

THE PLEISTOCENE SETTLEMENT OF THE TRANSCAUCASUS BY HOMINIDS

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1. INTRODUCTION

The aim of this paper is to discuss issues surrounding the earliest human occupation of the Transcaucasus, as well as to examine co-evolutionary problems of the main stages of the cultural processes and environmental changes of the territory of modern Georgia during the Pleistocene.

Georgia lies between the major Caucasus ridge to the north, the Minor Caucasus ridge to the south, the Black Sea to the west, and the Kura-Araks plain to the east. Physiographically, the country is divided into Western Georgia, with warm and a humid Mediterranean climate, and Eastern Georgia, where the climate is more continental. The Western and Central Caucasus lie at the northern periphery of the subtropical climatic zone. Georgia's complex topography of river valleys, foothills, and mountains is mirrored in the strict altitudinal zonality of its biotic resources, and the country contains all climatic zones from coastal to high mountainous ones.

2. BEFORE HUMANS

The Caucasus was already occupied by anthropoids. The primate teeth found within Miocene deposits in Eastern Georgia belonged to forms like *Dryopithecus fontani* (Andrews *et al.* 1996). Earlier these finds were described as the new species *Udabnopithecus garedziensis* (Burchak-Abramovich and Gabashvili 1945).

The several faunal localities have shown the richness of the territory with animal communities entirely Pliocene. Especially interesting are the faunal turnovers from the Middle Pliocene. At this time (the second part of the Middle Akchagylian), in Transcaucasia, as in all ancient Mediterranean regions, cooling took place. At the same time the Hipparion extinctions occurred. The last Hipparion was found at the site of Kvabebi (Gabunia and Vekua 1981, Gabunia *et al.*, in press). The next stage is marked by the appearance of the first *Equus* at the site of Diliska (Gabunia *et al.*, in press). This complex is the direct forerunner of the Dmanisi fauna which will be discussed in more detail below.

3. FIRST HOMINIDS

At the end of the Pliocene, Transcaucasia was, in a way, a geographic outpost of Asia Minor. It was isolated from the west and east by the Kujalnikh and Akchagyl seas and from the south by the Caucasian range, the northern mountains of which were washed by the waters of the Manich Strait. The Kura Strait of Akchagyl, which was altered at the beginning of the Pleistocene by the Apsheron basin, occupied a vast territory of East Georgia, creating bordering prevailing landscapes of middle and lower mountain masses broken down with rather deep valleys and ravines. The favorable environments with abundant food and water resources, numerous natural shelters were apparently attractive to hominids, who occupied Georgia during the entire Paleolithic and left behind hundreds of sites.

3.1. NON-ACHEULEAN INDUSTRIES

The site of Dmanisi (1000 m asl), located 80 km south of Tbilisi, contains the earliest evidence for hominid occupation (Djaparidze *et al.* 1989). The site has yielded primitive cobble tools, abundant faunal remains and a hominid mandible exhibiting features of *H. erectus* (Gabunia and Vekua 1993, Brauer and Schulz 1996). It is linked with ancient *H. erectus* of the African continent (Gabunia and Vekua, *ibid.*). The faunal remains of species such as *Struthio* *Miomys reidi*, *Kowalskia* sp., *Pachycrocuta perrieri*, *Cervus perrieri*, *Cervidae* cf. *Arvernoceros*, *Gazella* cf. *borbonica* and *Giraffidae* cf. *Paleotragus*, confirm that Dmanisi is older than the Late Villafranchian. The assemblage also contains forms which are observed during the entire Villafranchian: *Archidiskodon meridionalis*, *Megantereon cultridens*, *Homotherium crenatidens*, *Ursus etruscus*, *Equus stenonis*, *Dicerorhinus etruscus* (Vekua 1995).

The current radiometric, polarity and geological data are not in contradiction to the biostratigraphic position of the Dmanisi fauna. We think that the formation of the lowermost cultural levels of the site began very close to the time range 1,7-1,6 mya.

