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A.P. Derevianko's Multivolume *Three Global Human Migrations in Eurasia* and Its Place in Paleolithic Studies

Academician A.P. Derevianko's longterm studies are summarized in the first four volumes of his monograph on three global human migrations in Eurasia. The routes whereby early humans dispersed from Africa and eventually spread over nearly entire Eurasia are reconstructed, and numerous empirical and theoretical problems stemming from these reconstructions are convincingly resolved. Derevianko headed the excavations of Paleolithic sites scattered across vast territories of Asia. Especially important are the discoveries in the Altai. This work has raised a number of questions of key importance, for which no universally accepted answers have been given so far. Based on the hominin fossil record and having critically examined the principal hypotheses and proposals concerning both biological and cultural aspects of human evolution, A.P. Derevianko has come up with his own theory of the origin of the genus Homo, originating from Australopithecines. Some groups of the latter are believed to have been mentally predisposed for developing cumulative knowledge relating to lithic technologies and other aspects of culture. One of these aspects is the behavior relating to the interment of the dead—the first specifically human cultural trait, documented since the final Acheulean. Human migrations involve a plexus of issues: properties of the raw material affecting lithic industries, and the extreme environmental variability peculiar to the largest continent. Despite the exponential growth of publications addressing human evolution, Derevianko's conclusions, both empirical and theoretical, outlined in the first volumes of his summarizing work, retain a key importance.

Keywords: *Paleolithic, hominins, genus Homo, Australopithecines, lithic industries, migrations.*

The progress in the scientific developments apparently raises a considerable number of new questions. Science is a continuous search for answers to questions. Some questions have not been answered for centuries, but the river of knowledge, in this case, the Paleolithic issues, is constantly replenished by new answers and questions thanks to collective efforts of scientists. Occasionally, this river receives such powerful flows of answers that can change the direction of its course. The series by A.P. Derevianko *Three Global Human Migrations in Eurasia* is exactly such an inflow (2015, 2017–2020, 2022).

This study is unique in terms of the scale and depth of the analysis of the process that had evolved over more than 2 million years. The works by H. Obermaier *Prehistoric Man* (1913) and H. Osborn *Men of the Old Stone Age* (1924), published a century ago, as well as the monograph *Primitive Society* by the Soviet archaeologist P.P. Efimenko (1953), can be regarded as minor parallels. In terms of significance, as compared to the Derevianko's multi-volume series, these editions look like manuals on the history of the Stone Age. As a researcher, I am following with great interest this long-

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term process of creating of a grandiose and coherent picture of the ancient history of early humans on the basis of findings on each identified trace of *Homo sapiens* in Eurasia, the largest continent of the earth. This is a bold challenge to the aphorism "one cannot embrace the unembraceable".

I will focus on the first four volumes of the A.P. Derevianko's series, which describe the first two waves of global human migration from Africa to Eurasia. The question immediately arises: were these two waves separated in time or were they a continuous stream of bearers of the pebble-flake industry followed by those with the Acheulean tradition? This is a methodological question. Most likely, these waves followed one another without interruption.

Anatoly Derevianko worked together with A.P. Okladnikov from his young age and became a worthy student of his mentor: under Derevianko's leadership, the Institute of Archaeology and Ethnography SB RAS in Novosibirsk became one of the world-known centers of prehistoric archaeology. Novosibirsk archaeologists carry out their studies all over Asia, from the Middle East to the Far East and from the Arctic to India. Over the years of experience in field research and laboratory studies, Anatoly Derevianko has come up with the idea of creating a general picture of the initial dispersal and settlement of Eurasia by hominins throughout the Stone Age, which makes up 99 % of the history of mankind on the Earth.

