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LATE ACHEULEAN OF THE NORTHERN CAUCASUS AND THE PROBLEM OF TRANSITION TO THE MIDDLE PALEOLITHIC

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Abstract
Late Acheulean sites on the Northern Caucasus are found from the Black Sea coast (Mis Kadosh) in the west to Northern Ossetia (Hutor Popov 1 in the Terek River valley) in the east (fig. 1). A total of nearly 40 locations (Autlev, 1961; 1981; Golovanova, 1986; Formozov, 1965) are known here now. The majority of them are situated in the Belaya River basin. This partly reflects the fact that most field research was conducted in the area, but it may also be due to specific conditions of the Paleolithic remains taphonomy in the region. Three local groups of the Late Acheulean sites are of particular interest now. They are concentrated in a relatively small area of the Northwestern Caucasus, and include the Abadzeh and Khadjoh groups in the middle part of the Belaya River valley, and the Abin group near Krasnodar.

Key words : Prehistory, Paleolithic, Late Acheulean, Northern Caucasus

Geomorphologic position of the Late Acheulean sites

The majority of the Late Acheulean locations, on which the implements were gathered in river deposits, do not carry any information about geomorphologic position of the original sites. Only the Sredniy Khadjoh open air site is connected with an ancient terrace, as well as the Abadzeh and Abin locations, on which the implements were moved to lower terraces, adjacent to those, where the original sites were located.

Currently there is not enough material for river terrace dating on the Northwestern Caucasus. Their local nomenclature applied in the paper reflects only a succession of the terrace formation and assumes a different correlation with a local paleographical scale, as well with subdivisions of the more common one. The local nomenclature takes into account the usual increase of a number of terraces up the mountain river valleys, i.e. their "splitting". According to a local scheme of terrace formation, on the Northwestern Caucasus the Middle and Upper Pleistocene terraces are united into four assemblages (Nesmeyanov, 1986): Vozdvijensk, Gulkevich, Gireisk, and Kuban. Finds of the Tiraspol faunal complex are connected with the Vozdvijensk assemblage. The Gulkevich assemblage is divided usually into two parts. Its early part (Kurdjips terrace) is dated by finds of the Khazar fauna, and the latter one (Khadjoh terrace) by finds of the Upper Paleolithic faunal complex; the latter is also presented in the Vjushat and Maikop terraces of the Gireisk assemblage. Regional terraces of the Gulkevich assemblage split often. The Kurdjips terrace splits in two and the Khadjoh terrace - in two or more. S. Nesmeyanov suggests a correlation of the Khadjokh terrace with the Moscow Glaciation (= Late Riss Glaciation) and the Mikulino Interglaciation (= Riss-Würm Interglaciation) on the Russian Plain.

Based on a currently recognized correlation of these paleo-climatic events with the oxygen-isotope scale one can conclude that the most preserved Late Acheulean locations on the Northern Caucasus, described in the article, are dated to stage 6 of the scale. Moreover, the Sredniy Khadjoh site, probably, represents the latest among them (table 1).

The Abin location is situated on the right side of the Abin river valley, at a distance of 2 km from the river, on the left slope of its small tributary, and 3 km south from the town of Abinsk. High concentration of finds on an area of 0,5 km x 0,5 km is connected with several young terraces situated lower than the Kurdjips terrace as well with the last one, the accumulative cover of which is fully destroyed. On this basis, one can suggest that the primary cultural layer was connected with the Kurdjips terrace and localized near its outer edge. This layer, probably, was formed during the Khadjoh stage of river cutting, when the Kurdjips terrace was the only one above a flood plain.

On the Abadzeh location, artifacts were collected in a riverbed and on surfaces of the Maikop and Vjushat terraces of the Fiunt river valley, a right tributary of the Belaya River. The primary site was

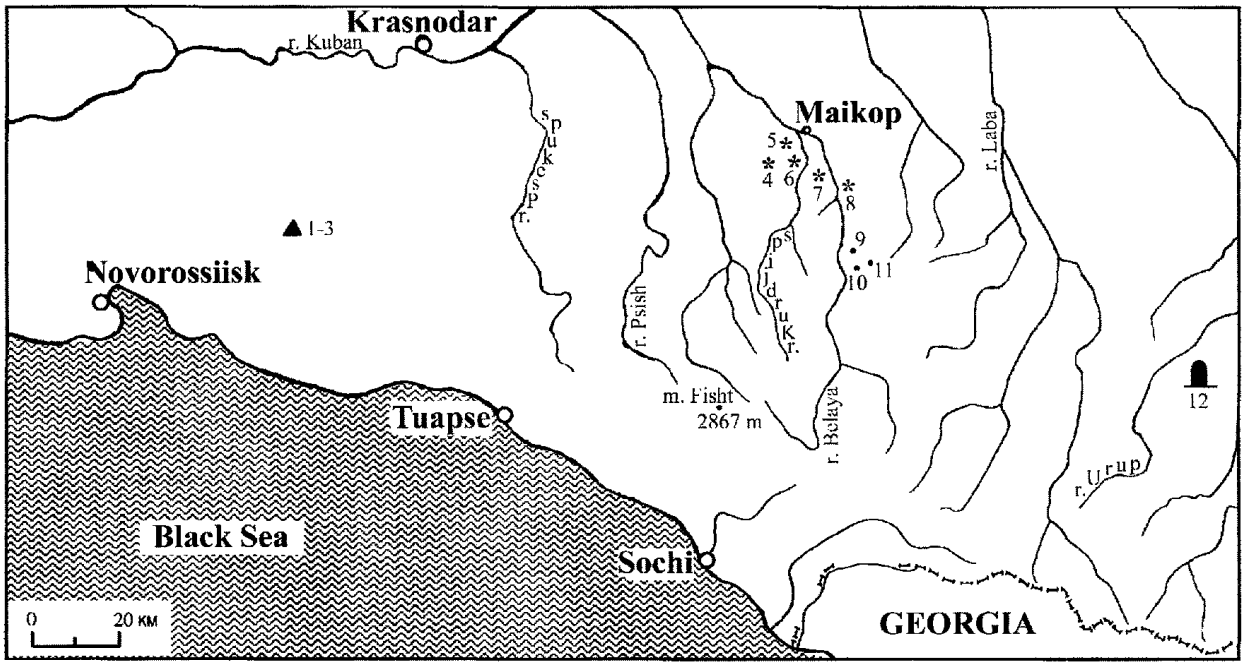

Figure 1. Distribution of the main Late Acheulean sites on the Northern Caucasus. Abin Group (1-3 Abin, Adagum and Khabl locations); Abadzeh Group, including later sites of the same type (4. Juchka, 5. Fortepyanka, 6. Kurdjips, 7. Semiyablonya, 8. Abadzeh locations); Khadjoh Group (9. Shahan location, 10. Sredniy Khadjoh site, 11. Shahan site); 12. Treugol'naya Cave.

probably located either on the Khadjoh terrace or the Kurdjips one.

The Sredniy Khadjoh open-air site is situated on the right side of the Sredniy Khadjoh River valley, a right tributary of the Belaya River (fig. 1). Its lower cultural layers 4 and 5, perhaps slightly moved, are dated by the beginning of the covering loamy deposits accumulation, that last overly river sand of the late Khadjoh terrace. The site is situated near the terrace back seam, where facial substitution of the upper horizons of alluvium by the cover loamy deposits is possible. For this reason, it is quite reasonable to correlate periods of the most active occupation of the Sredniy Khadjoh site with the middle part of the late Khadjoh stage. The Shahan workshop, situated not far from the Sredniy Khadjoh site, is connected with a relict of the Vozdvijensk terrace.

Khadjoh group of the Late Acheulean sites

Sites of this local group are situated in the middle flow of the Belaya River, on one of its small right tributaries, the Sredniy Khadjoh River (fig. 1). The first Paleolithic implements in the riverbed were collected during fieldwork of the Northern Caucasus Paleolithic expedition led by A. Formozov and A. Stolayr (Formozov, 1965). In 1964-65, P. Autlev found a lot of material within a cultural layer (Muratov & Autlev, 1971; Autlev, 1981). In 1982-83, Kuban Paleolithic Team under the guidance of L. Golovanova (Golovanova, 1985; 1986), continued work on the site. During that period, the Shakhan location was discovered, dated to the end of the Acheulean – beginning of the Mousterian (Golovanova, 1986), as well as a workshop of the Late Acheulean period on the Shahan II mountain (Doronichev & Golovanova, 1986).

Information on paleo-climate in the Late Acheulean period on the Northern Caucasus are still quite fragmentary. G. Levkovskaya's study of specimens taken from deposits at the Sredniy Khadjoh site showed three pollen horizons. Late Acheulean artifacts presented four levels of concentration within three strata. They were deposited under a cool (approximately 5° C cooler than today) and humid climate. In the upper strata, there is a horizon of temperature rise and the appearance of forests. The pollen of swampy cypress was extracted in the horizon. This cypress existed even in the relic region of Kolhida (Levkovskaya, 1986) only up to the Karangat transgression. The latter is correlated by Georgian researches with Riss-Würm. Therefore, layers of the Sredniy Khadjoh site could be comparable in age with Karangat and may even precede it. This data corresponds to the geomorphologic position of the site.

