



## SOME CHRONOLOGICAL PROBLEMS OF THE UPPER PALEOLITHIC AZOV-PONTIC AREA IN LIGHT OF NEW RADIOCARBON DATA FROM CRIMEA

Vadim COHEN\*\*, Marcel OTTE\*

### INTRODUCTION

Owing to new investigations on the Crimean Upper Palaeolithic, new radiocarbon dates have been produced for the sites of Siuren I and Skalistiy. Viewed from a chronostratigraphical standpoint of these sites, we undertake some comparisons between Crimea and adjacent regions (Central Europe, the Balkans, and the Northeastern Mediterranean). This brief approach puts radiocarbon evidence for Crimea and the Steppes in the context of Southeast European Upper Palaeolithic development.

During more than 100 years of investigations, the Crimean Upper Palaeolithic was considered within the framework of large geographic areas: Central and Western Europe (BONCH-OSMOLOVSKI, 1934), Caucasus (VEKILOVA, 1967; BADER, 1961; BIBIKOV, 1966), both Steppes and Caucasus (FORMOZOV, 1957), and Steppes or Southeast area (ROGACHEV, ANIKOVICH, 1984; ANIKOVICH, 1982). The prevalent tendency of Caucasian analogies was formed during 50-70 years under the influence of Imeretian culture periodization, firmly embedded in archaeological practices (ZAMIATNIN, 1957; VEKILOVA, 1957). Unfortunately, Late Würm chronology (35 - 10000 BP) in the Caucasus area was based on typological hallmarks exclusively by virtue of limited new archaeological data (LIOUBIN, 1993, p. 295).

The idea of searching the general context in the Azov-Pontic Upper Palaeolithic has been renewed in connection

with advances in Upper Palaeolithic archaeology of the steppes area (BORISKOVSKI, PRASLOV, 1964; STANKO *et al.*, 1989; PRASLOV *et al.*, 1989; KROTOVA, 1986; SMOLYANINOVA, 1990; LEONOVA, 1994; SAPOZNIKOVA *et al.*, 1995). Appreciable results as well were obtained in the area of radiocarbon dating (SVEZHENTSEV, 1993, Tabl.4).

As distinguished from the Crimea, the majority of steppes sites represents single-layer occupations, except for Dniester (Molodova I, V; Korman IV; Cosautsi), Dnieper (Osokorovka, Kaistrova balka) and Lower Don areas (Kamennaya balka II). There are long-term reoccupied base-camps amongst single-layer sites (STANKO *et al.*, 1989; LEONOVA, 1993). However, in the light of the chronological approach, this means that the majority of the periodization models were affected by typological estimations. It has entailed occurrences of some contradictory evidence. Hence, we shall follow radiocarbon results in this brief approach.

### STEPPE AND CRIMEA (historical references)

The so-called "Crimean Upper Palaeolithic province" was first described by M.Ya.Rudinski. This area included both Crimea and steppes (RUDINSKI, 1947). Later, P.P.Efimenko suggested that the origin of the Upper Palaeolithic in this region was in accordance with migration from the Caucasus (1960, p.24). P.I.Boriskovski transferred this background to the economic range and proposed the existence of a wide steppes area connected with a bison hunting adaptation (BORISKOVSKI, PRASLOV, 1964). From his idea, the economical

\* Université de Liège, Service de Préhistoire, Place du XX Août, 7, Bât. A1. B-4000 Liège.

\*\* The Institute of Archaeology, Vidvetskaya, 40, 252014 Kiev, Ukraine.

uniformity presupposes cultural similarity. Because the cultural deposits of Siuren I yielded multispecies fauna (VEKILOVA, 1957), the Upper Palaeolithic of the Crimea is excluded from this steppes context. In due course, the cultural entity of the steppe sites was reestimated. M.D.Gvozdover argued for the existence of a Kamennaya balka culture (1967). To follow, new cultural groups were recorded: Anetovskaya (STANKO *et al.*, 1989), Akkardzanskaya (STANKO *et al.*, 1989), Amvrosievskaya (BORISKOVSki, 1993), Osokorovskaya (TELEGIN, 1982), Fedorovskaya (KROTOVA, 1986). The Upper Palaeolithic of the Dniestr valley was seen as a local phenomenon (CHERNISH, 1987) or as the result of contacts between Central European, Carpathian and Russian Plain regions (Borziyak, 1983). J.Kozlowski and S.Kozlowski assigned Siuren I and Muralovka to the Central European Aurignacian (Krems-Dufour) culture (1975). In accordance with this division, both Osokorovka and Bolshaya Akkardza were connected with one Azov-Pontic Upper Palaeolithic culture. Recently, the assemblages from Siuren I were estimated as one culture and received an hypothetical age - maximum cold of the Upper Valday (Würm) (ANIKOVICH, 1992). The unity of the steppes sites could be seen into affiliation of wide taxons, both Aurignacian and Gravettian "routes of development" (ROGACHEV, ANIKOVICH, 1984; SAPOZNIKOVA *et al.*, 1995). It is necessary to note that the steppes represent a combination of two divisions of Mammoth theriocomplex (bison and saiga-cervus) (BIBIKOVA, BELAN, 1975) presupposing the existence of different bases for subsistence practices.

