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Human adaptation in the mountain environments of the Caucasus during Upper Palaeolithic and Mesolithic

ABSTRACT

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The Author proposes the first approach to model of human adaptation to mountain environments in the Caucasus during Upper Palaeolithic and Mesolithic. The model is based principally on the materials of Kolkhidian refuge where there are about 90 per cent of all the Upper Palaeolithic and Mesolithic sites known today in Caucasean region. According to these data, glacial and climatic factors predetermined changes in settlement system, use of different cave types, economic activities and also were conducive or laid obstacles to cultural contacts between the populations of Northern Caucasus and Transcaucasia. Adaptation to conditions of caves may be seen in variable situation of life centres, in position and types of bonfires and hearthes. Adaptive innovations are marked in hunting and fishing. For peculiarities of adaptation in Upper Palaeolithic and Mesolithic be more evident, the Author used at times the data of more early epochs of stone age.

Parole chiave: Caucaso, Paleolitico e Mesolitico, ambienti montani, modalità di adattamento, modelli di stanziamento, utilizzo delle grotte, strategie economiche.

Key words: Caucasus, Palaeolithic and Mesolithic, mountain environments, aspects of adaptation, settlement patterns, use of caves, economic strategies.

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1. Introduction

The situation of the Caucasus partly in temperate zone (Northern Caucasus), partly in Subtropical zone (Transcaucasia), huge height amplitude, altitudinal zonality of mountain landscapes, vast steppes in the North and continental uplands in the South - all these factors made for exceptional variety of natural environments of the territory, diversity and richness of it's food and raw material resources. The quantity of plants species exceeds 6.000 there, number of mammalia reaches 130. In the region there are almost all the kinds of sedimentary and volcanic rocks used by Palaeolithic men as raw materials (cherts of various quality, quartzite, sandstone, siliceous limestone and shale, obsidian, basalt, andesite and others). Abundance of rock shelters and caves there was also of great importance.

The significant constant factor which influenced the prehistory of Caucasean Isthmus was high mountain barrier of Great Caucasean range separating southern and northern parts of the region. During glacial periods this barrier appeared to be practically insurmountable. The last glaciation was highly extensive (fig. 1).

The northern slope of Great Caucasus was affected with as local glaciers as principal plain glaciation. The whole area of glaciers in this slope was 2-3 times as large than that of southern slope; the length of the glaciers reached 20-30, 60 Km, the thickness - 400 m (Dumitrashko, 1982, p. 41).

The glaciation of southern slope was less extensive, but fall of temperature was considerable: snow line came down by 800-1400 m. Glacial factor had influence on possibility of Palaeolithic men to settle the mountainous areas. During the periods of maximum cold (especially last pleniglacial) the people receded into foothills and found shelter in caves of such refuges as Kolkhida (Western Georgia) in Transcaucasia and - in a lesser degree - in deep canyons of Kuban basin rivers (Northern Caucasus). Therefore the problem of human adaptation in the Caucasus during Upper Palaeolithic is considered basing almost exclusively on Colchidian records. Available data allow the author to touch upon such aspects of adaptation as changes of settlement system, exploitation of caves and economic activities. For peculiarities of adaptation of Upper Palaeolithic and Mesolithic men in mountain environments, scale and dynamics of this process be more clear the author permits himself to use at times the data concerned earlier periods of Stone age.

2. Changes of settlement system

In pre-Acheulean (Velichko *et al.*, 1980; Džaparidze *et al.*, 1989) and Acheulean periods when in accordance with all the data natural conditions were very favourable (Lubine *et al.*, 1985; Lubine, 1989, p. 88) ancient man was settling in all the regions of the Caucasus, including Transcaucasean Upland and Small Caucasus, penetrated into the depth of mountains, surmounted barrier of Great Caucasus, inhabited in open air. As in Mousterian times a climate became colder, in the depth of mountain only hunting camps rested.