Techno-typological characteristics of all the Khadjoh group sites permit the group to be

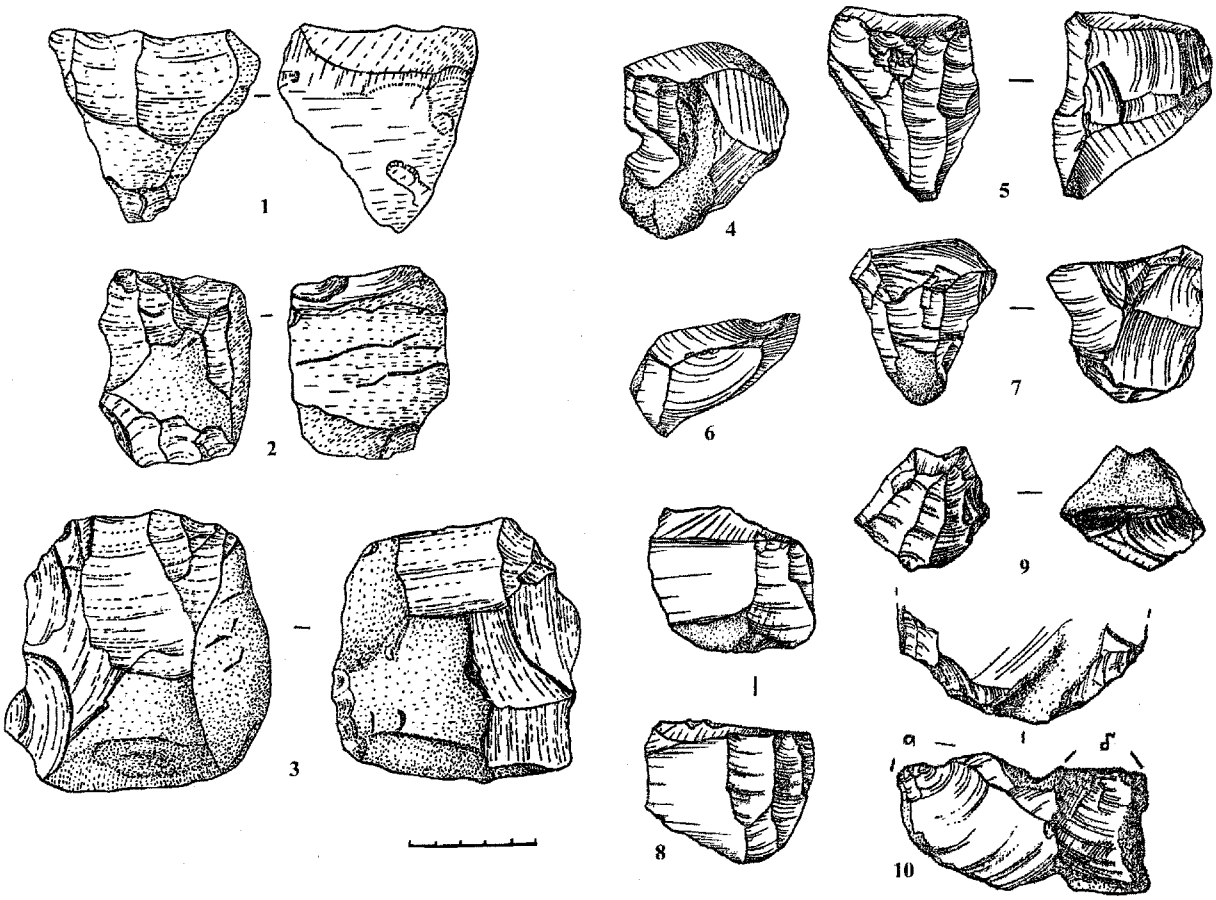

Figure 2. 1-3, Abin Group; 4-10, Khadjoh Group. Cores

described. Technique of flaking marks out these sites especially. This technique has no analogies in Acheulean sites of the region. A method of parallel flaking from slightly convex surfaces is characteristic. Core preparation is characterized by one blow preparation of each striking platform. Striking platform trimming by two or more blows are few. Previous scar negatives were used as striking platforms very frequently (fig. 2:4-10). Multi-side technique of core utilization with striking surfaces situated under different angles to each other (Doronichev, 1986) is a specific feature of these assemblages.

The typological appearance of the Khadjoh industry is defined best from the richest assemblage of level 3d at the Sredniy Khadjoh site. At other levels of the site, as well at the Shahan location and at Shahan workshop, tools are rare. A peculiarity of the Khadjoh industry is the use of flint pieces for tool making (31,5% of all blanks).

Study of retouch facets on tools from the sites under consideration indicates the presence of four distinct peaks on a diagram, which suggest the use of several techniques of retouch for tool making (Golovanova, 1984). The presence of flakes with burin spalls, not present in other Northern Caucasus sites, sharply points out the Khadjoh group assemblages. The first type is formed on fragments or flake angles by one or several burin spalls (fig. 3:13). Tools of the second type are made on distal ends of flakes by two burin spalls, like dihedral burins (fig. 3:14). Tools of the third type are also made on distal flake angles by flat burin spalls flaked from an end-scraper element, like a burin on retouched truncation (fig. 3:10). At the Shahan site and Shahan workshop tools with burin spalls are also marked out, accordingly two and five items (fig. 3:16). Different types of end-scrapers are also present in these sites: made by elongated facets (fig. 3:3), formed by rounded retouch (fig. 3:4), on flint fragments of high form (fig. 3:5), with scale retouch formed distal ends. It is interesting that specific forms were made on heavy, relatively large, fragments with distal ends sharpened by retouch (fig. 3:11).

Specific forms are denticulate tools, formed on steep transversal ends of flakes or fragments. Their "working elements" are formed by rounded retouch facets, which, alternating from dorsal to

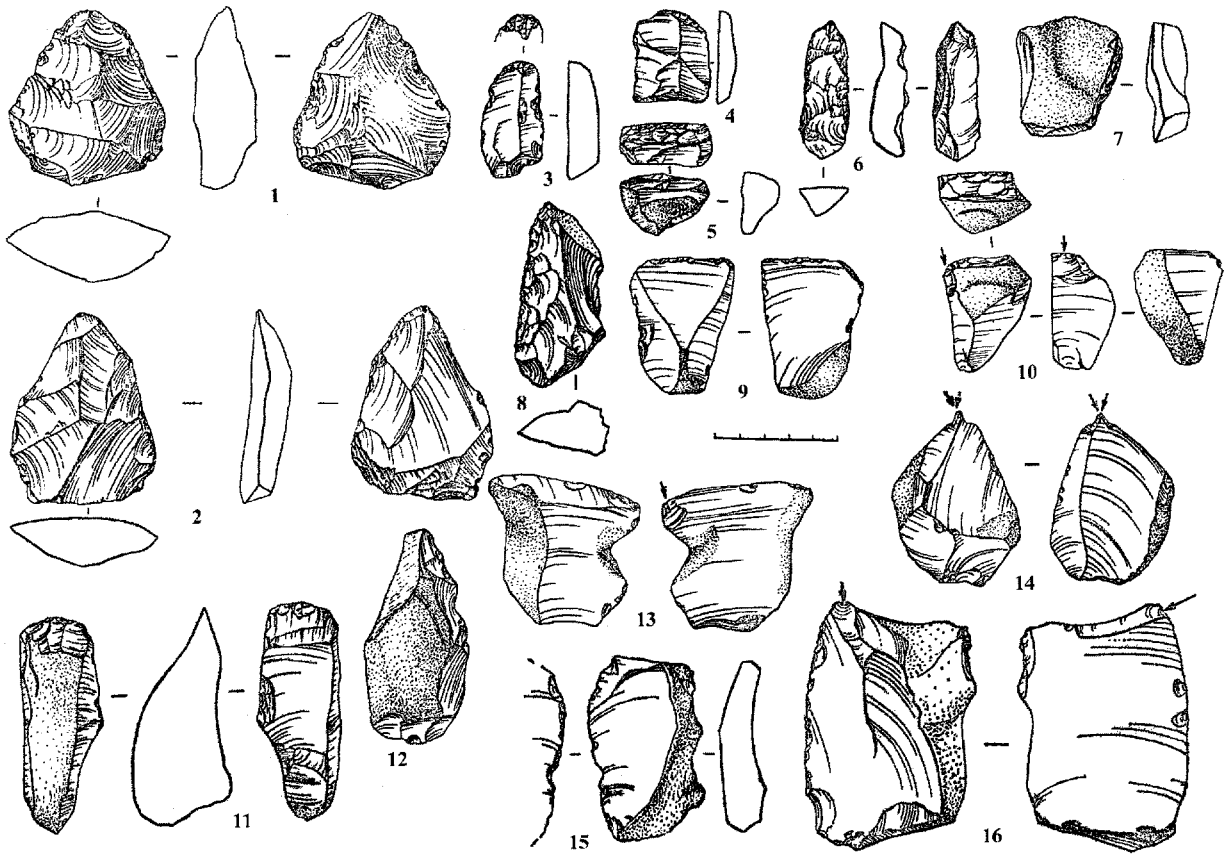

Figure 3. Khadjoh Group. Tools.

ventral surface, form a denticulated edge (fig. 3:9). A characteristic peculiarity of all Khadjoh sites is a small number of side-scrapers, formed by scale retouch (fig. 3:7-8). Clacton notches are poorly represented. At Sredniy Khadjoh there are only two denticulate tools made by small Clacton notches; in the Shahan workshop there are four such pieces (fig. 3:12). Notches made by scale retouch are also quite a few. There are usual backed forms of denticulate tools, made by alternating small facets (fig. 3:15).

