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THE BOHUNICIAN

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Problems related to the Middle/Upper Palaeolithic transition in SE Central Europe are actually the subject of intensive study, theoretical implications and discussion (Valoch 1986; Kozlowski 1988; Svoboda and Siman 1989). Not only the emergence of new techno/typological units in lithic industries, but also the appearence of modern humans suffer from a limited data-base and need to be more precisely cleared. In this context, a specific industry such as the Bohunician and the related data that expanded recently, attract attention.

Quantity of the Early Upper Palaeolithic (EUP) finds in Moravia witness a rapid demographic growth and formation of a dense settlement network throughout the territory. Most of the finds, however, were surface collections. Recent stratigraphic studies at newly excavated sites such as Bohunice, Stranska skala and Vedrovice V, show that the EUP in Moravia starts with the retreat of the Lower Würmian Pleniglacial (before 40 000 B.P.) and it evolves into the following Interpleniglacial, in an ameliorated environment of open loess steppe. EUP includes several cultural units: The Bohunician, the Szeletian and the Aurignacian (typical and atypical sorts). The first two cultures are technologically transitional between the Middle and Upper Palaeolithic. The typical Aurignacian is based on blade technology and evidently created by Homo sapiens sapiens; the time and place of its origin is anticipated (SE Europe?), but not exactly known.

Artifacts made by the Levallois technique, but typologically Upper Palaeolithic, have repeatedly been noted, both among the surface collections (Ondratice and Lišen) and rarely stratified in the loess deposits at Cerveny kopec hill in Brno. Homogenity of such assemblages, however, has never been clear. Thus it was not until the salvage excavation by K. Valoch (1974; 1976) at the Cerveny kopec hill (Brno-Bohunice) that comparable finds gained appropriate attention. This first excavation proved the survival of Levallois technique and development of blade production during very early Upper Palaeolithic (before 40 000 B.P.). The bifacial leaf-points were present in most of the excavated assemblages. Specific character of such industries, hitherto classified as Levallois-Szeletian (Valoch 1976) was subsequently recognized during studies of the quartzite industries from Ondratice, and the Bohunice-type industries were defined (Svoboda 1980 a,b).

In early 80'ies, the Bohunician and its leaf-point context became subject of vivid discussions (Oliva 1981; 1984; Valoch 1982; Svoboda 1984 a). The new idea introduced by M. Oliva and supported by K. Valoch was that leaf-points found at Brno-Bohunice are Szeletian intrusion or import, gained by exchange or by ramassage, and the term Bohuni-

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cian should be reserved to the remaining Levallois component only. Oliva's raw material observations and the derived arguments were not quite accurate and there is strong evidence that the leaf-points could have been produced directly in the Brno Basin: the raw materials used for leaf-point production are not unequivocally exotic, as has been claimed, but they were available from secondary sources in the Brno Basin; further, a primary local material such as the Stranska skala chert was used as well (Tab. 1); and, finally, there are traces of specialized workshops, destinated most probably to leaf-point production, at Brno-Bohunice. Local production by itself does not exclude the essence of Oliva's hypothesis (e. g. the Bohunicians and Szeletians could have lived side by side at the same places, etc.), but it suggests to pay more attention to other possibilities and viewpoints.

Between 1981–1989, systematic excavations were held at several Bohunician sites in the area of the Stranska skala hill in Brno. In consequence, the scope of interest moved from theoretical disputes to interdisciplinary studies of stratigraphy, environment, raw material exploitation, distribution and technology (Svoboda 1985; 1987; 1990; Svoboda and Svobodova 1985; Czudek et al. 1990).

Geographical setting

Bohunician apears to be a specific Moravian, geographically restricted technological unit. The Brno Basin and especially the Stranska skala hill as an important source of Jurassic cherts forms center of the settlement, of the lithic exploitation and of the raw material working (the Stranska skala exploitation area). Smaller settlement areas are located in the vicinity of Prostejov (including the Ondratice exploitation area at quartzite outcrops) and in the vicinity of Mohelno (Fig. 2) Even if other materials have been used and worked, especially outside the Brno Basin, the Bohunician boundaries are roughly the same as the distribution of cherts from Stranska skala. At the same time, Bohunician does not enter areas occupied by the Micoquian, and later, by the Szeletian, with their specific raw material sources (the Bořitov and Krumlov exploitation areas). This would seem to be a first indication of contemporaneity of the Bohunician with the Mocoquian/Szeletian evolutionary line.

Stratigraphy and chronology

Key arguments for contemporaneity of archaeological units, naturally, are being supplied by stratigraphic observations (Figs. 1,3). In the light of excavations at Stranska skala, Bohunician occupation may be divided into two phases. The lower phase, earlier than 40 000 B.P., is related to loess and soil sediments redeposited by gelifluction. This position is not clear everywhere. It is best documented at Stranska skala, site SS–III a (Czudek *et al.* 1990) and III–b, where the Bohunician layer forms the top of a complicated sequence of soil sediments, limestone debris, gravel and other sediments redeposited under extreme cold, buld slightly ameliorating conditions. It is less visible at Bohunice, where the occupation layer was in places affected by subsequent pedogenesis. This earlier Bohunician phase seems to be contemporaneous with the final Micoquian of the Kulna Cave (layer 7a), dated by C 14 around 45 000 B.P. and 38 000 B.P., and around 50 000 B.P. by amino-acid racemisation (Valoch 1988).

The later Bohunician phase was found at the site SS–III in an Interpleniglacial soil numbered 1, corresponding by its age (around 38 000 B.P.) to the Hengelo period. Both the age and stratigraphic setting are comparable to the Szeletian site of Vedrovice V, located in the Krumlovian exploitation area.

Aurignacian settlement layers were found superposed over the Bohunician at Stranska skala. The Lower Aurignacian of Moravia is still little known, but the Middle Aurignacian is found at several sites (SS–II, SS–IIa, SS–IIIa) in a soil numbered 2, corresponding by its radiometric age (33 000 – 30 000 B.P.) to the Denekamp-Arcy period. The Upper Aurignacian (site SS–IIa) lies at the basis of the last Würmian loess cover.