The most considerable displacement of sites occurred in Upper Palaeolithic: rigorous climatic conditions forced the people to abandone highlands absolutely and take

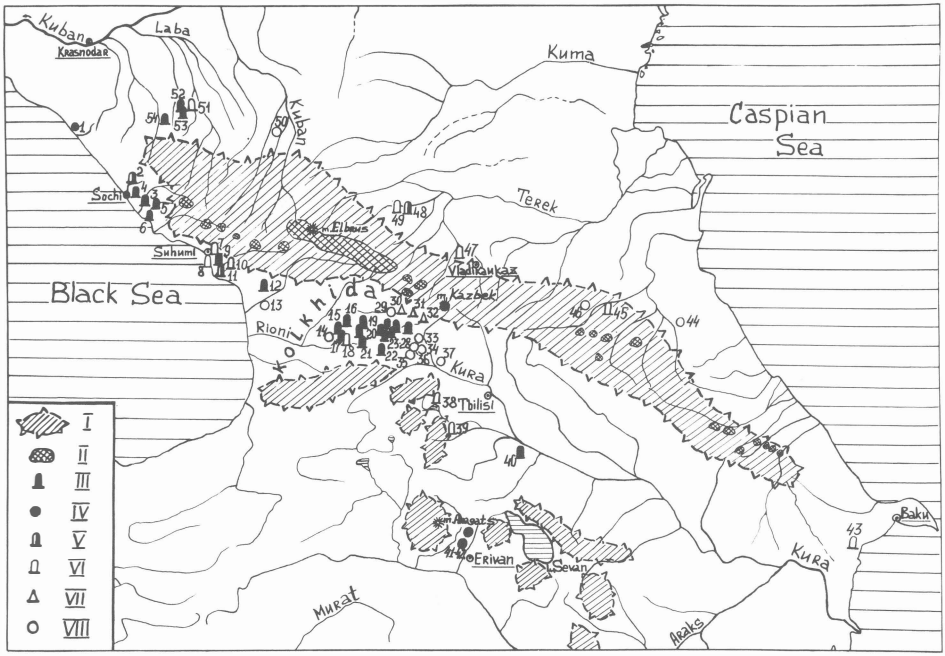

Fig. 1 - The Caucasus. Palaeogeographical scheme of Late Pleistocene glaciation (according to N.V. Dumitrashko) and distribution of Upper Palaeolithic and Mesolithic sites.
I - area of Late Pleistocene glaciation; II - modern glaciers; III - Upper Palaeolithic cave sites; IV - Upper Palaeolithic open air sites; V - cave sites with Upper Palaeolithic and Mesolithic layers; VI - Mesolithic cave sites; VII - Mesolithic cave bivouacs; VIII - Mesolithic open air sites. Sites: 1 - Shiroki mys; 2 - Ats; 3 - Ahshtyrskaya; 4 - Vorontsovskaya; 5 - Navalishenskaya; 6 - Hostinskaya; 7 - Yashthva; 8 - Kvachara; 9 - Svantasavane; 10 - Djampala; 11 - Apiancha; 12 - Okumi; 13 - Entseri; 14 - Darkveti; 15 - Sakajia; 16 - Uvarov's grotto; 17 - Ortvala Klde; 18 - Chahati; 19 - Gvardjilas Klde; 20 - Bnele Klde; 21 - Mgvimevi; 22 - Sagvardjile; 23-28 - Samertshle Klde, Samgle Klde, Sareki, Togon Klde, Dzudzuana, Taro-Klde; 29 - Baneturi; 30 - 31 - Kudaro I, III; 32 - Tsona; 33 - Djermuh; 34 - Selo; 35 - Pichidjin; 36 - Nagutni; 37 - Gudaleti; 38 - Edzani; 39 - Zurtaketi; 40 - Damdjily; 41, 42 - Nukus, Djatkran; 43 - Gobystan; 44 - Mekogi; 45 - Chokh; 46 - Kozma-Noho; 47 - Chorny grotto; 48 - Sosruko; 49 - Alebastrovy rock shelter; 50 - Yavora; 51 - Satanay; 52 - Gubski rock chelter I; 53 - Ruslanova; 54 - Kamennomostskaya.

cover in natural shelters of foothills. As it was mentioned above the main area where the sites were concentrated at that time was Kolkhidian refuge which is detached territory protected with mountain «amphitheatre» of Great and Small Caucasus and with binding them moderately elevated Dzirulsky massif. About 90 per cent of all the known now in the Caucasus Upper Palaeolithic sites are concentrated in this refuge. It should be marked, that according to A. Kalandadze (KALANDADZE, 1969) the sites referred to early and middle stage of Upper Palaeolithic are situated only at a height of no more than 800-900 m above sea level.

