3rd terrace can be correlated with the Don Glaciation, i.e. the second half of the Middle Pleistocene. Let us note that the conclusion about the age of the basal culture-bearing horizon is tentative and subject to further correction. Alluvial deposits are well represented both at Khryashchi and Mikhailovskoe. The strata overlying the pebble-bed contain 4 buried soils, which have preliminarily been dated to the Mindel-Riss interglacial or an interstadial within the Riss. The collection coming from the buried soils contains flat cores with parallel flake scars, flakes, rare blade flakes and tools. Some of the tools are rather close to the Mousterian forms. Stone artifacts found in alluvium are not many.

At Khryashchi they are represented by flakes, cores, and several tools. The cores are mainly flat and bear either parallel or radial flake scars. Many of the flakes are massive, with thick oblique striking platforms. It should be noted that such morphology is not necessarily indicative of a very old age; it may well be

due to the quality of raw material. The tools are represented by side-scrapers. Worthy of special note is a carefully worked double side-scraper (or limace). Let us mention also two choppers. The artifacts coming from the alluvial deposits of Mikhailovskoe are not numerous. Still they are very interesting. First of all, let us mention a big quartzite core with flat working surface and parallel flake scars. There are also amorphous flakes and several blades and bladelets with regular dorsal scar patterns. All the blades are thin in cross-section. The only retouched tool is represented by a big fragment. One of its surfaces bears longitudinal flake scars. Most probably the latter testify to the intentional thinning of the tool. Let us note also two small flakes having triangular cross-sections. They can be ascribed to the category of core surface preparation flakes.

Generally speaking, the industry from the alluvial deposits of Khryashchi and Mikhailovskoe is similar to some Clactonian assemblages of England and Germany. However, judging by the finds from Mikhailovskoe, it has a number of specific features too. The only way to get a more comprehensive idea of the character of this industry is to conduct new extensive field works at both sites, paying special attention to their chronology and paleoenvironmental reconstructions.

PALEOECOLOGICAL RECONSTRUCTION OF THE LOCALITIES OF BOGATYRI AND SINYAYA BALKA

S. A. Nesmeyanov[1], N. B. Leonova[2], O. A. Voeikova[2]

[1] Institute of Geoecology, Russian Academy of Sciences, Moscow
[2] Moscow State University, Moscow

Most scholars who studied the paleontological site of Sinyaya Balka (N.K. Vereshchagin, I.A. Dubrovo, N.B. Lebedeva) connected it with an ancient gully on the crown of an upland representing a young anticline.

The archaeological site of Bogatyri is confined to a small crest between two big landslide cirques. The excavation pit of 2007 exposed a subvertical contact between the Kujalnikian strata represented by dark gray clays and a subvertical laminated sedimentary series of the Eopleistocene age. The latter includes a bone-bed with remains of mammals belonging to the Taman' fauna complex, as well as archaeological artifacts. Towards the sea the inclination of layers sharply flattens out to 30-40° in northern bearings. The change in the dip of the Eopleistocene strata from their original horizontal occurrence to the sub vertical one took place in the Neo-Pleistocene.

It is known that since the time of I.M. Gubkin's and N.K. Vereshchagin's observations the relief of the area under consideration has undergone substantial changes. The considerable difference between the altitude of the locality of Sinyaya Balka (about 40 m above sea level, according to N.B. Lebedeva) and that of Bogatyri (about 27 m) allows one to assume that the original locality of Synyaya Balka has not preserved. Evidently, the site studied by Gubkin and Vereshchagin was situated up the slope, and the uppermost part of the crest has been destroyed recently both by natural and anthropogenic processes.

N.K. Vereshchagin studied also a bone-bearing lens, which, in his opinion, had slid 20 m down the slope. In is clear that what he studied in the given case was not the locality of Sinyaya Balka but dislocated deposits of Bogatyri. However, another section described by him and situated at the edge of the scarp could well have corresponded to the locality of Sinyaya Balka.

Proceeding from what has been said above the original situation can be reconstructed as follows (fig. 1). It is possible to assume that the bones exposed by the Bogatyri excavation were situated on the sea beach. This is evidenced by the fact that the underlying materials consist mainly of sand. The presence in this underlying material of some blocks testifies to the proximity of a terrain with dissected topography. South of the site (where the Eopleistocene deposits occur sub horizontally) this could have been a small ledge, cut with a relatively shallow gully. The first investigators of the site described exactly such a gully. This was the original locality of Sinyaya Balka.

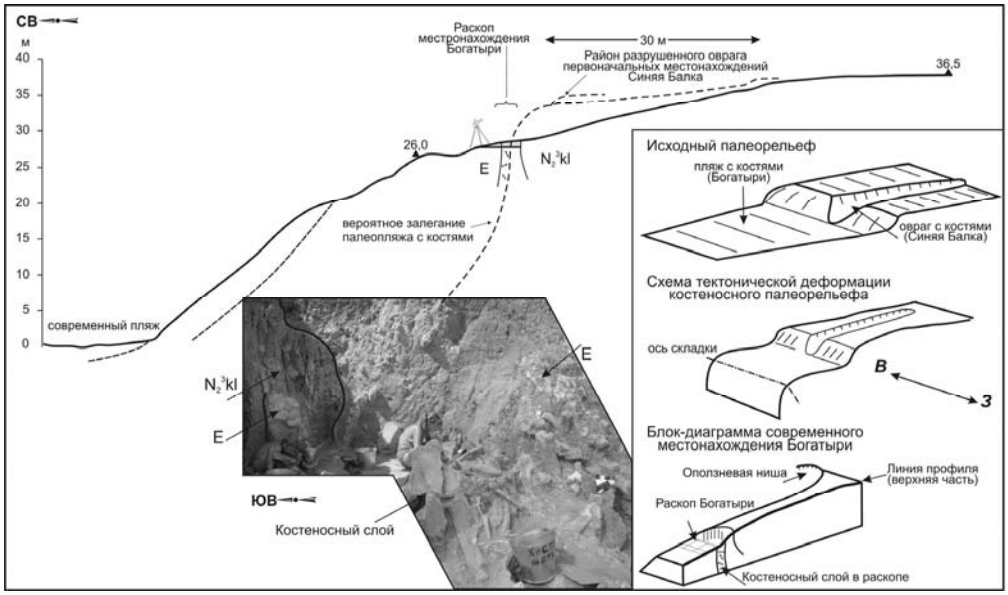

Fig. 1. Principal scheme of geological profile at the site Bogatyri – Sinyaya Balka region

An important circumstance, which impedes the adequate understanding of the present situation, is the sharply inclined position of the bone-bed of Bogatyri. This is due to the fact that the axis of a steep anticlinal bend goes here between the two localities, south of Bogatyri and north of the destroyed locality of Sinyaya Balka. Such a reconstruction (fig. 1) allows one to understand how the ancient gully, which shows no tectonic deformations, could have located in direct proximity with the steeply dipping layers of the ancient beach. The reconstruction of the original position of these objects permits to explain the relationship between the ancient and present geological situation.

Hence, it is possible to conclude that Sinyaya Balka and Bogatyri represent not one but two coeval and neighboring localities. However, despite their proximity they differ both in geological structure and paleolandscapes (Sinyaya Balka is associated with a ravine, while Bogatyri with its estuarine beach). Both situations were favorable for ancient human settlement.

The work was supported by the Russian Foundation for Basic Research, grants 06-06-80016, 07-06-10024-к, 08-06-10025-к.

THE ACHEULIAN IN WESTERN EUROPE: TECHNICAL SYSTEMS AND PEOPLING PATTERNS OF EUROPE

E. Nicoud

Université de Provence, France

According to the patterns given by scientific literature, the Acheulian of Western Europe seems to result from the broadcast of the Acheulian culture and the bifacial concept from Africa through the Near-East.

