PROCUREMENT AND DISTRIBUTION OF RAW MATERIALS IN THE PALAEOLITHIC OF NORTH-EAST HUNGARY.

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The following pages reflect the present state of a long-term research. For a long time Palaeolithic archaeology in Hungary concentrated on typology, while the study of technology and that of the distribution of the raw material were often reffered to in publications as additional elements or as supplement. It was only in the 70's that the significance of these aspects was realized and more stress was put on Hungarian raw material sources, on exotic and local raw materials, and on processing techniques.

As the results achieved till that time had only been sporadic, the first step for us was a survey, mapping and sampling of the raw material sources followed by an analysis of the material. This task was undertaken by Viola Dobosi at the Hungarian National Museum and by Katalin Takacs-Biro and Elisabeth Bacskay at the Hungarian Geological Institute, and myself. A very important stage in this work was presented in 1984 at a petroarchaeological seminar organized in Bulgaria (Takacs-Biro, Siman, Szakall, 1984), and the result of this work was introduced to the participants last year in Hungary at a regional conference on flint mining and sourcing (Takacs-Biro, 1986). Lastly, a so called lithoteka has been founded in the Hungarian National Museum. The lithoteka includes a collection of all Hungarian raw materials as well as all exotic types which have been found on archaeological sites in Hungary. This lithoteka contains samples of rocks and the significant lithological and archaeological data concerning them.

This paper will focus on the raw materials from Northeast Hungary which were used mostly or exclusively by Palaeolithic populations.

Northeast Hungary is a part of the Hungarian Mid-Mountain Range (Fig. 1) consisting of three significant units: the Tokaj-Presovc called Zemplén in Hungary) mountains formed by Pliocene volcanism, the karstic Bükk mountains with Miocene volcanism at its southern and eastern borders and the Matra mountains, also formed during the Miocene as a result of volcanic activities. They are bordered on the north by karstic hills which were seemingly inihabited during the Palaeolithic. The raw material sources can all be related to volcanic or post-volcanic activities. Of course, all amorphous materials were far from usable for tool making. Even good quality materials were not always used, or even known of by Palaeolithic people.

The raw materials of the Hungarian Palaeolithic can be divided into three groups. The strictly local raw materials were acquired from sources no farther away than about 25 km. The mesolocal raw materials remained within a restricted geographical-ecological area, usually 50 to 100 km. Some types of rocks have been identified as coming from sources several hundred kilometers, in alien geographical surrounding : the latter constitute the long distance raw materials.

Among the strictly local raw materials of the territory are the silicified sandstone and the limnoopalite, both found around Eger (Fig. 2). These materials are found in considerable quantities only on archaeological sites, mostly belonging to the Middle Palaeolithic and located around Eger. It is not really a high quality raw material being rather grainy and often with a non-homogenous structure. This material so far has not been found farther away from the source. The other local raw materials are mostly inferior quality ones, not worth mentioning here.

From among the more abundant mesolocal raw materials, we may mention the hornstone of the South Bükk area (Fig. 3). In the Middle Palaeolithic it was used only in the direct vicinity of the source. However, later, during the Upper Palaeolithic, some pieces were carried to farther off sites, too.

Another important member of this group is the limno-quartzite from the Avas hill at Mikolc. The "silex mine of the Avas hill" is known in the technical literature, but we must report that this mine is Neolithic. As the revision of the stratigraphical data has revealed, the Palaeolithic tools found during the excavations did not belong to the shafts, but were washed from the large Middle Palaeolithic site covering the hilltop into the upper layers of the fill. Beside the sherds and antler tools that were unearthed from the shafts, another proof of the mine's Neolithic age maybe the fact that the raw material type from the mine, a whitish limnic quartzite intercalated with quartzite veins, is not really known from Palaeolithic sites. Instead we can find as a dominating raw material a transparent variety with color varying from opalite white to deep red, which can be found ion the southern slopes of the hill exposed to the surface even now. This raw material can be found on the Palaeolithic industries on the hilltop and in the cave sites of the Bükk mountains (Fig. 4). In case of sites near Eger, however, it is not clear whether the raw material used was from the Avas hill or from the nearby Matra mountains.

A form transitional to the next group is represented by the material of the limnic quartzite bench between the villages of Boldogkövaralja, Arka and Korlat (Fig. 5). It can be found all over the Zemplén along the Hernad river and it is also present in the cave sites of the Bükk. Its characteristics are the presence of macroscopic organic, floristic remains, and the frequency of chalcedony intrusions. It is, however, difficult to identify if these features are missing. I will return to this raw material type in the second part of my paper.

Another transitional rock type is the so called Carpathian II obsidian (1) (Fig. 6). Its source is the southern part of the Zemplén. Pieces are characteristically small-sized: in the northern source area, they are seldom larger than 3 cm. These were favored in the Middle Palaeolithic. Upper Palaeolithic groups used the variety from the southern source area, which is somewhat larger and a bit more transparent (2). The CII. obsidian can be found on Palaeolithic sites in the southern and western foothills of the Zemplén and in the Bükk mountains.

The most characteristic of the long-distance raw materials found within the territory is the so-called glassy quartzporphiry, a dark grey, sometimes brownish, laminated silica. Its only source, as far as we know, is located on the eastern slopes of the Bükk mountains (Fig. 7). It was used throughout the whole Palaeolithic. The few pieces found on Neolithic sites probably do not belong to this later period. Greater densities can be found in the direct vicinity of the source, in Middle Palaeolithic workshops. This was also the period when it appears in the Matra mountains related to a group the "Babonyian" (i.e. a micoquoid) type of industry(3). In the Upper Palaeolithic, it was less important but still present at several sites, mostly in the form of bifacial tools. The farthest known representative is from Moravany Dlha, in Slovakia, cca 300 km from the source. The technological similarity between the Dlha and the Szob leaf-shaped tools seems to suggest that they were carried by a wandering group of people.

The best known long-distance raw material from the area is the Carpathian I. obsidian (Fig. 8) which was used on the examined territory no earlier than the Upper Palaeolithic and even then played a secondary role. The farthest sample so far identified was found in Lower Austria, cca 450 km from the source. The dispersion of the material is multidirectional reaching really great distances, so trade as probability seems to be justified.

Now, regarding the raw materials altogether, considering the radius of their distribution and their relative significance, we may say that the meso-local raw materials are predominantly used in a well defined industry or by a group of people inside a larger geographical-ecological unit. It may at the same time, give some hints concerning the periodicity of the wanderings of human groups: on leaving the area, the mesolocal raw material disappears, probably replaced by other mesolocal materials from a different geographical area. In the vicinity of these territories we can rarely detect even a trace of similar industries. We must suppose that human groups when leaving a geographical area - which, possibly, in consequence of hunting out the animals was no longer able to furnish a sufficient food supply -, traveled considerable distances, over a sufficient time period to lose the raw material which reflected their earlier living area. The rock dispersion shows, at the same time, the direction of population movements which followed the valleys of the Bodrog and Hernad Rivers, from the foothills of the mountains to the Danube. The glassy quartzporphiry associated with the Micoquian-like industries can be followed along this route from the territory of the Babonyian to Transdanubia, where it was found, at a site of the Jankovichian, in a similar micoquian-like industry (Ringer 1982; Gabori-Csank 1983).

The obsidian, as it was mentioned already, traveled even farther, towards the north, to Southern Polish territories. At the same time, in the other direction, the chocolate flint, the Jurassic Cracow flint, the Swieciechow and the erratic Baltic flints traveled to Northern Hungary. The earliest traces of the presence of northern raw materials date back to the Middle Palaeolithic, found in the form of a small assemblage of scrapers. The next, already qualitatively significant, appearance of these materials is during the Upper Palaeolithic. The exact route, where the Carpathians were crossed, and how it got to the Hernad valley, is not yet known.

Now let us examine the problem from another angle and consider what the "attraction circle" of the camp-sites may indicate. Here, we must face more problems. As many of the sites were discovered and excavated in the first half of the century, the collections are incomplete, not separated according to layers or mixed later on. So I often had to work with insufficient data, looking for trend indicators. Moreover, even the recently discovered sites cannot be evaluated at fully as materials often came from surface collections are frequently of mixed character.