In the period of last Pleniglacial mountain-glacial barrier of Great Caucasus impeded relations between populations of northern and southern parts of Caucasean Isthmus. This situation resulted in certain peculiarities of Upper Palaeolithic industries in

every region. A high density and compactness of population in natural shelters of Kolkhidian foothills appeared to led to intensification of contacts between different groups of population, mutual adoption of «foreign» knowledge, forming of «single Imeretinskaya culture». This culture tradition became later a base for forming of kindred Mesolithic cultures of Kolkhida (BADER & TSERETELY, 1989).

Fundamental change of natural conditions at the end of the last Glacial - beginning of Holocene, i.e. during final Upper Palaeolithic and Mesolithic, led to gradual disintegration and replacement of Upper Palaeolithic settlement system. Since the end of 14 th millennium B.P. on may speak about three chronological stages of this shift corresponded to three periods of radical rise of temperature: Bölling, Alleröd and Preboreal (10.000-8.800 B.P.). There was alternation of warm conditions and cold ones (Dryas II, III), when in the mountain regions periglacial environment was partly restored. Nevertheless in general the warm periods were the heralds of modern Interglacial and provoked significant irreversible changes of physical environment (DOLUHANOV, 1977).

In the Great Caucasus the warming phases resulted in ablation and reduction of vast mountain glaciers and degradation of periglacial landscapes. The snow line rose by some hundred metres (in the end by 800-1400 m). Disintegration of hyperzonal landscapes happened and modern altitudinal zonality of mountain landscapes began to be formed. In broadening mountain-forest zone the thermophilic and dark coniferous components became to dominate. At the same time the animals of forest and humid biotopes spreaded widely. Similar processes took place in other regions of the Caucasus too.

Restoration of favourable mountain environments provoked so-called «Reconquista» - repeated human occupation of such regions. Only in this period Palaeolithic people were given new opportunity «to pass the Rubicon» of 800-900 m altitude above sea level and move gradually again into the depth of mountains up to the high level of 1.600-2.150 m (remains of short bivouacs in caves Kudaro I, III and Tsona). Recurrent movement of human groups into the depth of mountains took place in other areas of Caucasus too.

Disappearance of glacial barrier in the axis zone of Great Caucasus provided obviously resumption of cultural contacts between populations of northern and southern parts of Caucasean Isthmus. For example, rectangles, points «Gvardjilas Klde» and points «Zarzi», which are such typical tools for final Upper Palaeolithical industries of Kolkhida, were found in synchronous sites of Northern Caucasus - Yavora and Baranaha (AMIRKHANOV, 1986, pp. 57, 100; DORONICHEV, 1992).

3. Human habitation as indication of adaptation

3.1. Preliminary notes

Human habitation reflected adaptive reaction to changes of environment. In this case the process of adaptation was the most active. Considerable deterioration of climate at the beginning of Upper Palaeolithic on Russian Plain provoked building of durable, warm and often deepened earthed mammoth-bone dwellings. Such building reached the highest level of growth in middle stage of Upper Palaeolithic, especially in the period of cold maximum (ROGACHEV & ANIKOVICH, 1984, p. 169).

In the Caucasus that abounds in caves a necessity to build artificial dwelling was lesser. But depending on climatic rhythms suitableness of the caves for inhabitation varied. So in different periods the use of caves by people was selective. There were also some changes in arrangement and structure of inhabited space in the natural shelters.

3.2. Natural shelters of the Caucasus

Many thousand natural shelters are known in Caucasean mountain. They are very various as regards to type (galleried caves, grottoes, rock shelters; throught and blind caves; narrow, corridor and vast, multichambered ones), to origin (karstic, deflated, erosional, postvolcanic caves), age, exposure and so on. The most part of caves is bound up with karstic limestones (basically Jurassic and Cretaceous rocks) of Great Caucasus and Small Caucasus. Limestone karstland landscape girds Great Caucasus along almost all the northern slope and in western (Kolkhidian) part of southern slope. In Small Caucasus this landscape spreads only within the ridges of it's eastern part.

Outside the limestone karstland a great number of so-called «caves under lavas» exist. Such caves are situated in river canyons of Transcaucasean volcanic upland.

Karstic natural shelters include all the cave types named above. It should be marked that galleried caves are the most frequent in Kolkhida (Sochi - Abkhasian Black Seaside, Imerety, north-western part of South Ossety). Lava (volcanogenic) caves represent small grottoes and rock shelters.