These patterns only take into account the ages of the deposits and the lithic industry, above all in a typological point of view. They don't take into account neither temporal intervals and spatial gaps between those sites nor the lithic technical features.

During the Lower Paleolithic, Western Europe (mainly France, England, Italy and Spain), forms what H. Breuil called a «dead end» («*Cul de sac*»), based on the presence of handaxes only at the West of the Movius Line, under no circonstances because of some exceptional geographical characteristics. Oldest handaxes sites in western Europe are 630 000 years old.

Taking into account those spatio-temporal intervals and the typological recognition of Acheulian in the sites, diffusion patterns from Africa generate some questions. Indeed, how to explain the total lack of handaxes in Eastern Europe, whereas this area is on the road of the broadcast? Why the oldest undubitable handaxes sites in Western Europe are located far in the North, in England? Why

typological differences are so important between handaxes or cleavers in south of Spain or Italy and North Africa? How to explain these hundreds of thousands years which separate handaxes industries of these two areas?

Moreover, these patterns force us to assume Acheulian of Western Europe as an homogeneous and stable technical complex, during 400 000 years at the scale of the Old Word, as if Western Europe was the B-ending point in a linear diffusion frame starting at the african A-point.

We discuss the dispersal pattern of Acheulian towards Western Europe looking at the technical homogeneity of lithic assemblages (in particular, bifacial products) in this area as it is suggested by the classical model.

First, we consider the main lines of the geological and climatic background of Western Europe during Acheulian period (isotopic stages 15 to 8) for a better understanding of the chrono-spatial distribution of the deposits.

Next, we present the Acheulian deposits in secure chrono-stratigraphical context, necessary to our comparative technicological study of the industry. Our work is a re-examination with a systemic approach of the lithic material from the sites of *Cagny* and *Soucy* in northen France, of *Boxgrove* and *High Lodge* in England, *Torre in Pietra*, *Castel di Guido*, *Notarchirico* in Italia, *Ambrona*, *Aridos* and *Torralba* in Spain. We highlight differences and similitaries to replace the industries in different spatial and chronological frames.

Assuming the diversity of Acheulian occurrences in Western Europe, we propose the hypothesis of one or more re-inventions («*convergence*») of tool structures, technical concept, and try to discuss its meaning.

EARLY PALEOLITHIC OF GEORGIA (Based on the Materials of Dmanisi)

M. G. Nioradze, G. N. Nioradze

National Museum of Georgia, Tbilisi

The discovery (in the 1980es) and excavation of the Early Paleolithic site of Dmanisi, situated 85 km south of Tbilisi, on a rocky promontory at the confluence of the Pinezauri and Mashavera rivers (90 m above the water line and 1000 m above sea level), gave new and reliable geological, paleontological, and archaeological data shedding an important light on the question of the earliest peopling of Georgia.

The basalt lavas, which underlie cultural deposits, have a series of dates ranging from 2.04-1.80 mya. The Early Pleistocene deposits can be subdivided into two units: lower unit A (layers VI-IV) and upper unit B (layers III-I). Layers VI-IV characterized by direct polarity are dated to the end of the Oldowan

paleomagnetic event, while layers III-I must have been formed during the subsequent period of reverse polarity Matuyama.

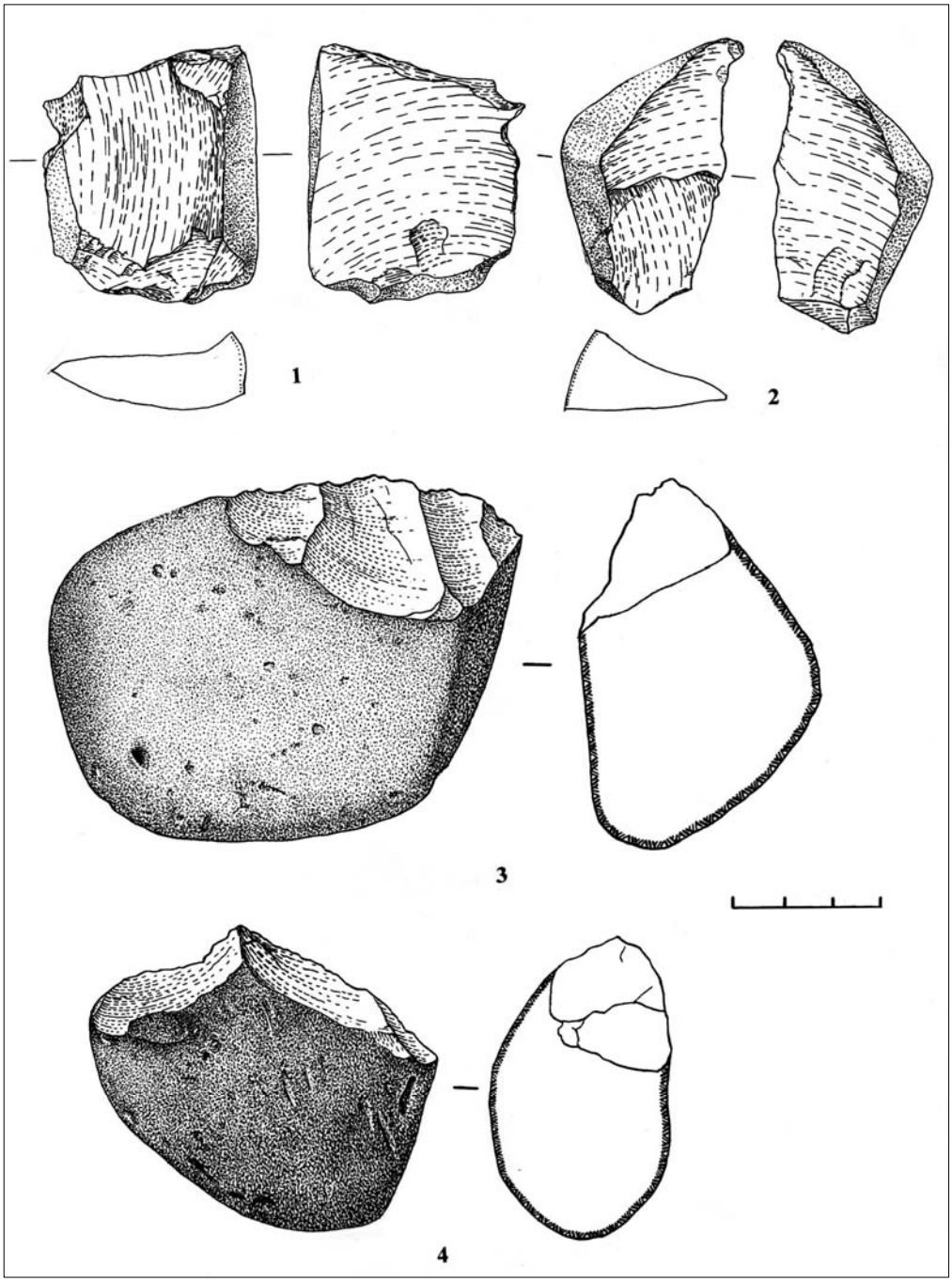

Fig. 1. Stone tools from Dmanisi: 1-2 – flakes (layer II), 3 – pebble tool (layer II), 4 – pebble tool (layer IV)

The faunal collection from the site includes over 4000 animal bones, belonging to southern elephant, Etruscan rhinoceros, saber-toothed cat, Etruscan wolf, Etruscan bear, Stenon's horse, deer, ostrich, giraffe, ox, terrestrial turtle, various rodents, and so on. Most bone comes from the lower unit (layers VI-IV). Some of them are strongly fragmented, some lie in anatomical order. In its composition the fauna of Dmanisi is similar to the Villafrancian faunas of Africa and Eurasia. The lowermost layers (VI-IV) contain skeletal remains of early hominids, identified as *Homo ergaster* (early *Homo erectus*): 5 skulls, 4 mandibles, isolated teeth, and over 50 postcranial bones. The total area of the site exceeds 5000 m^2, while the area exposed by now is about 300 m^2. The excavation yielded over 9500 lithics, of which 85 % belong to layer II. The collection of stone artifacts consists of 2400 objects, while the rest of lithics are unworked pebbles and their fragments, pieces of basalt lavas, etc. Artifacts are made of tuff, basalt, porphyrite, granite, quartzite, quartz, sandstone, limestone and some other rocks, all of which are readily available in the environs of the site in the form of river pebbles.