In conclusion, the Bohunician ranges between 44 000 – 37 000 B.P. and it may be considered the earliest industry with Upper Palaeolithic tool-types in our territory.

Environment

Much attention has been devoted to environmental reconstruction during this period. Some indications are supplied by impact of cryogenic processes on the sediments. The gelifluctions studied at the site SS–IIIa took place in several phases under extreme cold conditions of the final Lower Pleniglacial with gradually increasing temperature and humidity. Mean year temperatures increased from –12 – 8 °C (layer 5) to –8 – 3 °C (layer 4). These processes are described in detail by Czudek *et al.* (1990). The overlying soils 1 and 2 (Hengelo and Denekamp) suggest milder conditions of the Interpleniglacial.

Further details were supplied by palynology (Svoboda and Svobodova 1985; Svobodova 1987; Svobodova and Svoboda 1988). At Bohunice, the pollen analysis documents a cold, *Salix*-dominated toundra, and the poor pollen assemblages from corresponding layers at Stranska skala IIIa reveal comparable indications. For the following Interpleniglacial, the analyses reconstruct a steppe dominated by *Asteraceae* and *Poaceae,* with limited extension of *Pinus-Betula* forests.

Faunal remains are rarely preserved in the Bohunician layers. An exception is the site SS–IIIb, actually excavated, where bones are protected in depressions inside the limestone debris *(Equus* sp.).

It may be concluded that the relatively short time-span of the Bohunician occupation covers a period of climatic amelioration. The Bohunician apears under relatively cold conditions, but it survives until the milder Interpleniglacial times.

The industries

The Bohunician industries use mainly local raw materials: the Stranska skala cherts in the Brno Basin and the Ondratice quartzites in the Prostejov area. Both the primary and secondary workshops were analysed, providing informations about the technological structure and dynamics (Svoboda 1980 a,b; 1984 b; 1987). Sites SS–IIa and SS–IIIa (Figs. 4–5) are primary workshops almost completely based on the Stranska skala cherts; they produced pre–cores, blades and flakes, and, at the site SS–IIIa, also Levallois points (they are missing at site SS–IIa). Site SS–III (Fig. 6) is a primary workshop with strong specialisation upon Levallois point production (concentration A); the retouched tools, however, are mostly made from imported raw materials (radiolarite and others). Bohunice and Lisen are secondary workshops based on cherts imported from Stranska skala mainly, but using other materials as well – especially for the retouched tools.

The technology is Levallois-leptolithic: the flat or Levallois cores in the broader sense (uni– and bidirectional) form about 35%–50% of the core material, and prismatic Upper Palaeolithic cores form about 5%–20%.

The blade index (Ilam) ranges between 20%–30% in the Stranska skala exploitation area and increases to 30%–45% at Bohunice, where the blanks had to be transported. Generally, the Ilam is higher compared to the Mousterian of Sipka (about 15%) and lower than at most of the typical Aurignacian sites. (In this respect, the comparative blade index table published by J.K.Kozlowski, 1988, Fig. 22.2, illustrates too high values for the Bohunician and too low for the Aurignacian: for the Bohunician, sites with the highest Ilam have been selected, while the Aurignacian is represented by workshop-facies sites and by an atypical (Szeletian-like) site, all with extremely low Ilam values.)

While the Bohunician technology is specific and distinctive, the typology does not differ basically from the other EUP units.

Most of the Bohunician industries are end-scraper-dominated (IG = 25–45); the share of burins reaches higher values at Bohunice only (IB = 14). The end-scrapers are mostly flat, but in certain assemblages, especially in the earlier ones, appear some thick Aurignacoid forms (Fig. 4:11–13; Fig. 5:10,13). There are some side-scrapers (Mousterian-like side-scrapers and points are typical at Ondratice), notches and denticulates. The borers, raclettes, retouched blades and Chatelperronian points are found less frequently.

The only thinkable local predecessor of the Bohunician could have been the Mousterian of the Sipka Cave. However, the relationship to this slightly Levallois industry with some Upper Palaeolithic tool types is unclear; much closer affinities point to the Middle Palaeolithic Levallois technologies used in the Balkans, Dniestr area and the Near East.

The leaf-points

In frame of a conference dedicated to the leaf-points, special attention should be paid to this tool-type. Literary discussions concerning the leaf-points in the Bohunician have already been mentioned.

The bifacial leaf-points are present in all EUP cultures in Moravia, but in variing quantities. Two types of raw materials seem to have been prefered for their production: the Cretaceous cherts and the Krumlovsky-les-type cherts. The primary outcrops (the Boritov and Krumlov exploitation areas) were densely occupied by the Szeletians, but, as has already been mentioned, secondary sources were available and used along the Svitava river, including the Brno Basin. A. Prichystal, who studied in detail leaf-points from the surface site of Lisen, suggests that most of the raw materials were collected from river gravels.

Bohunician, compared to the Szeletian, is not a typical leaf-point culture. At Stranska skala, which is a Levallois-oriented primary workshop area, the leaf points are rare (few surface finds only) and flat retouche has only exceptionally been applied (Fig. 4:10). The leaf-point percentage (IPf) increases towards the periphery: 4,2 at Lisen (Fig. 7; raw material analysis of this most numerous leaf-point assemblage is summarized in tab. 1) and 5,2 at Bohunice, but it does not reach the values of certain Szeletian sites (over 10). It is worth mentioninig that at the primary outcrops in Ondratice even such hardly workable material as quartzite has been used to produce leaf-points (Svoboda 1980 a, Fig. 40).

Association of the Jerzmanowice-type points to Bohunician seems to be more meaningful. The most typical specimens, however, were found on the surface at Lisen (Fig. 8) and Ondratice, and only few less typical fragments are stratified at Stranska skala (all from the earlier Bohunician layers, Fig. 5:1). The Stranska skala cherts were used more frequently for the Jerzmanowice-type points than for the bifacial leaf-points. This is certainly an important behavioral and cultural pattern.