A.P. Derevianko spent most of his life in field studies all over Eurasia, and saw firsthand the lithic collections of various cultural traditions in Siberia, Central Asia, the Far East, Southeast Asia, India, the Middle East, and Europe. He has understood the necessity of a global systematization of the whole Paleolithic evidence from Eurasia, which would have been impossible without referring to the Paleolithic of Africa, the ancestral home of mankind. Derevianko realized the importance of resolving the long overdue problem of general systematization of the Paleolithic data from Eurasia, primarily Asia, Asian western periphery, and Europe. Starting with research on the origins of the classic Oldowan and small-tool lithic industries, the scholar proceeded with a global consideration of this phenomenon. And in my view, he made the correct conclusion that the features of certain Lower Paleolithic industries had been determined by the raw materials used. Of course, the creators of these small items simply did not have large pieces of stone. The second problem associated with the origins of the Paleolithic culture throughout Eurasia was the so-called Movius line.

Anyway, systematization of the Eurasian Paleolithic in space and time is an issue of great importance. I suppose that Anatoly Derevianko began to develop this idea in the 2000s. It turned out that the assumption of H. Movius about the fundamental differences between the Paleolithic traditions of the industries of Western and Eastern Eurasia is not entirely true: he proposed the boundary dividing the traditions, but it appeared to be the boundary on which the Acheulean migration from Africa "faded away". Derevianko found out that the second wave of migrants from Africa did not reach the extreme northern, eastern, and southeastern outskirts of Eurasia. Migrants from Africa assimilated into *Homo erectus* of the first migration wave, practicing the Olduvai or Clactonian lithic traditions. The bearers of this older technical tradition continued their successful evolution in the northern and eastern peripheral regions of Eurasia, which differed in their environmental and climatic conditions. Derevianko argued that *H. heidelbergensis*, representatives of the Acheulean culture, could have penetrated the northern and eastern outskirts of Eurasia; hence, they could also have borrowed the techniques of lithic industries from the former inhabitants of these areas, whose economy was adapted to the local resources.

The value of the *Three Global Human Migrations in Eurasia* lies in the fact that it provides important information on most "blank spots" in the Paleolithic of Africa and Asia, thanks to the discoveries made by many scholars, including A.P. Okladnikov and A.P. Derevianko. The series presents a profound picture of the Eurasian Paleolithic. Outlining a general scheme of human evolution on the planet during more than 2 million years, the author had to consider hundreds of various issues. However, the essence of the dialectic of a scientific research is precisely that while searching for answers to specific questions, new question arise that have yet to be answered.

A.P. Derevianko's work summarizes the 200-year long history of the study of the ancient past of mankind. The study provides information concerning the origin of man in Africa and human dispersal throughout Eurasia. It was Eurasia and Northeast Africa (owing to the diversity their geo-bio-chemical factors, which led to the formation of various ecological provinces) that proved to be the cradle of humankind.

Anatoly Derevianko has identified the main processes of peopling of the world. In his work, he considers three stages of human settlement, corresponding to three waves of migration of hominins from Africa—*H. erectus*, *H. heidelbergensis*, Denisovans, and *H. sapiens*. Volumes I and II present the analysis of migration routes of the first wave; volumes III and IV, those of the second wave—hominins with the Acheulean industry. These streams moved from west to

east through vast regions, with various environmental and climatic conditions. The process of adaptation of *H. erectus* to new environments was long and complicated. It took hundreds of thousands of years. Describing the main stage of the Paleolithic historical drama, the author identifies several large geographical provinces: the Levant, the Middle East, Asia Minor with Iran and Afghanistan, the Caucasus, India, Kazakhstan, Central Asia, Altai, Mongolia, Siberia, the Far East, and Southeast Asia. These lands differ in relief, climate, as well as water and food resources. The author indicates hundreds of Early Paleolithic sites and localities, and provides relevant geological and biological characteristics. Distinctive features of rather rare anthropological materials are also discussed. Apparently, the environments of particular physical-geographical provinces, available raw materials, and typical flora and fauna of the latitudinal zones of Eurasia affected the development of lithic industries and hunting/gathering practices of the migrants.

A detailed analysis of the movement of the first wave of *Homo* across Eurasia showed that there were two main migration routes from west to east. One of the roots ran through the Middle East, passed along the coast of the Indian Ocean, and reached the Far East. The climatic and environmental conditions of the regions along which this route ran were about the same as in Africa and did not require long-term adaptation. At that time, the south of Eurasia, similarly to Africa, was inhabited by giraffe, elephant, hippopotamus, ostrich, and other animals. Humans having reached the south of Eurasia with their African fauna might not have realized they entered another continent.