The Middle Palaeolithic site of Avas-Felsöszentgyörgy (Fig. 9) is composed of surface finds, and yet still represents a unit. The industry is Micoquian-like, characterized by handaxes, scrapers, bifacial scrapers and knives. The dominating raw material is the limnic quartzite, followed by the glassy quartzporphiry. Some pieces of silex from the South Zemplén area can also be found. Consequently, the site has local attraction. I am convinced that the same type of industry was found in the lower layer of the Szeleta cave (Fig. 10), resembling the above one both in its constitution and distribution of raw material. There are some pieces of the Korlat type limnic quartzite to be found here, too. These two sites belong to the circle of Micoquian type industry workshops, dispersed in great density around the source area of the Avas limnic quartzite and the glassy quartzporphiry. Regrettably enough they are mostly surface finds.

Another industry type from the same period is the Mousterian usually with a generalized tool assemblage. The most characteristic example is the Subalyuk cave.

According to Miklos Gabori's definition (Gabori, 1976), it belongs to the Central European Mousterian. The two layers display similar features not only typologically but also in raw material distribution (Fig. 11). Amongst the strictly local materials, Carpathian II obsidian is the only rock type to stand out. So once more we can observe local raw material attraction.

The sensu lato Mousterian workshop of the Büdöspest cave (Fig. 12) exploited a somewhat higher quantity of raw materials from Zemplen as well as the local glassy quartzporphiry. Its' counterpart, one may say, is the workshop at the top of the Avas hill (Simén 1986), which in turn exploited the Avas limnic quartzite and contained only a statistically insignificant quantity of the glassy quarzpophiry(4).

From amongst the Upper Palaeolithic sites, we must mention the upper layer of Szeleta cave (Fig. 13) which is the clearest representative of those Upper Palaeolithic industries where, after the dominating limnic quartzite, the second place is occupied by glassy quarzporphiry. (Once more the material is associated with an industry, the Szeletian, characterized by bifacial tools). In addition, it shows a strong connection to the South Zemplén source area.

The two most significant Upper Palaeolithic sites, from our point of view, are Arka and Bodrogkeresztur. The settlement material of Bodrogkeresztur (Fig. 14) contained first of all the local stone pulp, silex and obsidian. It shows, however, very noticable contacts, on the one hand, with the Bükk area through the hornstone and the glassy quartzporphiry and the Korlat area on the other. This is the site, where we can first detect exotic raw materials in a statistically significant quantity.

At Arka (Fig. 15) the situation is defined by the fact that it is a workshop processing the local limnic quartzite of the Korlat-Ravaszlyuktetö type. However, it also contains very small amonts ofSouth Zemplén Bükk mountains and exotic material mostly coming from Southern Poland.

In summary we can say, that although long-distance distribution had appeared by the Middle Palaeolithic, it is always strictly attached to one technological feature or one type of industry, i.e. it was transported. The dominance of the local raw materials at that time shows that variability in the types of industries was independent of the raw materials used. In the Upper Palaeolithic it is still the local raw material that dominates, however the ratio of the mesolocal or even long-distance acquisitions grows considerably. It may mean more active population movements as well as the start of some kind of an exchange system. We may also observe periods of a kind of "boom" of local raw material exploitation. The first one can be attached to the Micoquian-like industries of the Middle Palaeolithic, the second one to the Stillfried B phase (Bodrogkeresztur), and the last to the Lascaux phase (Arka)(5).

This problem can, fortunately, be studied on one site, at Korlat-Ravaszlyuktetö. It can be found on the western foothills of the Zemplén (Fig. 16) on the first line of hills along the Hernad river, 312 m above sea level. The site is on a small plateau cca 110 m southeast and 10 m deeper from the site, where L. Vértes defined the "heavy industry mesolithic" (Vértes 1951). The objective of the excavations was to locate a Middle Palaeolithic settlement indicated by sporadic surface finds. The test trenches were consequently deepened in a relatively small area revealing lesser amounts of raw material rubbish and waste on the surface. It was only by chance that, instead of a Middle Paleolithic settlement, we came across a limnic quartzite bench, one side of which had been taken out by prehistoric miners (Fig. 17). During three years of excavations we took soil samples from the two main trenches which were examined by a specialist of periglacial phenomena, Dr. Péter Csorba. According to his examinations the limnic quartzite bench of trench I was covered by redeposited clay of the Early Holocene, indicating that it was open during the Neolithic. The situation is somewhat more complicated in trench II. There the deepest sediments (140-160 cm) formed a brown forest soil with a very high lime content. Up to 70 cm from the present surface, the loess content grew, while the lime and sand content decreased. A sedimentational break was noted at a depth of 100 cm. This break was followed by the sedimentation of eroded forest soil with an increased ratio of silica and limestone fragments. Comparing the sedimentological data with the vertical distribution of the archaeological material we can say that in trench II the bulk of the material shows, in harmony with the stratigraphical results, a natural refilling that follows slope direction (Fig. 18). Reconstructing the workshop of trench II, it seems that miners extracted the material along a wide front and carried out the decortication and rough preparation of the material beside it. From there, the erosion washed it backin to the abandoned front area.

Analysis of the recovered materials is still in an initial phase. Thus, I will limit my discussion to the presentation of a small part of it. The total material can be divided into three groups. The first contains rolled specimens difficult to identify, some of which show traces of later use, mostly as hammerstones (Fig. 19). The second group contains worn, but not rolled, pieces, many of which seem to belong to the Middle Palaeolithic. These two groups make up about one third of the total material. The third group which I will discuss here includes pieces with fresh, unpatinated surfaces found in the two main trenches. In trench I (Fig. 20), the cores, core fragments, precores, and cores at an early stage of reduction make up less than 2% of the total (815 pieces). The proportion of blades and blade fragments is 18% and that of retouched tools 4%. The remainder is composed of flakes, technical flakes and waste, where there is more waste than flakes. In trench I one third of the core group consists of precores and early cores, the rest are spoilt or specimens unsatisfactory due to inclusions. Among the blades there are hardly any complete ones.

In trench II (1980 pieces) the proportion of cores is lower, hardly surpassing 1%. The blades constitute 12% and there are no more than 11 tools i.e. less than 1%. The flakes and waste make up 87% of the total material with the rather dominating. If we compare the different levels with the sedimentological data we can see that the same sedimentation break can be found here. Just above the break, there were fewer artifacts than at any other depth in the sequence, no more than 5% of the total material of the trench.

The number of cortical pieces is relatively low in trench I (Fig. 21), and even among these, the partially cortical pieces predominate. In trench II, these proportions increase as compared to the total material and the number of fully cortical pieces becomes more significant as well. We can deduce that above trench I there was a smaller workshop, whereas the first, decorticating processing was carried out(6) at trench II.

It is a very difficult task to estimate the age of an extraction point. We collected charcoal, but due to financial and administrative considerations they have not been analyzed. In any case, aware of the situation that they came from a natural redeposition containing mixed material, I would not really trust even C14 dating. Perhaps somewhat better results can be expected, although based on indirect evidence, from the distribution and dispersion of the raw material. As we may see in Fig. 6, the raw material appeared as early as the Middle Paleolithic in the Micoquian-like industry circle. Micoquian artefacts made of the local limnic quartzite were also found wedged between the blocks of the bench in trench I (Fig. 22). It can also be added that the characteristic raw material of this circle, the glassy quartzporphiry has also been found in the trenches. Thus, it seems certain that the material was extracted or collected from the exposed bench during the Middle Palaeolithic. The same raw material type is represented in greater quantities during the Upper Paleolithic. At the same time, nearly all the raw materials (mesolocal ones) characteristic of the Upper Palaeolithic Gravettian industries of the area could be found in the trenches, as well. Even a piece of erratic Baltic flint was identified in the form of a burin. What is even more striking is that a workshop processing the same raw material was uncovered in the 1960's by L. Vértes at the Arka-Herzsarét site (Vértes 1962) just opposite the extraction point.