The site of Akhalkalaki is located about 50 km from Dmanisi (1600 m asl) in the same volcanic region. It was known as a faunal locality with the remains of *Archidiskodon meridionalis*, *Megantereon cultridens*, *Homotherium crenatidens*, *Ursus etruscus*, *Hippopotamus*, *Equus stenonis*, *Dicerorhinus etruscus*, etc. (Vekua 1987). During recent excavations, flakes were discovered (Gabunia *et al.* 1994, M. Gabunia, pers. comm.). Biostratigraphically, the Akhalkalaki fauna are younger than at Dmanisi and clearly correspond to the gallery fauna of Europe.

Until now, only a small part of site has been excavated, and the relationship between stone tools and bones remains unclear.

3.2. ACHEULEAN SITES

The Central Caucasus contains the stratified cave sites of Kudaro and Tsona, found respectively at elevations of 1580 m asl and 2,150 m asl.

The lowest cultural layers at both sites contained primarily bifaces dating to the Middle Acheulean. Lithic assemblages of Kudaro consist of choppers, chopping tools, bifaces, and scrapers (Liubin 1989).

While both the lithic artifacts and the faunal remains from Kudaro are similar to those from Tsona, with warm-loving taxa predominating, faunal remains display more diversity at Kudaro. For example, the Acheulean levels contain *Macaca cf. sylvana*, *Ursus cf. thibetanus*, and *Dicerorhinus etruscus brachygnatus*. In the latest publication, it was suggested that the lower layers of Kudaro are older than at Tsona (Liubin and Bosinski 1995). These authors date them to an older stage of Middle Pleistocene. Upper Acheulean layers of Kudaro and Tsona are considered to correspond to the later part of the Middle Pleistocene.

In spite of these cave findings, the majority of the Acheulean tools recovered in Georgia to date come from surface collections in vast areas from 200 m to 2300 m asl. In the coastal region near Sukhumi, the Achelean localities Iachtkva and Bitskhi are found on the marine terraces. Open-air sites with undisturbed cultural levels are very rare. One of these, Ziari in Eastern Georgia, was found at the elevation 900 m asl. The abundant lithic material is assigned to the Middle Acheulean. The lack of paleontological material makes paleoenvironmental reconstructions and biostratigraphic correlations impossible (Bugianishvili 1991).

It should be mentioned that it is difficult to find a region in Georgia without findings of Acheulean tools.

Several Acheulean sites are known from high mountainous regions, e.g., the sites of Chikiani and Persati. Unfortunately, the rich collections of bifaces, cleavers, and flakes have no stratigraphical context (Kikodze 1986; Kikodze, pers. comm.)

3.3. HUMAN PALEOECOLOGY

The character of lithic catchment is similar in all these sites. The hominids used as raw material pebbles from nearby rivers. In Dmanisi, all tools were made of materials from the Mashavera and Pinesauri rivers which were running several meters away from the site. In Kudaro, the artifacts were manufactured from the rocks of the adjacent area (Liubin and Bosinski 1995). Finally, all other Acheulean sites are situated in direct association with raw materials. Below we will try to reconstruct the paleoenvironment during the formation of the Dmanisi site where our current research is being carried out.

The Dmanisi hominid lived near the lake formed after the volcanic eruption. Excavations in Dmanisi are still in beginning stages so we do not yet have complete information about the ecological structure of the fauna. At present, of the total number of specimens in the Dmanisi complex, 30% are Artiodactyla, 27% are Rodents and Lagomorphs, 22% are carnivores and only 9 % are Perissodactyla (Gabunia *et al.* 1996; Gabunia *et al.*, in press). Probosidea and other groups of animals are more poorly represented. In terms of percentage of separate ecological groups by number of individuals, the majority are inhabitants of open and half-open landscapes (steppe and forest-steppe) - 52.7% from the total number of individuals (134) and 45.2% from the total number of bone specimens.