#### STEPPEs AND CRIMEA (palaeogeographical features)

Wide steppes are spread south of 50° N, along the Black Sea and the Azov Sea. In a broad geographical sense, it includes the lower flows of large rivers: Dniestr, South Bug, Dnieper and Don. This area was never covered by glacial ice and was open to migrations from the adjacent Caucasus, Balkans and Central Europe areas. So, this area once enclosed different cultural traditions of foreign and local components (LEONOVA, 1994).

The Late Quaternary history of the steppes area was formed under the influence of Black Sea level fluctuations. According to V.N.Stanko, more than half the territory available for hunter/gatherers subsistence is now under the sea (1992).

The Black Sea Pleistocene-Holocene hydrological conditions are the object of long-term debates. There is no common point of view about the number of Upper Pleistocene transgressions, their volume and duration. Nevertheless, the following maxima of transgressions must be taken into account: Asheiskaya (124000 ± 3500, 139000 ± 5000), Karangatskaya (74000 ± 3000, 88000 ± 3000), Surozskaya (34100 ± 900, 41250 ± 340), Novoevksinskaya (22 - 10000 BP) (OSTROVSKI *et al.*, 1977; FEDOROV, 1977, p. 26).

In the "After Suroz" period, the basins of Black and Azov Seas were separated. Therefore, the Azov Sea did not exist during maximum cold period of the Valday. The north part of Black Sea represented a land spread along the modern shelf and the future Azov Sea area (SCHERBAKOV *et al.*, 1977, p. 58, 59; Fig. 1). As the Black Sea level fluctuated, two other factors responsible for the palaeoecological environment of this region (retreat of the ice sheet and changing of solar radiation) must be recorded (VEKLICH, 1987). The existence of Periglacial steppes in this area must be taken into account (KORENEVA, 1983). Thus, with respect to palaeogeography, Crimea was a south outlying area of the steppes region. Hypothetically, the mountain landscape could have been the conubia for different flora/fauna components in connection with seasonal and climatic fluctuations.

#### STEPPEs AND CRIMEA (chronological approach)

Today, three general chronological schemes are used for the steppes and Crimea Upper Palaeolithic. The first one presents a three-stage periodization:

1 - early stage of Upper Palaeolithic (part of Mologo-sheksinski interstadial - 42 - 25000 BP);

2 - middle stage (maximum Ostashkova cold - 25 - 18000 BP);

3 - late stage (Late Glacial - 18 - 10000 BP) (ROGACHEV, ANIKOVICH, 1984).

The second approach is used for the Dneper Upper Palaeolithic chronology. It argues for the interstadial Bryansk in the range of 31 - 24000 BP, the early Ostashkovo stage - 23 - 20000 BP, the final stage of Ostashkovo cold - together with Lascaux interval - 18 - 17000 BP and, finally, the Late Glacial period - 16-10000 BP (COVALENKO, 1995, p. 153).

The third scheme, proposed by M.F.Veklich, includes two stages of periodization: one stage coincides with the so-called " Bug " cold horizon (50-30000 BP). This period ends at the " Dofinovka " horizon (30-22000 BP). And the final (second) stage is connected with the Black Sea loess deposits (22-10000 BP) (1982, Table, 49).

We shall follow the first model as the most common and most suitable for comparisons.

The stratigraphic sequence of the Siuren I rockshelter has been used to provide the primary information about the Upper Palaeolithic of the Crimea. Through renewal of excavations, new information was obtained (OTTE *et al.*, 1996). Other excavations were undertaken in the open-air site of Vishennoye (YANEVICH, 1992) and in the Skalistiy rockshelter (COHEN *et al.*, in press). Contradictory chronological evidence existed before the new excavations, but can no longer be supported because of new radiocarbon data. This evidence may be summarized as follows.

In accordance with G.A.Bonch-Osmolovski, the three levels of *Siuren I* completely reflected the evolution of Aurignacian industries of the Krems-Dufour type (1934). Recently, these materials were re-estimated and are viewed as three stages of periodization of the Upper Palaeolithic of the Western Caucasus. Following E.A.Vekilova, the Siuren I sequence reflected the total Upper Palaeolithic continuum (1957). Both lower and middle levels fall in the Ostashkovo maximum cold according to the typology (ANIKOVICH, 1992). The industry from the upper level falls in the Late Glacial (VEKILOVA, 1971; COHEN, 1994), hypothetically in the Dryas I (BORDES, 1968).