For comparative purposes, I examined the three larger Gravettian sites in the area, the already known Bodrogkeresztur and Arka and the recently excavated Hidasnémeti. Arka is a workshop with more than 10.000 pieces containing a relatively high ratio of blades, in addition to the dominating waste and flakes (Fig. 23). The distribution of the major technical categories is nearly totally identical to that of trench I in Korlat Ravaszlyuktetö (Fig. 20). It probably represents the same processing phase. Naturally enough, the better part of the raw material is local. At Hidasnémeti, the proportion of blades is much higher, while that of flakes and waste is reduced. The proportion of cores is low and nearly all of them are totally exhausted. These observations suggest that most probably blade blanks were produced there. The raw material is nearly exclusively limnic quartzite and the distribution of other raw materials is similar to that found at Arka. More than 50% of the Bodrogkeresztur assemblage was cores and blades. While the retouched tools represent more than one quarter of the total material. The distribution of raw materials (Fig. 14) displays a high percentage of exotic raw material.

We know that Bodrogkeresztur is about 28.000 years old and Arka 17.000 according to C14 dating. The Hidasnémeti site yielded a late Gravettian, most probably close in age to the latter site. It is well established that the Korlat extraction point was used during the Upper Palaeolithic but it would be difficult to determine the phases during which it was exploited.

There was also a third extraction period at the Korlat-Ravaszlyuktetö site during the Neolithic. This period, however, is outside the scope of this article. Summing up, we may say that the results of our examinations, even at this rather early stage, are promising. We hope that further analysis will help uncover something more concerning cultural contacts, population movements, and social organization.

NOTES

1. On the Carpathian obsidians see: Takacs-Biro 1984.

2. Now no larger pieces than 5 to 7 cm can be found, although collectors have reported of specimens of 10-15 cm, too.

3. It was defined in the course of re-evaluating the so-called "heavy industry mesolithic". See: Ringer 1982.

4. There are several sites where Middle Paleolithic is mixed with Upper Paleolithic and/or Neolithic. Among them we can find all the sites that L. Vértes grouped in the "heavy industry mesolithic", i.e. Eger-Köporos, Miskolc-Avas and Korlat-Ravaszlyuktetö.

5. To carry on with this the train of thought, we may add that a similar "boom" could be observed during the Middle Neolithic concentrating partly on the limnic quartzite, discovering several new sources, and partly on the obsidian. The last, minor, upswing of raw material extraction is associated in this territory with the late Copper Age, the northern group of the Baden culture.

6. The material in the bench is variable, from the low quality pieces breaking in to splinters or containing an large amount of organic remains, to the best quality opalized wood. In any cases, all of them were extracted. Together with the sedimentological examinations, Dr. P. Csorba carried out the freezing-heating analysis of some types, arriving at the conclusion that some of the rocks react rapidly to temperature changes with others do not show any

change in their form or structure. These latter are found in the mine in mine-fresh states. They are the ones secondarily used as hammer stones. In addition we find pieces totally covered by intrusive materials, others with patinated surfaces, and a group which was re-processed after the primary patination. Here under cortex I mean the presence of intrusive materials and the primary patina which most probably was the result of a natural process: the harder rocks were exposed on the surface of the open bench with the destruction of the less resistant softer ones .

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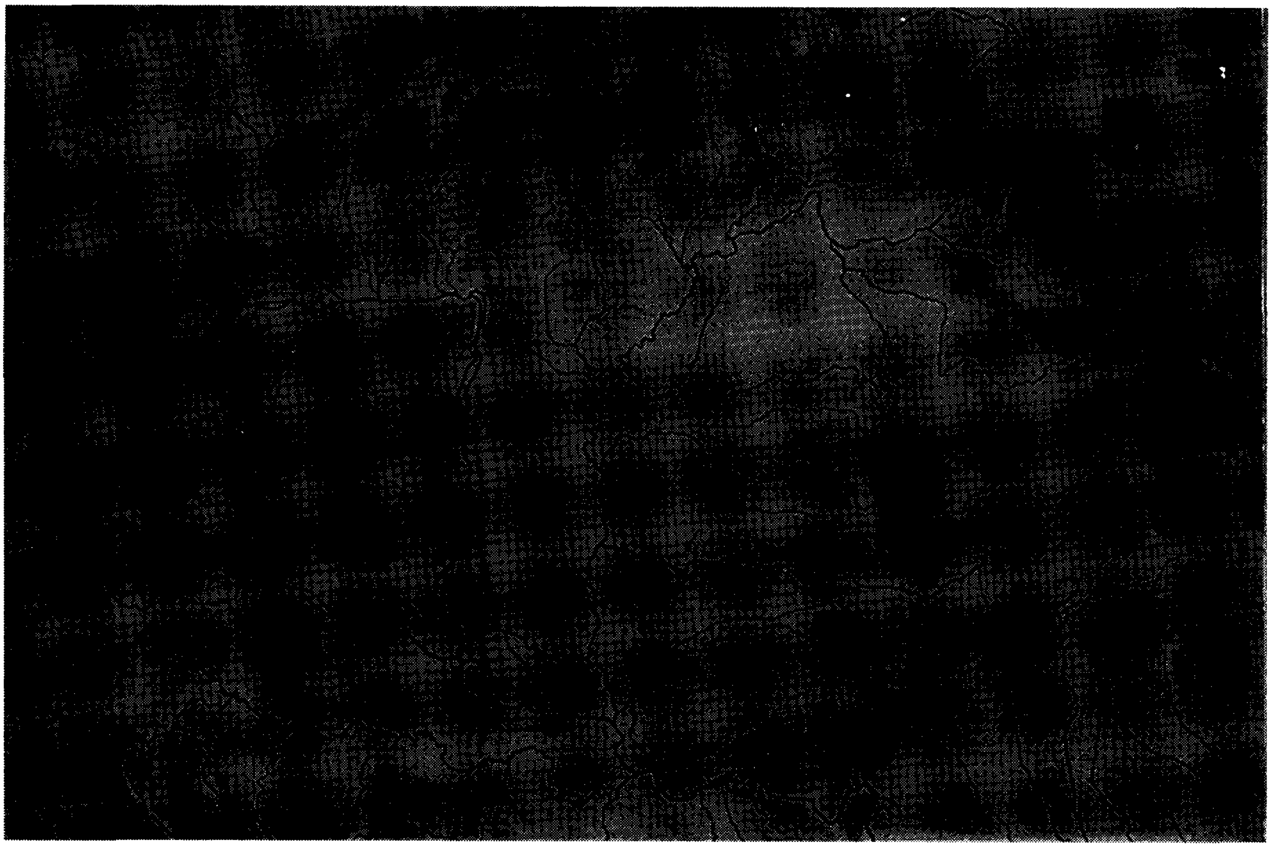