3.3. Suitableness of caves for inhabitation

In different periods of Pleistocene the extent of cave suitableness for inhabitation was very various. As an example galleried caves may be given. They were suitable for occupation during dry or rigorous climatic periods when water in rock fractures froze and fracture and filtration springs were dying down. In Upper Palaeolithic only caves of foothills were available and suitable for inhabitation, especially galleried caves where stable microclimate exists usually in their inner part. In humid periods, on the contrary, many galleried caves became very moist (dripping, karstik springs) and unfit to live. The flows often eroded and washed away friable deposits including cultural ones. In almost all the Caucasean galleried caves these processes resulted in erosional unconformity, forming of pockets, lenses, redeposition parts, calcitic crusts. In the caves Kudaro I and III, for example, the tops of Acheulean, Mousterian and later deposits were eroded in consecutive order. In cave Malaya Vorontsovskaya the flows washed away absolutely all the pre-Mousterian sediments (on the cave walls above the modern floor on may be seen the rests of more ancient floors and traces of «bear-grinding») and eroded partially Mousterian and more late layers.

3.4. Selection in human use of caves

According to suitableness on may mark the changes of choice of different cave types for occupation, discontinuity of inhabitation or abondement for many thousand years. In the middle stage of Upper Palaeolithic, during Würm maximum, even within Kolkhidian refuge Palaeolithic people, preferred to shelter in galleried caves of foothills situated in canyons of such rivers as Mzymta, Kudepsta, Cherimela, Jruchula, Nicrisi,

Cherula and others (caves Ahshtyrskaya, Navalishenskaya, Devis Hvreli, Samertshle Klde, Dzudzuana, Gvardjilas Klde and oth.). This selection appeared to represent the evidence of optimum human adaptation to cold climatic conditions. In early and final periods of Upper Palaeolithic when the climate was more favourable people, in opposite, more often occupied small rock shelters and grottoes (Okumi, Ortvala Klde, Svantasavane, Togon Klde, Samgle Klde and oth.).

Such selection was even more evident in final Upper Palaeolithic and Mesolithic. Let's examine Kolkhida where there were two thirds of known today in the Caucasus Mesolithic sites. Rapid ablation of vast Würm glaciers during Bölling and Alleröd led to increase of humidity and appearance of fracture and filtration springs in many karstic caves, especially deep and galleried. So final Upper Palaeolithic and Mesolithic inhabitants of Kolkhida preferred to settle basically small and more dry grottoes and rock shelters of Kolkhidian foothills (Ats, Yashthva, Apiancha, Djampala, Holodny grotto, Sagvardjile and oth.). At the same time human groups began move anew into the depth of mountains establishing sometimes their bivouacs at the entrance of galleried caves of highland (Tsona, Kudaro) and again, after long interruption at least about 10.-15.000 years, began to inhabit in open air (sites Entseri, Baneturi, Jermuh, Pichidjin, Selo and others in Georgia, Yavora and Baranaha in Kuban basin). Repeated opening of mountainous areas may be observed in Transcaucasean volcanic upland too (rock shelters and grottoes Edzani, Zurtaketi, Barma).

3.5. Displacement of «life centres» in galleried caves

This problem was not elaborated sufficiently because planigraphic fixation was not made in many cases (especially in former times). Nevertheless available evidences allow the author to conclude that in Upper Palaeolithic, especially in its middle stage, so-called «life centres» (the hearthes surrounded with accumulation of cultural remains) were displaced into the deepth of caves. For example, whereas in Mousterian layers of Ahshtyrskaya cave such objects were situated in it's vast entrance part, in Würm maximum, when the cave was surrounded with pine forests and open landscapes (C^{14} date - 19.000 ± 500) life centres were displaced considerably into the main karstic corridor. Hearth horizons and lenses in this levels became more thick (Vekilova & Grishchenko, 1972, pp. 44-45; Lubin, 1989, p. 72). Situation of such objects in the deepth of passages was also fixed in Upper Palaeolithic layers of caves Gvardjilas Klde, Svantasavane, Samertshle Klde and others (Berdzenishvili & Grigolia, 1967). In cave sites with cultural layers of different epochs Upper Palaeolithic levels contain in general more hearth horizons and lenses than other ones (caves Ats, Apiancha, Ahshtyrskaya, Navalishenskaya).

Cold conditions «drived» ancient people into the deepth of galleries in more early periods too. The large accumulation of hearthes in Acheulean (referred to Riss) layers of Azykh cave in Azerbaijan is also noted (Velichko *et al.*, 1980; Lubin, 1989, pp. 16, 19, 21, fig. 3).

