

Palaeobiology

Evolution of Paleosituation in Georgian Anthropogene

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ABSTRACT. By the beginning of Apsheron period (late Villafranchian) on the territory of Eastern Georgia, substantial change of physical-geographical conditions is outlined. Humid and moderately warm climate gives way to moderately arid one. Xerophytisation of existent landscape clearly begins to show, which naturally leads to significant reconstruction of composition of mammalian fauna. *Hipparions*, sabretoothed cats, *rhinoceros megalinus*, and others disappeared. Horses, late *Archidiskodons* appear, finally forcing out anancoid mastodons. Essentially new faunistic complex is being formed, the main representatives of which constitute the core of Quaternary fauna of Caucasian mammals. © 2011 Bull. Georg. Natl. Acad. Sci.

Key words: Apsheron, climate of Eastern Georgia, mammalian fauna.

Introduction. Apsheron period, rather, its first half, is characterized by Kotsakhuri and Tsalka faunas of terrestrial vertebrates in Georgia. The former, consisting of *Archidiskodon meridionalis taribanensis*, *Dicerorhinus* cf. *etruscus*, *Equus stenorhinus stenorhinus*, *Camelus* sp., *Protoryx* sp., *Leptobos* sp., *Struthio* cf. *transcaucasicus*, *Emys orbicularis* sp., *Testudo* sp. [1, 2] points at undoubtedly more arid conditions than those characteristic of the Akchagil period, when Kvabebi fauna inhabited Eastern Georgia [3]. A characteristic feature of cryptogamic-pollen complexes of Kotsakhuri is nearly equal ratio of pollen of arboreal and grassy vegetation. *Platanus* L., *Alnus* and *Pinus* are dominants in arboreal vegetation. Grassy vegetation is present in more variety, but cereals (up to 47%) evidently dominate in it. There is much pollen of *Chenopodiaceae* and *Artemisia*. Cryptogamic-pollen spectra of different grasses are mainly formed owing to pollen of representatives of *Compositae*, *Leguminosae*, *Umbelliferae*, *Ranunculaceae* and others. Cryptogamites are almost wholly represented by one-rayed *Polypodiaceae*. On the whole, data of cryptogamic-pollen analysis testify that Kotsakhuri fauna existed in the conditions of forest-steppe landscape of savannah type; at the same time, the leading role seems to have belonged

to steppes, where cereals were obviously predominant. Forests, more likely, grew in the river plains, in humid valleys and hypsometrically higher places [2, 4].

The climate of Eastern Georgia was closer to Mediterranean at that time, which was characterized by soft and relatively humid winter period and hot arid summer [4].

The fauna of Tsalka is close to that of Kotsakhuri by its composition and, probably, is somewhat younger than it. Forms of *Archidiskodon meridionalis*, *Equus stenorhinus*, *Eucladoceros* sp., *Dama* aff. *nestii*, *Cervus* sp., *Leptobos* sp., *Canis* aff. *etruscus*, *Homotherium* sp. enter its composition [5]. These faunas, supplementing each other, are characteristic of the same stratigraphic level, comparable with lower Apsheron. Paleopalynological data, obtained from bone-bearing sediments of Tsalka, point to the predominance of steppe landscape (dominance of *Chenopodiaceae* and *Artemisia*) and conditions of relatively dry climate.

We know very little about terrestrial vertebrates of Middle and Late Apsheron, but it should not be ruled out, that recently found separate remains of vertebrates in the seaside zone, unfortunately not having secure stratigraphic anchor, belong to the highest strata of this layer.



Fig. 1. View of Akhalkalaki

The fauna of mammals of Lower Pleistocene is well known in Georgia. It is the complex of Akhalkalaki [6, 7], timed to inter-lava lake sediments of Akhalkalaki suite (Upper Pliocene – Lower Pleistocene).

It must be noted that new type of original horse from Akhalkalaki, described by A. Vekua, was singled out by I. Kuzmina a paleontologist from Saint-Petersburg (1997) as a new subgenus, the horse of Vekua. *Hippopotamus* of Akhalkalaki, called Georgian *Hippopotamus* (*Hippopotamus georgicus*), by Alter differs from modern forms by larger sizes and peculiar articulation of metacarpus bones of wrist.