Fig. 1. Geographical map of Hungary

Fig. 2. Silicified sandstone and limnoopalite sources and dispersion around Eger

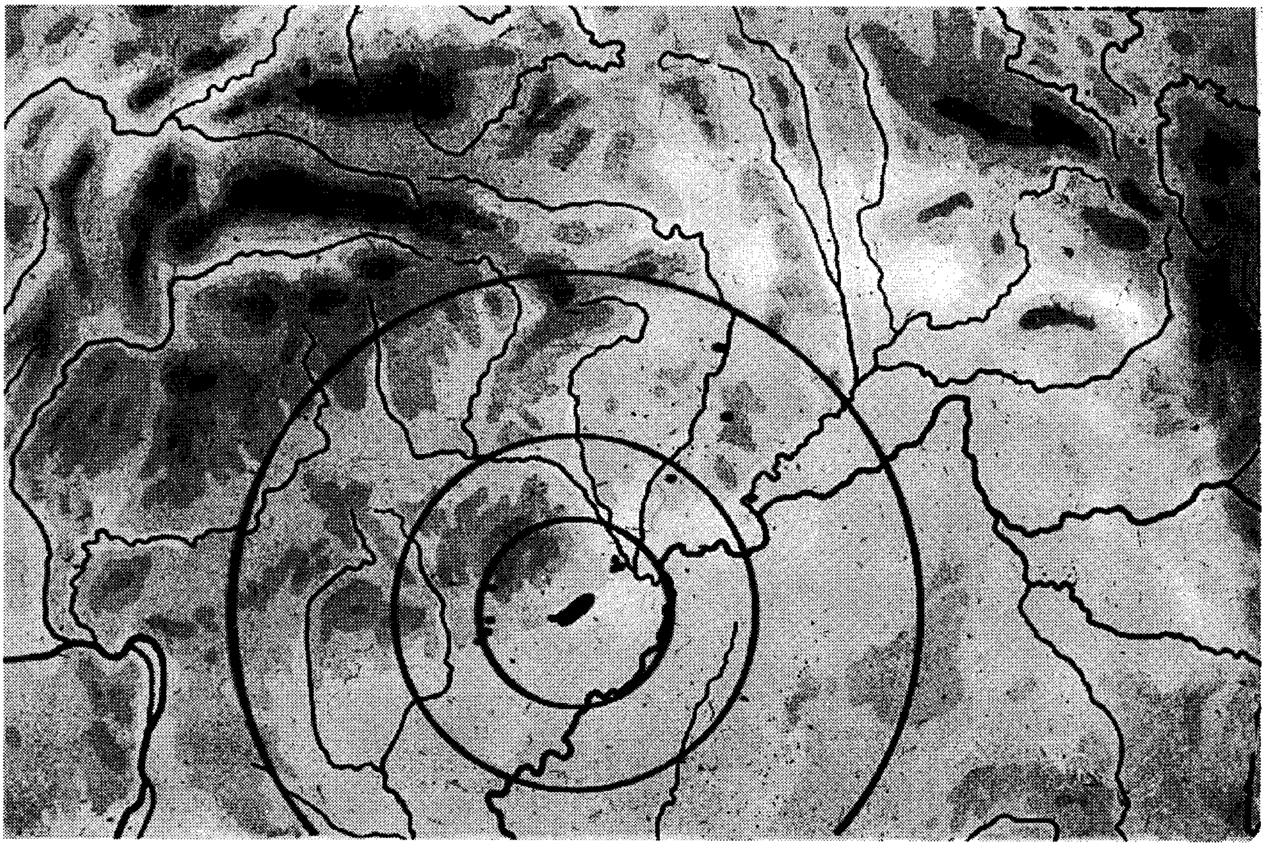


Fig. 3. Hornstone source and dispersion

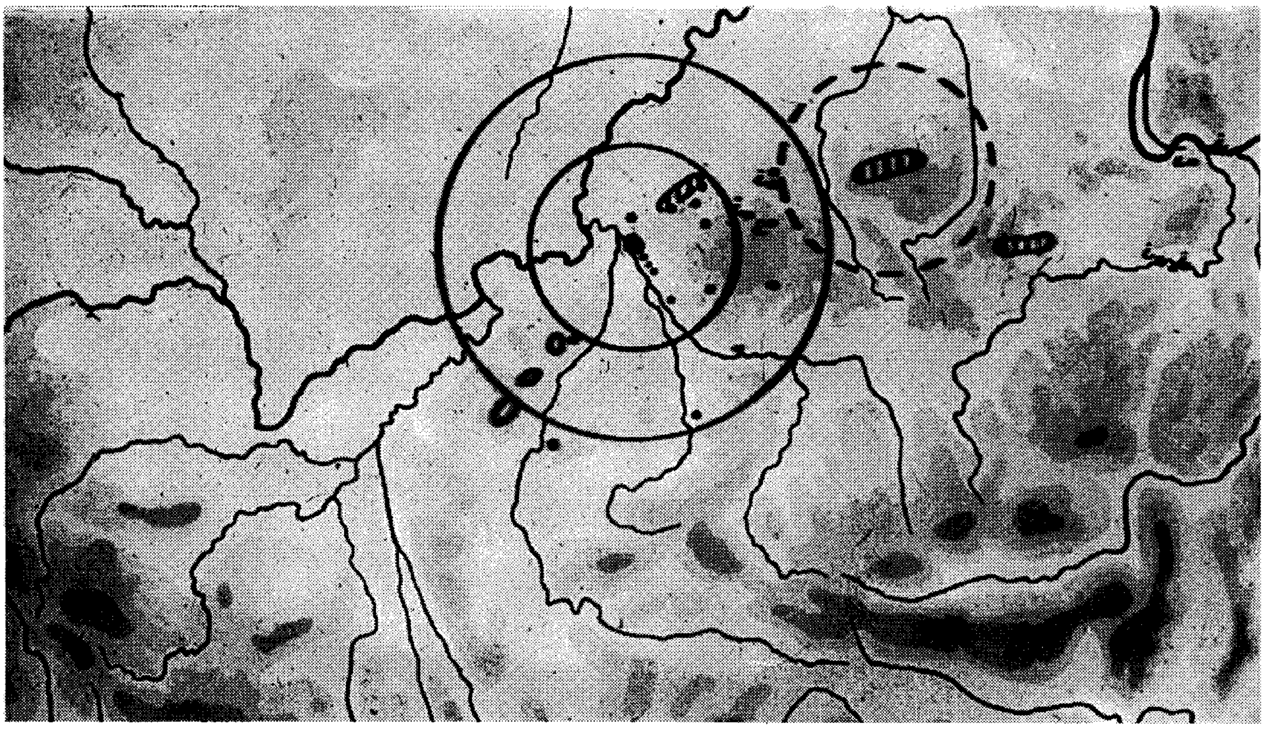


Fig. 4. The Limnic quartzite source and dispersion around Avas hill

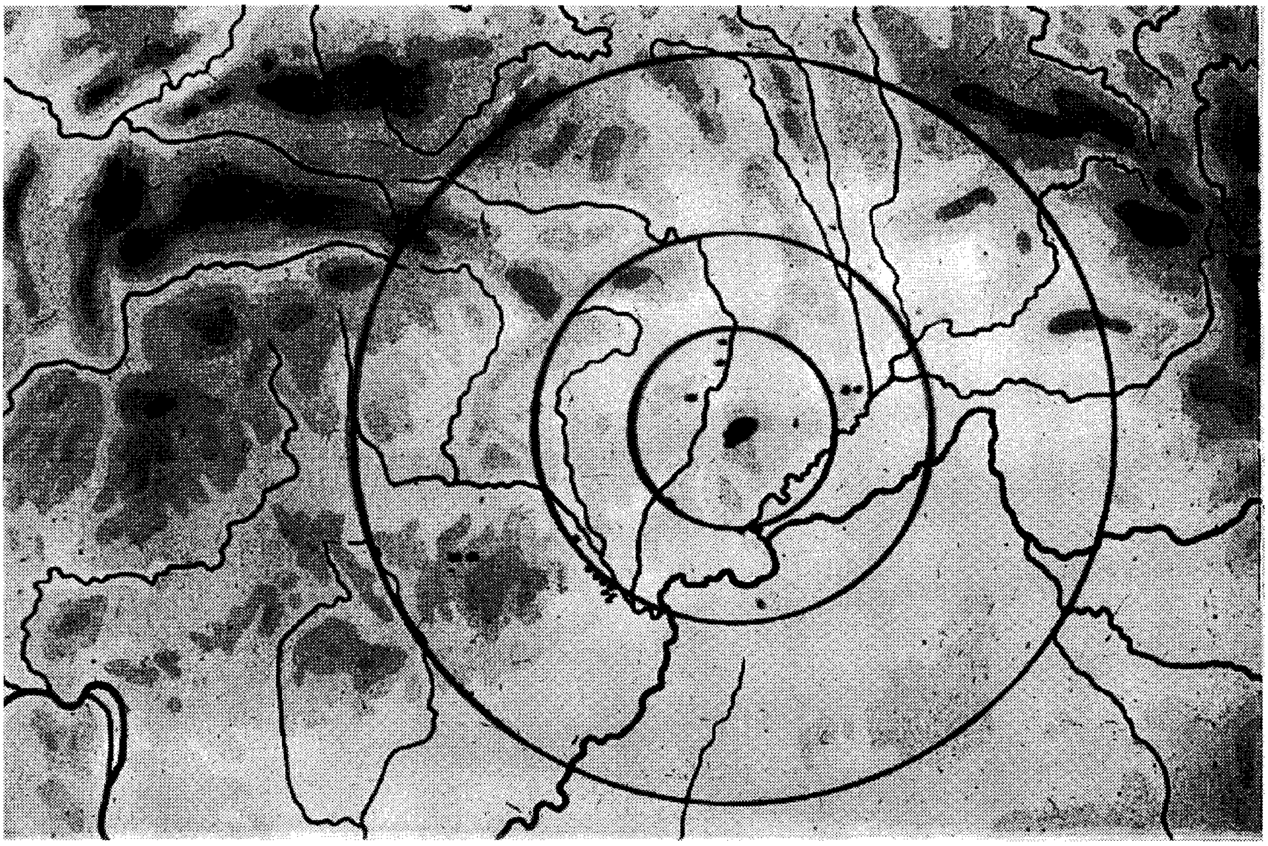


Fig. 5. Source areaand dispersion of the Korlat-type limnic quartzite

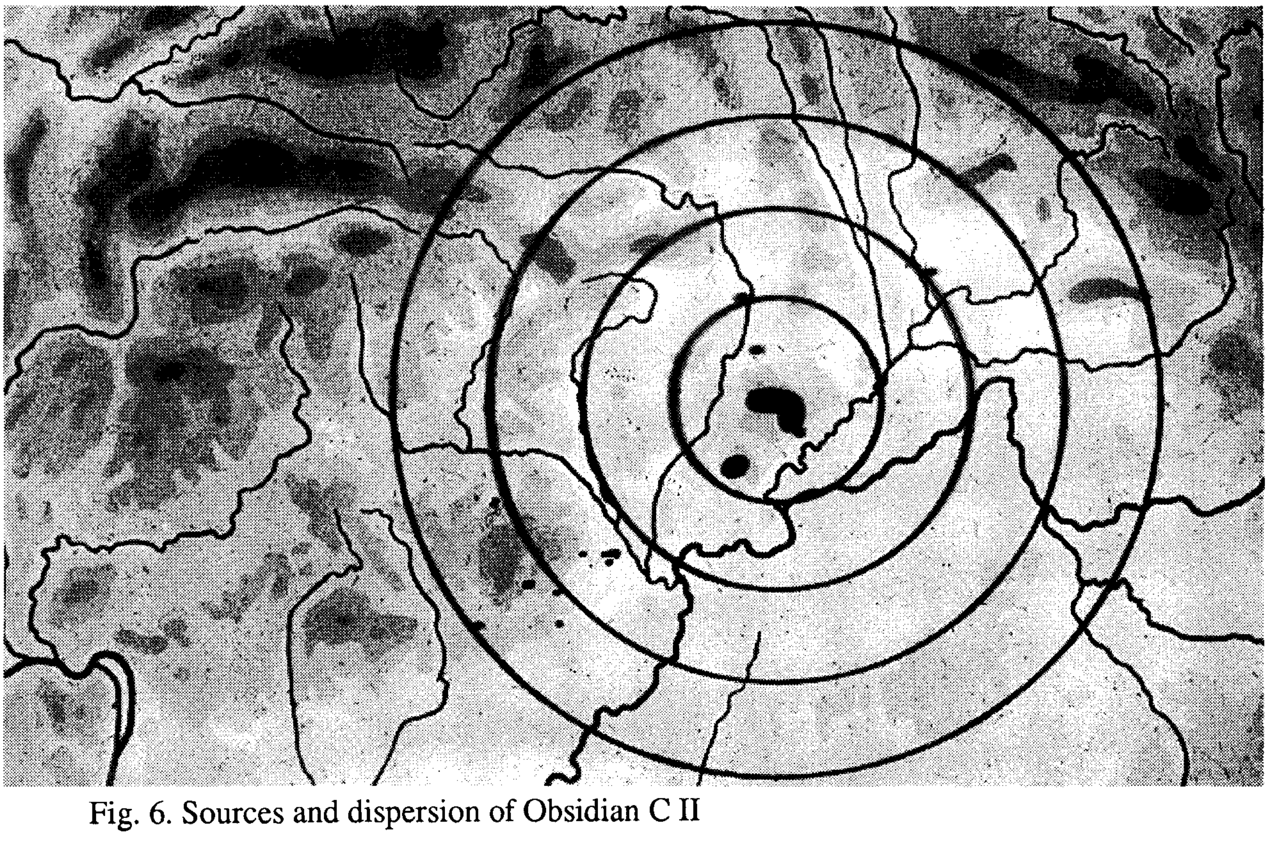