Implements made by chipping are present at the Khadjoh group. At Sredniy Khadjoh, a backed form with bifacially trimming side present. There is a core-like tool in the Shahan site, another at Shahan workshop, and two more at Sredniy Khadjoh. Sub-triangular double convex bifaces, made by wide deep scars (fig. 3:1-2), are present in the Khadjoh group. Quinson points form a specific feature of Khadjoh sites (fig. 3:6). They are of leaf-like form with convex edge (Ronen, 1970).

Abadzeh group of the Late Acheulean sites

Late Acheulean sites of the Abadzeh group are located in the middle flow of the Belaya River (fig. 1). A location on the Fortepyanka River was the first Acheulian site on the Northern Caucasus, which was initially identified as the Shellean (Zamianin, 1961). Kurdjips and Abadzeh locations were discovered later. Later the Fortepyanka location was re-dated to the Middle Acheulean and Kurdjips was re-dated to Early Mousterian (Autlev, 1981). Only the Abadzeh location has, for more than 20 years, kept its Late Acheulean dating (Autlev, 1963; 1981; Lubin, 1984).

Study of collections of the sites permits them to be considered as a single grouped industry. Analysis of cores shows that the proto-prismatic flaking technique in slightly convex planes had been used in all three sites. A preparation technique consisted in forming of a striking platform by several scars or by retouch. Core utilization was carried out mainly on one side (fig. 4:1-4) by increase in the number of striking platforms.

The larger flakes were used for tool making. Retouch facet measurements, proportion of length to width of a facet, and the consequent diagram setting for each of the sites made it clear that retouch facets form four main categories. Experimental conclusions attest to the use of different retouch techniques for the different retouch facets types (Golovanova, 1984).

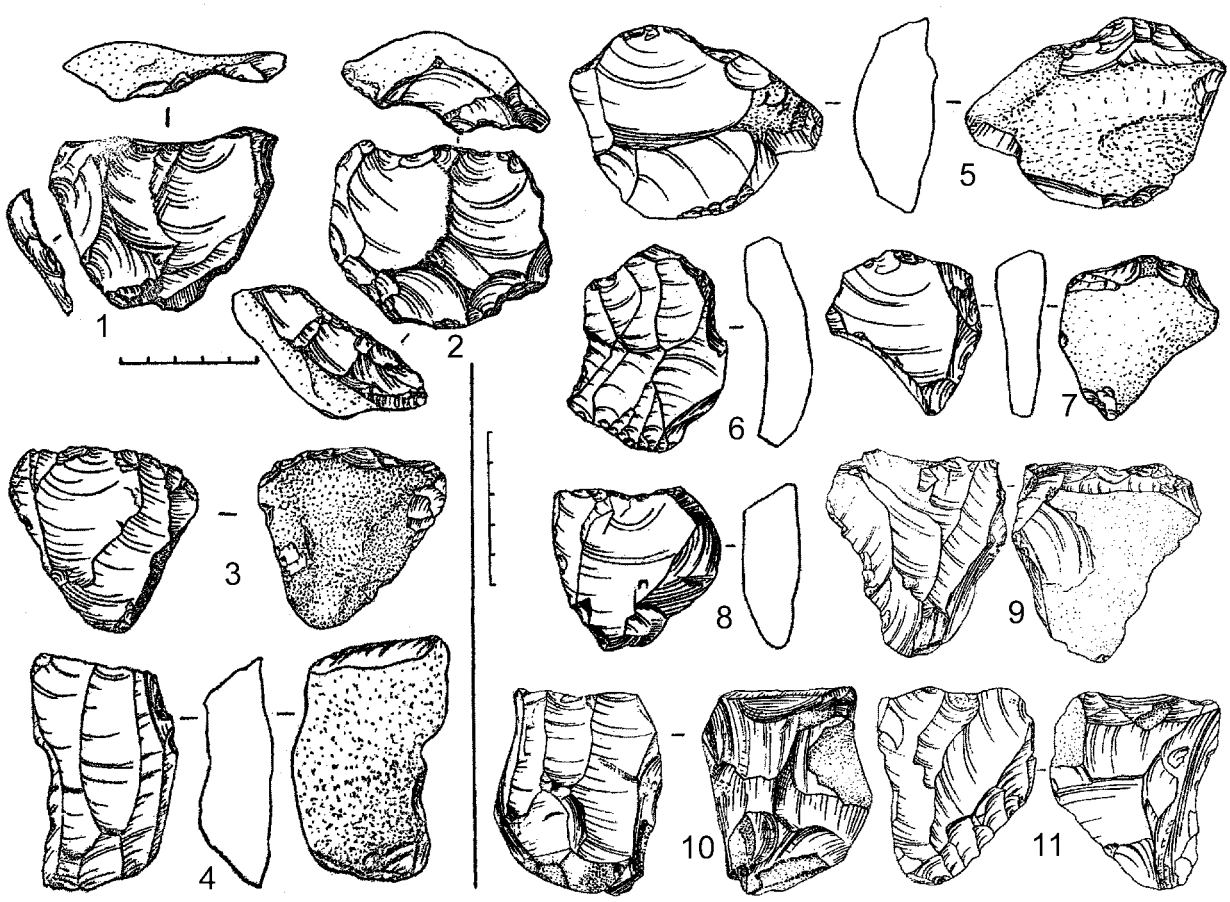

Figure 4. 1-4, Abadzeh Group. Cores; 5-11, Luchka and Semiyablonya. Cores.

Subsequent analysis of collections revealed that, in the Abadzeh group sites, usage of different retouch techniques for tool making was approximately identical.

For all the sites, the presence of end-scrapers of two types is typical. Elongated facets form working elements of the first type; one can trace small short facets on semi-abrupt edges of the majority of these tools (fig. 5:13). End-scrapers of the second type have elements formed by rounded facets; there are no signs of damage or trimming on edges of these implements (fig. 5:12). Notches do not always mark out end-scrapers of the first type, but for another type notches are obligatory. The first are made mostly on distal ends of elongated blanks, the second are made on flakes. End-scrapers made by elongated facets were found in all sites of the Abadzeh group. Side-scrapers formed by elongated facets (fig.5:7-8) and scale retouch are typical for this group (fig. 5:4-6), as well a specific form of side-scrapers (fig. 5:9).

Notches (fig.5:11) and denticulate tools are present. Denticulate tools are made by rounded facets (fig. 5:14-15), scale retouch (fig. 5:19) and Clacton notches (fig. 5:18). The presence of beak-like tools and implements with sharpened angles is characteristic of the Abadzeh group sites. Beak-like tools have small "working elements", formed by flat scale retouch. Tools with sharpened angles are divided to two types. Wide elongated facets (fig. 5:20) characterize the first type; and scale facets (fig. 5:16) form the second type.

The presence of sub-triangular plane-convex bifaces (fig. 5:1, 3) is typical: one at Fortepyanka, one at Kurdjips, and seven at Abadzeh. In additions there is one sub-cordiform double convex, one sub-triangular double convex, and one Micoquian biface at the Abadzeh location. They are formed by large elongated scars, ore often close to a leaf-like form (fig. 5:2), and have great size and rough trimming. Additionally, there are choppers (fig. 6:3), unifaces on pebble halves (fig. 5:10) and core-like backed tools with arched edge and end-scraper-like forming angle called Abadzeh type (fig. 6:1).