3.6. Position and types of bonfires as element of adaptation

«Fire was a great technical and social power. It provided humanity with constant protection from the cold and wild animals. Appearance of fire and a hearth resulted in forming of absolutely new space destined strictly for people» (Boriskovskiy, 1979, p.

88). As regards to Upper Palaeolithic dwelling in open air on may confirm that «... a hearth was the main object which allows us to get a notion about inhabited space, to define interior and exterior of dwelling, to reveal various ... activities ...» (LECLERC & TARRÊTE, 1988, p. 405).

In cave inhabitations the organization of inhabited space depended on the hearthes too. According to function the hearthes differ in types and position. It was Bordes who marked considerable differences in hearth types in Acheulean levels of Riss layers in cave Pech de L'Azé. Bordes determined there at least three types of the hearthes: elementary or amorphous hearths, paved hearths and «tailed» hearths. In most part the «elementary hearths» which were, strictly speaking, the rest of short bonfires were situated nearer the cave entrance. The paved and «tailed» hearths of long duration were more distant from entrance and were used for preparing of food (BORDES, 1972, pp. 60-62; PERLÉS, 1977, p. 73).

To judge by materials of Caucasean sites the position of hearthes in the caves depended on cave type, height of vault, entrance dimensions too. Short (night defensive) bonfires in galleried caves served for protection their inhabitants from external danger. For example, in different Mousterian layers of cave Kudaro I (eastern gallery) the protective bonfires were situated at 2-3 metres' distance from drip line in the middle of passage - invariably in the same place. Such position was obviously the most optimum: besides protective function the bonfires warmed penetrating from the outside cold air and also provided the smoke to go out. The experiences acquired owing to spending the nights in galleried caves allows the present author to represent the model of such situation (fig. 2).

Protective night bonfires usually were made fierce and hot. In the beginning brushwood was burnt, then more thick branches were added and later, before bedtime, when the heat became stronger some logs put into the fire. The logs were laid across the bonfire in order that at first their middle parts were burnt down. Then it was necessary only move up the log ends into the flame. Such bonfires used to burn for a long time and slowly. Within the night these bonfires need to be only readjusted two or three times and somewhat revived with brushwood laid in store earlier.

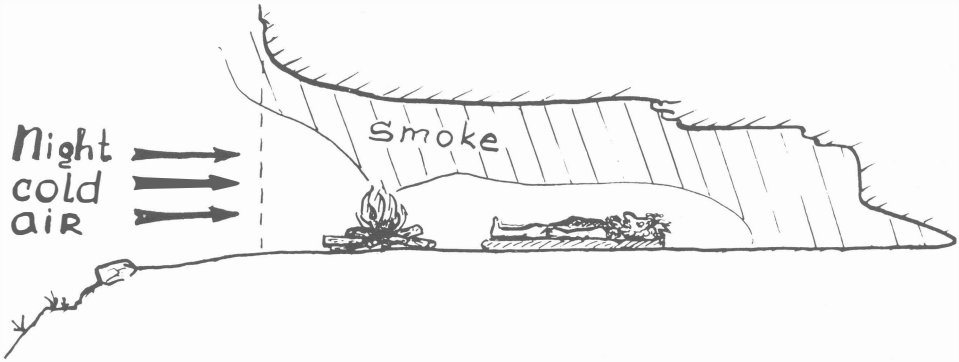

Fig. 2 - Night protective bonfires in galleried caves. Model of typical situation.