Flakes and their fragments dominate the assemblages of all layers. Flakes with intentional retouch or notches are rare, while those bearing utilization retouch are somewhat more frequent. Cores are diverse, mostly unifacial, but there are also spherical and polyhedral forms with multidirectional scar patterns. Pebble tools (choppers) constitute an important component of the industry. Artifacts from different layers seem to be rather homogenous, showing no difference in technology, typology, or raw material.

For the time being the Early Paleolithic industry from Dmanisi, dated to 1.8-1.7 mya, represents on of the oldest cultural assemblages known beyond Africa. It has much in common the industries of Kada Gona EG10 and EG12 (about 2.55 mya), Lokalelei 1 (about 2.34 mya), Fejej FJ1 (about 2 mya), etc. It shows also numerous analogies to the archaic stone industries of the Oldowan gorge (Bed I and Lower Bed II) and Koobi Fora.

Numerous finds from the European part of the Mediterranean basin have shown that South Europe was populated by hominids as early as 1,3-0.78 mya (Baranco Leon, ~1.3 mya, Fuente Nueva 3, ~1.2 mya, and Elefante, ~1.1 mya, in Spain; Vallonet, ~1.0 mya, in France; Belveder and Monte Poggiolo, ~ 0.9 mya, in Italy, and so on).

The pre-Acheulean stone industry of Dmanisi is the earliest assemblage in Eurasia. Some other materials of comparable age are known from the Near East. These and other data testify to the migration from Africa through the Near East and Caucasus and further to Europe and Asia. As evidenced by Dmanisi, Southern Georgia was one of the passageways for the first migratory wave of early hominids.

MODERNIZATION AND TRENDS: EURASIA AT ITS ORIGINS

M. Otte
Université de Liège, Belgique

From the furthest east (Renzidong at 2.2 mya) to the furthest west (Atapuerca at 1.2 mya), and in the center (Dmanisi at 1.8 mya), Eurasia as a whole evidences the presence of very early human occupations, perhaps even from the stage of *Homo habilis*. All of these populations, with their accompanying toolkits, evolved regionally and in parallel without interruption, following different axes or trends.

Tools tended to be on pre-shaped blanks for which the true nature is found in the effectiveness of preceding tools made of organic material (e.g., Schöningen spears).

Human anatomy evolved following the path begun with the process of hominization: reduction of the bony attachments of the cranium and the masticatory apparatus, and thus retraction of the mandible.

The process in each region led broadly to modern human forms and to the production of tools on blades: these trends were thus universal, which is why the current human world population is a single species, although originating from distinct populations in different regions. All of these processes were restricted to the biological species, the origin of which is much earlier in time.

Among all of this coherent diversity, Acheulean bifacial traditions appear as an episode unique to the Occident (the Levant and Spain) that is elsewhere only ephemeral. Bifaces in the Far East (e.g. at Bose) were the result of convergence, created by delimiting the contours of cobbles and not by significantly shaping the stone.

Modern humanity is thus clearly of Eurasian origin, shared among actual populations: China, Turko-Mongols, Indo-Europeans. Other world populations followed similar but autonomous evolutionary paths (Africa, Indonesia, Australia), separated into both geographically and environmentally distinct areas, for the most part tropical. Eurasia, in contrast, formed a single territorial unit, typified by the higher latitudes in which east-west distances were effectively shortened.

CURRENT STATE AND PERSPECTIVES FOR THE STUDY OF THE EARLY PALEOLITHIC IN THE RUSSIAN PLAIN

N. D. Praslov

Institute for the Material Culture History, Russian Academy of Sciences,
St. Petersburg

According to the review published in 1984 in the volume entitled "Paleolithic of the USSR", about ten Early Paleolithic sites of clearly pre-Mousterian age had been known in the Russian Plain by that time. All of them were situated in southern regions. Many of these finds (like the handaxe from Amvrosievka, and the finds from Luka-Vrublevetskaya and Gaisin) were not associated with cultural layers proper and had no reliable geological contexts. However, the sites discovered in the 60es near the village of Gerasimovka (on the shore of Mius estuary) and farmstead of Khryashchi (the Seversky Donetz River mouth) were found in more clear conditions. The available geological evidence pointed to either Early Pleistocene or early Middle Pleistocene age of these sites. Two archaic flakes and choppers associated with "*Archidiskodon wusti*" bones in clear geological conditions were found by B.I. Guslitser and P.Yu. Pavlov at the locality of Elniki on the Kama River.

In 1971 the author together with the local lore student S.A. Krasnodaev visited an occurrence of flaked flint and quartzite objects, situated on the left bank of the Pichuga ravine, disgorging into the Volga. A chopper and 2 flakes were found here in the course of cleaning the wall of the ravine. They were associated with calcareous yellowish-gray-greenish sandy loam, occurring at the depth of 2.5 m from the present surface and containing also inclusions of flint and quartzite pebbles and boulders, as well as silicified wood fragments. This layer is superposed on the dray-greenish clay, representing the eluvium of underlying marls. A small collection of pebble tools, including choppers, comes also from the talus (fig. 1).

The discovery by Kh.A. Amirkhanov of the Eopleistocene industries characterized by pebble technique in Dagestan allows us to assume, that prehistoric people had come to the Russian Plain much earlier than was indicated by the materials of Gerasimovka, Khryashchi, and Elniki.

Pebble industries analogous to that from Pichuga were found in the elevated parts of the southern Crimean coast in the environs of Yalta. Of special interest is the site of Gaspra, which yielded over 300 artifacts, including choppers, polyhedrons, spheroids, and objects with denticulate edges. According to S. Zhuk, similar assemblages were found the sites of Artek, Ai-Petri, and Echki-Dag.

In connection with these new finds let us remind that V.I. Gromova and V.A. Khokhlovkina mentioned of flaked flints found together with Khaper complex faunal remains (*Mastodon arvernensis, Hipparion* sp., *Archidiskodon*

meridionalis, Struthio, etc.) in a quarry near Matveev Kurgan. In the 30es of the last century and later these finds were treated with great skepticism, though some archaeologists admitted that a part of the objects bore signs of intentional manufacture. For example, P.P. Efimenko thought that 85 % of the collection (over 40 objects) had indisputable traces of manufacture.

All this facts point to the necessity of the systematic and purposeful search for the Early Paleolithic sites in the Russian Plain.