The cited techno-typological peculiarities of Abadzeh, Fortepyanka and Kurdjips locations allow them to be considered as a local group of the

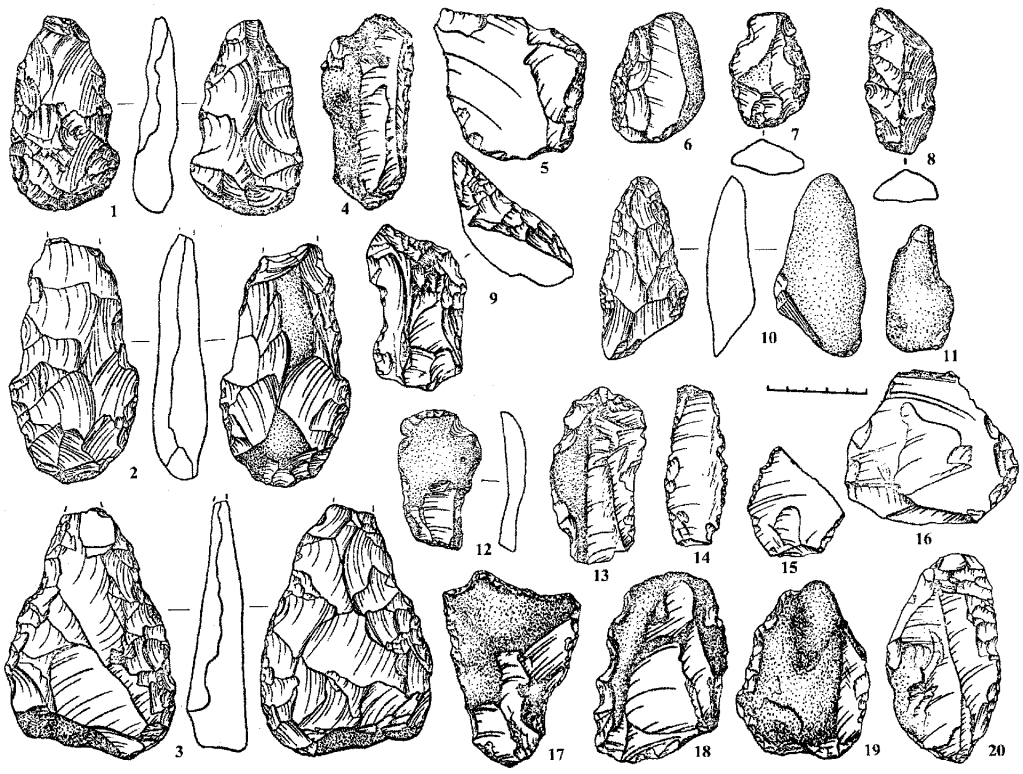

Figure 5. Abadzeh Group. Tools.

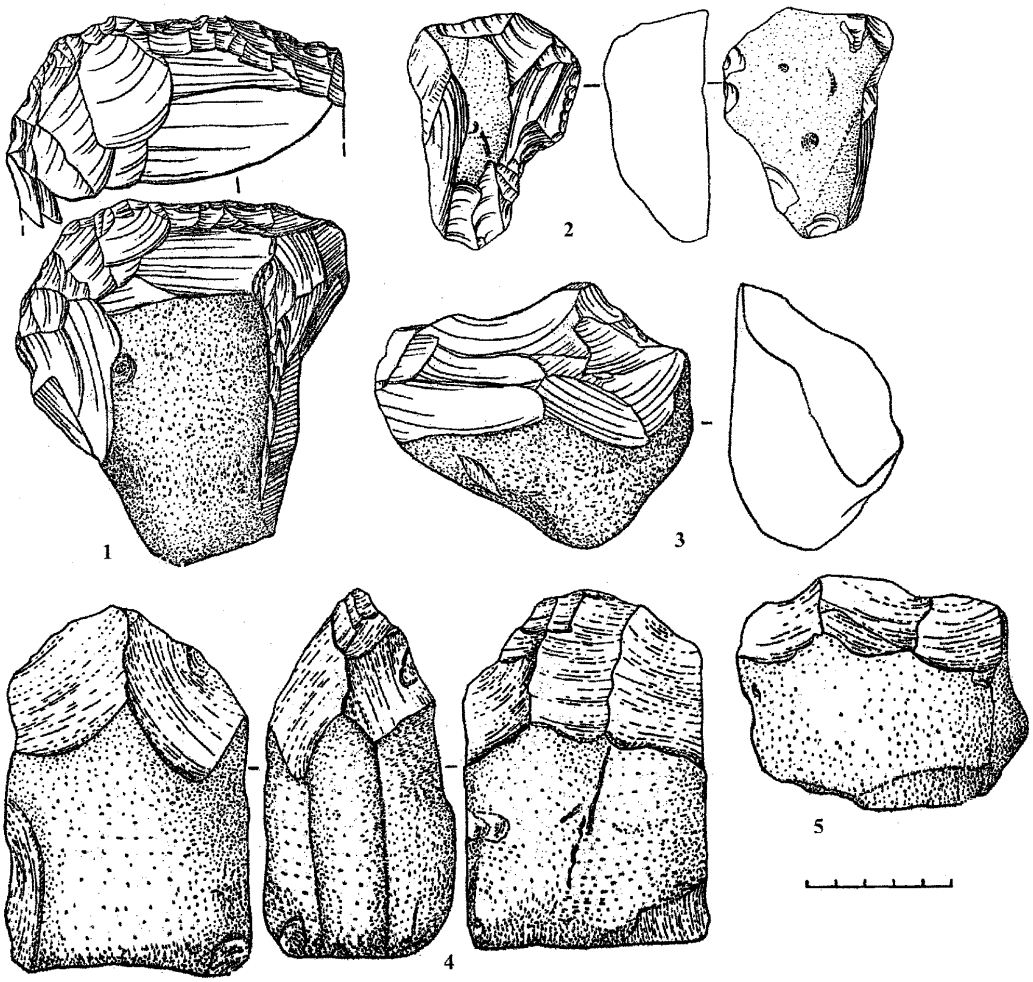

Figure 6. Heavy duty tools. 1-3, Abadzeh group; 2, Semiyablonya location; 4-5, Abin Group.

Late Acheulean sites. As implements found at Kurdjips and Fortepyanka locations were moved to riverbeds, dating of the group is based only on the geomorphologic position of the Abadzeh lacation, which, perhaps, is not older than 130,000 yr.

Abin group of the Late Acheulean sites

The Abin group of the Late Acheulean sites was discovered by P. Autlev in 1978-79 (Autlev, 1981) in the Abin and Crimea districts of the Krasnodar region. The Abin location has been studied more completely and a large collection of stone tools has been gathered. Only about 20 implements were found at the Adagum location, including one biface with an interception. At the Khabl location three implements were found, including one biface. The three sites are similar in raw material used for tool making. River boulders and pebbles of alevrolite and quartzite sandstone were the main raw materials. These kinds of raw material are rarely presented in the Paleolithic Kuban River basin sites. No flint artifacts have been found.

Plane parallel flaking is a characteristic of a flaking technique in these industries (fig. 2:1-3). Amorphous cores of a primary stage of flaking represent more than half the cores of the Abin group. For a utilization technique, one-side cores are typical, usually one-platform (25,6%) and multi-platform (15,3%), sometimes two-platform (2,6%).

A typological peculiarity of the Abin group is that tools make up to 28,2% of total (216 items). But the strongest peculiarity is that heavy-duty tools and bifaces prevail, respectively 37,5% (81 items) and 32,9% (71 items). Among the heavy-duty tools, one-sided choppers predominate (fig. 6:5) (54 items), but bifacially trimmed chopping-tools are also present (27 items) (fig. 6:4). There are several types of bifaces: triangular, sub-triangular (fig. 8:1-3), oval, elongated oval. A series of bifacial foliate points is also present (fig. 8:4-5).

Among flake tools, side-scrapers strongly prevail, making up 18,5% of the total (40 items) (IR - 29). Simple side-scrapers are mainly present (17 items) (fig. 8:6). There are two side-scrapers with ventral retouch (fig.8:7), two transversal and déjeté ones. Side-scrapers are formed mainly by scale retouch. Two end-scrapers (fig. 8:8-9), one borer, six naturally backed knives, two notches, and two proto-limaces are also present. A poor proportion of the Upper Paleolithic tools and complete lack of denticulate tools also determine specific features of the group.

Conclusions: the Late Acheulean of the Northern Caucasus

Studies of the geomorphologic positions of the Late Acheulean sites allow dating them in a wide range from about 100,000 to 150,000 yr. Typological features point only to the Late Acheulean age of the sites. There are no reasons to suppose development of one group into another. Facial variability of the industries is also excluded, because proportions of cores/flakes/tools in all the sites are similar (table 2), and only the Shahan location is interpreted as a workshop on the basis of lower tool percentage. Raw material quality didnot greatly influence technical indexes of these industries. In the Abadzeh group, for example, different sorts of raw material were used in each site. However, all the group industries both in technical and typological aspects are nearly identical.

Detailed techno-typological analyses allowed grouping of the sites inside the Abadzeh, Abin and Khadjoh groups. In all the Late Acheulean sites on the Northern Caucasus, primary flaking was performed by a method of parallel flaking in slightly convex planes. The main differences appear in core preparation for flaking and technique of utilization (table 3, 4). A specific characteristic for the Khadjoh group is the use of former scar negatives as striking platforms (25% for the Shahan workshop) and multi-faced technique of utilization. In contrasts, core utilization of one plane is typical for the Abadzeh group. The striking technique in the Abadzeh group sites gave a greater number of blades and elongated flakes: 13,5% in Abadzeh, 13,5% in Fortepyanka, and 19,0% in Kurdjips. In the Khadjoh group sites, blades are completely absent, and elongated flakes make up 4,3% at Sredniy Khadjoh, 8,8% at the Shahan workshop, and 4,0% at the Shahan location. Larger flakes were chosen for tool making. Sites of the Khadjoh group differ sufficiently from the Abadzeh group sites in usage of flint fragments for tool making.

