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# Findings from the Paleolithic Studies in Siberia

*It was long believed that Siberia with its harsh environment and climate had been peopled by humans rather late, and that the culture of early Siberian hominins was primitive. Wide-ranging discoveries of the last 3–4 decades, carried out by archaeologists of Siberia, especially those from the Institute of Archaeology and Ethnography SB RAS in Novosibirsk, with the participation of experts in other disciplines such as geology, geochronology, paleontology, paleobotany, genetics, etc., indicate very early dates of the initial peopling of Siberia and a new taxon, H. s. altaiensis, which is associated with one of the most interesting cultures in Eurasia and, along with the earliest anatomically modern African humans, H. s. neanderthaliensis, and H. s. orientalensis, had participated in the origins of anatomically modern H. s. sapiens.*

Keywords: *Siberia, Paleolithic, human evolution, H. heidelbergensis, Denisovans, lithic industry.*

## Introduction

300 years have passed since the first academic expedition led by Daniel Gottlieb Messerschmidt in Siberia and his first scientific excavations of archaeological sites in Khakassia (Messerschmidt, 2020). In October 2022 in Abakan and in November of the same year in Novosibirsk (Arkheologicheskiye kultury Sibiri…, 2022), international conferences dedicated to this event were held. Apparently, D.G. Messerschmidt's expedition started not only Siberian, but also Russian archaeology, although Russian explorers showed interest in antiquities even earlier, as they covered great distances in an extremely short time and reached the Pacific coast (Okladnikov, 1961: 15–16). "Early Siberian 'chroniclers' and royal envoys to Mongolia and China, as well as the first foreign travelers" often wrote about antiquities (Kyzlasov, 1962: 43).

Three academic editions of "The History of Siberia" cover former achievements in the studies of the historical and cultural heritage of the peoples inhabiting the vast expanses of Siberia, stretching from the Urals to the Pacific Ocean and from the Arctic Ocean to the border with China, Mongolia, and Kazakhstan. The first edition was prepared by an outstanding scientist, "the father of Siberian history", Academician G.F. Miller, a member of the second Kamchatka expedition (1733–1743). During the expedition, he collected a tremendous in volume and unique in significance information on archaeology, ethnology, history, and languages of the peoples of Siberia. G.F. Miller's "The History of Siberia" was published in Russian and German in the course of several years. The initial five chapters in Russian were published in 1750, and the subsequent chapters 6–8 were printed in 1764 and republished in 1787 (Miller, 1787). This manuscript by Miller, containing 23 chapters, was not published in full during his life. "The History of Siberia" by Miller was published in two volumes in 1937 and 1941; and in three volumes in 1999, 2000, and 2005. Unfortunately, none of these editions are complete. The richest material

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collected by Miller is deposited in Russian archives and is waiting to be studied.

The second academic edition of "The History of Siberia" was prepared by the team of scholars from the Institute of History, Philology and Philosophy of the Siberian Branch of the USSR Academy of Sciences, and published in five volumes in 1968–1969. Two editors-in-chief of the five-volume "The History of Siberia", A.P. Okladnikov and V.I. Shunkov, were awarded the State Prize of the USSR in 1973. The first volume of this publication was devoted to the results of archaeological research in Siberia.

The first two volumes of the third academic (four-volume) edition of "The History of Siberia", published in 2019 and 2022, provide generalizations based on the richest archaeological material of a wide time range—from the initial peopling of this area and to the early settlement of Slavic peoples, primarily Russians, in Siberia, taking into account the former and especially recent findings of field research conducted over the past 40 years. Notably, the results of archaeological research conducted in Siberia are included in the 20-volume "Archaeology of the USSR", as well as in the 6-volume series "The Paleolithic of the World".

The history of the Paleolithic studies is well presented in the first volumes of the two recent academic editions of "The History of Siberia", as well as in two books by V.E. Larichev (1969, 1972), and in monographs by other scholars addressing the results of studying the distant past of Siberian regions. The main goal of this paper is to show, in brief form, the history of development of centers for the Siberian Paleolithic studies, the significance and role of the discovered local Paleolithic sites, providing insights into the issues of origin of the genus *Homo* and development of anatomically modern humans, and their importance for world science.

## Results of Paleolithic research in Siberia

The first archaeological excavations in Siberia were carried out in the 18th century, but the study of the Paleolithic of the region began only in the late 19th century. Such a late awakening of attention to the ancient past of man is explained by the fact that Paleolithic studies originated in France as late as ca 200 years ago. Furthermore, for a long time, the idea that the history of mankind was rather short was popular not only in general public, but also among scientists. In this regard, it is very important to note that at the early stage of Paleolithic research in the world, the first Paleolithic site in Russia was discovered in Siberia, the excavations of which provided new information on the ancient history of man on the planet.

In the autumn of 1871, in Irkutsk, during digging the foundation pit for the construction of a military hospital on the high bank of the Ushakovka River, at its confluence with the Angara, the workers found an unusual ball with a carved surface, rings, and other items made, as was later established, from mammoth tusk. Bones of extinct Pleistocene animals and stone tools were also discovered at the work site. Luckily, the finds were examined and their value was immediately identified by I.D. Chersky and A.L. Chekanovsky—scientists with broad scientific interests. According to the conclusion of geologist Chersky, the finds belonged to the post-Pliocene (as the Pleistocene period was called at that time), and the artifacts were manufactured by ancient humans with the help of the stone tools discovered at the same site.

In the 19th century, the study of prehistory in Europe has just begun. Scientists of the world fiercely debated whether ancient stone tools should be recognized as the results of human activity; and the evolutionary theory of Charles Darwin was hotly discussed. In Irkutsk, for the first time, stone tools were discovered in association with the bones of long-extinct animals. A few years later, the famous Russian zoologist I.S. Polyakov revealed the famous archaeological site in the village of Kostenki on the Don; the site became a kind of training school for Paleolithic researchers. In 1879, K.S. Merezhkovsky began his studies of the Mousterian sites in the Crimea, and unearthed a Neanderthal burial in Kiik-Koba Cave.

The site of Voenny Hospital in Irkutsk was the first Paleolithic site (discovered in Russia) that contained archaeological materials suggesting the occupation of Siberia by humans already in the remote past. In addition, it is one of the first sites in the world that yielded pieces of art made by humans in a clear stratigraphic context, in association with ancient stone tools and bones of Pleistocene animals. Thus, this site provided one of the world's earliest evidence that our distant ancestors—mammoth and rhinoceros hunters—had great cognitive abilities and symbolic thinking.

The discovery of the Paleolithic site in Irkutsk inspired another remarkable scholar, I.T. Savenkov, to search for other similar objects in Siberia. After graduating from St. Petersburg University, he worked in Krasnoyarsk. Being a person of versatile interests, a theater-lover, a good chess player, Savenkov is also known for a special thing—he studied several Paleolithic localities and more recent sites in Krasnoyarsk. His name is associated with the discovery of a prehistoric site on Mount Afontova, on the Yenisey bank, in 1884; the site is still being studied today*.