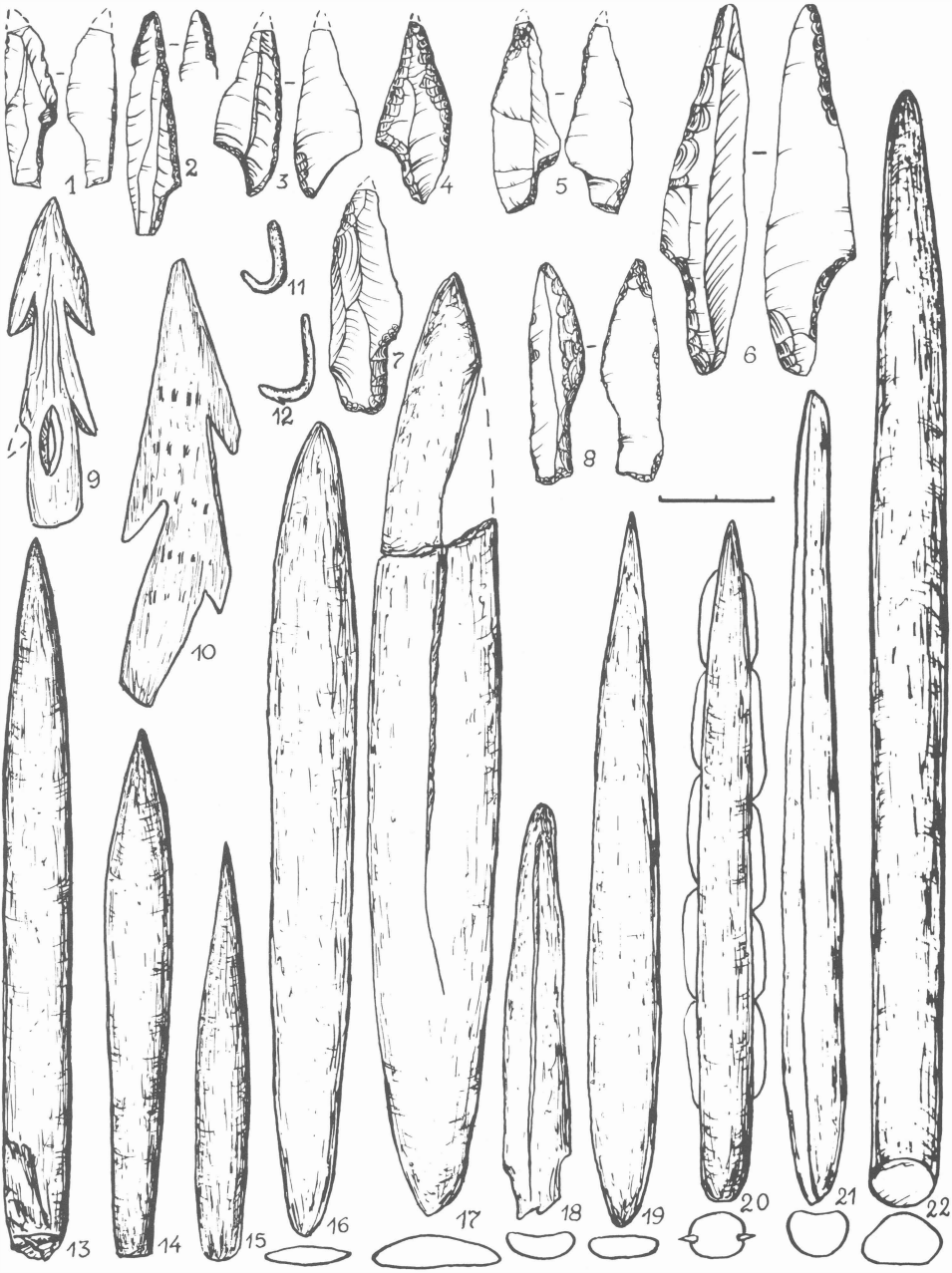

Fig. 3 - Zarzian chert points found in Kolkhidian caves: 1 - Kudaro I; 2, 3 - Apiancha; 4, 7 - Kvachara; 5, 8 - Gvardjilas Klde; 6 - Chahati. Harpoons and fish hooks from Holodny grotto (9-12). Bone points of spears and sagaes: 13-15 - Sakajia; 16, 17 - Satanay; 18 - Apiancha; 19 - Samertshle Klde; 20-22 - Kvachara.

The choice of firewood for such bonfires was of great importance too. The preference was shown to dry oak, beech and pine firing because of high calorification. The brushwood was broken by hand, the poles - with striking against sharp rock juts, the logs were put into the fire as a whole.

Unfortunately the data cited above come from either Mousterian and Acheulean cave sites or from personal experience of the author. On may suppose with confidence that similar data will be obtained if materials (planigraphic first of all) of Caucasean Upper Palaeolithic and Mesolithic sites are publicated to the full. Development of anthracological researches is very important too because it allows us to judge wood plants near the sites and kinds of firewood used in different types of bonfires and hearthes.