Differences between the two groups are obvious in the retouched tool typology (table 5). A comparison of tool models (Golovanova, 1984) also shows the presence of quite substantial differences, such as end-scrapers, made by elongated retouch and end-scrapers, formed by rounded facets. A number of models are present only in one or another group. These are chisel-like tools in the Khadjoh group, and side-scrapers made by elongated facets, denticulate tools made by scale retouch, tools with sharpened angles, and

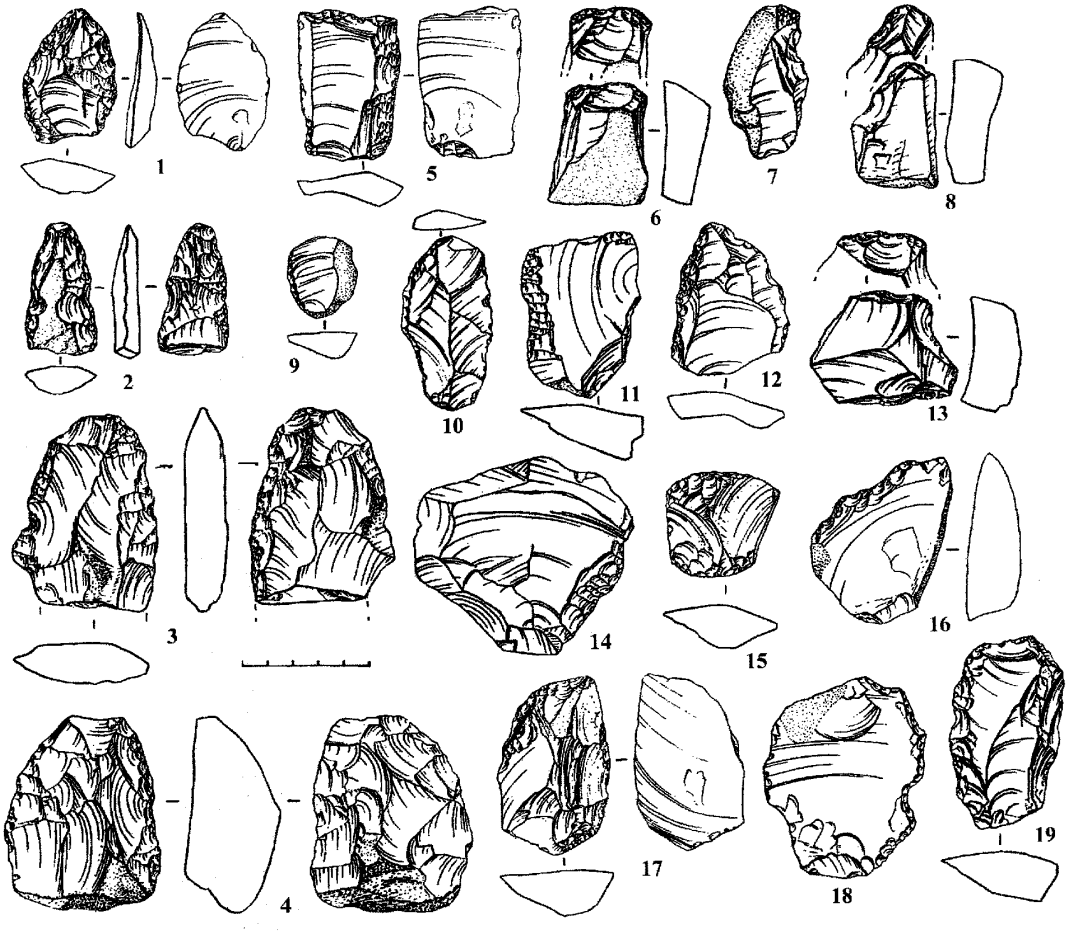

Figure 7. Luchka and Semiyablonya. Tools.

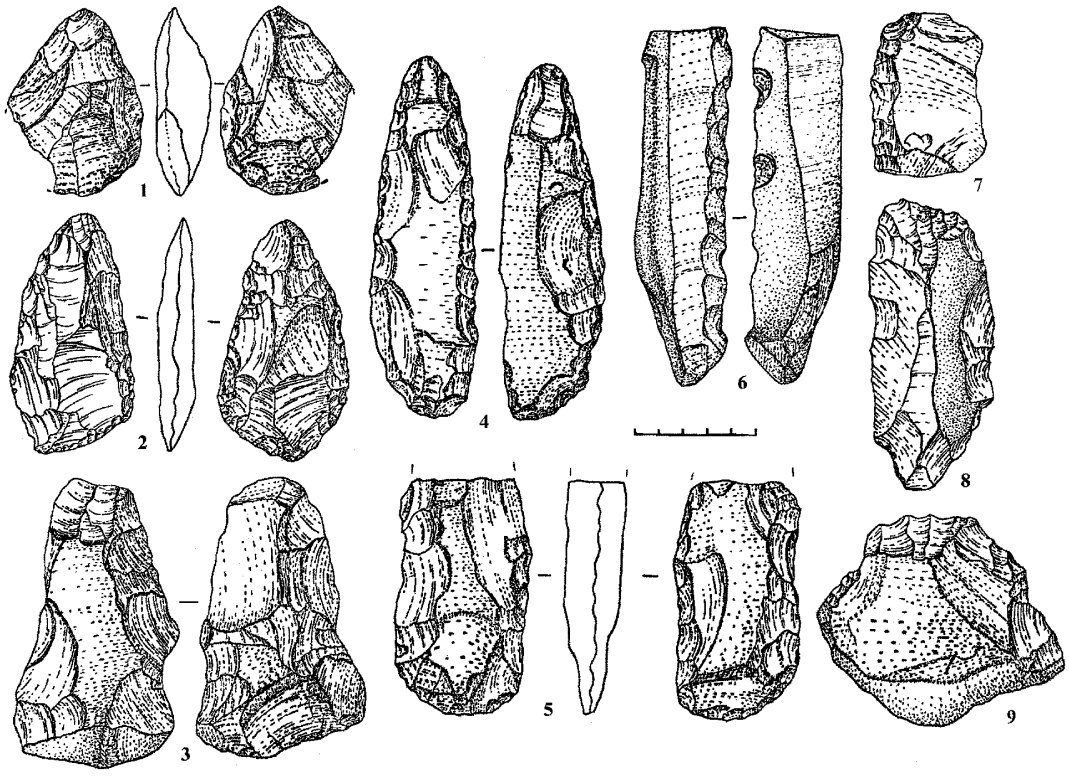

Figure 8. Abin Group. Tools.

beak-like tools in the Abadzeh group. A number of retouched tools, such as side-scrapers made by rounded facets, denticulate tools made by a series of clacton notches, as well single clacton notches, is presented in the Abadzeh and Khadjoh groups in different quantities. The same significant differences between sites of the two groups can be traced through comparing chipping tools. In the Abadzeh group sites, the major part of bifaces have a plane-convex cross-section, thinned base, made by short wide scars. In addition, there are choppers, chopping-tools, Abadzeh-type tools, and unifaces on pebbles. In the Khadjoh group sites there are no tools like these. Calculation of χ^2 coefficient (Riabushkin a.o., 1981) showed insufficiency of differences within each of these groups (table 6).

Comparison of sites using F. Bordes typology (Bordes, 1961) (table 7, 8) indicates that greater numbers of side-scrapers and the Upper Paleolithic tools are typical for the Khadjoh group (31,5-37,7%). There are quite few bifaces in both Abadzeh and Khadjoh groups. In contrast, a number of bifaces in the Abin group make up to 32,9%, and 29,2% is represented by side-scrapers, as well as a great number of choppers and chopping-tools.

Thus, today one can speak about intensive settlement of the Northern Caucasus during the Late Acheulean. All the Late Acheulean sites of the region are characterized by a plane parallel flaking, and pointed biface forms. Moreover, finding some analogies with the Near-Eastern and European sites, they could not be identified with any of them, although the Abadzeh group sites seem closest to such sites as Evron, Kissufim, En-el-Assad (Rollefson, 1980). The latter are characterized by a high development of Levallois knapping technique, pointed forms of bifaces (amingoloid, cordiform), a great percentage of side-scrapers. Sites of the Abadzeh group are also characterized by developed plane parallel flaking, traditionally called Levallois, cordiform and subtriangular forms of bifaces and a high amount of side-scrapers (25,9%). But there is a strong difference in the biface index among these sites: 36% for Kissufim, 40% for Evron, and only 0,2% for Abadzeh, as well 1,7% for Fortepyanka. In additions, there is a rather high persentage of Jabrudian elements (28,3% at En-el-Assad, and 21,6% at Kissufim), which are completely absent in the Abadzeh location industry. The same is true for the Abin group.