*Subsequently, several sites were found on Afontova Gora (Astakhov, 1999).

Part of the collection from this site was exhibited at the International Anthropological Congress held in Moscow in 1892. At this congress, Savenkov made a report that was of interest to a French archaeologist J. de Baye. In 1893, 1896–1897, J. de Baye visited the sites on the Yenisey and reported about his trips to the French Academy of Sciences and the Paris Geographical Society. So, the Siberian Paleolithic became known in Europe.

In the late 19th century, another unique archaeological site was found in Siberia. In spring of 1896, in Tomsk, in a ravine on the high bank of the Tom River, an accumulation of bones was exposed, which attracted attention of professor of the Tomsk University N.F. Kashchenko. He carried out a thorough cleaning of the finds, perfect for that time, which made it possible to identify numerous mammoth bones over a small area (Kashchenko, 1901). It should be noted that Kashchenko carried out excavations exemplary not only for the late 19th century, but also for the present time. Many years later, M.V. Shunkov, while analyzing the collection of 1896, discovered a flask with charcoal pieces from the hearth. Kashchenko could not assume that many decades later, the radiocarbon method would be invented for determining the age, but he considered it necessary to preserve everything discovered during the excavations. This is a good example for modern archaeologists. It should be understood that excavations are the destruction of the cultural layer of any archaeological object, and only the careful recording of every find in the journal, in drawings and plans, using photo- and video-recording, will make it possible to reconstruct the site as accurately as possible and to derive the most complete information in future. The radiocarbon date of 18,300 ± 1000 BP was generated on the charcoal from the Kashchenko's collection; at that time, the hunters apparently killed the mammoth, butchered the carcass, and occupied this place for some time.

In the late 19th to the first half of the 20th century, search and study of archaeological sites (including Paleolithic) in various regions of Siberia and the Russian Far East were carried out by scientific teams from local universities and museums, academic centers of Moscow and Leningrad, and by members of the Russian Geographical Society. As a result, new Paleolithic sites appeared on the archaeological map of North Asia, indicating that Siberia, which was considered unsuitable for habitation of ancient people for a long time, was settled by hominins as early as in the Pleistocene. As it is hardly possible to recount all the discoveries, I consider it necessary to name only some of the researchers who contributed to the study of the Paleolithic in the east of our country: A.V. Eliseev and Hungarian scholar F. Forkas in the Far East; A.P. Mostits, Y.D. Talko-Gryntsevich, A.K. Kuznetsov, P.S. Mikhno, G.P. Sosnovsky, and G.P. Romanovsky in Transbaikalia; N.K. Auerbach, V.I. Gromov, A.Y. Tugarinov, Austrian archaeologist G.K. Mergart, S.M. Sergeev, M.D. Kopylov, A.P. Markov and others in Siberia.

Noteworthy is the role played by Prof. B.E. Petri, not only in the study of the Stone Age, but also in the creation of the scientific school. He graduated from St. Petersburg University, where he was one of the students of Academician V.V. Radlov; after graduation, he trained at the Peter the Great Museum of Anthropology and Ethnography; starting from 1912, he carried out archaeological and ethnographic research in the Baikal region (Petri, 1914), became a professor at the Irkutsk University founded in 1918, and established the Department of Prehistoric Culture and an ethnology club therein. In the vicinity of Irkutsk, Petri and his students explored Stone Age sites of Verkholenskaya Gora, Pereselenchesky Punkt at Kaiskaya Gora, at the Ushkanka valley, and other sites (Petri, 1923, 1928). Petri made a great contribution to the study of the Stone Age of Siberia; but even more significant were his efforts in the promotion of historical and cultural heritage of the peoples of the Baikal region and the creation of the ethnology club. This club was attended by A.P. Okladnikov, M.M. Gerasimov, G.F. Debets, G.P. Sosnovsky, G.F. Ksenofontov and others; they took part in field archaeological and ethnographic research, mastered the methodology of excavations, and made their first scientific reports at the club's meetings. Subsequently, many of the members of the club became outstanding scientists and founded their scientific schools.

In this regard, the findings made by Gerasimov and Okladnikov during their works in 1920s–1930s are particularly noteworthy. In February 1928, the Irkutsk Museum of Local Lore received a message that in the village of Malta on the Belaya River, a tributary of the Angara, local residents found a great number of animal fossils. In the course of small-scale excavations, a young employee of the local museum M.M. Gerasimov found a unique accumulation of mammoth and reindeer bones and stone tools. The scholar carried out excavations of this site in 1929–1934 and 1956–1957.

Malta is one of the outstanding Paleolithic sites both in Russia and in Eurasia. It is located on a 16–20-meter terrace of the Belaya River (Gerasimov, 1931, 1935, 1958). This site, as other Late Paleolithic localities, yielded a great number of stone tools. The cores were dominated by prismatic, cuboid, edge-faceted, and conical varieties. Primary reduction was targeted at laminar blanks production. These blanks were used for the manufacture of various types of end-scrapers, points, borers, cutting tools with straight or asymmetrically located working edge, straight dihedral, side, angle, and many-faceted burins, chisel-like tools, and combination tools. The bone tools included points made of mammoth

tusk with cut marks at the ends, needles, awls of various shapes and sizes, polishers, etc. The excavations revealed a large number of animal bones: mammoth, reindeer, woolly rhinoceros, bison, horse, arctic fox, wolverine, wolf, and fox. In general, the stone and bone tools, as well as faunal remains, at the Malta site are typical of many other Late Paleolithic sites in Eurasia; however, the Malta assemblage is characterized by a number of unique features. First, the remains of semi-underground dwellings of rounded and quadrangular shape were identified at the site. During construction, the foundations of the dwellings were lined with limestone slabs and vertically set tusks, mammoth skulls, and other large animal bones, primarily mammoth, rhinoceros, and bison. The roof made of reindeer antlers was covered with skins of wild animals. In addition to semi-underground ones, the Malta people also arranged above-ground dwellings. There are quite few Upper Paleolithic sites in the world with such well-marked remains of dwelling structures as at the Malta site. Second, the site yielded a large number of various personal ornaments, images of animals, birds, and female figurines (Gerasimov, 1935; Abramova, 1962, 1966, 1989; Kamenny vek…, 2001: Vol. 1; Istorya Sibiri, 2022: Vol. 1; and others). Malta contains the most numerous collection of pieces of art among all Paleolithic sites of the world. The researchers found here more than two dozen female figurines made from mammoth tusk and reindeer antlers. As compared to the European samples, Malta figurines are graceful, they have a modeled face, and some possibly show a hairstyle. Certain figurines are covered with ornaments, which, according to the researchers, render fur clothes. Of great artistic value are images of birds, a plate made of mammoth tusk with an engraved figure of a mammoth, and a plaque with a stylized drawing of a snake and a spiral pit pattern on the reverse side of the plate. Diverse personal ornaments were found: bracelets, diadems, pendants, beads, and patterned plaques. Third, under the floor of one of the dwellings at the settlement, in an elongated oval pit enclosed with stone slabs at the northern and eastern sides, a paired burial of children about one year old and three or four years old was found. The deceased were oriented with their heads to the northeast, thickly sprinkled with red bloodstone powder, and covered with a slab, on top of which a mammoth tooth was placed. The skulls and postcranial parts of the skeletons were poorly preserved, which made it impossible to reconstruct the morphological features of the buried (Alekseev, Gokhman, 1987; Gokhman, Zubov, 2003).