4. Changes in hunting activity

In Upper Palaeolithic when the climate became colder there were a shift of altitudinal zonality and redistribution of natural food resources. Middle stage of Upper Palaeolithic (24-16.000 B.P.) was the most critical period: a man had to adapt to light forest and open landscapes, to work out new strategy (in comparison with Mousterian one) of hunting of open grassland species (Equus caballus, Bison priscus, Capra caucasica) which became dominating game. The rests of these animals prevail in the sites referred to period that coincides or is conterminous with the last cold maximum of Würm Glacial (caves Dzudzuana, Mgvimevi, Samertshle Klde, Gubski rock shelter I, lower layer of Gvardjilas Klde). In the list of game animals on may also often observe the combination of subalpine, forest and opengrassland species - the result of «compression» of various landscape zone in foothills (caves Sakajia, Okumi I, Devis Hvreli and others). In the process of adaptation to new physical conditions there was some evolution of hunting strategy and weapons. Hunting for nimble-footed hoofed animals in conditions of open landscapes demanded to elaborate new tactics and make more light and long - range projectile weapon.

Bone points of spear, sometimes with microlith barbs, became one of the basic means of hunting. The microlith barbs improved cutting function of point and, besides that, «conduced to holding of spear in the body and to aggravation of haemorrhage as the animal was escaping and spear shaft was striking a ground and trees» (Vereshchagin, 1971, p. 209). Bone spear and sagae points were more durable than chert ones. Hunting with light spears became more productive even if it was made individually. «Light projectile spear-sagae of great piercing power provided people with ample opportunities to kill the most large ... animals near the fords, ambushing or pursuing them only by small groups or even by individual hunter. Collective driving hunting ... became dispensable. The spear that may be thrown by strong and skillful hand beyond the distance of 20-30 m pierced the chest of animal between the ribs. To pierce and tear the abdominal wall was still easier ... The evidence of that is wellknown picture on the wall of Lasco cave ... where there is a bison with guts falling out the pierced with spear abdomin» (Vereshchagin, 1971, p. 210).

According to N.O. Bader (Bader, 1984, p. 280) bone spear points appeared already in the early stage of Caucasean Upper Palaeolithic, but the most wide spread of them is

marked in the middle stages (caves Sakajia, Devis Hvreli, Mgvimevi, Samertshle Klde, Gvardjilas Klde) (fig. 3). Such bone points disappeared in the late stage. At the end of the late stage as J. Kozlowski pointed out (Kozlowski, 1972) there were radical changes of bone and antler tools: spread of harpoons and hoes.

In Mesolithic layers of Kvachara cave in Abkhazia, however, there is a relapse (?) of bone point manufacture (Bader & Tsereteli, 1989, p. 96). Some bone points with grooves for microlith barbs, similar ones without grooves and one flat foliated point were found in this cave (fig. 3). However there are some doubts about Mesolithic date of all the finds because the collection contains mixed and unseparated materials of three layers (1,05-1,35 m in the whole) differed by lithology.

So, in general, period of maximum spread of spears or sagaes with bone points coincides with that of dominance of periglacial landscape and it appears to be the evidence of human adaptation to new physical conditions.

During Tardiglacial, especially from 11.000 B.C., industries with various backed tools and geometric microliths prevailed in Upper Palaeolithic of the Caucasus (Kozlowski, 1972). Microlithization of inventory and improvement of composite tools with microlithic barbs are indicative of the same process of development of light projectile weapon (including bow and arrow). As the most clear evidence of that on may adduce asymmetrically tanged points referred to Zarzian type (Gvardjilas Klde, Kvachara, Ats, Chahati, Sagvardjile, Kudaro I, Baranaha) and also probably elongated asymmetric triangles, micro-Gravette points and Gvardjilas Klde points which resemble Vachons point (fig. 3).

5. Adaptive aspects of fishery

Materials of Caucasean sites are of great importance concerning the problem of beginning and development of fishery. At present on may establish three «episodes» of fishing activity that took place in Acheulean period (cave Kudaro I), in Mousterian one (Kudaro I, Malaya Vorontsovskaya cave) and during Tardiglacial - beginning of Holocene (caves Apiancha, Holodny grotto and others).