The Late Acheulean industries of Tabun E (Jelinek, 1975: t. 1-8) are also characterized by the presence of bifaces (from 1,9% to 32% according different authors), as well as high scraper indexes (16-68%), and blade indexes (20-40%). The main difference of these industries is a presence of a rich and variable canted side-scraper group (0,5-8,2%). This feature sharply distinguishes the Near-Eastern Late Acheulean sites.

Unfortunately, Transcaucasus Late Acheulean sites are found only at surface locations, the dating of which is difficult. Moreover, the majority of the collections is selected. On the reason collections from the Satani-Dar, Djraber and other Armenian locations are strongly dominated by bifaces while flake-tools are almost completely absent. Their common feature is a prevailing of sub-triangular and sub-cordiform bifaces, as well presence of blade technique.

In Europe, the Markkleeberg location is close in age to the North-Caucasus Late Acheulean sites. Earlier it was dated by the end of Mindel-Riss to the beginning of Riss. Long triangular, short and small triangular, and asymmetric oval bifaces are numbered here to 0,2%. Among the flake-tools simple side-scrapers prevail. Blade index is 10%. But in contrast with the North-Caucasus materials, there are here Mousterian points and a series of pointed tools called *Spitzklingen* (Baumann a.o., 1983). The Reuretsruh location includes the same elements, as well as Upper Paleolithic and even Neolithic intrusive materials (Luttropp & Bosinski, 1971), so that its dating is difficult.

The lower layers in the Weinberg caves (Danube region) are dated to the Late Pleistocene. Their industries are characterized by the presence of broad, flat hand-axes, flake-tools, and "typical Middle Paleolithic cores" (Müller-Beck, 1988). In other regions too were found sites of Riss age, that include a small number of bifaces, such as Abri Suard, La Chaise in Charente, France (Debenath, 1988). But they have a completely different set of flake-tools. For example, Kostenki and Chatelperron knives were found in La Chaise.

The Khadjoh group has quite unexpected and interesting analogs in the industry of the Muret site in Northern Alps (Malenfant, 1976), namely, in primitive plane flaking, small blade index (6,9% - Muret, 4,4% - Sredniy Khadjoh), low facetage index. Typologically, these sites are characterized by small numbers of side-scrapers (Muret - 9,85%, Khadjoh - 10,1%), presence of end-scrapers, Quinson points, burins, partly bifacial tools, and side-scrapers with bifacial retouch.

The majority of the so-called Late Acheulean of Levallois facies sites, recognized in Northern France (Somme and Oise basins), Southern Germany (Salzgitter-Lebenstedt, Hannover-Dohren, Rethen, Herne, Balver Höhle), and Belgium (Grotte de l'Hermitage, Docteur), are dated prior to the beginning of Wurm glaciation (Bosinski, 1967; Ulrix-Closset, 1975). A lot of them have small numbers of triangular or cordiform bifaces; Levallois technique is noted. But most of these sites are characterized by the presence of Levallois or Mousterian points, bifacial side-scrapers, leaf-shaped bifacial side-scrapers, and triangular flakes with retouched tops. The majority of the sites like the North-Caucasus ones do not have absolute dates.

However, all the mentioned industries, chronologically close to the North-Caucasus Late Acheulean sites, exhibit only a very high level similarity: a presence of some number, often small, of sub-triangular and sub-cordiform bifaces, as well as Levallois or blade techniques. The majority of the European sites have Mousterian points and other pointed tools. The Near-Eastern sites are also distinguished by the presence of canted tools.

The comparaisons mentioned above give no grounds to establish genetic connections of any Late Acheulean industries on the Northern Caucasus with ones in the Middle East or in Central Europe. But they suggest that the Late Acheulean of the Northern Caucasus had a more complex nature, than previously considered.

Problems of the Lower to Middle Paleolithic transition

The question of the evolution of the local Acheulean culture into the Mousterian has been propounded for the North-Western Caucasus only supposedly, mainly on the basis of the fact that some sites with small bifaces exist here.

The study of the collections revealed considerable differences between the sites. First of all, the bifacial tools, which were considered as an indication of the Early Mousterian age of the sites, have analogies in different time industries. Two bifaces from the Semiyablonya location (fig. 7:3-4) are analogous to those coming from the Abadzeh site, as well are two tools close to the Abadzekh type (fig. 6:2). Side-scrapers (fig. 7:9-12, 14) and denticulate tools (fig. 7:16,18-19) prevail among flake-tools from the Semiyablonya and Luchka locations. In this respect, the latter are close to the Abadzeh group of the Late Acheulean sites. Side-scrapers made by elongated facets were found in both sites (fig. 7:11, 14), as well as in the Abadzeh group sites only. The same is true for a specific side-scraper form (fig. 7:17) close to one from the Abadzeh location (fig. 5:9). Tools with sharpened angles (fig. 7:15) present one more tool type closing these sites with the Abadzeh group. End-scrapers in these sites also have clear analogies in the Late Acheulean sites. It is especially true for high end-scrapers: similar tools present both at the Abadzeh and Khadjoh sites (fig. 7:7-8, 13). Therefore, affinity of the sites under consideration with the Late Acheulean sites is quite obvious. This is revealed not only in the percentage of tools, but also in their principal characteristics.

However, in the collections of the Semiyablonya and Luchka, there are some elements which have analogies in the Mousterian industries. There are two Mousterian points (fig. 7:1) from the first and a fragment of bifacial leaf-shaped point from the second (fig. 7:2). The latter finds analogies in the materials of Il'skaya and Mezmaiskaya cave. Besides, in the materials of Luchka one can note truncated-facetted pieces (trimming of a ventral face and then dorsal thinning), which is very characteristic for the nearest Mousterian sites (Monasheskaya, Barakaevskaya and Mezmaiskaya caves). A convergent side-scraper has also been found at Semiyablonya (fig. 7:5).

The study of the flaking technologies of the industries under discussion shows that the technology of parallel flaking from slightly convex flake surfaces was used. Core reduction was carried out mainly in one plane by means of turning a core and forming the next striking platform (fig. 4:5-11). However, the industries differ from each other regarding the technologies of core preparation. The highest index of platform preparation was noted for Semiyablonya. At Luchka it is much lower. At the same time, in their core preparation, flaking and reduction technologies, both sites are rather close to the Abadzeh Late Acheulean group. Probably, they represent a later stage when technology of core preparation came into wider use. The well-developed technology of core preparation led to the increase in the number of high-quality blanks at Semiyablonya. Blades and elongated flakes make up 17,2%. The indices of trimmed and facetted platforms are more than 19,3% and 15,7% respectively. They exceed considerably the data obtained for Acheulean sites, but are more than two times less than the indices characteristic of Mousterian industries. At Luchka these indices are considerably lower.

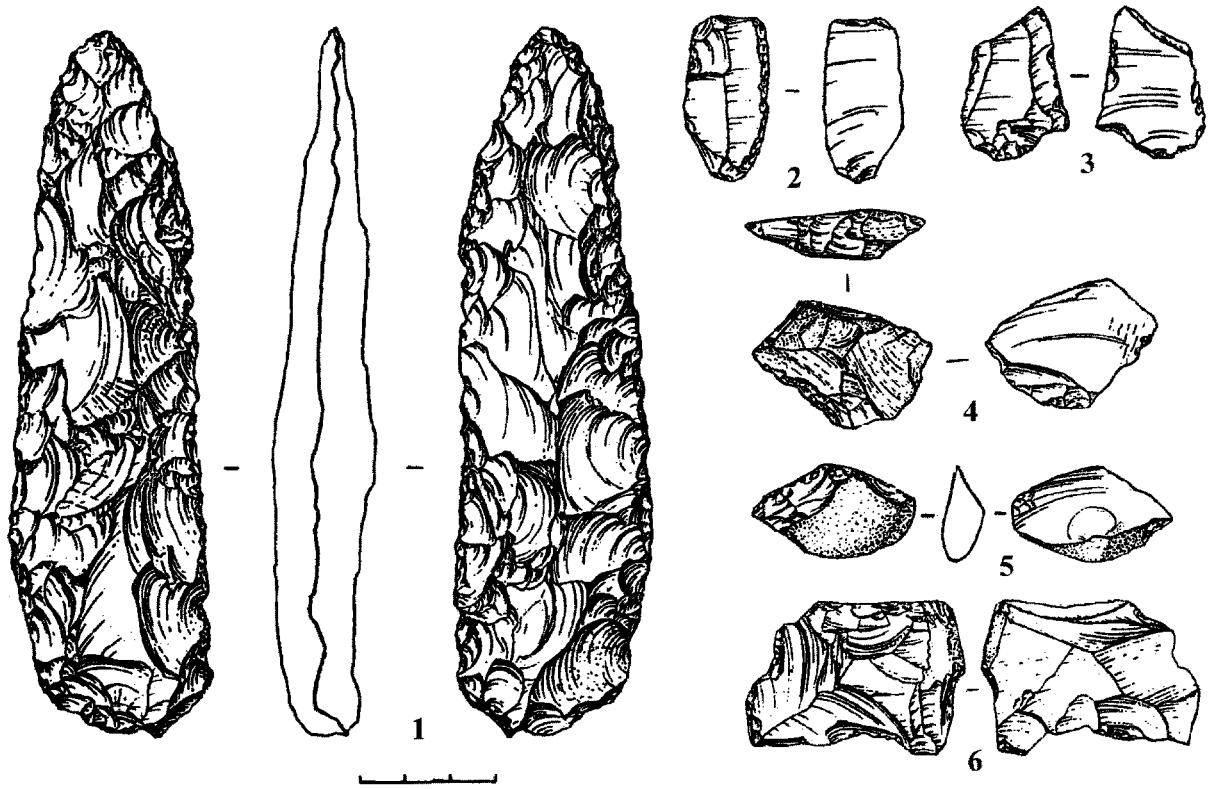

Figure 9. Matuzka Cave. Artifacts from Layer 5B.