Erinaceus sp., *Lepus europaeus*, *Citellus* aff. *citellus*, *Marmota* sp., *Canis tengisii*, *Crocuta* cf. *sinensis*, *Ursus* sp., *Vormela peregusna*, *Lutra* cf. *lutra*, *Meles meles*, *Panthera* cf. *tigris*, *Panthera* sp., *Mammuthus* aff. *trogotherii*, *Archidiskodon* sp., *Equus süssenbornensis*, *Eq. hipparionoides*, *Dicerorhinus*, *etruscus*, *Hippopotamus georgicus*, *Praemegaceros verticornis*, *Sinoreas* sp., *Capra* sp., *Bos* sp., *Bison* sp. enter the composition of Akhalkalaki complex.

From faunistic complexes of the European part of the former USSR the Tamanian reveals most closeness to Akhalkalaki complex, though it has a somewhat more archaic look, perhaps, conditioned not so much by the difference of geological age, as of ecological environment.

Among the faunas of Western Europe those of Forest-Bed, Abbeville, Sona, Süssenborn, Ponte-Galera and others are rather close to Akhalkalaki fauna in composition. The community of forms, peculiar to the beginning of Pleistocene, draws the Akhalkalaki fauna close to all these complexes. Differences mainly appear in the predominance of Asian element (*Crocuta*, *Vormela*, *Panthera* and others) and in the presence of endemics, perhaps conditioned by partial zoogeographical isolation of the territories of the South Caucasus.

Judging from the composition of the Akhalkalaki faunistic complex, it can be assumed that in the time of Early Quaternary period open landscapes, with small reservoirs here and there, rich in littoral thickets, dominated in the territory of South Georgia and adjacent regions of the South Caucasus. The climate must have been warm or moderately hot [7]. Specifically, finds in bone-bearing layers of fruits of xerophytic plants *Lithospermum arvense* and *Celtis glabrata*, as well as of shells of terrestrial mollusks *Jaminia pupoides* ad *Helicella* (*Xeropicta*), being inhabitants of present day steppes and semi-deserts of the Near East and the South Caucasus, testify to this [8].

By the Middle Pleistocene in Georgia, especially, in its Eastern part, obvious change of natural conditions is observed, revealed in a relative fall of temperature and

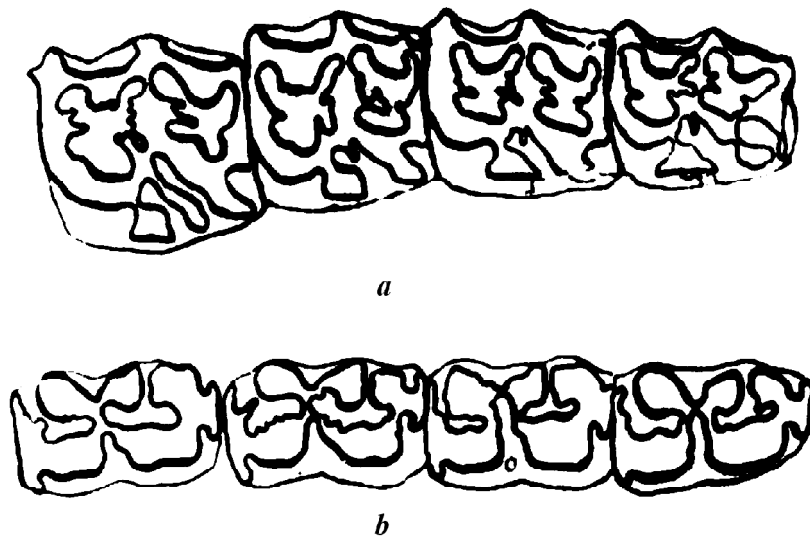


Fig. 2. Akhalkalaki. *Equus hipparionoides* Vekua. a. P⁴-M³. b. P₃-M₂.

increase of climate humidity, which could not but have an effect on the composition of the fauna of vertebrates spread there. In Eastern Georgia faunas of Zemo Orozmani and Akha belong to Middle Pleistocene, containing *Marmota* sp., *Panthera* cf., *spelaea*, *Crocota spelaea*, *Equus caballus strictipes*, *Cervus elaphus*, *Dama* cf. *mesopotamica*, *Megaloceros* sp., *Bos* cf. *primigenius*, *Ovis* sp. and others. Presence of *Dama*, *Cervus elaphus*, *Bos* *primigeniu* and other forest forms evidently testify to the afforestation of that territory, where in Early Pleistocene inhabitants of dry stations prevailed, in the Middle Pleistocene.