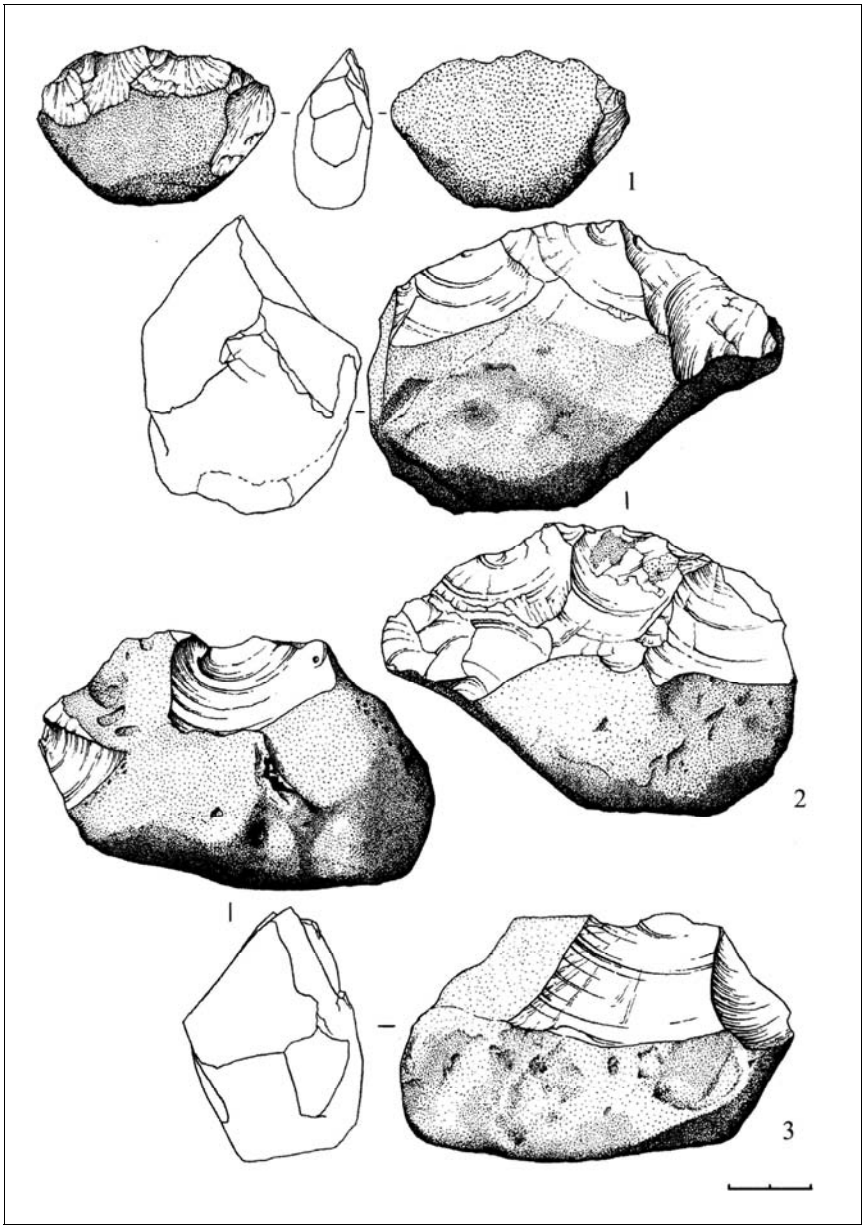

Fig. 1. Pebble tools from the site of Pichuga in the Volgograd Region

PALEOLITHIC SURVEY IN NORTH WEST ZAGROS, IRAQ, KURDISTAN (NEW DISCOVERY)

E.-Kh. Rahman

Sulaimanyie muséum, Kurdistan, Iraq

Zarda rockshelters, which are located near the town of Darbendikhan–Sangaw in the Kirkuk province, have been discovered by author in 2006. The sites consist of two rockshelters and one cave. The rockshelters produced rich artifact assemblage. All stages of lithic processing are represented at the sites. Late Middle, Upper and Epipaleolithic (Zarzian) components have been identified and the sites could be interpreted as base camps used by hunter-gatherers. Lithics are represented by typical and atypical Levalloisian flakes, points and Mousterian scrapers, Levalloisian flake and blade cores, etc. along with burins, notched and denticulate pieces. Zarda rockshelters are the first Middle Paleolithic sites discovered in the region. The sites are similar with other Middle Paleolithic sites of the Zagros region (Shanidar, D, Hazar Myrd, Warwasi). The continuation of the surveys in the region and excavations in the sites mentioned would open new pespectives for the Paleolithic archaeology at Zagros and Mesopotamia.

LES INDUSTRIES LITHIQUES AU PALEOLITHIQUE INFERIEUR DE L'EUROPE CENTRALE : UN PARADOXE AU REGARD DES MODELES DE PEUPLEMENT DE L'EURASIE?

Roxane Rocca

Université Paris X-Nanterre, France

Les débats sur la question du peuplement de l'Europe sont principalement centrés autour des questions de chronologie. C'est la date d'arrivée en Europe qui interroge et ainsi le crédit que l'on doit ou non accordé à tels ou tels sites.(contexte chrono stratigraphique, validité des artefacts). La chronologie des sites se conjugue avec leur localisation pour aboutir à une carte de répartition censée représenter le parcours des premiers Européens.

Dans cette démarche, le matériel archéologique, et notamment les caractères de l'outillage lithique sont peu pris en compte. Des grandes familles d'outils sont profilées sans être approfondies et sans peser réellement dans les critères de différenciation des groupes en présences.

Or dans les plus anciens sites européens (première vague), les industries présentent des caractéristiques originales qui permettent de se questionner sur les modalités de peuplement. Les sites les plus anciens se situent à l'extrême ouest et l'extrême est de l'Europe. Sont-ce les mêmes groupes humains ? Viennent-ils forcement d'Afrique ? Pourquoi les limites actuelles de l'Europe sont-elles prises comme définition à priori d'une entité de peuplement préhistorique ?

À la période suivante (après 500.000 ans) l'originalité et la distinction entre des aires culturelles apparaît également, relativement claire. Les industries bifaciales sont présentes tout autour de l'Europe centrale : en Chine et en Inde à l'Est, au Proche-Orient au sud en Europe occidentale (Europe du nord-ouest et pourtour méditerranéen à l'Ouest).

Du point de vue strictement archéologique, les données concernant l'Europe de l'Est apparaissent comme paradoxal au regard des modèles de peuplement de l'Europe. Les sites d'Europe centrale, qualifiés d'industries à petit éclat, témoignent notamment de cette originalité, mais l'on peut étendre l'absence de biface à toute la moitié est de l'Europe, à l'Asie centrale. Comment considérer cet espace comme un lieu de passage alors que les traces des cultures humains qui nous sont parvenues témoignent d'une spécificité technique?

THE MOST PROBABLE AGE OF THE SINYAYA BALKA (BOGATYRI) LOCALITY

M. V. Sablin

Zoological institute, Russian Academy of Sciences, St. Petersburg

The Sinyaya Balka (Bogatyri) locality in the Taman Peninsula, Azov Sea, is the type locality of the Taman Faunal Complex: hundreds of mammal bones have been collected here since beginning of 20th century. It is notable that Taman complex largely reflects savannah-steppe conditions, where the remains of the following open landscape herbivores are predominated: elephant *Archidiskodon meridionalis*, rhinoceros *Elasmotherum* sp., horse *Equus* sp., gazelle *Gasella* sp., bulls *Bovini* gen. The absence of small canine *Nyctereutes megamastoides* and presence of felid *Panthera gombaszoegensis*, both sensitive time indicators, provides further temporal correlation Taman Faunal Complex with the Late Villafranchian after Olduvai epoch (Torre et al., 1992). Currently, it is widely accepted that Taman Faunal Complex close to the bottom of the Jaramillo Subchron at c. 1.1 Ma (Vangengeim et al., 1991), but, unfortunately, the fossil material from Taman' Peninsula evidently is heterogeneous, possibly stratigraphically as well as taxonomically (Vereshchagin, 1957; Forsten, 1999; Sher, 1999) and couldn't be used for the whole assemblage correct age recon-

struction. Here we report the investigation shows an age of approximately 1.6 Ma for Sinyaya Balka (Bogatyri) according to *Archidiskodon meridionalis* last upper molars published data.