Historical meaning

Evolutionary interpretations of Bohunician technology in the literature are controversial: it has been understood either as a transitional stage stressing further development towards the Upper Palaeolithic (Valoch 1976; Svoboda 1980 a,b) or a deadline with no evolutionary consequences (Oliva 1981; Valoch 1986; Kozlowski 1988). Such a ra-

dical difference between extreme viewpoints is based on various approaches to understanding technological „abilities" or „unabilities" to further evolution.

At the moment, we know nothing about the physical character of the Bohunician nor the Szeletian people. What we know is that the Micoquians were Neanderthals (Kulna Cave, layer 7a), and that the later Szeletian technology roots, at least partly, in the Micoquian. The Bohunician appears as a rather foreign cultural element of SE origin. If it brought a new population into our territory, it certainly accelerated the local Middle Palaeolithic evolution and encouraged the leptolitisation trends in lithic technology. Who were these people physically, however, remains unknown. We are not sure until the appearence of the Aurignacian, which is clearly connected with a morphologically variable modern human population.

Table 1

Leaf-points with flat surface retouche from Lisen. Raw material analysis by A. Prichystal, 1985

	determined	?	total
Moravian Cretaceous cherts	20	8	28
Cherts of the Krumlovsky-les-type	6	2	8
Moravian Jurassic cherts from gravels	5	-	5
Cherts of the Stranska-skala-type	6	6	12
Menilite cherts	–	2	2
Polish chocolate flint	–	1	1
Undetermined silicites	–	7	7
Total leaf-points			63

REFERENCES:

CZUDEK, T., SMOLIKOVA, L., SVOBODA, J. MINARIKOVA, D. and SVOBODOVA, H. 1990: Profil IIIa na Stranské skale v Brne. *Sb. geol. ved A - Anthropozoikum*, in press.

KOZLOWSKI, J.K. 1988: Problems of Continuity and Discontinuity between the Middle and Upper Paleolithic of Central Europe, in: H.L. Dibble and A. Montet-White, eds., *Upper Pleistocene Prehistory of Western Eurasia*, Philadelphia, 349-358.

OLIVA, M. 1981: Die Bohunicien-Station bei Podoli (Bez.Brno-Land) und ihre Stellung im beginnenden Jungpaläolithikum. *Cas.Mor. muzea. Sc.soc.* 66, 7-45.

OLIVA, M. 1984: Le Bohunicien, un nouveau groupe culturel en Moravie. Quelques aspects psycho-technologiques du développement des industries paléolithiques. *L'Anthropologie* 88, 209-220.

SVOBODA, J. 1980a: Kremencova industrie z Ondratic. K problému pocatku mladého paleolitu. *Studie AU CSAV* IX/1. Praha: Academia.

SVOBODA, J. 1980b: Ondratice I: Early Upper Paleolithic technologies of quartzite working, in: L.Banesz and K.Kozlowski, eds., *L'aurignacien et le gravettien (périgordien) dans leur cadre écologique*, Nitra, 275-281.

SVOBODA, J. 1984a: K nekterym aspektum studia exploatacnich oblasti kamennych surovin. *Arch.rozhl.* 36, 361-369.

SVOBODA, J. 1984b: Stranska skala. Study of a lithic exploitation area, in: *IIIrd seminar in Petroarchaeology.* Reports. Plovdiv, 153-167.

SVOBODA, J. 1985: Neue Grabungsergebnisse von Stranska skala, Mähren, Tschechoslowakei. *Arch.Korrbt.* 15, 261-268.

SVOBODA, J. 1987: Stranska skala. Bohunicky typ v brnenské kotline. *Studie AU CSAV* XIV/1. Praha: Academia.

SVOBODA, J. 1991; Stranska skala. Vysledky vyzkumu v letech 1985-1987. *Pamatky archeologické*, in press.

SVOBODA, J. and SIMAN, K. 1989: The Middle-Upper Paleolithic Transition in Southeastern Central Europe (Czechoslovakia and Hungary). *Journal of World Prehistory* 3. 283–322.

SVOBODA, J. and SVOBODOVA, H. 1985: Les industries de type Bohunice dans leur cadre stratigraphique et écologique. *L'Anthropologie* 89, 505-514.

SVOBODOVA, H. 1987: Prirodni prostredi, in: J.Svoboda, *Stranska skala. Bohunicky typ v brnenské kotline.* Praha, 18-21.

SVOBODOVA, H. and SVOBODA, J. 1988: Chronostratigraphie et paléoécologie du Paléolithique supérieur morave d'après les fouilles récentes, in: *Cultures et industries paléolithiques en milieu loessique*, Amiens, 11-15.

VALOCH, K. 1974: Nové kolekce ve sbirkach ustavu Anthropos Moravského muzea. *Prehled vyzkumu* AU CSAV 1973, 9-14.

VALOCH, K. 1976: Die altsteinzeitliche Fundstelle in Brno-Bohunice. *Studie AU CSAV* IV/1. Praha: Academia.

VALOCH, K. 1982: Neue paläolithische Funde von Brno-Bohunice. *Cas.Mor.muzea,* Sc.soc. 67, 31-48.

VALOCH, K. 1986: Stone industries of the Middle/Upper Palaeolithic transition, in: *The World Archaeological Congress. The Pleistocene Perspective* I, 15 pp.