Fig. 6. Sources and dispersion of Obsidian C II

Fig. 7. The source and dispersion of glassy quarzporphiry

Fig. 8. Source area and dispersion of obsidian C I

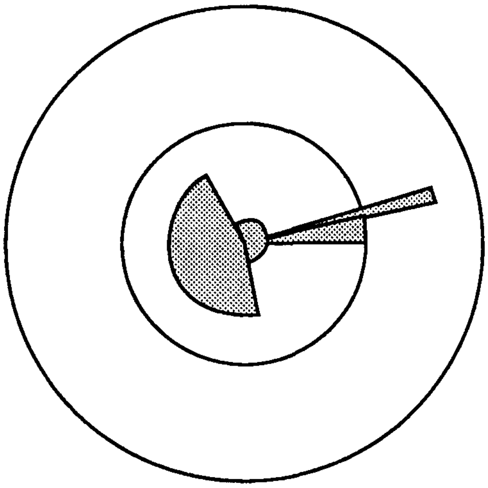
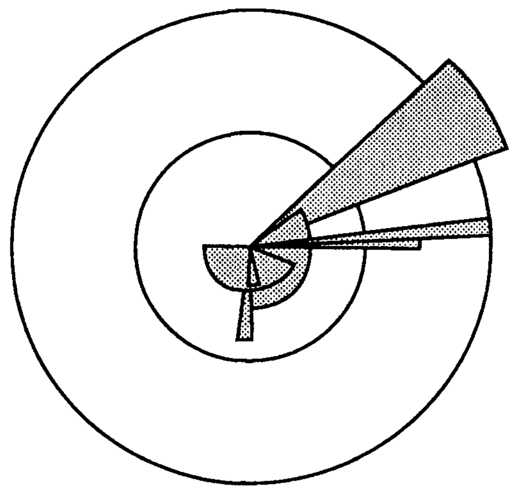
 

Fig. 9. Raw material attraction of the site of Avas-Felsöszentgyörgy (according to the cardinal points in circles with a radii of 25 - 50 - 75 - 100km)
Fig. 10. Raw material attraction of the lower layer of Szeleta cave