Global change during the Villafranchian was manifested in declining temperatures and increased amplitude of climate cycles. Linking these changes to the evolution of continental faunas requires well-documented fossil/palaeomagnetic evidence that can be examined through substantial periods of time. A few sequences of southern Europe and the Khapry sequence of southern Russia provide such a database. The Khapry Faunal Complex of Russian stratigraphy is midway in stratigraphic sequence between the top of the Reunion palaeomagnetic event at c. 2.11 Ma and the bottom of the Olduvai Subchron at c. 1.97 Ma (Tesakov et al., 2003); new work places all of the classic Italian Upper Valdarno faunas in positively-magnetised deposits in the later part of the Olduvai Subchron (i.e. c. 1.8 Ma) (Lister et al., 2001); the Pietrafitta Late Villafranchian fauna is regarded as c. 1.4 Ma in age (Sardella et al., 1998). Fossil elephants are important elements in each of the successive faunal units; their remains are common in the vertebrate-bearing strata and they are good biostratigraphic indicators. Detailed history of *Archidiskodon* lineage development – from ancient to the latest forms – is well reconstructed for the Europe.

Systematic identification of elephants is commonly established by morphological composition characters of last upper molars. Traditionally, lamellar frequency index (LFI), hypsodonty index (HI), and enamel thickness (ET) are regarded as the most informative features: periodic changes of landscape and vegetation during the Villafranchian – Pleistocene have caused an increase of LFI, HI, and decrease of ET. The primitive subspecies of *A. meridionalis* from Khapry Faunal Unit corresponds with the group of European *A. meridionalis* “St Vallier stage”; it’s the last upper molars are low and wide (HI = 1.23) (Titov, 2001) with wide enamel thickness – 3.25 mm (Dubrovo, 1964), and have low lamellar frequency – 4.5 (Pevzner & Vangengeim, 2001). The environment of the Khapry elephant was probably the same as modern African elephant. According to the most common view, Sinyaya Balka (Bogatyri) *A. meridionalis* is an intermediate between classic elephant at Upper Valdarno: LFI = 5.3; HI = 1.25 (Lister et al., 2001); ET = 3.2 mm (Ferretti, 1999) and *M. trogontherii*, existed in the Europe in the end of Matuyama epoch: c. 0.8 Ma; LFI = 7.0; HI = 1.75 (Lister et al., 2001); ET = 2.56 mm (Dubrovo, 1971). However, from teeth of *M. trogontherii*, fossils from Sinyaya Balka (Bogatyri) (LFI = 5.5 (Pevzner & Vangengeim, 2001); HI = 1.35; ET = 3.0 mm (Dubrovo, 1963)) noticeably differed; in HI morphological distance between these two forms is incomparably more than, for example, between *M. trogontherii* and woolly mammoth: c. 0.025 Ma; LFI = 9.4; HI = 1.84; ET = 1.39 mm (Averianov et al., 1995). Actually, compared with the Upper Valdarno form, the Sinyaya Balka (Bogatyri) *A. meridionalis* M^3 looks only slightly advanced. Obtained diagrams (fig. 1) show this Sinyaya Balka (Bogatyri) elephant stage close corresponds to pa-

rameters of Pietrafitta *A. meridionalis*: 1.4 Ma; LFI = 6.0 (Lister A. M. et al., 2001); HI = 1.35; ET = 2.9 mm (Ferretti, 1999), or even more primitive. I.e., the age of the Sinyaya Balka (Bogatyri) locality may be formerly adopted as equal to 1.6 Ma – an intermediate between the Upper Valdarno and the Pietrafitta.

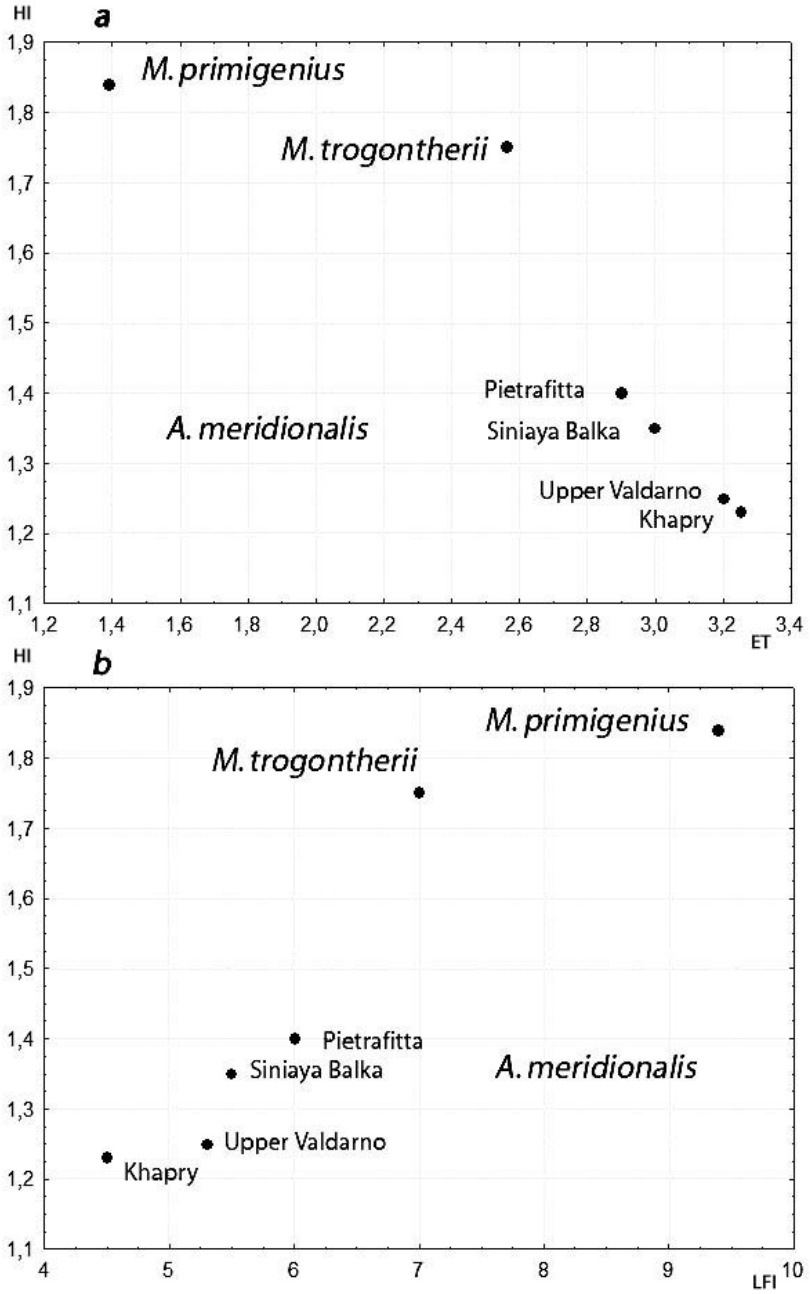

Fig. 1. HI plotted to ET (a); HI plotted to LFI (b) in *Archidiskodon* and *Mammuthus* M^3 from the Europe

NEW FINDS OF EARLY PALEOLITHIC ARTIFACTS IN MIDDLE TRANS-URALS

Yu. B. Serikov

Social-Pedagogical Academy, Nizhny Tagil

In Middle Trans-Uralian the Early Paleolithic sites are extremely rare. At present there are known 11 sites, which gave 155 stone artifacts. All the finds come from secondary (redeposited) contexts.