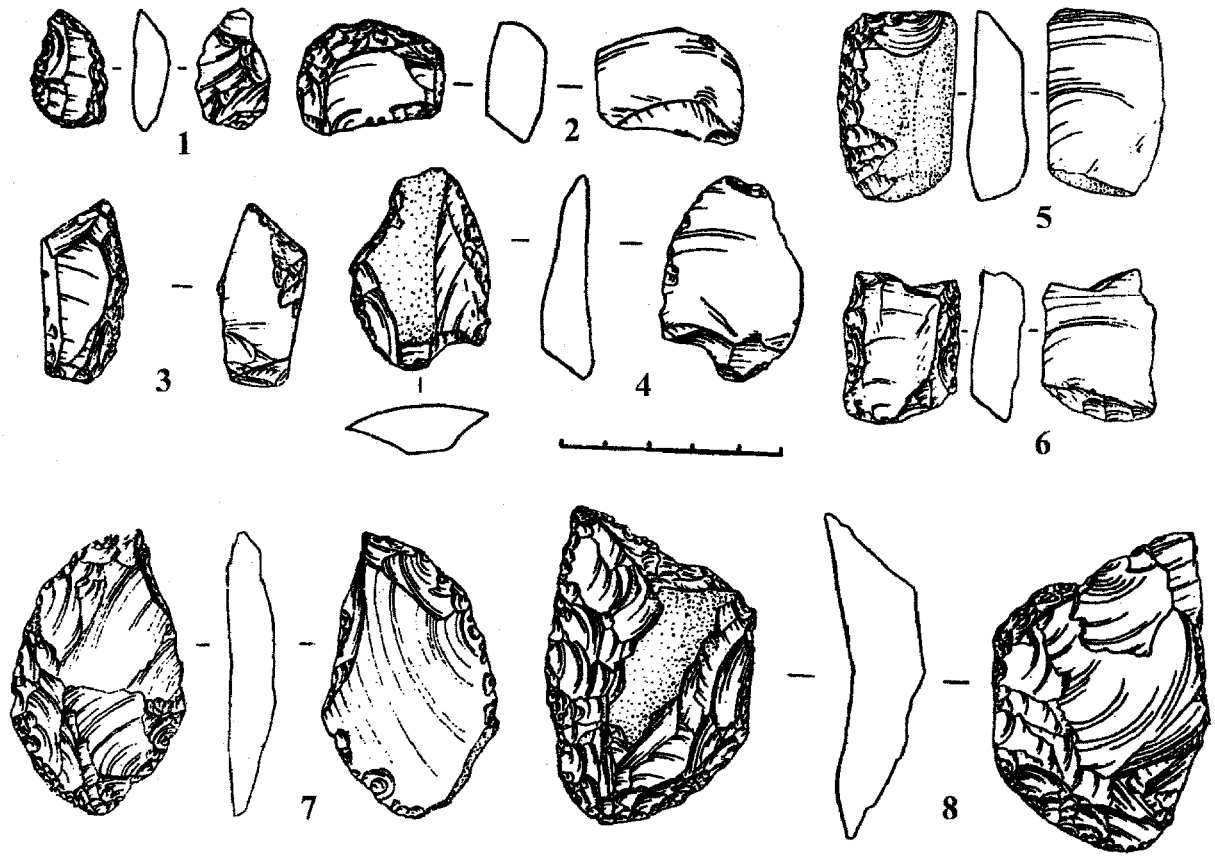

Figure 10 Matuzka Cave. Tools from Layer 6.

The material coming from the lower levels of the Matuzka cave is very important with respect to the question of the Lower to Middle Paleolithic transition and the initial stage of the Mousterian on the North-Western Caucasus. The Matuzka cave is situated at an elevation of 720 m a.s.l. near the northern edge of the Lago-Naki massif of the Upper Jurassic limestone. The total area excavated in 1985-1991 is 54 m². The section of the cave deposits includes two Holocene and 12 Pleistocene layers. With the exception of layer 5a, stone tools are present in all the Pleistocene layers. The stone industry from layers 3b and 4a has analogies with the Levallois blade-focused industries of the Khosta culture sites near the Sochi. The industries from strata 4b and 4c are typologically close to the Gubs culture (Typical Mousterian). Layers 3a-c and 4a-d can be dated to the Middle Würm or stage 3 of the oxygen-isotope scale. Layer 4b of Matuzka has the date 34.200±1.410 kyr B.P. (LU-3692). Layers 5-6 are older than the Middle Würm. Layer 7 was preliminarily dated back to the Riss-Würm.

Samples for paleo-magnetic study (Pospelova a.o., 1996) were taken from layers 7, 8a, and 8, while samples from layers 6, 7, 8a, and 8 were also used for the study of composition and structure of the magnetic grains. On the basis of the NRM (t) and Irs (t) curves, one can establish that the magnetic properties of the sediments are caused by fine-grained hematite. Magnetic parameters of the sediments vary in different layers of the cave. Sediments of the layers 8a and 8 have normal polarity last of thermal demagnetisation before 600° C. In the lower part of layer 7, a transition from normal polarity is revealed. The upper part of the layer has reverse polarity. VGP's are placed near the South Pole (λ=114° E, Φ=83° S). We suppose that in layer 7, the Blake geomagnetic excursion is recorded. This supposition is confirmed by geological and geomorphologic data of S.A. Nesmeyanov that the age of layer 7 is 100,000-120,000 yr. On the basis of the faunal data, G.F. Baryshnikov dated the layer to the Riss-Würm/Late Riss time.

Thus, the industries of layers 5-7 are dated to the period from Riss-Würm to Early Würm. In spite of the small numbers of artifacts, these industries demonstrate significant cultural peculiarities. Altogether 166 artifacts come from these levels. At every level, cores are single (fig. 9:6; 11:9). All of them have parallel scars on their striking surfaces. Platforms are usually plain; only one core has a retouched platform. All the cores were reshaped into tools except one strongly exhausted core from level 5b (fig. 9:6). The shortage of raw material exerted a great influence on the appearance of the industry. The majority of flakes from each layer have negatives on dorsal surfaces that coincide with the axe of the flake itself. Blades were found in layer 5 only (fig. 9:3), while in underlying layers 6 and 7 only elongated flakes present. Most striking platforms on the flakes are plain. Trimmed or facetted platforms are single (fig. 10:6; 11:3-4).

The small but sufficiently impressive industry from levels 5-7 of Matuzka does not have complete analogies in the Early and Middle Paleolithic industries of the Northern Caucasus. In the collection from layer 5, the most striking form is a bifacial point (fig. 9:1), which resembles to some extent bifacial points from the Tcona cave in Georgia and the Abin Late Acheulean location on the Northern Caucasus. Besides, the collection contains three end-scrapers of high form (fig. 9:4-5) like those often presented in the Late Acheulean sites of the North-Western Caucasus. In layer 6, there are several specific tools: an unfinished leaf-shaped point (fig. 10:7), a small triangular biface (fig. 10:1), and a side-scraper made on a core (fig. 10:8). High end-scrapers present too (fig. 10:2). There are also two *déjeté* side-scrapers of original type unknown in the nearest Mousterian sites (fig. 10:5). In layer 7 large tools on limestone pebbles and slabs are present, including a chopper (fig. 11:6). Here there are also high end-scrapers (fig. 11:5) and an atypical *déjeté* side-scraper (fig. 11:1). However, the most common forms in layers 5-7 are single side-scrapers (fig. 9:2; 10:3, 4, 6; 11:2-4, 8), as well denticulate and notched tools including a convergent denticulate tool (fig. 11:7).