A series of radiocarbon dates was derived from the Malta materials. In the course of the studies in the 1990s, several stratigraphic levels were identified at the site (Maltinskoye Paleoliticheskoye mestonakhozhdeniye…, 1996; Kamenny vek…, 2001: Vol. 1). The bulk of the finds was attributed to 25–20 ka BP (Istorya Sibiri, 2022: Vol. 1, p. 133). The comprehensive studies of Malta have shown that the material and spiritual culture of the Upper Paleolithic Siberian populations was not lower than that of the populations of other regions in Africa and Eurasia. No other Paleolithic site of that period yielded artifacts similar to those found at Malta—great amount of various personal ornaments, female sculptures, and other items testifying to the cognitive abilities and symbolic thinking of the inhabitants of the site.

Malta is not the only site in the Baikal region with culture-bearing strata indicating a high level of the material and spiritual culture. In 1936, close to Malta, near the village of Nizhnyaya Buret in the Angara valley, Okladnikov discovered a site with remains of dwellings of various designs, stone tools similar to the Malta artifacts, and bone figurines covered with ornaments (1940, 1941a, b; 1960). The discovery of another site with the technical and typological features of stone tools close to those from Malta and with pieces of art made it possible to identify the Malta-Buret culture in the Baikal region, and gave hope that other sites related to this culture will be discovered in Siberia in the future.

In the second half of the 20th century, the studies of Siberian archaeological sites were carried out with the active participation of many well-known scientists from the academic centers of Moscow and Leningrad, as well as a great number of graduates of Siberian universities and pedagogical institutes. At that time, a lot of Paleolithic sites were discovered and explored, and many relevant papers were published*.

A particularly great contribution to the study of the Paleolithic of Siberia was made by well-known archaeologists from the Paleolithic Department of the Leningrad Branch of the Institute of Archaeology of the USSR Academy of Sciences (since 1992, the Institute for the History of Material Culture of the Russian Academy of Sciences): Z.A. Abramova, S.N. Astakhov, S.A. Vasiliev, and N.F. Lisitsyn. Of great importance for the study of the historical and cultural heritage of Siberia were large-scale rescue archaeological surveys carried out under the projects of construction of the Irkutsk, Bratsk, and Boguchany hydroelectric power stations on the Angara River, and Krasnoyarsk and Sayano-Shushenskoye hydroelectric power stations on the Yenisey River in the areas of future flooding of reservoirs. During these works, a significant number of archaeological sites associated with various chronological periods, including the Paleolithic, were examined. Unfortunately, owing to the limited funds on rescue operations and the lack of time to complete the entire scope of research, some of the most important and

*For the most complete list of publications on the Paleolithic of Siberia, see (Istoriya Sibiri, 2022: Vol. 1).

valuable archaeological sites remained unexcavated and were submerged in water.

Z.A. Abramova researched the Yenisey Paleolithic for many years and identified the Afontovo and Kokorevo cultures (1979a, b; 1984; etc.). N.F. Lisitsyn excavated several sites on the Yenisey (1997, 2000; etc.). S.N. Astakhov and S.A. Vasiliev studied open-air Paleolithic sites and stratified complexes in Tuva (Astakhov, 1986, 2008; etc; Vasiliev, 1996; etc.).

Academician A.P. Okladnikov made an outstanding contribution to the Paleolithic studies of Siberia and Asia in general. He started his work in the field archaeological expeditions of the B.E. Petri's club, and as early as in 1926, being an 18-year-old young man, he found Stone Age sites and published his first scientific article (Okladnikov, 1926). During his life, Alexey Okladnikov discovered and studied hundreds of Paleolithic sites in Siberia, Mongolia, Uzbekistan, Turkmenistan, Kyrgyzstan, and other regions.

In the second half of the 20th century, due to the efforts of A.P. Okladnikov and M.M. Gerasimov, small centers for Paleolithic studies were established in the Siberian cities of Irkutsk, Krasnoyarsk, and Ulan-Ude. The Irkutsk school proved to be the most successful. Two researchers of the Irkutsk Museum of Local Lore, M.P. Aksenov and G.I. Medvedev, graduates of the Irkutsk University, participated in the Malta excavations in 1956–1957 headed by Gerasimov. The continuity is traced from Petri to Gerasimov, and from him to these young specialists in the Paleolithic studies. Aksenov and Medvedev explored dozens of Paleolithic sites in the Baikal region; they also brought up a galaxy of talented specialists at the Irkutsk University. Graduates of the Irkutsk University conducted large-scale research in various regions of Siberia: L.V. Lbova and V.I. Tashak in Transbaikalia, N.I. Drozdov on the Yenisey, M.V. Shunkov and K.K. Pavlenok in the Altai.

A great contribution to the study of the Paleolithic of Eastern Siberia was made by the Irkutsk archaeologists E.A. Lipnina, A.I. Generalov, P.E. Shmygun, E.O. Rogovskoy, A.V. Volokitin, and others. In the Angara River basin, the archaeologists discovered more than ten Early Paleolithic sites with pebble-and-flake industry. A large number of Upper Paleolithic sites have been found and studied in the Angara and Lena regions (Stratigrafiya…, 1990; Paleolit Yeniseya, 1991; Kamenny vek…, 2001: Vol. 1, 2; Aksenov, 2009; and others).

At the Krasnoyarsk Pedagogical University, N.I. Drozdov trained such talented archaeologists as E.V. Artemiev, E.V. Akimova, V.M. Kharevich, and others. Over the last 30 years, they have been involved in the study of many sites, especially in the Kurtak archaeological district (Kurtakskiy arkheologicheskiy rayon…, 1990; Drozdov, Chekha, Haesaerts, 2005; Arkheologiya…, 2007; and others). Good results were achieved by L.V. Lbova and V.I. Tashak during the study of Upper Paleolithic sites in Western Transbaikalia (Lbova, 2000; Prirodnaya sreda i chelovek v Neopleistotsene…, 2003; Tashak, 2016; and others). In Eastern Transbaikalia, Prof. I.I. Kirillov, a student of A.P. Okladnikov, established his scientific school (Kirillov, 1979; Okladnikov, Kirillov, 1980; etc.). After the death of I.I. Kirillov, one of his talented disciples, M.V. Konstantinov, together with his students, graduates of the Chita Pedagogical University, made a great contribution to the study of the Late Paleolithic of Transbaikalia (Konstantinov, 1994; etc.).