The early hominin migration along the second continental route—through the middle latitudes—was slower; they moved through the Middle East to the Caucasus. At the Caspian Sea, the path forked. The Southern Caspian route ran through the wooded uplands of Elbrus, the Kopet Dag, the slopes of the Hindu Kush, and led to India. The Northern Caspian route led from the Caucasus to the steppe zone of the middle latitudes, from where hominins could move both to Eastern Europe and through Central Asia to the Far East.

The early hominins, who had already mastered the tropics and subtropics of Eurasia, reached the northern regions of Eurasia most likely during the warm interglacial periods; therefore, the dates of the oldest Paleolithic sites in the middle latitudes are 800–700 ka BP.

Volumes III and IV describe the cultures of the second wave migrants practicing the Acheulean industry. Anatoly Derevianko distinguishes between the sites with the classic Acheulean culture (characteristic tools—handaxes, cleavers, pick-like tools, and Kombewa flakes) and other older and younger sites where, in particular, handaxes were found. It is noted that the materials of the latter sites, including the oldest Acheulean site in the Levant (1.4 mln years old), might have been of local origin.

Notably, the Acheulean site in the Levant, Gesher Benot Ya'aqov, located, like Ubeidiya, at the exit from Africa, is almost twice as young as the latter, 800–600 ka BP. The Gesher Benot Ya'aqov's lithic industry reveals the entire set of the above-mentioned artifacts of the classic Acheulean. Derevianko points out that its representative was *H. heidelbergensis*. Based on available evidence, the author traces the advance of the Acheulean to the Middle East, the Caucasus, and the territory of India, where cleavers and pick-like tools are occasionally found along with handaxes; and in Central India, Kombewa flakes have also been reported. Considering the issues of the Acheulean in Europe, Derevianko notes that the bearers of this culture could have gotten to Europe not only through the Bosphorus and the Dardanelles, but also through Gibraltar, and during a sharp drop in the level of the Mediterranean Sea, from Tunisia to the Apennine Peninsula. The Acheulean culture in Southern Europe is represented by cleaver-like tools and sometimes Kombewa flakes. However, in Northern Eurasia, only handaxes are found. This culture raises many questions; in particular, some handaxes from V.P. Lyubin's and H.A. Amirkhanov's collections, judging by the available images, can hardly be attributed to it.

From the Caucasus, the handaxe culture spreads to the north, to the Southern Urals; many sites with handaxes were found in the upper reaches of the Or, Ilek, Irgiz, and Emba rivers in the Mugodzhary Mountains. Further to the east, in Central Kazakhstan, sites with rare handaxes, and sometimes with single cleavers, form a scarce chain, stretching east to Mongolia.

The pattern of the Acheulean distribution in Central Asia is noteworthy. In the west, handaxes were spread over the Aral-Caspian region and the Caucasus; handaxes have been found not only in the Caucasus, but also in the southwest of Turkmenistan, on the Ustyurt Plateau and the Mangyshlak Peninsula, and in the Mugodzhary Mountains, to the north of the Aral-Caspian region. At the lower Syr Darya River, sites with handaxes are rare (Mamirov, 2010: 13–17).

In the foothills and middle mountains of the Pamir-Alay and the Tien Shan, no Lower Paleolithic sites with Acheulean-like industries have been identified. The buried soils in loess sections, studied by V.A. Ranov, yielded only pebble-flake industries from 900–800 to 600–500 thousand years old. Similar artifacts were

reported from the foothills and middle mountains of Southern Kazakhstan. It is possible that the regions of the upper reaches of the Amu Darya and Syr Darya rivers were rather densely populated by representatives of the first migration wave from Africa by the time when humans with the Acheulean culture reached this area. Therefore, the *H. heidelbergerensis* tribes passed over these territories. Anatoly Derevianko assumes that in the Middle Acheulean period, a branch of the *Homo altaiensis* diverged from the *H. heidelbergensis* genetic pool; *Homo altaiensis* tribes moved eastwards through Central Asia and reached the Altai.