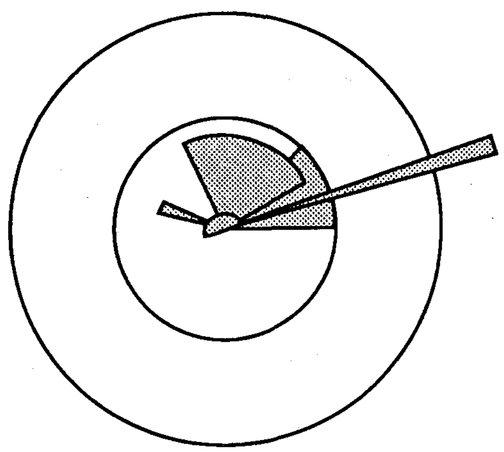
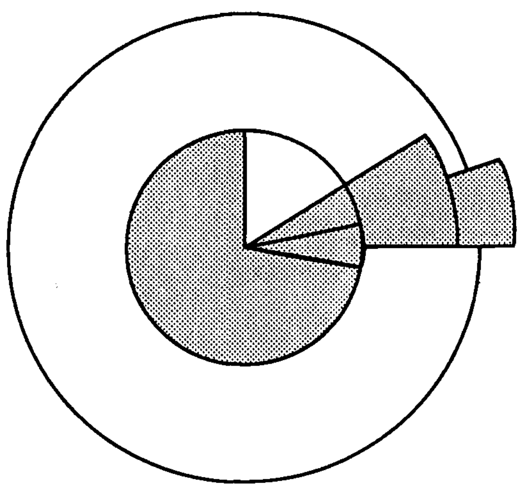
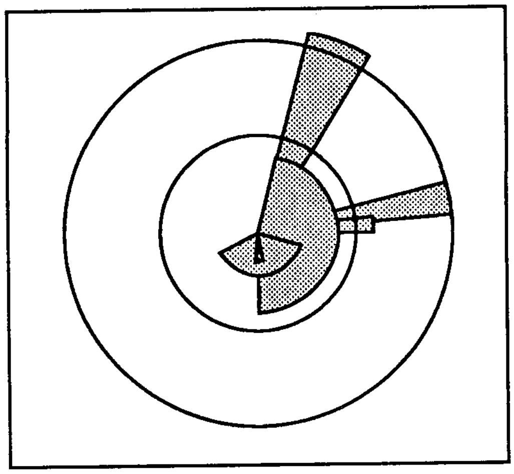
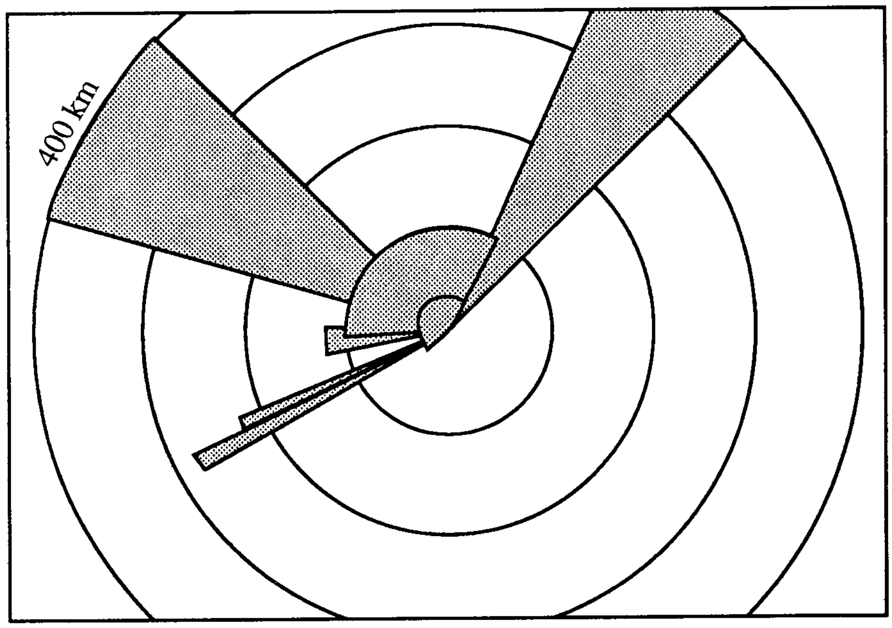
 

Fig. 11. Raw material attraction of the Subalyuk cave (both layers)
Fig. 12. Raw material attraction of the Büdöspest cave





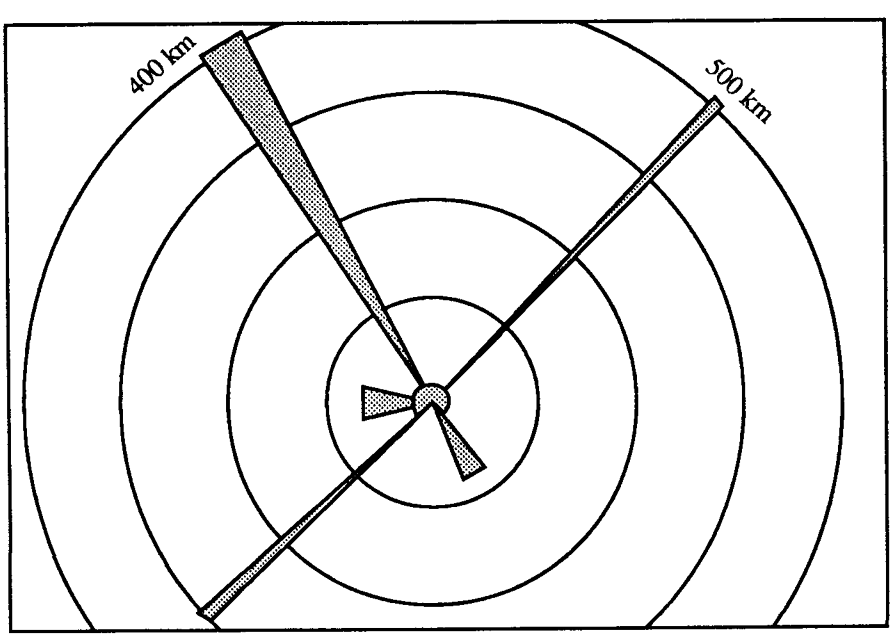


Fig. 13. Raw material attraction of the upper layer of Szeleta cave

Fig. 14. Raw material attraction of the Bodrogkeresztur site

Fig. 15. Raw material attraction of the Arka site

Fig. 16. The surroundings of the Korlat-Ravszlyuktetö site

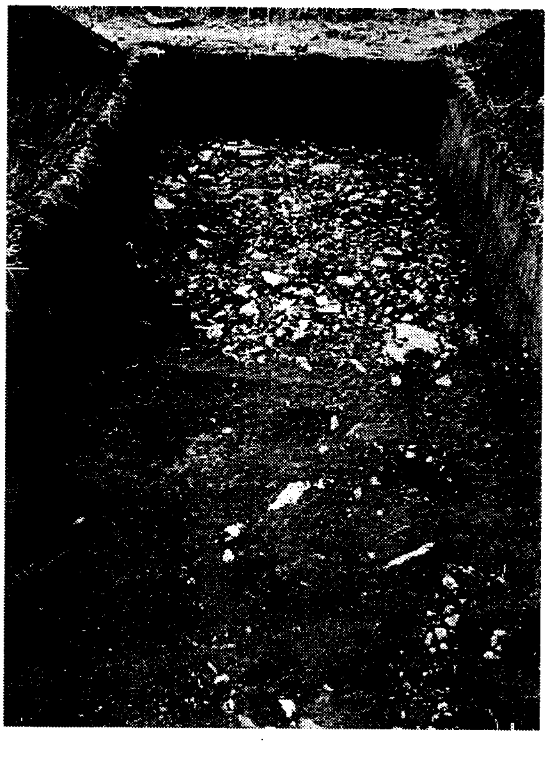


Fig. 17. Limnic quartzite bench
in trench I., Korlat-Ravaszlyuktetö

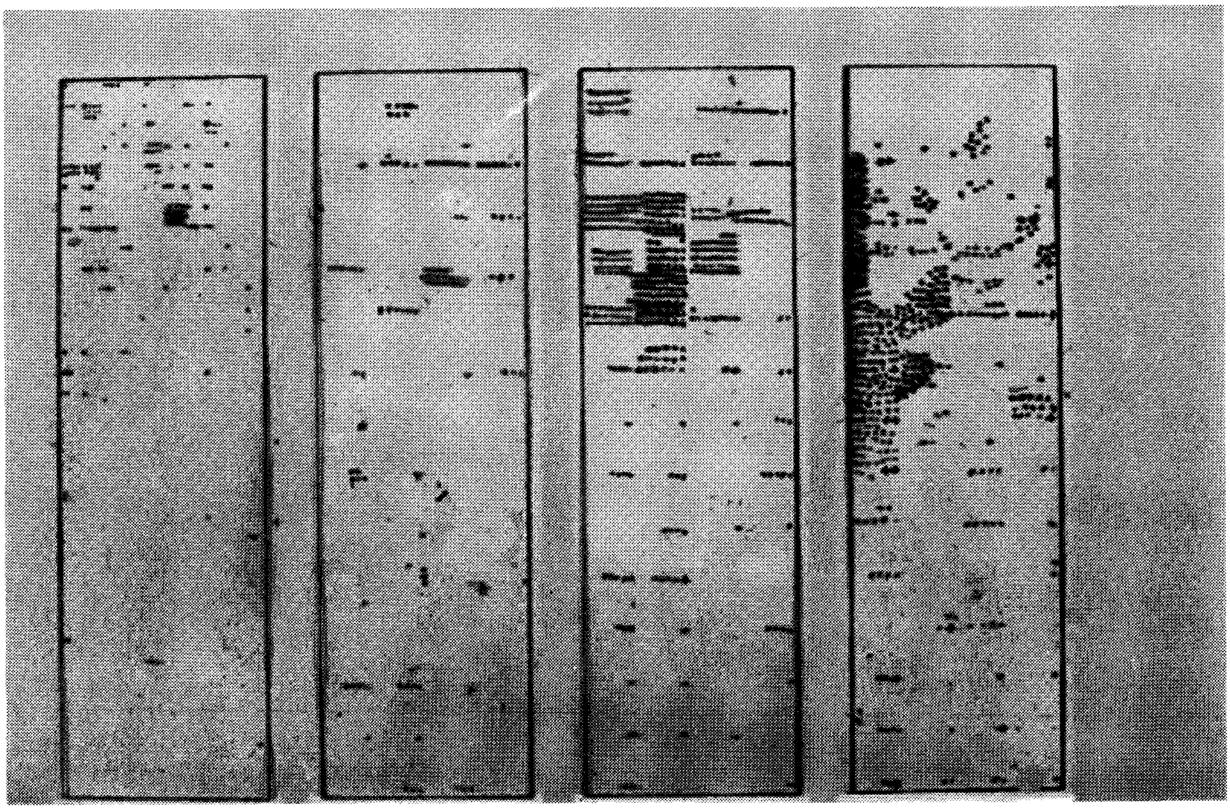


Fig. 18. Distribution of the material in Trench II at Korlat-Ravaszlyuktetö in four depth sequences. + cores and precores; green dots - blades and blade fragments; blue dots - waste and flakes; red dots - retouched tools.