In 1985 in the course of excavations of the Beregovaya III site in the Gorbunovo peat bog (8 km from Nizhny Tagil), P.K. Khalyaev found about ten unusual stone artifacts. They were big and massive flakes with well-pronounced percussion bulbs and striking platforms forming obtuse angle with the flaking surface. Similar flakes were found also at the Galianskaya Early Paleolithic site, situated on the slopes of Golyi Kamen' mountain [2]. In addition to archaic flakes, this assemblage contains three massive objects resembling bifaces.

Only one of the three bifaces is intact. It is 16 cm long, 5.8 cm wide, and 3 cm thick. Both its faces bear big and middle-sized negatives, creating the elongated and slightly asymmetric foliated form of the tool (fig. 1, *1*). No analogies to this artifact are known in the Stone Age of Ural. The second tool is a broken upper part of an identical biface. The fragment is 9.3 cm long, 5.3 cm wide, and 2.4 cm thick. No difference can be seen in the manufacturing techniques of these two bifaces (fig. 1, *2*). The third object differs from the former two in its shape. Judging on the equal thickness of its profile it was made on a plaque. Unfortunately, it is broken, too. It is 13.6 cm long, 9.7 cm wide, and 1.8 cm thick. Its both faces bear big negatives only (fig. 1, *3*).

The three tools are made of greenish fine-grained sandstone. In its color and structure it is very similar to serpentine. It is for the first time that the use of this raw material is reported for Middle Trans-Uralian. Most early Paleolithic artifacts known in the region are made of siliceous tuff aleurotuff. Another specific feature characteristic of the tools from Beregovaya III is the absence of patina. All the Early Paleolithic artifacts found in Middle Trans-Uralian are covered with patina (1-2 mm thick). Its presence is an important marker indicative of the Early Paleolithic age of an object. In the present case, however, the typology and technology seem to be very archaic, but patina is absent.

The excavation of Beregovaya III gave Mesolithic, Neolithic, Eneolithic, and Early Iron Age materials, including numerous stone tools. However, there are no bifaces similar to those described above. At the same time, technologically they are similar to the archaic tools from the Galianskaya site. It appears that the whole assemblage should be dated to the Early Paleolithic.

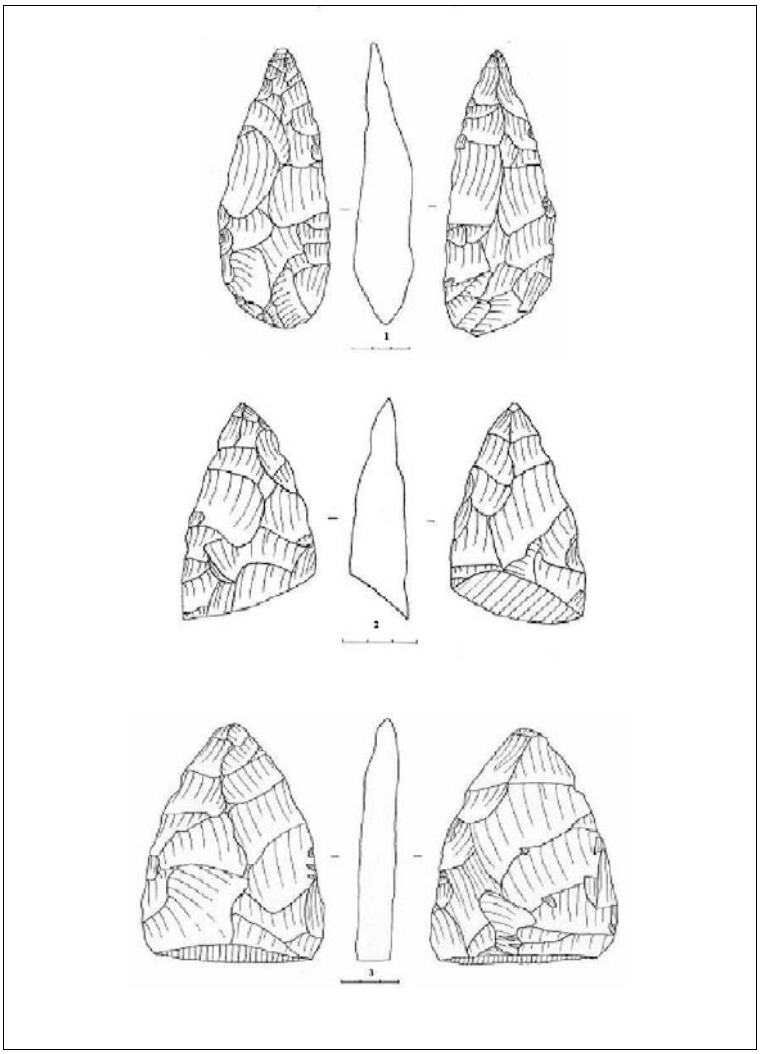

Fig. 1. Каменные изделия из III-ей Береговой стоянки Горбуновского торфяника

The purposeful search for artifacts covered with patina in the collections of the Nizhny Tagil Museum-Reserve enabled us to reveal two more Early Paleolithic finds. The collection of the Beregovaya I site contains a massive patinated flake of greenish aleurotuff. Its circular striking platform is fully covered with primary cortex. Of the same origin is probably the bifacial tool found in the mixed assemblage of Poludenka I. It is made of dark-gray (nearly black) siliceous tuff and covered with 1 mm thick layer of patina. Its edges are heavily rolled. It is worked by big and middle-sized removals, with some areas bearing also small flake scars. The size is 8.5 × 7.4 × 2.7 cm. Originally the tool was longer, as is evidenced by the presence of a negative, which removed a part of the object. Judging by the tapering in the upper part of the tool it can be recon-

structed as a handaxe. Some analogies (in shape, manufacturing technology, raw material, and state of preservation) can be found in the collection of the Galianskaya site. Most probably this object was brought to the Beregovaya I site as a piece of raw material intended for reutilization.

Two more patinated sidescraper-like artifacts of gray-greenish siliceous tuff come from the shrine on the northern shore of Lake Shaitanskoe (Kirovgrad district of the Sverdlovsk Region). Their appearance here could be due to the fact that in the eyes of local people ancient artifacts had a particular sacral status. They have been widely used in cult practice since old times.

CARNIVORE ASSEMBLAGES OF THE TAMAN FAUNA AND RELATED EARLY PLEISTOCENE MAMMALIAN COMMUNITIES IN THE CONTEXT OF BIOCHRONOLOGICAL DEFINITION OF THE EARLY PALEOLITIC SITES

M. V. Sotnikova

Geological Institute Russian Academy of Sciences, Moscow

The Taman faunal Complex was established by V.I. Gromov (1948) and placed between the Psekups and Tiraspol faunal complexes in the stratigraphic scale of continental deposits of southern Russia. The type assemblage of large mammals of this unit is the fossil fauna of the Taman Peninsula, which was found in the sites Kuchugury, Fontalovskaya, Tsymbal, and in the type locality Sinyaya Balka (Vereshchagin, 1957). The most characteristic elements of this complex are *Archidiskodon meridionalis tamanensis* and *Elasmotherium caucasicum*. The Taman fauna is assigned to the biozone of *Archidiskodon meridionalis tamanensis* and characterizes the post-Villafranchian part of the European Early Pleistocene (Vangengeim et al., 1991). According to the geological, paleontological and paleomagnetic records, the time span of the Taman faunal Complex was defined as 1.2-0.9 Ma (Pevzner & Vangengeim, 2001; Dodonov et al., 2006). In 2000, the bone-bearing stratum of the Sinyaya Balka locality with Elasmotherium and Taman elephant yielded stone material interpreted as Lower Paleolithic artifacts. Since that time this paleontological locality is known as the Early Paleolithic site Bogatyri (=Sinyaya Balka) (Shchelinsky & Koulakov, 2007).