Kuldara, the oldest Paleolithic site in the south of Central Asia, is located not very far from the most ancient sites in the Soan River basin, aged 1 mln years or more, although A.P. Derevianko considers these dates to be overestimated. Anyway, during the warm Günz-Mindel Interglacial, the oldest *H. erectus* tribes from South Asia could have reached the north of Central Asia and arrived to Karama in the Altai 800–700 ka BP. No Acheulean sites proper have been recorded in the Altai to the north of Torgalyk, studied by S.N. Astakhov. In terms of morphology and typology, the Torgalyk artifacts are very close to the finds from contemporaneous localities in the Mugodzhary Mountains.

By the beginning of the Middle Paleolithic, all areas inhabitable for early hominins were occupied. Then, a fundamentally new stage in the evolution of humans and their culture began. Selected pebbles were used for grinding, softening and crushing the products of gathering—grains, seeds, rhizomes, and stems of plants. V.P. Lyubin, in his publication on the Mousterian culture of the Caucasus, reported the occurrence of fish bones in the cultural layers of some caves. Recently, the information about numerous fish bones found in almost all cultural layers at Gesher Benot Ya'aqov Cave, in the Jordan valley, dating back to 800–600 ka BP, appeared. The analysis of the remains of fish heads showed that inhabitants of the cave were engaged in regular fishing; they baked fish on coals in the way that fishermen cook it today (Zohar et al., 2022). Such obvious traces of fishing in Central Asia during the Paleolithic have not yet been found.

During the Middle Paleolithic, or in the Mousterian, the territory of Eurasia (up to the Altai and the Tien-Shan) was settled by the Neanderthals, and there appeared specialized stone tools: burins for processing solid organic materials, knives for cutting meat, and bone burnishers for dressing skins.

In the foothills of the Levant, as I believe, the local type of Neanderthal man, with the genome showing traces of gene flow from early *Homo sapiens* from Africa, has apparently been formed rather early. In the Middle East, these evolutionary processes possibly began earlier than in other parts of Eurasia.

I consider it premature to discuss the results on the Middle Paleolithic developments proposed by Anatoly Derevianko, although in the fall of 2022 I have already received from him volume V, full of new observations and ideas. As far as I know, volume VI is being prepared for publication.

The style of the author of the multi-volume series under discussion is characterized by returning to the topics previously stated by him; he continues to develop these topics on the basis of discoveries of recent years, complementing and correcting his earlier conclusions. Not every researcher follows such an approach.

Noteworthy are some issues that arise in reading the first four volumes of the Derevianko's extensive study. One of them concerns Australopithecus. According to a well-known hypothesis, life in the savanna was full of dangers, which awaited upright walking primates. They were able to survive solely owing to socialization patterns that originated in some primate populations. For example, a male, having become a father, began to take care of the offspring, protect and feed them and their mother. Only such couples left heirs. If we assume that the first humans differed from apes in their ability to make stone tools, then we can suggest that humanism-based family life was formed long before the invention of wooden and lithic tools. Thanks to the family, humans began to produce first tools, which required the elaboration of methods and means of storing and transmitting information. This is where technology training began. The first tool was a stick that could be processed only by a stone. That is, Australopithecus can be called proto-human. These assumptions are supported by the famous traces of a mother and child preserved on the surface of petrified volcanic ash in Africa. Australopithecines invented more than just the human family. They settled all Africa and, judging by the recently discovered Australopithecus bones in China, also the southern part of Asia. Notably, stone tools of Dmanisi humans do not show signs of retouch, while those of *Homo habilis* were processed by primitive retouch.

Populations of some Australopithecus species apparently consisted of already socialized individuals, which differed from animals in having a developed signaling system. This system made the community a complex social organism, without which the invention and development of tool-making technology would have been impossible; human culture was developed on the basis of a complex of skills and knowledge transmitting methods.