14% of the individuals are forest inhabitants whereas 22% prefer swampy habitats. Eurytopic organisms are about 14% of the total number of individuals. Thus, inhabitants of the forest-steppe ecosystem evidently dominate at Dmanisi. The great number of carnivores generally points to the wide development of the forest-steppe. Notably, in Dmanisi we have a real predominance of Felids and Canids over typical forest forms such as mustelids and bears. *Struthio*, *Ochotona* and some others indicate the importance of steppe conditions. The predominance of xerophytic landscapes is also seen in the Dmanisi reptiles and such forms as *Coluber najadum* (Chkhikvadze and Kharabadze 1995), *Hypolagus brachygnatus*, *Archidiskodon meridionalis* and others. This conclusion is confirmed by preliminary data of the terrestrial gastropods (I. Taktakishvili, pers. comm.).

However, as shown by the abundance of deer in Dmanisi (more than 80% of the common number of Artiodactyla), forest ecosystems played a great role. All the given Cervids, with the exception of *Dama nesti*, are typical inhabitant of the forests. *Sorex* sp., possibly *Dmanisibos georgicus*, and some others also belong to the forest ecosystem. All these data show that the site of Dmanisi was surrounded by wide open space with intermittent forest plots, connected mainly to the valleys.

Information about flora associations of the Dmanisi Early Pleistocene corresponds well with the interpretations of faunal material by the latter flora. The newest palynological investigations only partly support the earlier flora evidence retrieved from the coprolite in Dmanisi (Klopotovskaja *et al.* 1989) and show rich forest spectra. In probes from Layer 3 and 4, there is an absolute predominance of shrub and grass elements (*Chenopodiaceae*, *Artemisia*, *Ephedra* and others). Arboreal elements were found mainly in single pollen grains of *Betula* and *Pinus*, and only one sample produced the pollen of *Tilia*. At the same time, thousands of *Borragiaceae* seeds, *Anchusa*, *Lycopsis*, *Lithospermum* and other sorts, were present in all cultural layers of the site. The seeds of hackberries (*Celtis*) are rather frequent. They are characteristic elements of savannah flora (Leme 1974) and they are also found in the woodlands of the Caucasus and Middle Asia (Gulisashvili 1980). We do accept that hackberries and maybe the fruits of *Ephedra* were consumed by Dmanisi man. Seeds of *Celtis* are frequent in other early Palaeolithic sites, in particular Zhoukoudian (Dohnal 1961), the caves of Lazare and Terra-Amata, Tautavel and others (Bahn 1984), and we may consider them as elements in the diet of the prehistoric inhabitants. The abundance of *Borraginaceae* seeds in Dmanisi is of special interest. These xerophyte grasses are anthropophytes often found in archaeological sites of late times and they usually accompany the residences of ancient peoples in southern regions (Van Zeist 1991). A great number of grass seeds from the family

of beetroot are inedible. It seems that the Dmanisi hominid already had an impact on the vegetation of the immediate surroundings of the site.

The presence of pollen of *Abies*, *Pinus*, *Alnus* and rare *Ulmus* and *Salix* (Klopotovskaja *et al.* 1989) reflects a considerable variety of vegetation and possibly some vertical zonality. The predominance in Dmanisi of grass forms is obvious, and we have seen that it is in complete accordance with the facts of herpeto (snake) fauna as well as with the fauna of some other groups of vertebrates. It seems that the forested landscapes probably covered the latitudes of the middle mountains and the flat-bottomed valleys, where vast spaces of savannah created a mosaic vegetation. In this time in Eastern Georgia, riparian woodlands were widespread. The proximity of the Caspian Sea at the time of the Dmanisi occupation resulted in a more humid climate.

This substantially reduced resource stress during dry seasons and facilitated hominid colonization here.

The savannah environment is also indicated by organic remains from the site of Akhalkalaki (Gabunia *et al.* 1994).

The broad-leaved forest landscapes, with a warm climate, prevailed in the neighboring regions of the sites of Kudaro and Cona during the occupation of the Acheulean layers (Liubin and Bosinski 1995). The richness of archeological remains at Kudaro suggest a long-term Acheulean occupation while those of Cona suggest a more ephemeral presence, perhaps a temporary hunting camp. We think that the lack of direct evidence for subsistence activities leaves open issues concerning hunting techniques, as well as roles of scavenging in the Caucasus during the Lower Paleolithic.