VALOCH, K. 1988: *Die Erforschung der Kulna-Höhle 1961-1976.* Anthropos 24, N.S.16. Brno.

upper loess	Bohunice	SS–IIa	SS–IIIa	SS–III	Vedrovice V
		Upper Aurignacian			
soil 2 Denekamp		Middle Aurignacian 32 350 ± 900 B.P. (GrN 14829)	Middle Aurignacian 30 980 ± 360 B.P. (GrN 12605)		
		erosion	erosion	Bohunician 38 200 ± 1100 B.P. (GrN 12297)	Szeletian 39 500 ± 1100 B.P. (GrN 12375)
soil 1 Hengelo				38 500 $^{+1400}_{-1200}$ B.P. (GrN 12298)	37 650 ± 550 B.P. (GrN 12374)
gelifluction	Bohunician 40 173 ± 1200 B.P. (Q 1044) 41 400 $^{+1400}_{-1200}$ B.P. (GrN 6802) 42 900 $^{+1700}_{-1400}$ B.P. (GR (GrN 6165)	Bohunician	Bohunician 41 300 $^{+3100}_{-2200}$ B.P. (GrN 12606)		

Fig. 1. Stratigraphic position of the Bohunician in the sequence of South Moravian loess sites

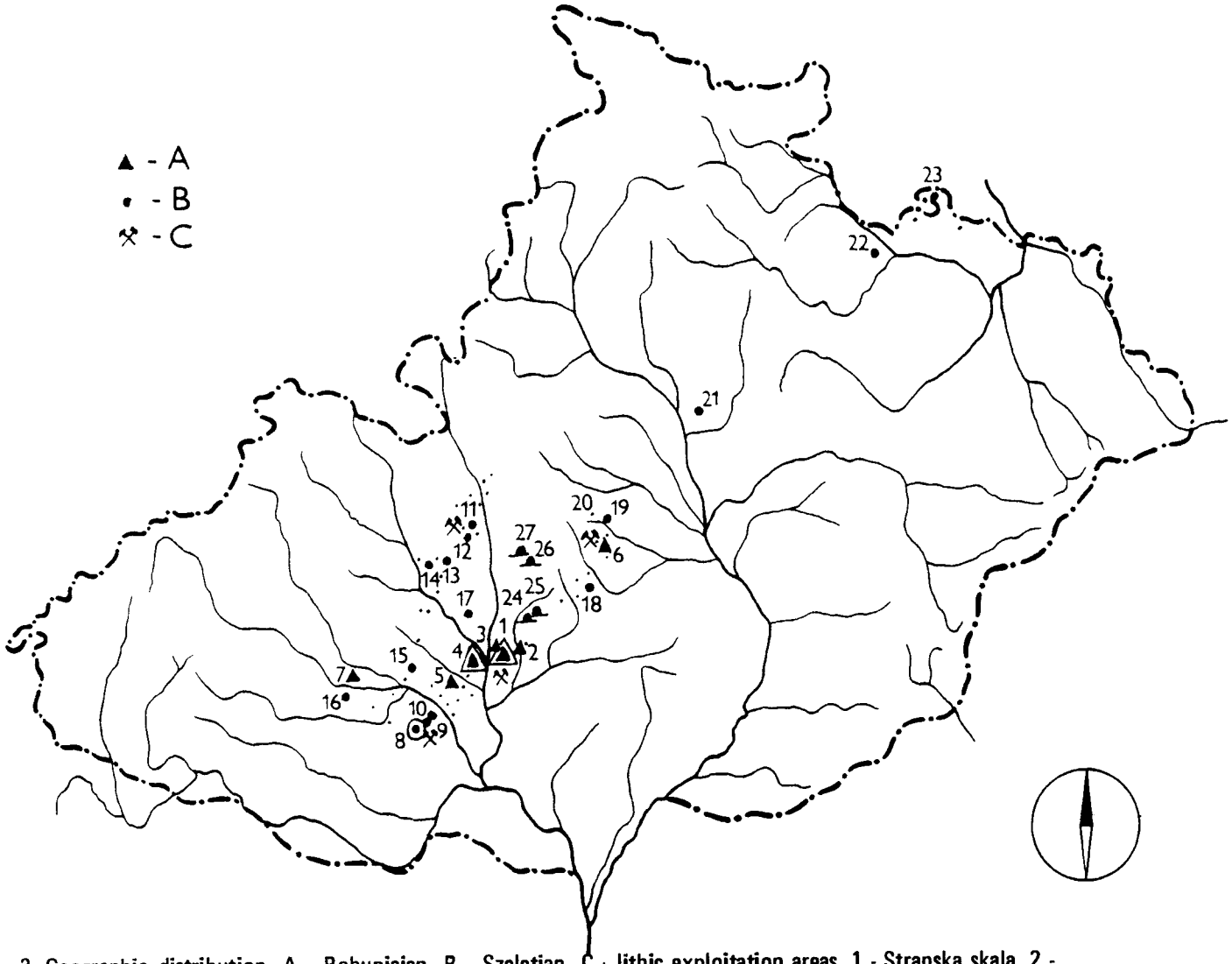

Fig. 2. Geographic distribution. A - Bohunician. B - Szeletian, C - lithic exploitation areas. 1 - Stranska skala, 2 - Lisen, 3 - Nova hora, 4 - Bohunice, 5 - Orechov, 6 - Ondratice, 7 - Mohelno, 8 - Vedrovice, 9 - Jezerany, 10 -Marsovice, 11 - Boritov, 12 - Cernà Hora, 13 - Malhostovice-Nuzirov, 14 - Hradcany, 15 - Neslovice, 16 - Dukovany, 17 - Rozdrojovice, 18 - Drnovice, 19 - Otaslavice-Vincencov, 20 - Myslejovice, 21 - Olomouc-Drozdin, 22 - Otice, 23 - Trebom. 24 - Pekarna Cave, 25 - Krizova Cave, 26 - Rytirska Cave, 27 - Pod Hradem cave.