Thus, the industries of levels 5-7 of Matuzka have analogies both in Acheulean and Mousterian sites. However, no complete analogies are revealed. These industries have no chronologically close sites in this region, probably, except of layers 5-7 of Il'skaya 2, which are dated to Riss-Würmian age, but remain almost unpublished.

The main characteristics of the materials from the Semiyablonya and Luchka locations are close to the Late Acheulean sites. Numerous analogies among bifacial and flake tools also render these sites similar to the Late Acheulean ones. Though the appearance of Mousterian points augments the percentage of convergent forms, the latter is still much lower than in the Mousterian assemblages. The industries under consideration are close to the local Late Acheulean industries of the Abadzeh group and, probably, belong to the same group of sites, but are somewhat later in age. It should be

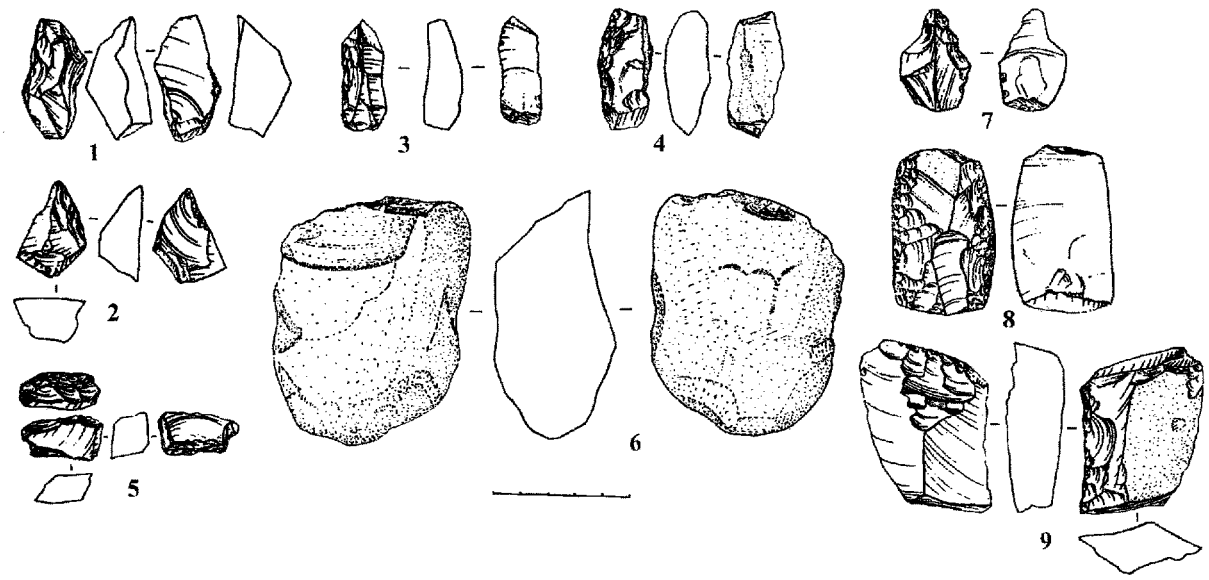

Figure 11. Matuzka Cave. Artifacts from Layer 7.

noted that the analyzed industries have no continuation in the later Mousterian sites. In the end of Riss-Würm – beginning of the Würm, the East European Micoquian appeared in the Northern Caucasus. A break exists between the local Late Acheulean and Mousterian industries.

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O18 Scale	Age Kyr	Alp-ine scale	S I T E S
4	68		
5	125	R-W	Matuzka layer 5 ? Matuzka layer 6 Matuzka layer 7
6	180	Late Riss	Semiyablonya, Luchka Sredniy Khadjoh, Shahan st., Shahan w. Abadzeh, Fortepyanka, Kurdjips Abin, Habl

Table 1.

Total proportions	Total number	Cores % (n)	Flakes % (n)	Tools % (n)
Abadzeh location	2691	14,2 (382)	82,3 (2242)	22,6 (610)
Fortepyanka loc.	569	24,4 (139)	74,2 (422)	11,4 (65)
Kurdjips location	582	17,5 (102)	80,6 (469)	11,7 (68)
S. Khadjoh, level 3	346	7,2 (25)	64,5 (223)	28,6 (99)
Shahan location	583	9,4 (55)	90,1 (525)	5,1 (130)
Abin location	710	11,1 (78)	59,2 (416)	28,2 (216)

Table 2.

Striking platforms	Facetted %	Trimming %
Abadzeh location	38,1	23,6
Fortepyanka loc.	10,0	14,3
Kurdjips location	31,0	23,9
S. Khadjoh, level 3	-	14,3
Shahan location	-	17,9

Table 3.

Cores	Many-sided %	One-sided, 2-4 platforms %
Abadzeh location	8,6	41,4
Fortepyanka loc.	27,4	46,1
Kurdjips location	3,9	44,0
S. Khadjoh, level 3	42,9	-
Shahan location	45,1	2,0

Table 4.

Sites	Abadzeh Location	Fortepyanka Location	Kurdjips Location	Sredniy Khadjoh site	Shahan workshop	Shahan Site
Comparisons	1	2	3	4	5	6
Total number of tools	495	50	49	68	26	7
Double-convex bifaces	-	-	-	3	1	1
Flat-convex bifaces	19	2	3	-	-	-
Choppers/chopping-tools	5	2	1	-	-	-
“Abadzeh” type tools	7	1	-	-	-	-
Unifaces on pebble shalves	1	1	-	-	-	-
Quinson Points	-	-	-	2	-	-
Tools with burin spalls	-	-	-	20	5	2
End-scrapers w/elongated r.	24	2	6	3	1	-
End-scrapers w/rounded r.	17	6	4	-	3	-
Side-scrapers w/elongated r.	6	2	3	-	-	-
Side-scrapers w/rounded r.	54	-	-	12	2	-
Side-scrapers w/scale retouch	101	10	20	6	5	2
Denticulate tools w/rounded r.	67	9	-	9	-	-
Denticulate tools w/scale r.	28	-	1	-	-	-
Denticulate tools w/clacton n.	77	6	3	2	3	-
Notches w/rounded retouch	3	-	-	-	-	-
Notches w/scale retouch	8	8	1	8	3	2
Clacton notches	9	-	-	3	-	-
Tools w/elongated r. angles	8	-	3	-	3	-
Tools w/scale retouch angles	13	-	4	-	-	-
Beak-like tools	48	1	-	-	-	-

Table 5.

Comparisons	1-2	1-3	2-3	4-5	4-6	5-6	1-4
χ^2 value	14.7003	21.9881	18.1827	6.9457	2.7284	2.7692	31.7568
Table χ^2 value	30.1000	30.1000	30.1000	30.1000	30.1000	30.1000	30.1000
Result	Difference not sufficient	Difference not sufficient	Difference not sufficient	Difference not sufficient	Difference not sufficient	Difference not sufficient	Difference sufficient

Table 6.

Sites	IR	IC	IDent	IUP	IB
Abadzeh location	31,5	17,0	37,7	6,4	3,1
Fortepyanka location	27,3	18,2	27,3	14,5	3,1
Kudjips location	40,6	31,3	6,3	15,6	4,4
Sredniy Khadjoh site	6,7	-	38,2	25,8	3,0
Shahan workshop	27,6	-	13,8	31,0	3,3
Abin location	29,2	5,1	-	2,2	32,9

Table 7.

Tool types (by F. Bordes)	Abadzeh location	Fortepyanka location	Kurdjips location	Sredniy Khadjoh	Shahan site	Shahan workshop	Abin location
Total of tools	559	55	64	89	7	29	208
Simple straight Side-scrapers	19	-	-	-	-	-	6
Simple convex Side-scrapers	68	6	11	6	2	6	2
Simple concave Side-scrapers	35	3	-	-	-	-	6
Simple convex-concave Side-scrapers	-	-	-	-	-	-	3
Double straight side-scrapers	5	-	-	-	-	-	-
Double Double-convex side-scrapers	9	-	-	-	-	-	-
Double Double-concave side-scrapers	2	-	-	-	-	-	-
Convergent convex side-scrapers	-	-	2	-	-	-	-
Canted Side-scrapers	1	-	-	-	-	-	2
Transversal Straight Side-scrapers	3	-	-	-	-	-	2
Transversal Convex Side-scrapers	18	1	4	-	-	2	2
Transversal concave Side-scrapers	6	3	5	-	-	-	5
Inverse Side-scrapers	6	2	3	-	-	-	12
Biface Side-scrapers	4	-	3	-	-	-	-
End-scrapers	36	8	10	3	-	4	1
Borers	-	-	-	-	-	-	1
Burins	-	-	-	20	2	5	-
Notches	30	8	1	11	2	3	2
Denticulate tools	211	15	4	34	-	4	-
End-scrapers Of high form	3	-	6	6	-	2	-
Choppers	4	1	1	-	-	-	54
Chopping-tools	1	1	-	-	-	-	27
Miscellaneous	98	7	14	9	1	3	3
Leaf-like tools	-	-	-	-	-	-	8

Table 8.