4. MIDDLE PALEOLITHIC

Most Middle Paleolithic stratified sites are located in Western Georgia, in the foothill region, but undisturbed cultural layers are also represented in high mountainous caves, as well in Eastern Georgia. Unfortunately, most of the sites were investigated without using radiometric methods and the chronology is based on typological grounds. We will briefly touch on some of the most important sites.

In Western Georgia, on the Upper Imereti Plateau, mainly in Kvirila Gorge, about ten caves have been discovered with Middle Paleolithic artifacts. Most of the sites were excavated by D. Tushabramishvili (Tushabramishvili 1991). One of the most important sites is Djruchula (600 m asl). This cave contains two cultural layers dating to the Middle and Late Middle Paleolithic which are separated by sterile deposits one meter thick. Hominid remains recovered include a first molar belonging to Neandertal (Gabunia *et al.* 1961). Faunal remains from the lower level consist of cave bear remains while those from the upper level are dominated by ibex, deer and bison bones. The absence of radiometric dates prevents us from correlating

these deposits with stratigraphic schemes. It seems that the lower layers are from the oldest Middle Paleolithic in Western Georgia and were deposited before the last glacial.

Ortvala-Klde (560 m asl) contains archeological material dating to the Late Middle Paleolithic. The industry is Mousterian, and most of the production is non-Levallois (Tushabramishvili 1994). It is the only Middle Paleolithic site in this area containing few cave bear remains, with a faunal assemblage absolutely dominated by *Capra caucasica*. The geological age of the Mousterian layers is limited to the first half of the last glaciation. The upper part of the section contains Upper Paleolithic levels. Excavations are currently in progress and we hope to obtain more information, particularly geochronological data.

Several cave sites are found near Kutaisi. Five Tsutskvati caves (Bronz, Double Shelter, Bizon, Bears cave and the Upper Cave) yield rich Mousterian assemblages. Cave bears dominate, but bones of bison and *Capra* are also well represented (Vekua 1978). Excavations are in progress and we will soon have additional information.

The cave-sites of Ortvala and Sakajia are located nearby. Cultural layers with Mousterian artifacts are present. Cave bears dominate in the faunal remains (Nioradze 1994). In Sakajia, a hominid maxilla was found, linked to Neanderthals (Gabunia *et al.* 1978). In these caves, Upper Paleolithic assemblages are also represented.

Human presence in the Georgian Highlands during the first half of the Last Glaciation is in evidence in the Mousterian levels of the Cona and Kudaro caves. Faunal remains have been recovered at the sites.

In different mountainous regions of Georgia, many non-stratified Mousterian localities have been discovered (Bugianishvili 1991).

In the Black Sea region, the cave site Apiancha should be mentioned. The Middle Paleolithic levels are represented by Mousterian artifacts. Faunal remains recovered are dominated by cave bears. (Tsereteli *et al.* 1982). In the upper part of the section, Upper Paleolithic levels are represented.

In Eastern Georgia, the most well-known Middle-Paleolithic site is Tsopi. This open-air site (820 m asl) contains the Charentian facies of the Mousterian, unique in the Caucasus. Among the faunal remains, *Equus* dominates (Grigolia 1963). Radiometric dates are absent. The geological age of the sediments seems to be at the end of the Middle Paleolithic / beginning of the Upper Pleistocene. The Mousterian sites were discovered in Eastern Georgia close to the *Dryopithecus* locality. These open-air sites contain tools and unidentified faunal remains (Bugianishvili 1991).

5. UPPER PALEOLITHIC ARCHEOLOGICAL RECORD

Upper Paleolithic sites have been found only in the Western Georgian foothills. About 20 stratified cave sites are known from the Eastern Black Sea Region and from the Kvirili-Basin. These sites have been classified on typological grounds (Tushabramishvili 1991) but the lack of radiometric dates makes chronological subdivisions impossible. Most of the sites have a lithic assemblages of Oriniacian Type (Tushabramishvili 1991). In Western Georgia, no Upper Paleolithic sites are known from the coastal lowlands. Since this area was submerging at the rate of 6 mm/yr (Adamia *et al.* 1990), it is likely that the Upper Paleolithic remains there today are deeply underground. Finally, we think that the absence of known Upper Paleolithic sites in Eastern Georgia reflects taphonomical conditions, as well as insufficient archeological survey, more than the environmental factors.