Middle Pleistocene fauna of vertebrates in Western Georgia is mainly known according to material from cave dwellings. First of all, these are Acheulian dwellings Kudaro I, III and Tsona, the cultural layers of which contain numerous remains of vertebrates. *Ursus spelaeus*, *Bison*, *Cervidae*, *Capra caucasica* dominate in this fauna. Fauna of predators is diverse (*Panthera spelaea*, *Panthera pardus*, *Cuon*, *Canis lupus*, *Vulpes*, *Meles*, *Martes*, etc.). Fauna of Rodentia is also rather rich. The presence of the following animals is attested to here – *Marmota bobac*, *Hystrix vinogradovi*, *Allactaga* sp., *Ellobius* sp., *Cricetulus migrotorius*, *Mesocricetus raddei*, *Prometheomys schaposchnikovi*, *Clethrionomys* sp., *Lagurodon arancae*, *Rombomys* sp. and others. According to isolated finds, *Dicerorhinus etruscus brachicephalus* [9], *Megaloceros* sp., *Alces alces* and others are defined. Presence in this Acheulian fauna of *Macaca* cf. *silvana* [10], being yet the only monkey found in the leistocene of the former USSR, is of special interest.

Ecological analysis of the Acheulian fauna of Western Georgia shows that it was mainly formed of inhabitants of Near Eastern plateaus (*Hystrix*, *Meriones*, *Ellobius*

and others), characteristic of arid stations, and of such typical forest forms as *Cervus elaphus*, *Capreolus*, *Alces*, *Meles*, and others. On the whole, this fauna reflects conditions of relatively humid and moderately warm climate, predomina during the Middle Pleistocene on the territory of Imereti Plateau and adjacent territories of Western Georgia [11].

The following stage of development of vertebrate fauna of Georgia is connected with the beginning of the

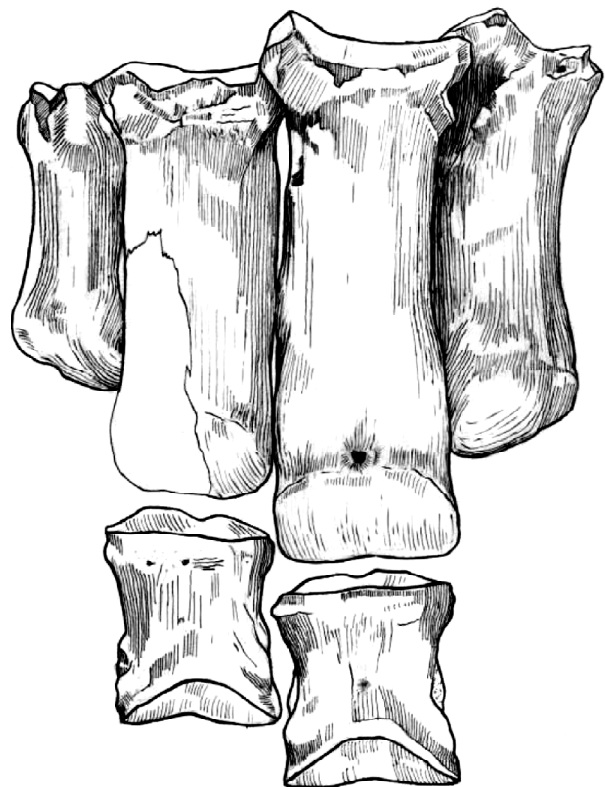


Fig. 3. Akhalkalaki. *Hippopotamus georgicus* Vekua. Hand (dext.).

Upper Pleistocene. In essence, this is the fauna of Moustier and Upper Paleolithic period, timed almost exclusively to cave dwellings of the ancient humans.