In Acheulean layers of Kudaro I there were many thousand bones of Black Sea salmon (Salmo trutta labrax Pallas) and its freshwater variety - the trout. The largest number of these finds came of middle Acheulean layer 5 «b», which dates to Mindel - Riss interglacial (conditions of humid subtropics; RTL date - 350 ± 70.000 B.P.). Approximately the same quantity of fish bones were found in laying above Mousterian horizons. Mousterian level 3 «c» (Brörup or the first interstadial of middle Würm Glacial) should be marked specially: a number of salmon bones there reach several tens of thousands (Tsepkin, 1980). Dozens of salmon bones were found also in upper Mousterian layer (interstadial Hengelo?) of Malaya Vorontsovskaya cave in Black Sea - Side (Lubin, 1989, pp. 81-82). In Upper Palaeolithic and Mesolithic of the Caucasus founds of fish bones are know to be only from the sites referred to Tardiglacial - early Holocene. By the way, it should be point out that on may observe the same facts in cave sites of Crimea.

So it is possible to conclude that these episodes of fishery activity were bound up with periods of climatic optimum (interglacials, interstadials) that are periods of propi-

tious regimen of Caucasean rivers when they were probably the most deep and their biological productivity increased.

At first (Acheulean, Mousterian epochs) the fishing was very primitive and not differed essentially from hunting: the most ancient inhabitants of Kudaro I and Malaya Vorontsovskaya caves appeared to pierce the salmons with spears and sagaes in spawning places or simply killed them hitting out with stones and cudgels in shoals. The methods of hunting of ground animals were spread to another sphere. So the fishery consisted not in catching but rather in «slayghter» of salmons and not required the manufacture of special tools. Primitive harpoons (barbed points) that appeared at the end of Upper Palaeolithic - in the beginning of Mesolithic were still derivative of hunting projectile weapons. However invention of hooked tools with bait was an essentially new technical achievement in making of true fishing tackle. The invention of such «fishholding» tools as harpoons and fish hooks was a result of development of bone and antler technologies during former stages of Upper Palaeolithic.

The evidence of that were discovered in Mesolithic levels of Kolkhidian caves situated on the rivers Kvirila, Dzevrula (Rioni Basin) and Kodori. The harpoons were found in Mesolithic layers of caves Sagvardjile, Holodny grotto, Gvardjilas Klde and fish hooks - in Holodny grotto. Besides that in caves Darkveti and Apiancha there were plummets made of pebbles and in Holodny grotto and Apiancha there were the bones of salmon and other fish.

As precondition of fishery revival on may consider probable increase of biological productivity of Black Sea and the rivers falling into the sea owing to sea transgression that began about 14.000 B.P.

Considerable increase of outflow as a result of Caucasean and Russian Plain glaciers thawing (Shcherbakov, 1997, pp. 57, 61) was probably the main factor of this transgression.

SUMMARY

This is a first approach to model of human adaptation in mountain environments of the Caucasus and in particular in Kolkhidian refuge that is a territory abounding in cave shelters, food and raw material resources. In Author's opinion this model reflects fairly co-ordinated social and natural process, fairly clear reaction of social system to drastic changes of ecological situation during last Pleniglacial and at the end of Pleistocene - in the beginning of Holocene. In spite of proposed draft seems to be quite logical and permissible it needs undoubtly additional evidences because at present mountain areas except foothills are investigated still insufficiently, palaeogeographical reconstructions are not comprehensive, absolute dates are rare and methods of excavations in some cases require to be improved. However every such model concerning prehistorical problems will be hypothetical, of course, even if information enlarges.

RIASSUNTO

L'autore propone il primo approccio al modello di adattamento umano all'ambiente montano nel Caucaso durante il Paleolitico Superiore e il Mesolitico. Il modello si basa principalmente su materiali provenienti dall'areale di rifugio della Colchide, dove si trova quasi il 90% dei siti paleolitici superiori e mesolitici noti fino ad ora nella regione caucasica. Stando a tali dati, i fattori glaciali e climatici hanno predeterminato dei cambiamenti nel sistema degli stanziamenti, nell'uso dei diversi tipi di caverne, nelle attività economiche ed inoltre hanno contribuito o, viceversa, ostacolato i contatti culturali tra le popolazioni del Caucaso settentrionale e della Transcaucasia. Nelle mutevoli situazioni dei centri vitali, nella posizione e diversa tipologia dei falò e dei focolari, si può osservare l'adattamento alle condizioni delle caverne. Notevoli sono le innovazioni adattative che intervengono nella caccia e nella pesca. Per rendere più evidenti le particolarità dell'adattamento durante il Paleolitico Superiore ed il Mesolitico, l'autore ha utilizzato di volta in volta i dati pertinenti ad epoche dell'età della pietra molto più antiche.

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