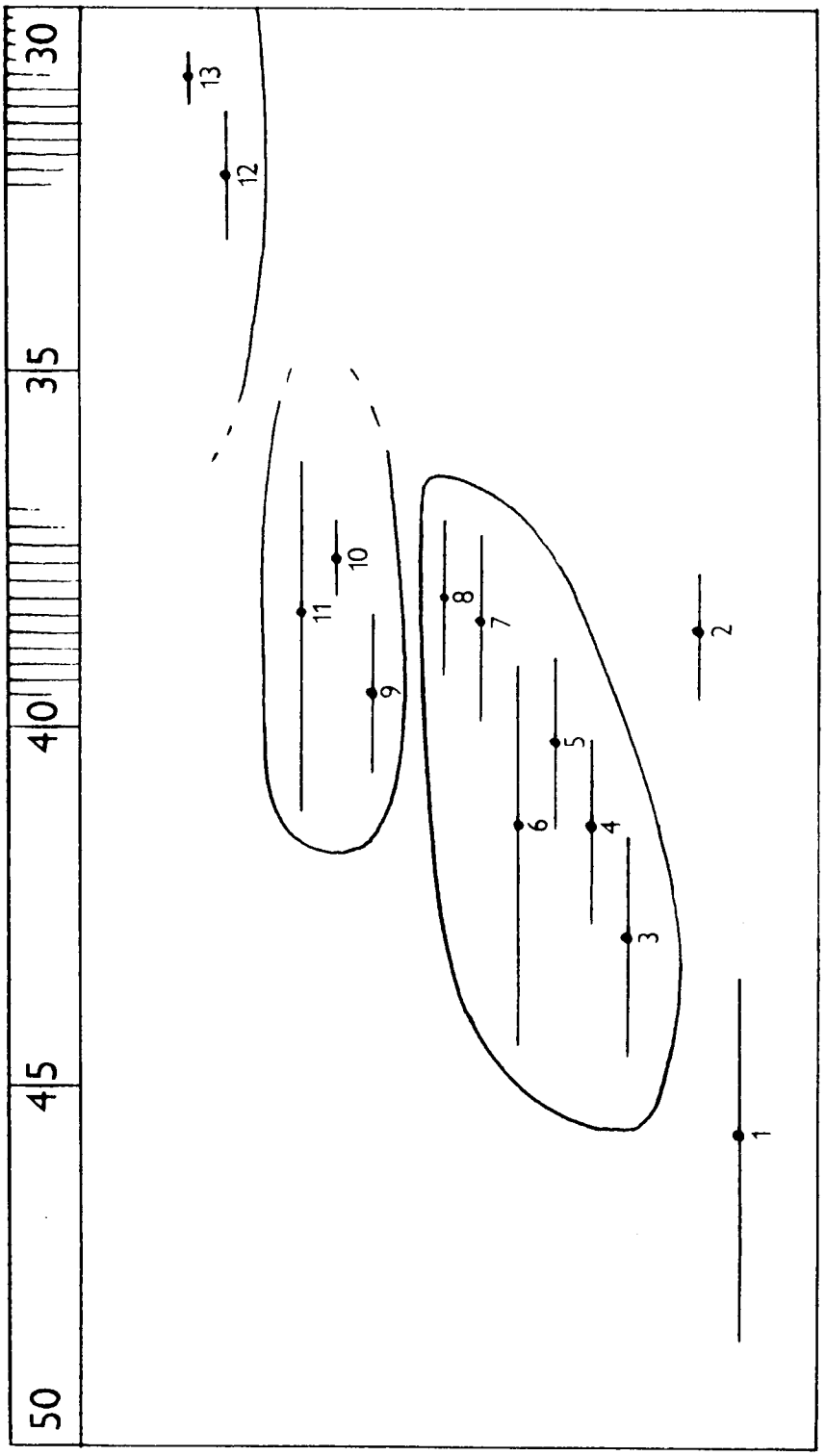

Fig.3. Radiometric (C 14) position of the Bohunician compared to other cultures. Micoquian: 1,2 - Kulna 7a; Bohunician: 3 - Bohunice (brickwork), 4,5 - Bohunice (Kejbaly), 6 - Stranska skala IIIa-4, 7,8 - Stranska skala III-5; Szeletian: 9,10 - Vedrovice V, 11 - Certova pec Cave; Aurignacian: 12 - Stranska skala IIa-4, 13 - Stranska skala IIIa-3.