On the territory of Eastern Georgia Moustierian fauna is most fully represented at the site of Tsopi (*Marneuli district*), where it contains the following species: *Canis lupus*, *Ursus* sp., *Lepus europaeus*, *Ochotonoides transcaucasica*, *Rhinoceros* ., *Equus caballus strictipes*, *Eq. cf. hydruntinus*, *Cervus elaphus*, *Capra cylindricornis*, *C. aegagrus*, *Bison priscus*. *Bos* cf. *primigenius*, *Ovis* sp. and *Marmota* sp., separate remains of which are found in many Upper Pleistocene burials, should be ascribed to it as well.

It is remarkable that *Ursus spelaeus*, the most peculiar element of Moustierian fauna of Western Georgia, is absent in this fauna. There is no elephant in Tsopi fauna, which, probably, had already been extinct by the Upper Pleistocene here. At the same time, inhabitants of arid and open landscapes (*Equus*; *E. caballus*, *E. hydruntinus*, *Ovis*, *Ochotona* and others) are richly represented in it.

The fauna of the same age of Western Georgia substantially differs from the discussed fauna. According to kitchen garbage of Moustieian man, inhabiting the caves of Sakazhia, Tsona, Kudaro, Tsutskhvati, Apiancha, Belaya etc, this fauna is very rich and diverse. In many respects, it is similar by its composition to the already discussed Acheulian fauna of Western Georgia, but at the same time, there are important differences: in the Moustier fauna of Western Georgia *Equus caballus* appears for the first time, importance of *Ursus spelaeus* as game animal evidently decreases, the lot of *Carnivora* considerably increases, though *Ursus spelaeus* still keeps a dominant position; representatives of Near Eastern faunas began to play an important role, as revealed in the appearance of relatively xerophytic elements (*Vormela*, *Hystrix*, *Meriones*, *Equus*, *Ochotona*) on the plateau of Imereti.

It is remarkable that *Alces*, *Mammuthus*, *Coelodonta antiquitatis*, *Lemmini*, *Ovibos moschatus* and other representatives of boreal faunistic complexes, characteristic

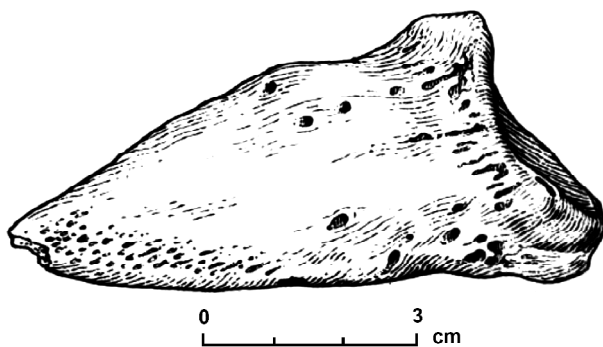


Fig. 4. Tsutskhvati. *Alces* sp. Phalanx III.

of Late Pleistocene faunas of the Russian plain are absent.

Some specialization of hunting is already outlined in the Mustier epoch in Georgia. one or another group of animals becomes a favourite object of hunting of the Neanderthals of Georgia according to location of Moustieian side. Thus, in Upper Imereti (Sakazhia, Samertskhle Klde, Bronzovaya, Verkhnyaya, Belaya, Dvoynoy Grot etc) bones of *Ursus spelaeus*, *Capra caucasicus*, *Bison* prevailed in kitchen garbage. At sites of the Black Sea littoral (Apiancha, Kholodnyi Grot, Okumi) there is abundance of remains of *Sus scrofa*, *Capra aegagrus*, *Cervus elaphus* and especially many remains of large *Cricetus* (Apiancha, Kholodnyi Grot). At Moustier site of Tsopi (Eastern Georgia) remains of large South Caucasian *Ochotona* predominate, which local Moustieian certainly used as a food, just as ancient inhabitants of caves of Apiancha and Kholodnyi Grot used *Cricetus*.

Ecological peculiarities of representatives of Moustier and Upper Palaeolithic faunas of Western Georgia testify to the dominance of conditions of moderately warm and relatively humid climate.