The carnivore fauna of Taman faunal complex is derived from Sinyaya Balka, Tsymbal, and Akhtanizovskaya in the Taman Peninsula. The additional material was received from the sites of adjacent territory in southern bank of the Taganrog Gulf of the Sea of Azov – Margaritovo, Semibalki, and Chumbur Kosa.

Fragment of the lower jaw of relatively small canid – *Canis tamanensis* was found in the type locality Sinyaya Balka in association with *Archidiskodon meridionalis tamanensis*, *Equus* aff. *sussenbornensis*, *Elasmotherium caucasicum*, *Bison* sp. (Vereshchagin, 1957; Vangengeim at al., 1991).

There is a long list of small and large mammals including the index forms, *A. m. tamanensis* and *E. caucasicum* in the Tsymbal locality. Vereshchagin (1957) referred the Carnivora material from this site to *C. tamanensis* (upper P3) and to *Panthera* sp. (right ulna).

The right horizontal ramus of Pachycrocuta brevirostris was recently collected at the Akhtanizovskaya site. According to Tesakov (2004), the rodent fauna of the locality contains *Allophaiomys* cf. *pliocaenicus*, *Prolagurus* (*Lagurodon*) *arankae*, *Prolagurus* (*Prolagurus*) *pannonicus*, *Mimomys pusillus*, *Mimomys intermedius* and other forms. This assemblage is characteristic for the middle stage of the Taman faunal Complex, and can be correlated with Early Bicharium of the West Europe (Tesakov, 2004).

In the Taganrog Gulf of the Sea of Azov, findings of Taman mammals originate from the lagoon deposits exposed at the very base of outcrops. According to paleomagnetic data, the bone bed in Port-Katon and Margaritovo belong to a reverse magnetized interval assigned to the upper part of the Matuyama Chron (Tesakov et al., 2007). In Margaritovo site, a fragment of a right mandibular ramus of the large canid *Canis* (*Xenocyon*) *lycaonoides* is found together with remains of *A. meridionalis tamanensis*, whereas in Chumbur Kosa a jaw of *Lutra simplicidens* associates with remains of *Archidiskodon* sp.

The Semibalki locality yielded numerous remains of *A. meridionalis tamanensis*. The lower jaw of saber-toothed cat *Homotherium* was found together with *Trogontherium cuvieri*, *Pachycrocuta* cf. *brevirostris*, *Equus major*, *Eucladoceros* aff. *orientalis*, and *Bison tamanensis* (Bajgusheva et al., 2001).

Among the rodent fauna, remains of *Allophaiomys pliocaenicus* were also identified by Rekovets (1994).

The revised list of Taman Carnivora is: *Canis tamanensis*, *Canis* (*Xenocyon*) *lycaonoides*, *Lutra simplicidens* ssp., *Pachycrocuta brevirostris*, *Homotherium latidens* and *Panthera* sp. (Sotnikova & Titov, in press). The Taman Complex contains the same elements as post-Villafranchian Carnivora complex of Western Europe. Some new taxa, which were unknown in the Villafranchian time, appeared here. Among them are *Canis* (*Xenocyon*) *lycaonoides*, *Lutra simplicidens*, and *Homotherium latidens*.

During the late Early to Middle Pleistocene two sympatric canids of different body size were occurred in Eurasia. In the Taman Complex they are represented by *Canis tamanensis* and *C.* (*Xenocyon*) *lycaonoides*. As was shown by morphological analysis, *C. tamanensis* resembles post-Villafranchian *C. mosbachensis*, rather than Villafranchian forms of the similar size, *C. arnensis* and *C. etruscus* (Sotnikova & Titov, in press).

Table 1

The Carnivora assemblages from Early Paleolithic and paleontological sites of Europe and the adjacent territory of Georgia. The age of localities and lists of Carnivore fauna are from: Arzarello, Marcolini, Pavia, Pavia, Petronio, Petrucci, Rook & Sardella, 2006; Garcia Garcia & Cuenca-Bescos, 2007; Kahlke, 2001, 2005; Martines-Navarro, 2005; Moulle & Echassoux, 2005; Vekua, 1995

Tamanian Faunal Unit 0.8-1.2 Ma Human remains (HR) – absent Lithic artifacts (LA) – present	***Dmanisi*** ca. 1.8 Ma HR – present LA– present	***Pirro Nord*** 1.3-1.7 Ma HR – absent LA– present	***Atapuerca TELRU*** 1.2-1.5 Ma HR – absent LA– present
Canis tamanensis	*C. etruscus*	*C. mosbachensis*	*C.* cf. *arnensis / mosbachensis*
Canis (Xenocyon) lycaonoides	–	–	–
Lutra simplicidens ssp.	*Martes* sp.	–	*Pannonictis* cf. *nestii*
Pachycrocuta brevirostris	*Pliocrocuta perrieri*	*P. brevirostris*	–
Panthera sp.	*P. gombaszoegensis*	–	*P. gombaszoegensis*
Homotherium latidens	*H. crenatidens*	*H. latidens*	–

Venta Micena 1.2-1.4 Ma HR – absent LA – absent	***Fuente Nueva-3*** 1.2-1.5 Ma HR – absent LA – present	***Barranco Leon-5*** 1.2-1.5 Ma HR – absent LA – present	***Le Vallonnet*** 0.99-1.05 Ma HR – absent LA – present	***Untermassfeld*** 0.99-1.05 Ma HR – absent LA – absent
Canis mosbachensis	*C. mosbachensis*	*C. mosbachensis*	*C. mosbachensis*	*C. mosbachensis*
Canis (Xenocyon) lycaonoides	–		*C. (X.) lycaonoides*	*C. (X.) lycaonoides*
Meles sp.	*Meles* sp.	*Meles* sp.	*M. meles*	*Meles hollitzeri*
Pachycrocuta brevirostris	*P. brevirostris*	*P. revirostris*	*P. brevirostris*	*P. brevirostris*
Panthera gombaszoegensis	–	–	*P. gombaszoegensis*	*P. gombaszoegensis*
Homotherium latidens	–	–	*H. latidens / crenatidens*	*H. latidens*

Lutra simplicidens is the member of the Middle Pleistocene Carnivora assemblage of Europe. It was identified in the Tamanian complex as well. The morphological characters of a new subspecies *L. simplicidens* demonstrate clearly more primitive stage of development of *Lutra simplicidens* lineage, apparently indicating the late Early Pleistocene age of the studied fauna.

The Taman *Pachycrocuta brevirostris* does not add any biochronologic information due to its poor preservation. Rarely known in the middle Villafranchian, this taxon was widespread in Eurasia since the late Villafranchian time to the end of the Middle Pleistocene.

Homotherium latidens from Semibalki-3 shows characters, which are also observed in the Untermassfeld form dated at about 1.0 Ma according to Kahlke (2000). Both specimens are considerably different from the older forms of middle and late Villafranchian.

Thus, the presence of *Homotherium latidens* and *Lutra simplicidens* defines consequently the lower and upper stratigraphic limits of the Taman Carnivora community and allows to correlate it with the post-Villafranchian part of the Lower Pleistocene. This conclusion is in good agreement with the age estimates of the Tamanian complex.