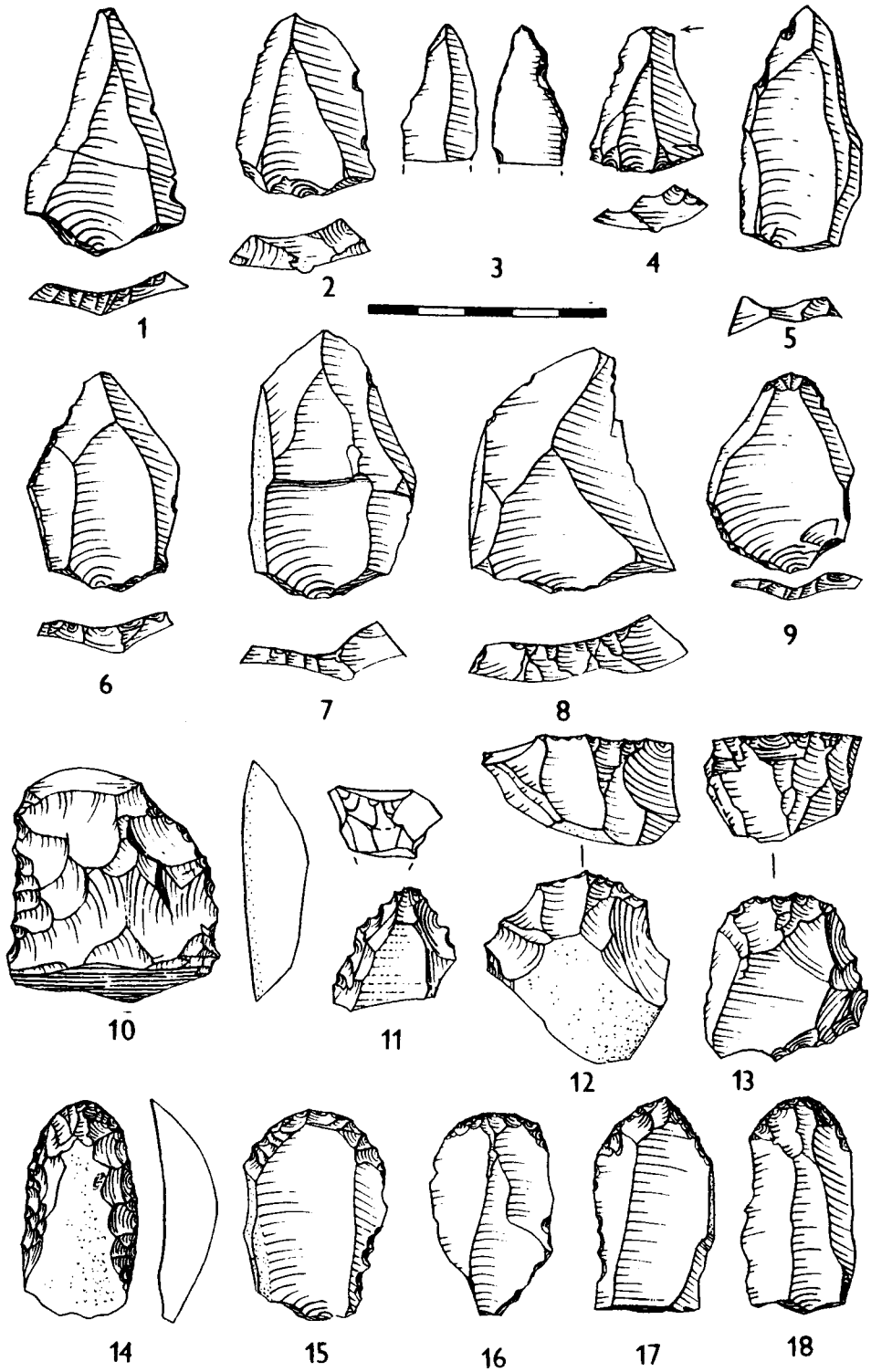

Fig.4. Earlier Bohunician industry. Stranska skala IIIa, layer 4.

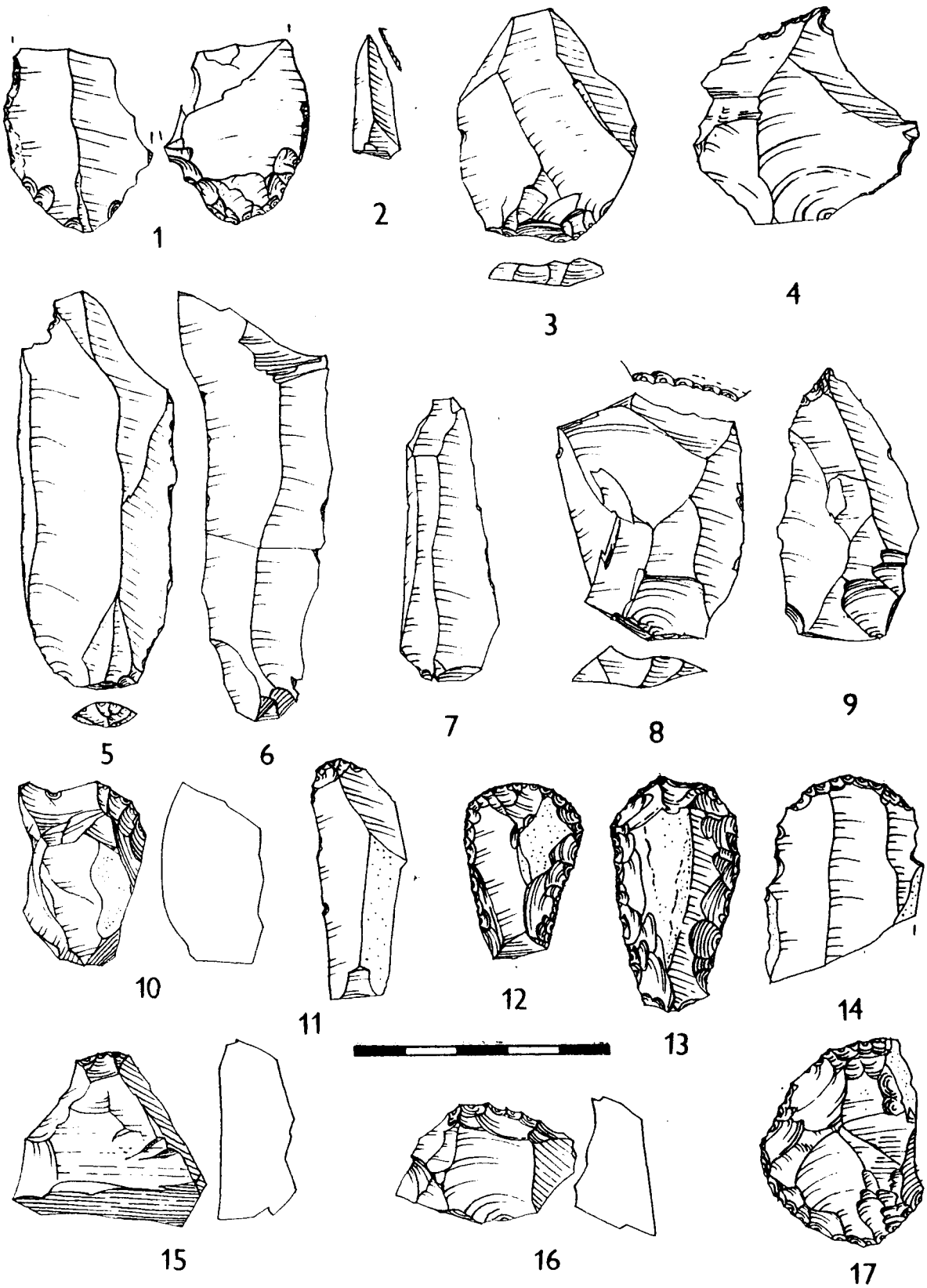

Fig.5. Earlier Bohunician industry. Stranska skala IIa, layer 5.