Results of palynological researches, conducted in the caves of Sakazhia, Jruchula, Tsona, Kudaro, Tsutskhvati, Apiancha [12-14] indicate the wide development of forest formations, consisting mainly of broad-leaved mesophilic species (*Fagus* L., *Carpinus*, *Quercus*, *Castanea* etc).

It seems that in mountainous regions representatives of coniferous species (*Pinus*, *Abies* and others) predominated and open spaces with meadow-shrubby thickets occupied comparatively limited areas. It should be noted that in the studied cryptogamic-pollen complexes nearly all main taxa, forming present forest cover of Kolkheti, are present, which testifies to relative stability of conditions of flora development on the territory of Western Georgia from Moustier to the present day [15]. Data on Pleistocene Uzunlari flora of Tskaltsminda (Kolkheti), most representatives of which still participate in the formation of the vegetative cover of Western Georgia, being at the same time edificators of local forest, testify the same [16].

There is an opinion, based on analysis of the process of lithogenesis and some data of paleopalynology, that in the second half of the Pleistocene of Western Georgia, rhythmical alternation of climate cycles, consisting of relatively warm, prolonged and colder short phases, are observed [17]. But it should be noted that if such alternation of climate conditions really had existed, it was not so important, as to affect the process of development of physic-geographic situation in Western Georgia substantially. It is remarkable in this regard that fauna of verte-



Fig. 5. Satsurbliia. *Alces* sp. mandible.

brates had not experienced any noticeable reconstruction during this time.

The idea had been expressed for a long time that the territory of the South Caucasus constituted a part of a vast region of supposed formation of the human being [18]. Later this idea was confirmed to a certain extent by finds of the mandible of ancient human, called *Azykhanthropus*, in Middle Acheulian layers of Azykh (Azerbaijan) [19], and fragment of skull of paleoanthrop in alluvial sediments of the terrace of the river Razdan (Armenia), supposedly dated as Middle Acheulian as well [20].

The hypothesis of Debets and others got serious confirmation due to the discovery of a mandibles unique site with remains (skulls, lower jaws) of hominids oldest in Eurasia, Villafranchian fauna of vertebrates and primitive stone tools in Dmanisi (Eastern Georgia). The discovery in Dmanisi is almost the most notable event in paleoanthropology since the times of outstanding finds of early *Pithecanthropus* in Kenia. The antiquity of Dmanisi finds (1,85 mln years) is confirmed by biostratigraphic, archeological and paleomagnetic methods of investigation, as well as by numbers of isotopic age.

It can be said with certainty that the creator of Dmanisi stone industry, the oldest beyond the limits of Africa, Dmanisi hominid, allows to consider this region as one of the possible hearths of initial origin and settlement of hominids in Eurasia [21]. Fauna of vertebrates, accompanying stone inventory, is in complete agreement with its considerable antiquity. It is undoubtedly older than the faunas of the Ubeidi, Middle Acheulian Azikh and Early Pleistocene Akhalkalaki, meeting, more likely, the highest strata of Villafranchian (MN17). Palynologic data of bone-

bearing sediments of Dmanisi indicate the mosaic character of landscape, undoubted spread of various forest formations, combined with open stages of meadow-shrubby formations. It should be added that according to the isotopic method, the Dmanisi sediments are dated as 1,85 million years.

As early as in 1961, from Moustieian layers of the cave dwelling of Jruchula the upper first molar, belonging to an adult individual, was extracted. Judging by a series of morphological features (considerable sizes, massivity, character of root junction, strong skewness of transverse axis, observable taurodontism etc.), this tooth was presumably ascribed to Neanderthal [22]. Later, in bronze cave of Tsutskhvati, in a Moustieian layer, a slightly worn upper left molar was found, belonging to a child of about 8 years. Combination of such peculiarities in the structure of this tooth, as high degree of taurodontism, presence of anterior and posterior pits, solid and comparatively high skew comb, development of additional prominence on the distal crest of protocone, rather large hypocone etc, point to closeness of Tsutskhvati man to Neanderthal man as well [23].