The Carnivora assemblages from Early Paleolithic and paleontological sites of Europe and the adjacent territory of Georgia, broadly synchronous to the Taman fauna, are represented in the Table 1. They demonstrate a strong overall similarity in carnivore taxa. The only notable difference of the assemblage of the oldest site Dmanisi (<= 1.8 Ma) is the presence of typical Villafranchian elements, *Canis etruscus*, *Pliocrocuta perrieri*, and *Homotherium crenatidens*.

The work was supported by Russian Foundation for Basic Research, project no. 06-05-64049a.

LOWER PALEOLITHIC OF UKRAINE: CURRENT STATE OF RESEARCH

V. N. Stepanchuk[1], L. I. Rekovetz[2]

[1] Institute of Archaeology, National Academy of Sciences, Kiev
[2] National Scientific and Natural Museum, National Academy of Sciences, Kiev

The stratigraphic position of the Lower Paleolithic sites known in Ukraine corresponds to the time of the Priazov – Tiligul/Potyagailovsky horizons of the Ukrainian scheme, or OIS 23-12/9, between 950/750 and ~450/300 kya. Despite the long duration of the period, the Lower Paleolithic sites known in the territory of Ukraine are not numerous, which can be due to different factors,

including taphonomy, insufficient intensity of field explorations, and low population densities during the Lower Paleolithic.

Of particular importance are archaeological assemblages from layers VIII, VII, VI, and V-c of the site of Korolevo, situated west of the Carpathian arch. As has been shown by G.A. Pospelova (and then confirmed by P. Haesaerts) layers VIII and VII occur below the Brunhes-Matuyama boundary. Taking into consideration that geographically Korolevo belongs to Central Europe, one can consider Medjibozh (in the Yuzhny Bug basin) as a candidate for the role of the earliest (Mindel-Riss) Paleolithic site in the East European part of Ukraine.

Some accumulations of surface finds can presumably be dated to the Lower Paleolithic, too. They include, for example, Neporotovo VI and a number of similar occurrences confined to the 7th and 6th terraces of the Dniester, as well as some isolated finds from Kodak on the Dnieper that can date to Mindel-Riss. Of special interest are archaic-looking pebble industries of Echki-Dag, Gaspra and some other sites in Crimea, which are thought to date to the period between Dunai-Günz and Günz-Mindel. There are also some finds indicative of the possibility that Lower Paleolithic micro-industries were present in Crimea too.

The spatial distribution of the Lower Paleolithic sites in the territory of Ukraine shows that most of them are concentrated in the Carpathian region (including the Dniester basin) and Crimean peninsula. Geographically these regions gravitate to Central Europe and the north of Mediterranean.

By and large, the Lower Paleolithic sites in Ukraine are very rare and their chronological position is often disputable. The overwhelming majority of these sites have no faunal remains. As to the surface finds, their attribution to the Lower Paleolithic is very tentative, since it is based almost exclusively on morphological characteristics of stone artifacts.

Of particular interest are the materials Medjibozh, because their Lower Paleolithic age is confirmed by a number of independent lines of evidence, including stratigraphy, palynology, malacology, paleontology (mega- and microfauna), and TL dates for overlying layers. Single artifacts of Medjibozh are correlated mostly with the basal part of the sequence, represented by compact clay marls lying on Archean granites. The alluvial deposits superposed on these strata contain remains of *Mammuthus* cf. *trogontherii* Pohlig, 1885; "*Dicerorhinus*" cf. *kirchbergensis* Jaeger, 1939; *Megaloceros* sp.; *Cervus* cf. *elaphus* L. 1758; *Cervus* sp.; *Capreolus* sp.; *Sus*. cf. *scrofa* L. 1758; *Ursus* cf. *deningeri* Richenau, 1904; *Canidae* (1–2 sp.). The artifacts are represented by pebble tools, flake tools, flakes, and fragments bearing signs of utilization. The technological and typological characteristics of this industry do not contradict to the idea of its Holstein age.

PLEISTOCENE CHRONOSTRATIGRAPHY AND PALEOGEOGRAPHY IN THE SOUTH OF THE EAST EUROPEAN PLAIN, WITH PARTICULAR REFERENCE TO THE LOESS-SOIL FORMATIONS STUDIED IN THE EASTERN PART OF THE AZOV SEA REGION

A. A. Velichko[1], T. D. Morozova[1], S. N. Timireva[1],V. P. Nechaev[1], O. K. Borisova[1], A. S. Tesakov[2] ,V. V. Titov[3], V. V. Semenov[1], Yu. M. Kononov[1]

[1] Institute of Geography, Russian Academy of Sciences, Moscow
[2] Geological Institute, Russian Academy of Sciences, Moscow
[3] Southern Scientific Centre, Russian Academy of Sciences, Rostov-on-Don

The complex study of subaerial deposits in the eastern part of the Sea of Azov Region has shown that the Pleistocene loess-soil formation is represented most fully in the terrace levels dated to the Lower Pleistocene. Judging on the small mammal remains coming from krotovinas in buried soils, the earliest phase of the Pleistocene soil formation was associated with the Tamanian stage, whereas according to the paleomagnetic data it can be dated to the Brunhes normal chron and correlated with the Rzhaksinsky horizon of the stratigraphic scale. The Lower Pleistocene formation includes also the Voronsky soil complex (its main phase is correlated with the Muchkap Interglacial). The Inzhavinsky (Likhvinian Interglacial) and Kamensky (Kamensky Interglacial) soil complexes are dated to the Middle Pleistocene, and the Mezin soil complex (Mikulino Interglacial) to the Late Pleistocene.

According to the materials of paleopedological studies, during the last 0.6 myr (from the late Early Pleistocene to Holocene) the types of soil formation in the region under consideration has gradually changed from the conditions characteristic of subtropical ecosystems to those typical of the temperate zone. The latter too show a number of successive transitions in types of soil formation: from humid prairies to forest-steppes, semi-arid steppes, and finally to steppes of the present day arid zone. Thus, the established succession of soil-formation types forms a trend reflecting the decrease in temperature and humidity and progressing continentalization of the climate. Palynological data points to the gradual decrease of the role played by arboreal vegetation.

Interglacial periods alternated with glacial ones, which were characterized (in the periglacial zone of Eastern Europe) by the accumulation of loess. Our knowledge of the glacial environments in the given territory is based on the study of loess horizons, occurring between horizons of soil complexes. Of special importance are lithological observations (first of all, on the morphoscopy of sand grains), as well as palynological data and the structure of fissured deformations. Granulometric data show that the participation of the clayey fraction decreased in the later periods, which is indicative of increasing role of physical

weathering. This means that climatic conditions were becoming more and more severe and continental. The morphoscopic analysis of sand grains from the Don and Valdai loess horizons shows signs of considerable activation of cryogenic processes (desquamation, frost breaking, etc.).

The character of the fissured deformations observed in buried soils too shows that the transition from the interglacial conditions to periglacial ones was accompanied by extremely sharp environmental changes. The combination of aridity with progressing seasonal freezing and high moisture-holding capacity of loamy soils led to the formation of complex polygonal systems of cryo-arid cracking.

Signs of active cryogenic processes can be observed in the Valdai loess horizon, which is thick enough and shows good preservation (as distinct from the older horizons, almost entirely absorbed by soil profiles), which also is indicative of the development of cryo-arid conditions during the last glacial period.

As shown by the morphoscopic analysis of sand grains, the aeolian processes played the most important role in the accumulation of loess materials. It should be noted that these materials came both from distant and local sources of sedimentation. The latter include sands from liman and alluvial deposits, underlying the loess-soil strata. The sand grains from these deposits experienced processing by water, and after that were involved into subaerial sedimentation due to the influence of aeolian processes.

Supported by RFBR, grant № 08-05-00275, and NS, grant 4412.2008.5.