In the Altai, in the late 20th to early 21st century, Y.F. Kiryushin and his students A.L. Kungurov, V.N. Semibratov, K.Y. Kiryushin explored Upper Paleolithic sites. In Yakutia, effective studies of the Paleolithic of Siberia were carried out under the supervision of Academician of the Academy of Sciences of the Republic of Sakha (Yakutia) Prof. A.N. Alekseev by the Yakut State University (since 2009, North-Eastern Federal University), and under the supervision of Y.A. Mochanov and S.A. Fedoseeva by employees of the Institute for Humanities Research of the Siberian Branch of the Russian Academy of Sciences (Mochanov, 1992; Mochanov, Fedoseeva, 2013).

By the end of the 20th century, many Paleolithic sites were found in Siberia. A number of new cultures were identified: in the Altai—the Early Paleolithic Karama, Middle Paleolithic Denisova and Early Upper Paleolithic Kara-Bom, Karakol, and Srostki; in the Kuznetsk basin—the Bedarevo; on the Yenisey—the Afontova and Kokorevo; in the Cis-Baikal—the Malta, Upper Lena, Badai, Makarovo; in Transbaikalia—the Tolbaga, Tangin, Kunalei, Studenoye, Oshurkovo; in Yakutia—the Dyuktai and Yana; in Kamchatka—the Ushki, in the Far East—the Selemdzha, and Ustinovka archaeological cultures.

The researchers of Siberia repeatedly made generalizations of the accumulated evidence and determined the place of the Siberian Paleolithic in the Eurasian Stone Age. Petri was, perhaps, the first scientist who made an attempt to develop a periodization of the Stone Age in Eastern Siberia and to designate its place in the Paleolithic of Europe (1923, 1928). According to Petri, the Siberian Paleolithic was a part of the European Stone Age, but retained its originality: Paleolithic sites of Cis-Baikal, along with fairly developed types of tools, often contained archaic implements. Until recently, this Petri's conclusion was cited by researchers of this region in their papers; they noted the pebble nature of the industries, the considerable proportion of choppers and chopping tools, classified the Upper Paleolithic as the post-Mousterian, etc. Austrian archaeologist G.K. Mergart (1923), on the basis of materials from the Yenisey sites, identified the lithic industry with archaic stone tools, and the industry with tools similar

to European Late Paleolithic artifacts. He considered the earliest sites of the Afontova Gora type, with spearheads and bone tools, to be chronologically close to the European Aurignacian, and attributed the later sites, such as the Verkholenskaya Gora in the Angara region, to the Siberian facies of the Upper Paleolithic. From the point of view of Mergart, the Siberian Paleolithic was largely formed under the influence of the European culture.

N.K. Auerbach and G.P. Sosnovsky (1932) identified a special Siberian facies of the Upper Paleolithic. The scientists explained its originality, manifested in the use of some archaic types of stone tools along with chopping tools and other implements typical of the Early Paleolithic of Europe, by the features of raw materials, the hominins' need in such a tool set for their subsistence strategy, and, to some extent, by the backwardness of the culture of Siberian populations, which was due to their remoteness and isolation from the more developed European habitation centers. S.N. Zamyatnin (1951), considering the possibility of identifying local variants in the Paleolithic, attributed the Siberian Paleolithic to the vast Siberian-Chinese province.

The peculiar Malta-Buret culture attracted attention of many scholars. Indeed, owing to a considerable number of pieces of art, various personal ornaments, dwellings, and other features of spiritual and material culture, the sites of this culture stay apart in the Siberian Paleolithic and show certain parallels with the European Paleolithic; although, no sites with a similar industry have been found to date over the vast region separating the European sites from the Angara ones. Researchers have no common opinion about the origin of the Malta-Buret culture. In the 1930s, M.M. Gerasimov (1931, 1935), P.P. Efimenko (1938), A.P. Okladnikov (1940, 1941a, b), S.N. Bibikov (1959), and others associated the origin of the Malta-Buret culture with the European Paleolithic and considered it the Siberian parallel to the Aurignacian, Aurignacian-Solutrean, and Late Solutrean. Later, while comparing the Central Asian Mousterian and Siberian Upper Paleolithic sites, Okladnikov admitted that these cultures, including the Malta-Buret, had a common origin (1968a), and did not exclude genetic links of the Malta and Buret populations with the carriers of the Aurignacian cultures of Europe (1968b).

G.P. Sosnovsky (1934) and M.G. Levin (1950, 1951) adhered to the hypothesis of the autochthonous origin of the Malta-Buret culture, but substantiated it in different ways. Sosnovsky rightly noted that the Malta site contained many stone tools similar to those from the Upper Paleolithic Siberian sites. In addition, the scholar believed that some Malta figurines of women and birds showed significant stylistic differences from European pieces of art. Levin explained the parallels in the Malta-Buret and European assemblages by the close Late Pleistocene environmental conditions in Siberia and Europe and similar economic structure of Upper Paleolithic communities of hunters, which suggested the convergent development of many features of material and spiritual culture in Siberia and Europe.

On the basis of materials excavated from the sites in various parts of North Asia, archaeologists identified local cultures and their possible correlations with each other. For example, Z.A. Abramova, taking into account the variability of Paleolithic industries, suggested to use a concept of "cultural area" to combine and separate cultures (1975). She combined the Transbaikalian, Yenisey, and Altai Paleolithic sites into the South Siberian cultural area, some sites of Western Siberia, the North Minusinsk basin and the Angara basin into the Central Siberian area, and the sites of the northeastern part of Siberia into the Northeastern area. Other viewpoints on the classification, combination, and separation of the Paleolithic sites of North Asia were also proposed.

All the theoretical generalizations on the Siberian Paleolithic proposed before the beginning of the 21st century, were formed under the dominance of the idea that in the second half of the Middle to the Early Upper Pleistocene, Eurasia and partly Africa was inhabited by the Neanderthals. In Europe, the Middle Paleolithic was identified, while in Africa the Middle Stone Age, showing certain distinctions. The Middle Paleolithic was often identified with the Mousterian industry of the Neanderthals. All researchers of the Siberian Paleolithic, including myself, attributed the sites of the first half of the Upper Pleistocene to the Mousterian, implying that the Neanderthals settled in this territory too.

A new stage in the Paleolithic studies in Siberia began in the late 20th to early 21st century, and it was largely associated with the research made by the Institute of Archaeology and Ethnography of the Siberian Branch of the Russian Academy of Sciences. This period was marked by large-scale works of archaeologists from Chita and Ulan-Ude in Transbaikalia, the Irkutsk team in Cis-Baikal, researchers from Krasnoyarsk on the Yenisey, the Altai University team in the Altai. Particularly successful were the studies carried out by the research teams of the IAET SB RAS in the Altai. Over 20 cave and open-air sites have been excavated here since 1983.