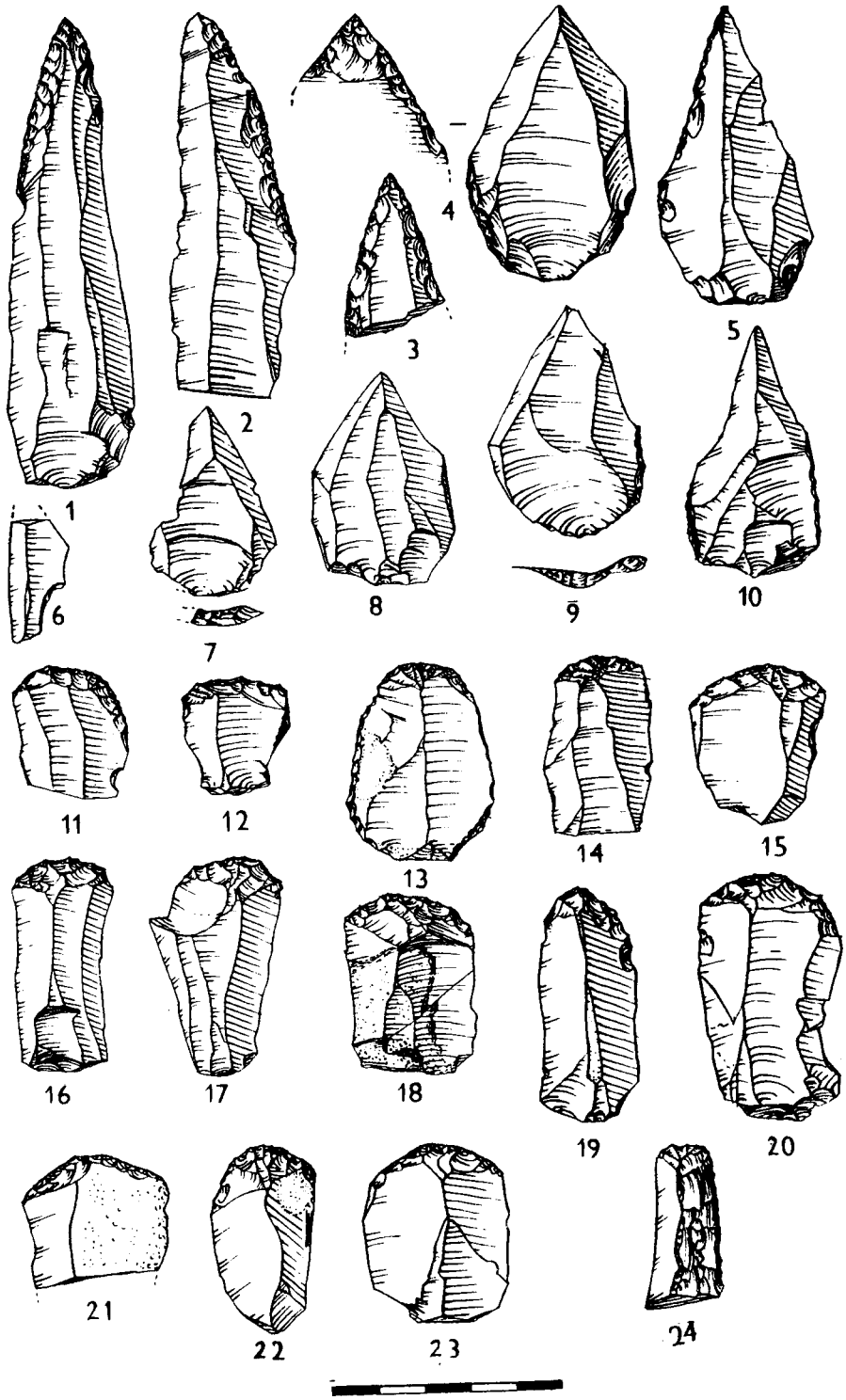

Fig.6. Later Bohunician industry. Stranska skala III , layer 5.