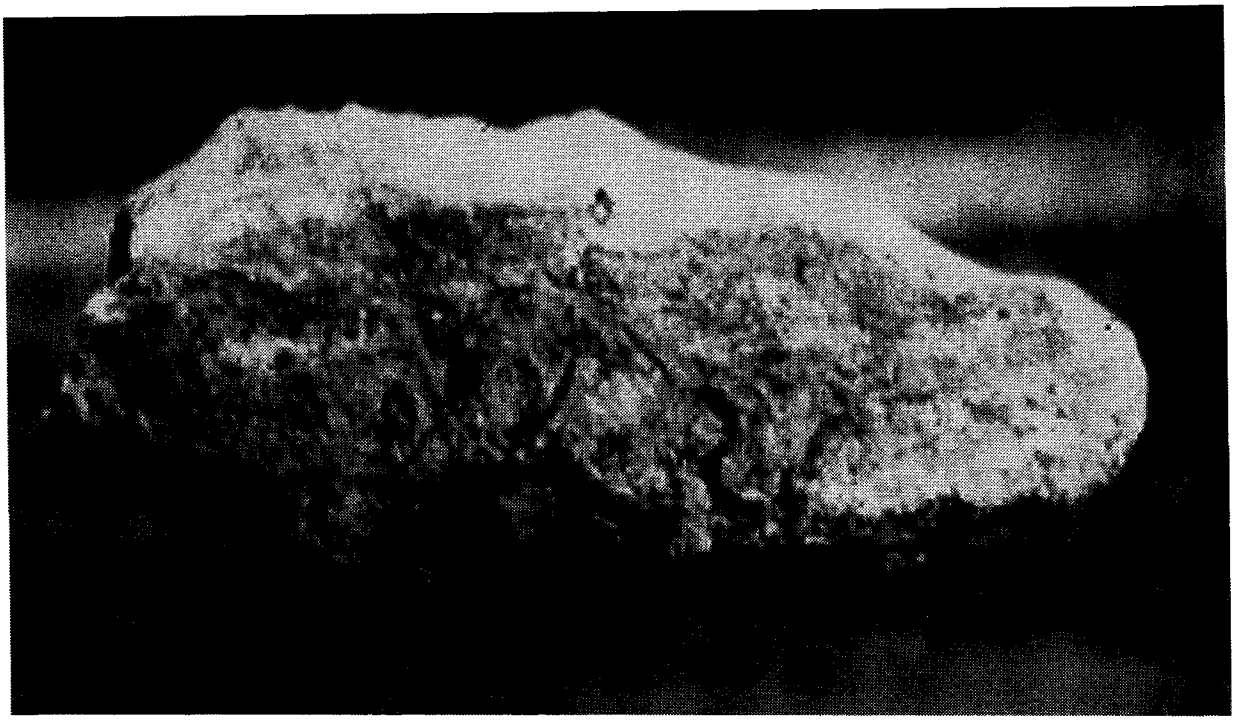


Fig. 19. A patinated technical flake utilized as hammerstone. Korlat-Ravaszlyuktetö

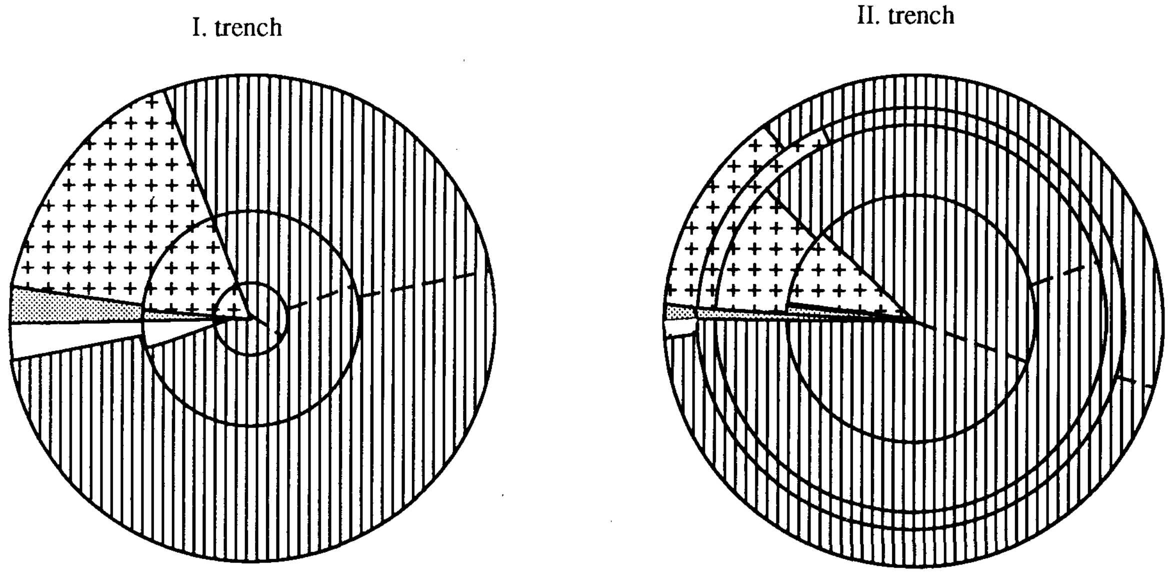


Fig. 20. Distribution of the material according to main technical categories. Korlat-Ravaszlyuktetö. dots - cores, pre-cores, core fragments; crosses - blades and blade fragments; striped - waste and flakes; empty - retouched tools.