One of the main tasks of archaeologists studying sites in any region is to solve the issue of the initial peopling of this area. Volume 1 of the second academic edition of "The History of Siberia" (Istoriya Sibiri s drevneishikh…, 1968) did not provide any clear solutions of that problem. The Ust-Kan cave site excavated in 1954 by S.I. Rudenko was the only site that could undoubtedly be attributed to the Late Mousterian.

With regard to the issue of initial peopling, it is necessary to briefly consider the hypothesis of

Y.A. Mochanov on the non-tropical origin for humanity. Mochanov excavated the site of Diring-Yuriakh and estimated its age in the range of 3.2–1.8 Ma BP. Based on this date, he argued that along with Africa, there was another center of human origin—Yakutia (Mochanov, 1992; Mochanov, Fedoseeva, 2013). This is an absolutely unscientific hypothesis. All scientists involved in the studies of human evolution (anthropologists, archaeologists, and geneticists) believe that the ancestral home of the genus *Homo* is Africa. About 6–7 Ma BP, the ancestral line of man in the order of primates was divided into two branches—the higher great apes and australopithecines. Subsequently, the evolutionary development of australopithecines, which settled only in Africa, proceeded along the sapient lineage. Among australopithecines, there were groups that became ancestral to the genus *Homo*; the earliest representatives emerged ca 2.8 Ma BP. Studies of anthropological remains have shown that in the Late Pliocene to Early Pleistocene, three species of the genus *Homo* existed in Africa: *H. rudolfensis, H. ergaster/erectus*, and *H. habilis*. About 1.8 (1.7) Ma BP, *H. ergaster/erectus* left Africa and started settling in Eurasia. In the course of a long and complex evolution, the polytypic species *H. erectus* served as the basis for the development of modern humans, *H. s. sapiens* (Derevianko, 2012, 2017, 2019).

If there was a second center of human origin in Yakutia, there should have been an independent *H. sapiens* lineage in the order of primates that inhabited this territory several million years ago and became the ancestral basis for the Yakutian representative of the genus *Homo*. There is no evidence for this assumption. The possibility of such an evolutionary development is excluded; otherwise, an absolutely different genetic species of anatomically modern humans should have evolved in Yakutia on a different ancestral basis. This should have led to the dispersal of two different human species on the planet—one from Africa, the other from Yakutia. According to the laws of biology, animals of two different species could meet, interbreed, but their offspring would be non-fertile. Thus, the hypothesis proposed by Mochanov as to the non-tropical origin for humanity is not confirmed by any anthropological and reliable archaeological data, and it contradicts the laws of evolution. However, the Mochanov's discovery of Diring-Yuriakh, dated to 267 ± 24 and 366 ± 12 ka BP (Waters, Forman, Pierson, 1997, 1999) (given these dates are real), should be recognized important: this finding shows that humans could have inhabited such remote northern areas at such an early time.

Data of great importance for the study of the Siberian Paleolithic were derived during the study of the Karama site, located in the northwestern Altai, 14 km from Denisova Cave upstream the Anui River (Derevianko, Shunkov, 2005). Three excavation trenches were established at the site at a height of 41, 51, and 57 m above the river level. In trench 2, a stratigraphic sequence 11 m thick was established, and 13 lithological horizons were identified, of which four (7, 8, 11, and 12) bore a pebble-and-flake lithic industry. Correlation of the derived paleogeographic data with geomorphological and lithological-stratigraphic materials suggests that the unit of deposits containing two lower cultural horizons was formed in a warm period corresponding to oxygen-isotope stage 19 (800–760 ka BP). The gray-colored loams overlying the unit were accumulated during a cooling period during isotope stage 18 (760–715 ka BP). The main part of the overlying red-colored stratum with two upper cultural horizons was formed during the warm period corresponding to isotope stage 17 (715–660 ka BP), while its top was formed during the epoch of relative cooling corresponding to stage 16 of the oxygen-isotope scale (660–600 ka BP) (Istoriya Sibiri, 2022: Vol. 1). Thus, the Early Paleolithic layers (7, 8, 11, and 12) belong to the range of 800–600 ka BP, and the upper culture-bearing layer in trench 1 with the Early Middle Paleolithic (Denisova) industry to ca 300 ka BP. The artifacts from the Early Paleolithic layers reflect a long chronological sequence; however, in terms of technical and typological features they form a single technical and technological complex—the Karama lithic industry, associated with *H. erectus*.

The discovery of the Early Paleolithic Karama site, with a clear stratigraphic sequence, in the Altai provides an undoubtedly great insight to a number of fundamental issues. The site is located at 52° N latitude. The materials obtained at the site suggest that *H. erectus*, by the time of their arrival to the Altai, already had great cognitive capabilities and adaptive abilities, which allowed them to settle far in the north of Eurasia. This became possible due to the advanced lithic industry of the Karama people. Comparative analysis of the Karama lithic industry with those of the Early Paleolithic sites of China revealed significant differences between them. Hence, populations of *H. erectus* might have migrated to the Altai from the western regions through the territory of Central Asia. In Mongolia and Kazakhstan, there are many Early Paleolithic sites with pebble-and-flake industry, but all of them show surface occurrence of archaeological materials and do not provide geochronological evidence, which makes it impossible to infer about the time of the initial dispersal of *H. erectus* in Central Asia. The discovery of Karama, whose lowermost cultural layer dates back to ca 800 ka BP, suggests that the earliest occupation of Central Asia by *H. erectus* migrating eastwards from Africa occurred ca 1 Ma BP or a little later.

The Karama lithic industry, demonstrating a sequence of developmental stages, is the basis for another important conclusion. Many researchers refer to the Early Paleolithic

industries in Eurasia as Oldowan or Olduvai, because stone tools were found in association with representatives of the first taxon of the genus *Homo* named *H. habilis* in the Olduvai Gorge. But in my viewpoint, it is incorrect to designate the Early Paleolithic industry in Eurasia as Oldowan (Derevianko, 2016). Most scholars believe that *H. habilis* never left Africa, and that Eurasia was occupied by another taxon, *H. ergaster/erectus*. A paradoxical situation has arisen in the Early Paleolithic studies: the Early Paleolithic industry widespread in Eurasia is named Oldowan, although it belonged to *H. habilis*, which never left Africa.

*H. erectus* settled in Eurasia, including the Altai (Karama), in areas with different environmental and climatic conditions, landscapes, flora and fauna, stone resources, in small groups and quite isolated from each other. The Early Paleolithic industries discovered Eurasia are rather different and variable, though all of them are based on pebble and flakes. In a generalized sense, it is more reasonable to designate them as pebble-and-flake industries, or Mode 1, as earlier, with a specification of the locality where they were found. For example, in China, two Early Paleolithic industrial complexes are clearly distinguished: Nihewan with a small-sized lithic industry in the north, and Longgupo with large stone tools in the south. The Early Paleolithic industry in Eurasia also shows specific technical and typological features, such as the Dmanisi in Georgia, the Le Vallonet and Atapuerca in Western Europe, the Karama in Siberia, and others.