6. THE LATE PLEISTOCENE PALEOENVIRONMENT

Due to the diversity of landscapes and proximity to the Black Sea, environments of the Western Caucasus featured local specificities. While the entire temperate zone witnessed radical environmental changes during the first half of the last glaciation, the Western Caucasus did not undergo extreme fluctuations and the climate remained rather cool and humid. Climatic changes did bring about the redistribution of vegetation zones but did not affect their structure. During the "Middle Würm" warming, the environment became similar to present-day conditions. The growth of glaciers resulted in temperature inversions which caused the occasional spread of birch and boreal vegetation to the lower altitudes.

A gradual lowering of the altitudinal zones began during the second half of the glaciation. The zones reached their lowest points during the Last Glacial Maximum (20000-18000 B.P.). The increased aridity of the climate led to the degradation of forest landscapes, but did not totally eliminate the warm-loving species which survived and spread widely just after the maximum.

6.1. SUBSISTENCE STRATEGIES

During the last glaciation, many regions of Georgia contained stable resources such as water, lithic raw materials, and natural shelters available for human use. Paleobotanical studies indicate that warmth-loving floral species survived in Western Georgia even during the Last Glacial Maximum and produced a number of resources which could be gathered. Today, eight kinds of nuts, about 60 kinds of edible berries and fruits, approximately 70 kinds of edible roots, and up to 160 kinds of other edible vegetable resources are known in Georgia (Grössgeim 1948). Various subtropical plants may also have constituted a significant part of human diet during the Pleistocene. The use of these resources, however, is very poorly documented in Georgia, as elsewhere.

Animal protein was a crucial subsistence resource for the hominids occupying the Caucasus.

In the Middle Paleolithic faunal assemblages, the remains of cave bears dominate (Vekua 1991). However, we think that this species was not the main prey of humans. Numerous bones of *Ursus spelaeus* could have originated from the natural deaths of these animals. No archeozoological work has yet been done to clarify this question.

The dominance of one species - *Capra caucasica* at Ortvala-Klde mirrors those recorded at a number of European Middle Paleolithic sites, which appear to be associated with seasonal hunting of a specific animal species. It should be mentioned that during the Middle Paleolithic occupation of Ortvala-Klde, at least three substantial environmental changes took place in the surrounding area (Lordkipanidze 1992), but the main hunting prey was always ibex. In Western Georgia, besides the ibex, bison was also important; fewer remains belong to deer (Vekua 1991).

In Eastern Georgia during this period, remains of *Equus* prevailed, but were rarely exploited in Western Georgia. However, the horse became an important subsistence resource during the Upper Paleolithic in the West, with the spread of the open landscapes here. It seems that, in Georgia, we have neither a high degree of mobility nor extensive sedentism of Paleolithic populations.

7. THE ROLE OF THE CAUCASUS IN HOMINID COLONIZATION PROCESSES

Due to its geographical position, the Caucasus always played an important role in paleobiogeographical processes. Today the Caucasus belongs to the Mediterranean province of Holarctic realms; here crossed the borders of the European and Middle Asian biogeographical provinces (Voronov 1963). During the early epochs, there existed a strong influence of African elements as well; in Paleogene Caucasus, there was a link between Palearctic and Tropical African realms. During the Plio-Pleistocene, faunal elements of different origins were present. In the Kvabebi fauna, tropical and Ethiopian elements including *Stuthio transcausicus*, *Kvabebihyrax kacheticus*, *Oryx* sp., and *Gazella postmitilnii*, together with cosmopolitan species, were predominant (Vekua 1972). Later, we observe a general trend of decrease of paleotropical components. But in Dmanisi, together with cosmopolitan and palearctic species, there are some African elements, including Ostrich, Hyena, Gazelle, and Giraffe. We should also mention the presence of the Hippopotamus in Akhalkalaki (Vekua 1987), Macaca in Kudaro (Liubin and Bosinski 1994). All of these examples enable us to assume extensive faunal interchanges on the territory of Georgia via the Levantine corridor during the Plio-Pleistocene.