Human relationships took a long time to develop in Australopithecine communities: from *Australopithecus*

garhi to the first *Homo*. Recently, at the Nyayanga site in Southwestern Kenya, in the earliest layer aged 3.032–2.581 Ma BP, a culture-bearing horizon was identified. Along with numerous fragments of mammal bones, this horizon revealed 330 coarse stone items made of rhyolite and quartzite, as well as two teeth of Paranthropus. Thus, the early lithic industries of Africa were practiced not only by *Homo erectus* and *Homo habilis*, but also by more primitive Paranthropus (Plummer et al., 2023).

Communities of early hominins were apparently formed not only through ancestral ties, but also on the basis of information about typical situations that required appropriate solutions. They might have also produced wood, bone, leather and stone goods, of which only stone products survived until nowadays.

The question of the effect of raw materials on the technology and typology of stone tool production has long been discussed. I see the answer to that question in the expansion of experimental studies with the rocks that were available to ancient humans inhabiting a specific site within the area of their subsistence cycle.

The above issue is related to migrations and relationships between small tribal communities of ancient hominins. As was previously assumed, they had all forms of friendship and enmity recorded in history and ethnology. In recent years, thanks to the methodology developed by S. Pääbo, it was found out from the Altai materials that ancient people actively maintained marital ties with neighboring communities. According to ethnographic observations, girls of all nations choose a stranger as a marriage partner when there are several candidates. It is not reasonable to consider the relationships between various groups of ancient hominins through similarities and differences in the typology of cores, flakes, and tools. Despite the great abundance of available isotropic stone rocks that were used for the production of several known forms of cores and no more than two dozen types of tools, researchers often draw conclusions about the kinship of lithic industries that are very distant from each other. This gives rise to ideas about cultural migrations over thousands of kilometers. Apparently, there is no reason to completely deny such migrations. In ancient times, migrations took place on the Eurasian continent from west to east. In the west, especially in the Mediterranean regions, population density was always higher than in the northeast.

Another debatable topic is connected with the known burials of ancient hominins. The earliest mass burials of bones of the deceased are known in Sima de los Huesos Cave in Spain, dating back to ca 500 ka BP, and in Zhoukoudian Cave (burials of skulls) ca 300 ka BP. In the Rising Star cave system in Africa, specially made burials of *Homo naledi* were discovered, dating back to 236–335 ka BP (https://naked-science.ru/article/anthropology/homo-naledi-mogli-polzovatsya-ognem). Funerary rite of Neanderthals emerged in the Middle Paleolithic. The burials of early *Homo sapiens* in the caves of the Klasies River valley in southern Africa also pertain to this period. Many researchers argue that religious ideas based on ordinary human feelings emerged in the Paleolithic. Religious doctrines were developed considerably later. Burial of a deceased loved member of a family was a reaction to a disaster. For each of us, the death of a loved one is the greatest loss. This irreparable loss causes a desire to preserve the remains of the deceased, and the memory of this person gives rise to the illusion that he has gone to another world (because he appears in our dreams). This is how the idea of the otherworld was formed. The hope for an afterlife, which is well known from the mythology of all ancient peoples, helps to get over the grief of loss.

In conclusion, we would like to note the great success of Anatoly Derevianko in establishing a friendly team of talented youth and ensuring the archaeological studies at the highest methodological level. Thanks to the work of his students in the late 20th to early 21st centuries, important discoveries were made in the Altai. Stunning findings about the family relationships of Neanderthals in the Chagyrskaya and Denisova Caves have been made under the leadership of A.P. Derevianko.

The discussed multi-volume generalization, providing a wealth of details, raises completely new and often unexpected questions that change the scholar's line of thought. Apparently, not all readers of the Derevianko's series *Three Global Human Migrations in Eurasia* will agree with his conclusions. These books address fundamental issues of the origin of the genus Homo, dispersal of humans over the continent, their material and spiritual culture in the Pleistocene, and evolution of anatomically modern humans, and are based on the findings of the most recent archaeological, anthropological, genetic and other scientific studies. This series is the first generalization of this kind in the world literature, which is made not by a large group of authors, but by a single researcher, and it undoubtedly makes an important contribution to the study of ancient human history.

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