The research in the Denisova Cave is of particular importance for the study of the Paleolithic of the Final Middle to the first half of the Upper Pleistocene in Africa and Eurasia. The first test pit in Denisova Cave was made by N.D. Ovodov in 1978 at the instruction of A.P. Okladnikov. Since 1983, stationary excavations have been carried out in the cave, as well as at other Paleolithic sites in the Altai. As noted above, the initial occupation of the Altai by *H. erectus* took place ca 800 ka BP. Approximately after 600 (500) ka BP, this territory was uninhabited by humans: no Early Paleolithic sites dating to 600–300 ka BP have yet been found in the Altai.

The second wave of hominin dispersal in the Altai and other regions of Southern Siberia took place ca 300 ka BP. Lowermost cultural layer 22 in Denisova Cave dates back to 287 ± 41 ka BP. A unique stratigraphic sequence was revealed in the cave (Prirodnaya sreda i chelovek v Paleolite…, 2003). The cave deposits, starting from lowermost layers 22.2 and 22.1 up the profile till top layer 9, contain rich and technically and typologically diverse stone implements, which give the possibility to trace the evolution of the industry from the Early Middle to the advanced Upper Paleolithic (Derevianko, Shunkov, 2005; Derevianko, 2022; etc.). On the basis of the materials from Denisova Cave, five main stages in the development of the industry were identified: the early stage of the Middle Paleolithic (300–150 ka BP), the middle stage of the Middle Paleolithic (150–120 (100) ka BP), the terminal stage of the Middle Paleolithic (120 (100)–60 ka BP), transitional stage from the Middle to Upper Paleolithic (60–55 (50) ka BP), and initial (early) stage of the Upper Paleolithic (55 (50)–40 ka BP). The material and spiritual culture of *H. s. altaiensis*, possessing the ability of symbolic thinking, was one of the most ancient and brightest in the initial (early) Upper Paleolithic, as compared to the culture of hominins that settled at that time in Africa and Eurasia. Suffice it to say that it was only in the Altai that so many bone items (11 eyed needles alone), various personal ornaments (diadems made of mammoth tusk, a fragment of a stone bracelet), and other pieces art dating back to 50–40 ka BP were found; among them is the oldest carved bone figurine of a feline animal (Prirodnaya sreda i chelovek v Paleolite…, 2003; Derevianko, Shunkov, Kozlikin, 2020; Derevianko, 2022).

In layer 11.2 in the East Chamber of Denisova Cave, in association with the Upper Paleolithic industry dating back to 63 ± 6 to 55 ± 6 ka BP (Jacobs et al., 2019; Douka et al., 2019), a phalanx of the hominin's little finger was found; the DNA sequencing showed that it belonged to a girl aged 7–9 years of a previously unknown taxon, which genetically differed from both modern humans and Neanderthals (Reich et al., 2010). This taxon was tentatively named after the place of discovery—Denisovan (*H. denisovan*).

Anthropological remains of the Denisovans were recorded in lowermost cultural layer 22.1 of the Main Chamber, at the boundary between layers 12.1 and 11.4, in layer 11.2 of the East Chamber, and in layer 11 of the South Chamber. Genetic material of the Denisovans was extracted from the deposits of layer 15 in the East Chamber. There is every reason to believe that the Denisovans inhabited the cave from the time of its initial occupation ca 300 ka BP (layer 22) and up to 40 ka BP (the upper part of layer 11 of the South Chamber). The observed homogeneity of lithic industries from all cultural layers of the cave can be considered as a reliable evidence of the Denisovan habitation in the cave in this time range.

The discovery of the new taxon became a worldwide sensation. In recent years, dozens of papers presenting the results of archaeological, genetic, anthropological, and genomic studies, as well as the study of origin, material and spiritual culture of the Denisovans, have been published in leading scientific journals. These data made it possible to trace the evolution of the Denisovans, determine their role in the formation of anatomically modern humans, and identify continuity in the development of their bright and distinctive industry

over 250 thousand years (Prirodnaya sreda i chelovek v Paleolite…, 2003; Derevianko, 2012, 2019, 2022; Derevianko, Shunkov, Kozlikin, 2020; and others).

### *The origin of Denisovans*

The evolutionary development of the ancestral form of *H. erectus* in Africa 1.8–0.8 Ma BP led to the appearance of a new taxon, which is known among anthropologists under two names—*H. rhodesiensis* and *H. heidelbergensis*. These human groups belonged to the same biological species both morphologically and genetically, but their subsequent evolutionary histories were different. *Homo rhodesiensis* remained in Africa; their ancestral basis gave rise to the development of anatomically modern humans (*H. s. africaniensis*) 200–150 ka BP. *Homo heidelbergensis* with the Acheulean industry migrated to Eurasia (the site of Gesher Benot Ya'aqov in Israel) ca 800 ka BP. This migration was associated with the first (initial) stage in the formation of three taxa: anatomically modern humans in Africa, Neanderthals and Denisovans in Eurasia. This is confirmed by genetic data: the division of the common ancestral taxon into *H. sapiens*, on the one hand, and *H. s. neanderthalensis* and *H. s. altaiensis*, on the other hand, occurred ca 800 ka BP (Meyer et al., 2012). Part of *H. heidelbergensis* population with the Acheulean industry moved to Europe 700 (600) ka BP, where their assimilation by late *H. erectus* (*H. antecessor*), through intermediate forms of Mauer, Montmorin, Steinheim, Arago 21, Sima de los Huesos, Petralona, and others, led to the formation of classic Neanderthals with the Mousterian industry 200–150 ka BP (Derevianko, 2019).

*Homo heidelbergensis* in the Middle East 800–100 ka BP was also involved in the important evolutionary processes. The further development of *H. heidelbergensis* in this region could have been influenced by their assimilation by the late *H. erectus*—the descendants of the first wave migrants from Africa to Eurasia (the site of Ubeidiya in Israel). Unfortunately, Middle Pleistocene anthropological fossils in the Near East have been found mainly in Israel (Qesem, Zuttiyeh, and Misliya); the bones are characterized by mosaic morphology (signs of *H. sapiens* and *H. s. neanderthalensis*). In the Middle Pleistocene, in the Levant, two taxa were formed: anatomically modern humans (Skhul and Qafzeh) and Palestinian Neanderthals (Tabun, Amud, and Kebara), who demonstrated similar techno-typological complexes of stone tools. Palestinian Neanderthals differed significantly in their morphology from classic Europeans, and their industry was not similar to the Mousterian.