However, while we can discuss the general characteristics of the Late Pliocene and Early Pleistocene vertebrate fauna from fossil remnants of extinct forms, we cannot necessarily do the same for fossil flora. Much of the flora continues to exist today, especially in Western Transcaucasia, where thermophilous elements were also present during Pleistocene glaciations.

The vegetation of the Caucasus is characterized by a high percentage of the endemic (20%) as well as by the presence of Tertiary relics (Grossgeim 1948).

In the late Miocene, the Caucasus was divided into two floristic provinces: Kolkheti, characterized by links with Mediterranean flora; and Girkan, closely linked genetically with East Asian flora (Shantser 1982). During the Pliocene, half-xerophile types of plants probably spread into the territory of the small Caucasus and the surrounding lowlands from the Iranian Asian region. Since the Miocene, there exists in the Caucasus vertical zonality and boreal elements (Shatilova and Ramishvili 1990).

Characteristic traits of the paleoenvironment of the Caucasus and particularly of Georgia were the co-existence of both mosaic landscapes and refugia. We have complete dominance of the elastic, resilient (see Foley 1984; Gamble 1995) paleoenvironment in Georgia during the Plio-Pleistocene.

The natural environment of the Caucasus was already rather favorable for hominid occupation at the end of the Pliocene and at the beginning of the Pleistocene. Gamble has argued that the existence of the complementary environments of plains and uplands, the southern plant and animal refugia, faunal migrations from the east, marine effect and the existence of mosaic landscapes were necessary preconditions for the permanent colonization of Europe by hominids (Gamble 1995). Undoubtedly, all these conditions existed in the territory of the Caucasus during the entire Plio-Pleistocene. It is clear that the groups of hominids who stopped here "on the gates of the Europe" found exceptionally favorable natural surroundings for their existence, which probably allowed them to establish a strong hold and later colonize adjacent regions. We will not be involved in the discussion of when the first colonization of temperate Europe took place. We think that the Caucasus was not an unsurpassable barrier for hominid movements to the north in the Early Pleistocene, except possibly, for only short periods, when the Caspian and the Black Seas were connected; the Kuma-Manich strait could have been a temporary obstacle for this process (see also Gamble 1995).

In my view, the occupation of Georgia was a continuous process. Some chronological gaps reflect the taphonomic reality of poorer preservation of materials in mountainous terrains rather than paleoecological factors limiting occupation. The idea of a one million year hiatus in hominid occupation in the Caucasus is very controversial and so is the view that the spread of tropical forests made human occupation in Western Caucasus impossible (Liubin 1997).

It should be mentioned that since the Miocene, there were no more tropical forests in Western Georgia (Shatilova and Ramishvili 1990). We also should keep in mind the discovery of Acheulean tools in Iashtuch, on the Imereti Platou, etc.

Great potential for the discovery of the Early Paleolithic sites exists in Eastern Georgia. The finds in Kotsakhuri (Vekua 1991) of collections of large mammals similar to the Dmanisi fauna call for future research.

8. CONCLUSIONS

Given the geographical location of the Caucasus, we can assume that this region served as the dispersal corridor for the hominids leaving Africa and the Near East and entering Eurasia.

Abundant archeological remains indicate continuous occupation from the Early Pleistocene onward.

Some chronological gaps reflect taphonomic reality of poorer preservation of materials in mountainous terrains rather than paleoecological factors.

Dmanisi gives us evidence of the human presence in Transcaucasia more than 1.5 million years ago.

Pleistocene climatic changes were less dramatic here than in more northerly regions of Eurasia. This resulted in greater temporal continuity of familiar landscapes with known resources throughout time.

The archeological remains in Georgia indicate neither a high degree of mobility nor extensive sedentism of the Paleolithic population.

Human adaptations in Georgia throughout the Pleistocene were organized around the altitudinal zonality which characterized this region in the past and which continues to do so today.

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