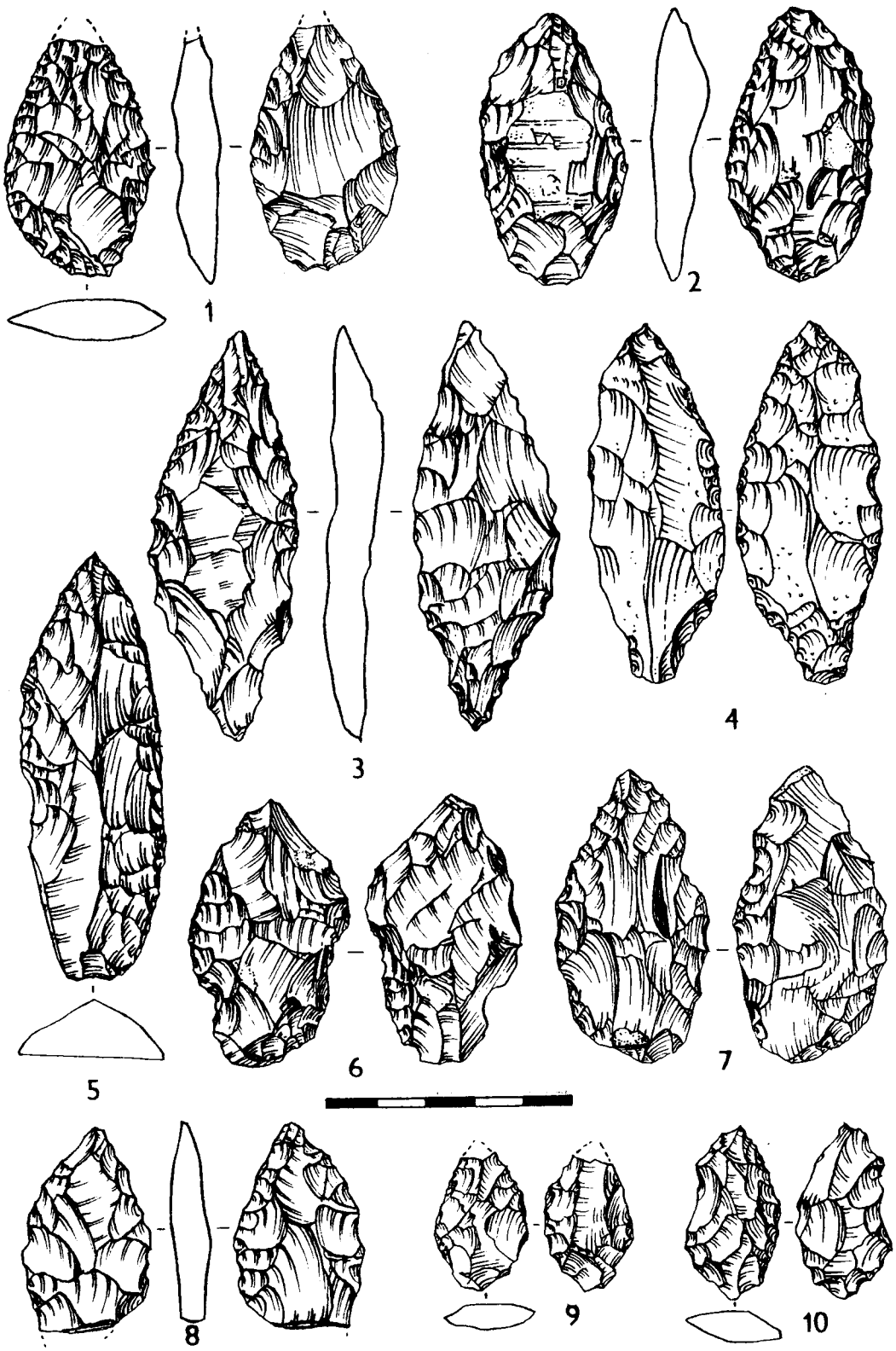

Fig.7. Leaf-points with flat surface retouche, bifacial (1-4,6-10) and unifacial (5). Bohunician context, Lisen.

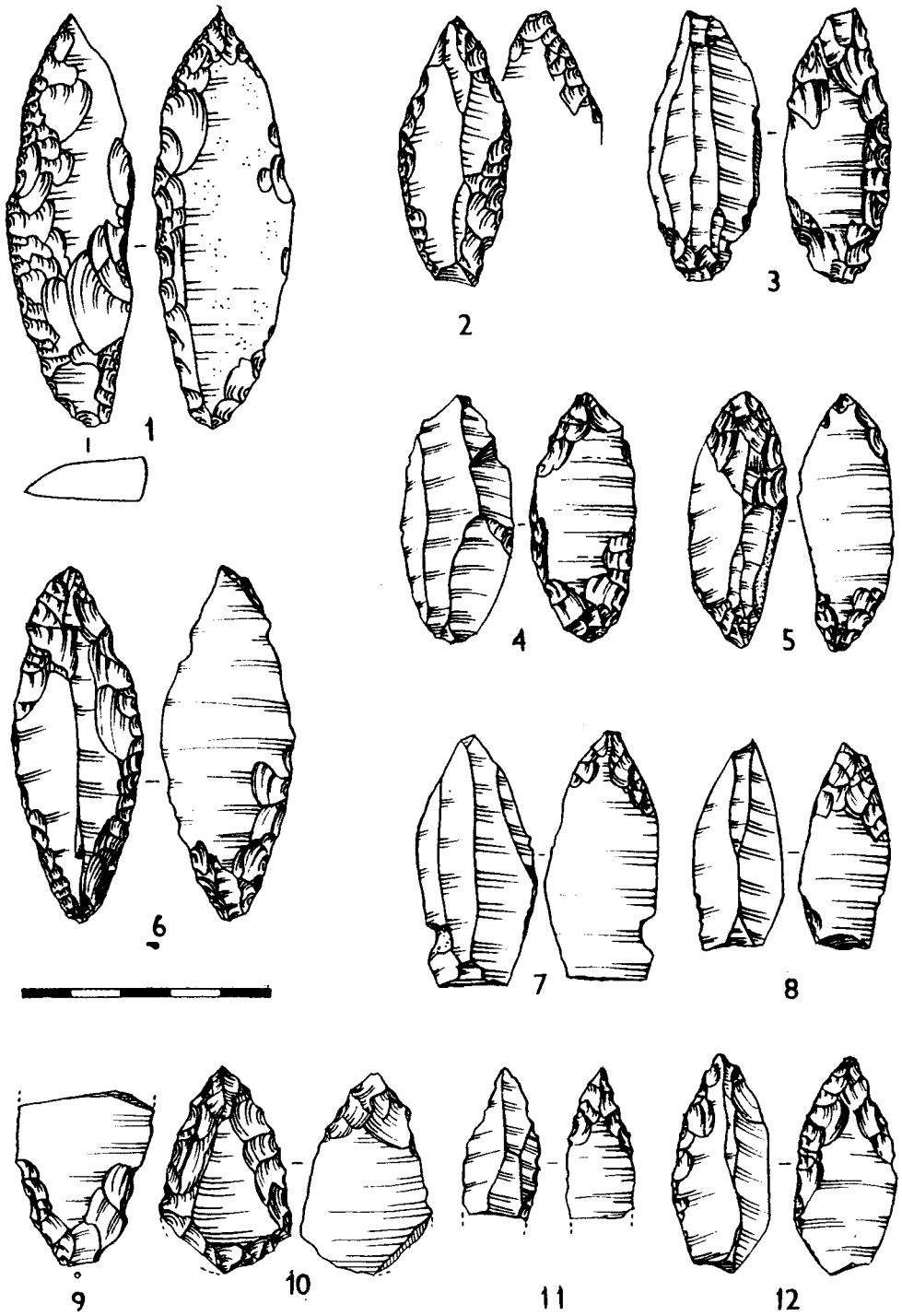

Fig. 8. Jerzmanowice-type points and related forms. Bohunician context, Lisen.