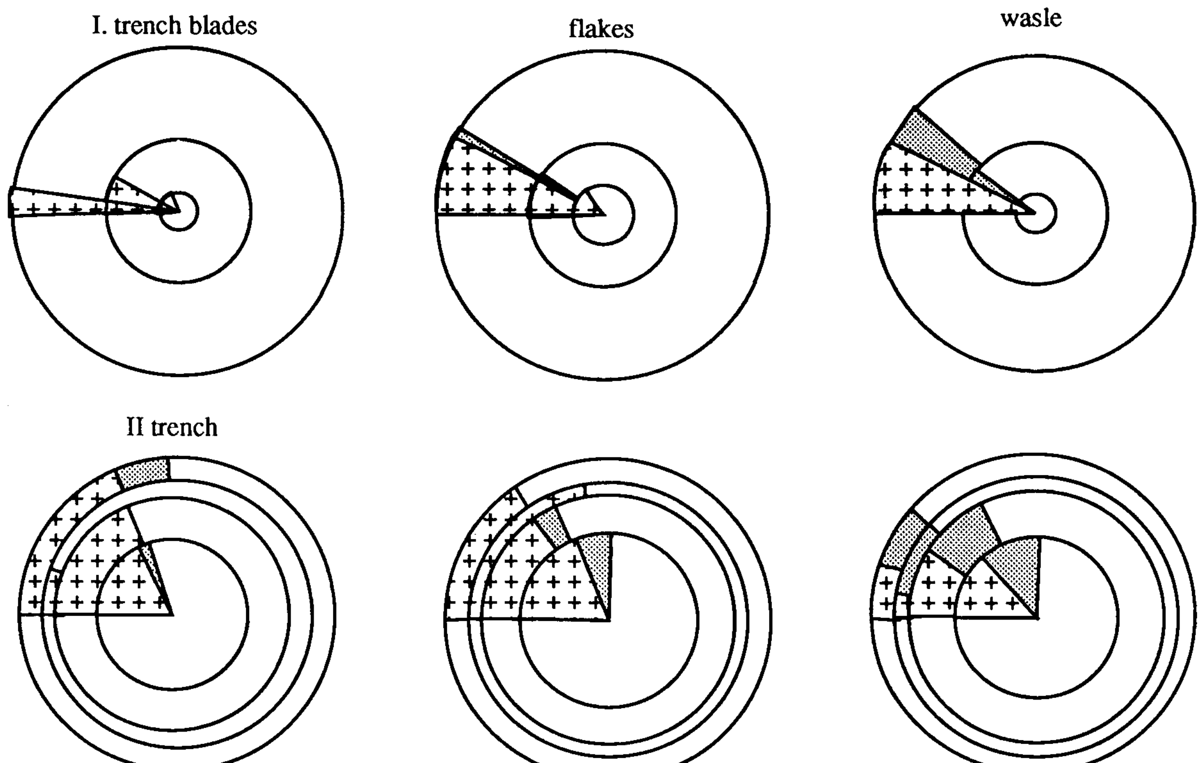


Fig. 21. Ratio of cortex bearing blades, flakes and waste at Korlat-Ravaszlyuktetö. crosses - partial cortex preserved; dots - totally covered by cortex

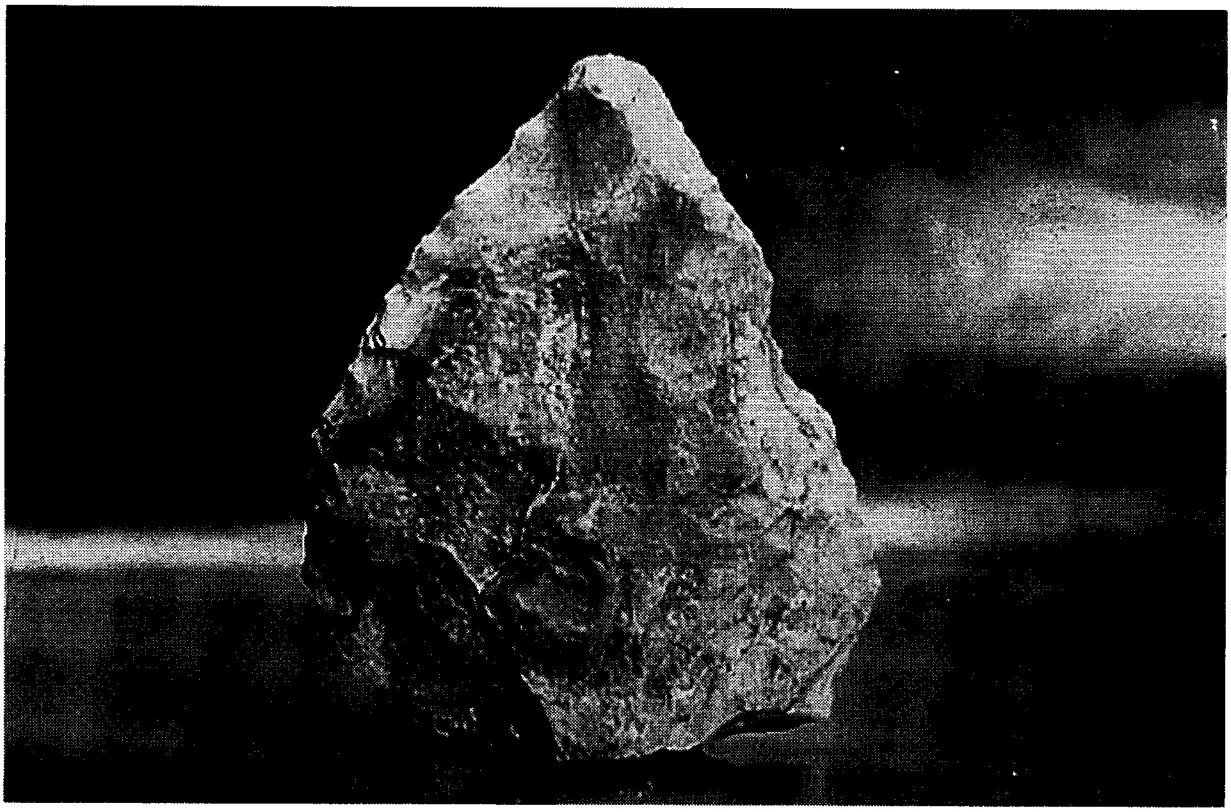


Fig. 22. Bifacial tool from trench I. Korlat-Ravaszlyuktetö

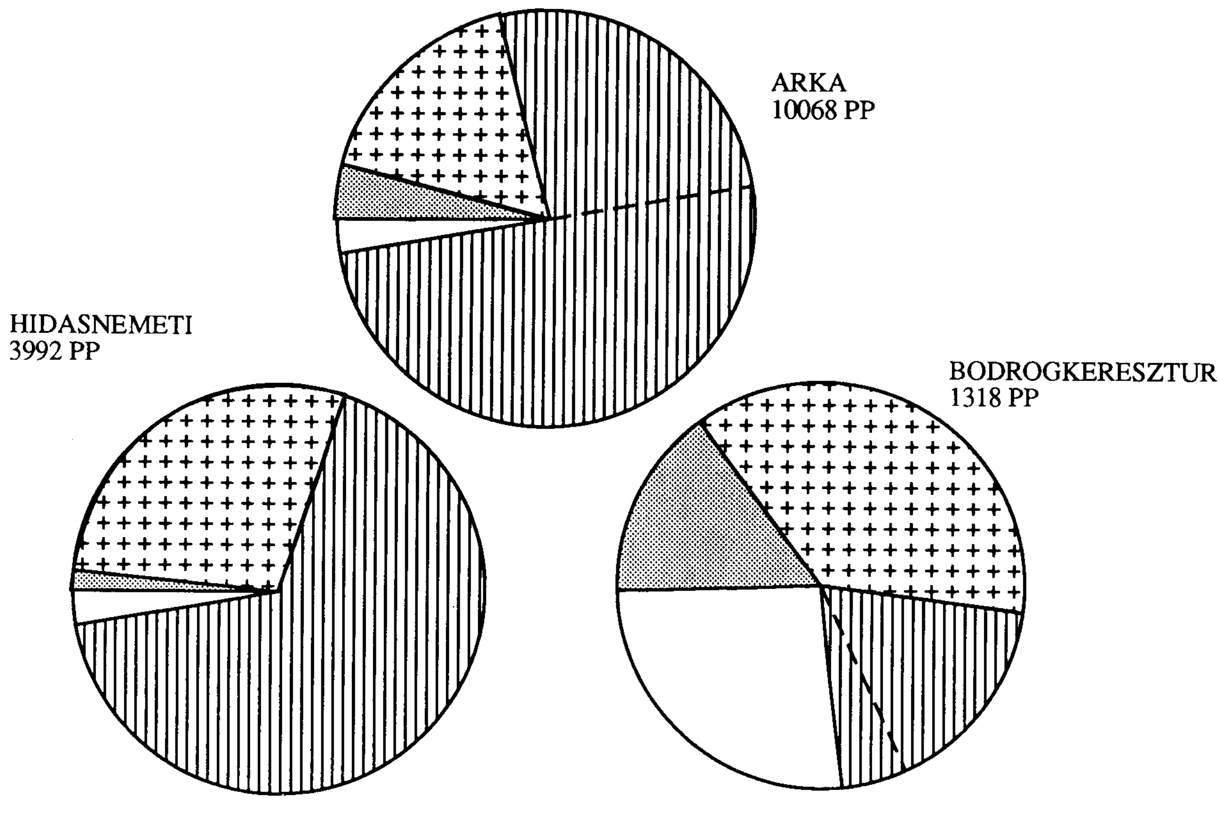


Fig. 23. Distribution of the Arka, Hidasnémeti, Bodrogkeresztur Gravettian site materials according to main technical categories.
(Legend see at fig. 20)