Finally, in the Moustieian layers of Sakazhia cave, a series of isolated teeth and fragment of alveolar section of the left half of the upper jaw with four mildly worn teeth (C, P1, P2, M1) were found. According to the degree of wear, the piece of jaw was ascribed to a young individual (not more 25). We shall remind the reader some of the peculiarities of the structure of the facial part of the skull of the man from Sakazhia: noticeably thickened anterior surface of alveolar section, almost complete absence of traces of dog pit, rather considerable sizes of upper jaw sinus, formation of which, as Kheim (24) showed, depends on reduction of canine pit. Palate is relatively flat, which,



Fig. 6. Apiancha. *Phoca caspica* mandible.

perhaps, is connected with the presence of well developed maxillar sinus. Arch of palate is high, and does not yield to Rhodesian in this respect. Of its other features a considerable inclination of anterior surface of alveolar section can be pointed (line, connecting prosthion with nasospinale, forms angle up to 70 % with tangent and alveolar edge), indicating noticeable alveolar prognathism, pronounced, perhaps, in larger degrees than in some Neanderthals and, namely, in many people from Spa and La Chappelle-au-Seine. Alveolar arch has the form close to parabolic, reminding the same in Palestinians (Skhul Y) and some other paleoanthropuses [25].

On the whole, the Moustieian man from Sakazhia is close to typical Neanderthals, though its relatively narrow nose, mainly characteristic of neoanthrops, and, possibly, several Palestinian paleoanthropuses, somehow distinguishes it.

The teeth of the individual from Sakazhia and other Western Georgian Moustieians are characterized by large sizes, massiveness, high degree of root junction, clear taurodontism and by some other features, observed in other Neanderthals.

Certainly, it is difficult to judge with confidence on the place of Western Georgian Moustierians in the system of paleoanthropuses, having only very scanty information. The presence in it, side by side with obviously Neanderthaloid peculiarities, of such features as high arch of palate, characteristic of Rabatian, possibly, Palestinians and others, and relative narrowness of pyriform opening, more peculiar to early neoanthrop and, apparently, some Palestinians, indicates, perhaps, some isolation of this paleoanthropus. It is not excluded, that in some extent it represented parallel to Palestinians branch of paleoanthrops, living in peculiar conditions of ancient Colchis.

In conclusion, we consider it interesting to refer to the rather vast material accumulated over the last years, allowing us to assume the development of rudimentary forms of religion (magic, cult of animals etc) with Western Georgian paleoanthropuses supposedly (Moustieians). Namely, the facts of burial of *Ursus spelaeus* in caves of Kudaro [10], Tsutskhvati [26] and Kvachara [26, 27] point to this. Moreover, the upper cave of the Tsutskhvati system seems to have an entirely religious purpose, to which the following facts point: the cave contains weak cultural layers, in which only 14 stone objects and numerous, mostly unbroken bones of various animals are found; the cave was not used for permanent inhabitation (its area is too small and could not have been used for living). Neither could it have been a hunting camp, nor temporary refuge (there is no production garbage in habitation layers); the entrance to the cave was half blocked by dry laying of stones, heaped on each other in disorder; whole skulls, mandibles and bones of extremities of *Ursus spelaeus* were fixed on the side walls of the cave. The foregoing allows to assume that this cave had really been used for a religious purpose, where some ritual ceremonies were performed.

პალეობიოლოგია

პალეოგარემოს ევოლუცია საქართველოს ანთროპოგენში

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ანთროპოგენის დასაწყისისათვის (აფშერონი) საქართველოს ტერიტორიაზე ამჟამად შეიმჩნევა პალეოგეოგრაფიული გარემოს ცვლა. თბილი და ნოტიო ჰავა ადგილს უთმობს ზომიერად მშრალ კლიმატს. ამჟამად გარემოს ქსეროფიტიზაციის გაძლიერება. სათანადოდ იცვლება ხერხემლიანთა ფაუნის შემადგენლობა. ფაუნიდან ქრება სამთითა ცხენი-ჰიპარიონი, ხმალკბილა ვეფხვი, ჟირაფი, მასტოდონტი. მათ ნაცვლად ფაუნაში ჩნდება კაბალოიდური ცხენი, და სამხრეთის სპილო — არქიდისკოდონი. ფაუნა თანამედროვე იერს იღებს.

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