Some representatives of the Heidelberg taxon, which were not yet diverged genetically and morphologically, migrated to East Asia from the Levant 400–350 ka BP. During this migration, the divergence between Denisovans and Neanderthals was completed. According to the results of the nuclear genome study, the complete genetic separation of these taxa occurred ca 430 ka BP (Meyer et al., 2014). The late *H. heidelbergensis* migrated to the east of Asia along two routes. A small part of them ca 400 ka BP began to move southwards, along the coast of the Persian Gulf. In South Asia, the late *H. heidelbergensis* met the indigenous population and were assimilated by it. Most of the late *H. heidelbergensis* with the Acheulean industry followed the northern route, skirting the largest orographic systems of the Tian Shan, Pamir, and Tibet from the north, and settled in the Iranian Plateau and the territories of modern Turkmenistan, Tajikistan, Kyrgyzstan, Uzbekistan, Kazakhstan, and Mongolia in Central Asia.

Occupation of these vast spaces was slow. In those areas where the *H. heidelbergensis* met the indigenous population (first settlers, late *H. erectus*), there could have been assimilation between newcomers and local residents. Both species had an open genetic system; as a result of interbreeding, fertile offspring were born, apparently with distinct *H. erectus* morphological features. Since Central Asia was probably sparsely and unevenly populated by indigenous populations, admixed groups of various regions, which appeared as a result of assimilation, could have had different sets of erectoid features. The process of dispersal of the late *H. heidelbergensis*, which took place in various environmental conditions, was accompanied by assimilation and gene exchange, and led to the formation of a new taxon—the Denisovans, which ca 300 ka BP occupied Denisova Cave. In the Altai, anthropological finds were found only in this cave, although the Denisova industry was recorded at many sites. The level of genetic diversity in Denisovans was higher than in seven Neanderthals from various regions of Western and Central Europe (for which complete mtDNA genetic sequences have been obtained), but lower than in modern humans (Sawyer et al., 2015). This suggests their wide dispersal in Central, East and Southeast Asia (Meyer et al., 2012; Prüfer et al., 2014; Derevianko, 2022).

In the Early Upper Pleistocene, 120–60 ka BP, three early human taxa settled in Africa and Eurasia: anatomically modern humans in Africa (*H. s. africaniensis*), Neanderthals in Europe (*H. s. neanderthalensis*), and Denisovans in Central and North Asia (*H. s. altaiensis*) (Derevianko, 2012; etc.). Representatives of these taxa interbred with each other and produced fertile offspring. This means that the interbreeding occurred not between subspecies, but within one species. If at the final stage of the evolution of genus *Homo* there were three taxa with an open genetic system, then throughout the 2.5 million years long evolution humans also had an open genetic system,

which allowed representatives of taxa to interbreed and produce fertile offspring. All the so-called species identified by anthropologists on the basis of a small number of remains from Early and Middle Paleolithic sites in Africa and Eurasia were subspecies with an open genetic system. According to the genetic data, the genome of modern humans (non-Africans) preserves 1–2 % of the Neanderthal genetic heritage. The genome of modern inhabitants of Australia and Oceania contains up to 3–6 % of the genetic heritage of Denisovans (Reich et al., 2011). Consequently, Neanderthals and Denisovans contributed to the genetics and morphology of anatomically modern humans, with the stem lineage of the early anatomically modern humans, which evolved in Africa 200–150 ka BP and migrated to Eurasia 80–50 ka BP (Derevianko, 2012, 2019, 2022; Derevianko, Shunkov, Kozlikin, 2020).

In East and Southeast Asia, the process of development of hominins toward *H. sapiens* proceeded from the initial settlement of *H. erectus* in these regions around 1.7–1.6 Ma BP. By now, about 10 anthropological fossils, dating from 120 to 60 ka BP, have been found here, associated by scholars with anatomically modern humans. We should agree with the opinion of Chinese researchers that in these parts of Asia there evolved the fourth subspecies of modern humans (*H. s. orientalensis*), which also took part in the formation of anatomically modern humans, *H. s. sapiens* (Derevianko, 2011).

### *Neanderthals in Siberia*

The Altai yielded anthropological remains of not only a new taxon, *H. s. altaiensis*, which took part in the evolution of modern humans, but also those of Neanderthals. The remains of Neanderthals with the Mousterian industry dating to 60–40 (35) ka BP were found in two caves: Okladnikov and Chagyrskaya. Fossils of Neanderthals and their mtDNA extracted from cultural deposits testify to Neanderthal habitation in Denisova Cave. However, the Mousterian industry was not recorded there; probably, the Neanderthals inhabited the cave for a short time and they were females. The time of emergence of Neanderthals in the Altai is still debatable. In layer 15 of East Chamber, dating to 253 ± 14 ka BP, the Denisovan mtDNA was extracted from the sediments and the Denisovan industry was found; overlying layer 14 yielded the Neanderthal mtDNA, dating back to 197 ± 12 to 187 ± ± 14 ka BP (Jacobs et al., 2019), also with the Denisovan industry. The possibility of such an early appearance of Neanderthals, especially with the Denisovan industry, is highly doubtful (Derevianko, 2019). Notably, the classic Neanderthal type in Europe was formed ca 200 ka BP; in Eastern Europe, in the Caucasus, in the Crimea, and throughout the whole transit area up to the Altai, no anthropological remains nor sites with Mousterian industry older than 100 thousand years have been found.

In this regard, the following hypothesis can be considered the most convincing: the Denisovans and Neanderthals had a common ancestral taxon—*H. heidelbergensis*. In the course of migration of *H. heidelbergensis* with the Acheulean industry to Europe 700 ka BP and assimilation processes with the late *H. erectus* (*H. antecessor*), in the process of evolution of the classic Neanderthals (*H. s. neanderthalensis*), the latter retained part of the ancestral genetic heritage. This is evidenced by the Denisovan mtDNA and Neanderthal nuclear DNA extracted from the individual dated to ca 430 ka BP from Sima de los Huesos (Meyers et al., 2014). The tribes of *H. heidelbergensis*, who migrated to the east of Asia much later (400–350 ka BP) and assimilated the late *H. erectus* in Central Asia, which led to the formation of the Denisovans (*H. s. altaiensis*), also retained part of the ancestral genetic heritage, which is evidenced by mtDNA extracted from cultural layer 14 with the Denisovan lithic industry. This means that *H. heidelbergensis* who settled in the Middle East, Europe, Central Asia, and the Altai were a taxon being in the process of divergence into modern humans, Neanderthals, and Denisovans; and they had open genetic systems, interbreeding ability, as well as retained some part of the ancestral genetic heritage.

Neanderthals with the Mousterian industry began to settle in the Altai ca 60 (70) ka BP. This is evidenced by the data from excavations in Okladnikov and Chagyrskaya caves. The techno-typological complex of Neanderthal stone tools differs from that of the Denisovans. The absence of the Mousterian industry in Denisova Cave suggests that Neanderthals have never settled there for a long time. Probably, Neanderthal women got into the cave as wives. Neanderthals could also have visited the cave for a short time, because their dispersal area was adjacent to that of the Denisovans. One more fact is very important: Denisovans and Altai Neanderthals lived side by side; they had common hunting areas. They met and interbred with each other. This is confirmed by the hybrid *Denisova 11*, whose father was a Denisovan and mother was a Neanderthal. At the initial stage of the Upper Paleolithic (50–40 ka BP), the Denisovan lithic industry was strikingly different from that of the Altai Neanderthals not only in technical and typological characteristics of tools, but also in a great number of bone tools, various personal ornaments, and non-utilitarian items. The Neanderthals living in Denisova and Chagyrskaya caves did not have bone tools, personal ornaments and pieces of art. This unique evidence of differences in the mentality of Denisovans and Neanderthals requires further careful study.

Altai Neanderthals lived in the Altai up to 40 (35) ka BP. Their further development is unknown, but it is possible that most of them were assimilated by the Denisovans and anatomically modern humans. With regard to the dispersal of late Neanderthals (with the Mousterian industry and specific material and spiritual culture) in the Altai, despite the fact that for a long time they lived next to the Denisovans and interbred with them, a very important question arises. Prior the 21st century, when only two taxa were known—modern humans in Africa and Neanderthals with a Mousterian industry in Eurasia—all researchers of the Paleolithic in Southwest, North and Central Asia attributed the lithic industries of the terminal Middle to the first half of the Upper Pleistocene to the Mousterian. The industry of this period from various sites, including Denisova Cave, was considered by researchers of the Altai Paleolithic as Mousterian. The discovery in the region of a new taxon with an industry that significantly differed from the Mousterian required a new consideration of this issue (Derevianko, 2016).

Scholars use the term "Middle Stone Age of Africa" to designate the Middle Paleolithic of Africa, since it differs from the European Mousterian. For a long time, some scientists believed that Neanderthals with the Mousterian industry populated northern Africa, in particular the Jebel Irhoud site. At present, taking into account the new significantly older dates for this site (302 ± 32 and 315 ± 34 ka BP), anthropological remains from it are associated with early modern humans (Hublin et al., 2017; Richter et al., 2017). The Aterian, early and late Nubian cultures, spread in the northwest and northeast of Africa, also cannot be identified with the European Mousterian, because these belonged to the early modern humans. Neanderthals never settled in Africa. Neither they, nor the Mousterian were in Southeast and East Asia, too.

So, we should adhere to the opinion, supported by many researchers in Europe, that the Mousterian industry had lots of local variants, but belonged to Neanderthals. Material and spiritual culture of Neanderthals has been studied for a century and a half: in Europe, about 20 variants of industries associated with the Mousterian have been identified. The study of the Denisovans as a new subspecies of anatomically modern humans has just started; in the future, many local variants of their material and spiritual culture will probably be identified. Four taxa of the Late Middle to Early Upper Pleistocene have been identified: anatomically modern humans in Africa (*H. s. africaniensis*), *H. s. neanderthalensis* in Europe, *H. s. altaiensis* in Central and North Asia, *H. s. orientalensis* in East and Southeast Asia: during this period, all these taxa showed variabilities in the industry and mosaic morphology due to significant differences in the environmental conditions and mineral resources for their subsistence in the places of habitation.

## Conclusions

Summing up the history of study of the Siberian Paleolithic, it should be noted that a huge amount of work has been carried out despite the large size of the territory, the severity of climatic conditions and the limited time for field research (June–August), as well as a comparatively small number of Paleolithic experts working in universities, local history museums, and research institutes in Siberia. The world's oldest Paleolithic site of Karama, located at 52° N latitude, was discovered in Siberia; this suggests the significant cognitive capabilities of *H. erectus* developed by the time of 800 ka BP, and the adaptive abilities allowing this population to settle so far north. A significant number of Paleolithic sites have been discovered in Siberia; some of them are quite well studied; over a dozen of cultures have been identified. Importantly, field research and laboratory studies involve the use of various methods of natural sciences, which make it possible to derive maximum information from the excavated materials at the present level of development of science. For eight years (2002–2010), employees of 12 research institutes of the SB RAS, under the leadership of those from the Institute of Archaeology and Ethnography, the Institute of Geology and Mineralogy, the Limnological Institute, and the Institute of Geochemistry, have studied the changes in environmental and climatic conditions in Siberia over the past 300 thousand years. The results of these multidisciplinary studies have been published in several dozen papers. Owing to cooperation between the Institute of Archaeology and Ethnography SB RAS and the Max Planck Institute for Evolutionary Anthropology in Leipzig, Nobel Prize winner Professor S. Pääbo and a team of his talented students, it was possible to sequence the DNA of Neanderthals from the Okladnikov and Chagyrskaya caves, and to identify, based on anthropological remains from Denisova Cave, a new taxon, which was originally named *H. denisovan* and is currently known as *H. s. altaiensis*. This taxon, in the course of assimilation of *H. s. neanderthalensis* and *H. s. orientalensis*, with the stem lineage of *H. s. africaniensis*, 60–40 ka BP contributed to the evolution of anatomically modern humans (*H. s. sapiens*)

The techno-typological complex of the Middle to Upper Paleolithic transition and of the Initial (Early) Upper Paleolithic in Denisova Cave, which includes stone and bone items, various ornaments, and pieces of art, is unique. It represents the sophisticated process of formation of the material and spiritual culture of *H. s. altaiensis*, indicating significant cognitive abilities, developed symbolic thinking and modern behavior of this population. In Denisova Cave, in the cultural layers dating to 50–40 ka BP, a lot more non-utilitarian items, personal ornaments in the form of mammoth tusk diadems, fragments of stone bracelets, and products made

from bone and ostrich egg shells were found than at any other contemporaneous site in Africa and Eurasia. In layer 11, dating back to 45–40 ka BP, the world's oldest nine needles with eyes for threading were found; these needles might have been used by the cave dwellers in sewing clothes not only from processed hides of small animals, but also from fabric. Fragments of a bracelet manufactured using such technical operations as drilling, grinding, and polishing were also recovered from this layer. The world's oldest sculpture of a feline animal was also found in Denisova Cave.

I am convinced that in the future new sites relating to the unique Malta-Buret culture will be found in Siberia. V.V. Pitulko from the Institute for the History of Material Culture of the Russian Academy of Sciences has discovered on the Yana River one more Upper Paleolithic site with a large number of bone tools, well preserved in permafrost conditions (Pitulko, Pavlova, 2010).

The study of Paleolithic sites in Siberia showed that this region was rather early occupied by humans. The Karama site is one of the best-studied Early Paleolithic sites in Russia, with a clear and long stratigraphic sequence. Currently, quite few sites with the Denisova and Malta-Buret lithic industries have been found yet, but there is every reason to hope that the new sites relating to these impressive Paleolithic cultures of Eurasia will be discovered. The available results of the Paleolithic studies of Siberia, including the most important achievement—the discovery of a new taxon, *H. s. altaiensis*, which contributed to the evolution of anatomically modern man—*H. sapiens sapiens*, provide a significant insight into the distant past of mankind.

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