On the base of bone samples from layers G and F, both (middle) levels have received new radiocarbon data (OTTE *et al.*, 1996):

I.G - 28450 ± 600 BP (OxA 5154),

I.F - 29550 ± 500 BP (OxA-5155) (Table.1).

Both dates fall within the Stillfried B interstadial (Kesselt, Bryansk) - *i.e.* 30-28000 BP.

Level B of the *Vishennoye II* site falls in the range of 11700-11800 BP, in accordance with paleomagnetism estimations (YANEVICH, 1992, p.30). This assemblage includes a developed series of points and geometric microliths realized on narrow long blades and bladelets (" Falita " points with truncated base, elongated narrow points with arched back, and rectangles). This assemblage originated from an outside area: the Late Molodova Dniestr culture after A.A.Yanevich (1992) or the Caucasus - Near-East after V.Yu.Cohen (1991). It is possible that the absolute dates from Vishennoye are not correct.

The stratigraphic sequence of the *Skalistiy* rockshelter is divided in two parts: Upper Palaeolithic (I.VII - IV) and Final Palaeolithic (I. III/3 - III/I, II, I - Shankobian). According to radiocarbon data (Table.1), lithological, palynological and microfaunal data, the Upper Palaeolithic assemblages fall within Dryas I; the early Shankobian within Dryas II; and levels III/2 and III/I both belong to the Alleröd. Level II is associated with the end of the Alleröd - beginning of Dryas III chronological time segment. Level I falls into the end of Dryas I.

As was suggested before, the upper level of Siuren I chronologically **underlying** the Shankobian with a small hiatus between them. However, the new data enable us to re-think this point of view. The faunal remains from this level represent the following species: *Bos sp.*, *Saiga tatarica*, *Cervus megaceros*, *Equus sp.*, *Cervus elaphus*, *Vulpes lagopus*. Saiga is predominant. The presence of both *Vulpes lagopus* and *Cervus megaceros* indicate an extremely cold climate. These species are not found in Dryas II-III deposits along the Mediterranean area (BIBIKOV *et al.*, 1994). Relevant to the steppes sites,

*Vulpes lagopus* was recorded in Osokorovka (I.III, II), Kaistrova Balka II and Anetovka II. This last site has been radiocarbon dated (Table.1).

The limited faunal collections from the Skalistiy rockshelter show the predominance of *Ovicapra* remains (I.VI-II). *Bos sp.* (I.III/I), *Cervus elaphus* (I.III/3, III/2) and Saiga (I.III/2) were also encountered (estimations by A.Starkin). The ovicaprines are not present in Siuren I or in the middle Shankobian (VEKILOVA, 1957, COHEN, 1994, Table 3). Consequently, another faunal group with small settled ungulates of ovicaprinae genus is inherent to Dryas I-II in the Crimea. The presence of *Vulpes lagopus* in Siuren (up. I.) may be viewed as a chronological evidence of a cold episode, presumably the maximum Ostashkovo cold (24-18000 BP).

The prevalence of saiga adult males in the hunting remains in the sequence of Siuren I assigns the saiga hunting to the time following the reproductive period of this species (December/January) (RAKOV, 1963, p.147-151; BARISNIKOV *et al.*, 1994, p.468). According to both the faunal and structural evidence, the assemblages from Siuren I may be viewed as reoccupied base camps of cold periods.

The penecontemporaneous cave Il'inka near Odessa represents the initial Upper Palaeolithic in the steppes area. The excavations of this cave conducted during the last century yielded numerous faunal materials (cave-bear, bison, horse, deer, lion, etc.) and rare lithic artifacts. The fauna comparisons assign Il'inka to the early Aurignacian of the Bacho-Kiro type in Bulgaria, which is related to the period around 44000 BP according to radiocarbon data (SAPOZNIKOVA *et al.*, 1995; KOZLOWSKI, 1982).

The reoccurrence of Aurignacian industries is recorded in this region after a long-term hiatus, in the assemblages of Zeleniy Hutor I-II, Kuludar', Nenasitetz III. Unfortunately, these numerous collections were gathered on the surface. Both the lower number of blade-blanks and the high number of notched scrapers make a distinction between these and the classical Aurignacian. Viewed from a general estimation, the industries from the Zeleniy Hutor type belong

to the end of the Early Upper Palaeolithic stage and developed from the denticulate Mousterian assemblages of the Dniestr region (Stinka) (STANKO *et al.*, 1989; SAPOJNIKOVA *et al.*, 1995). Recently, the excavations of the stratified site Anetovka 13 were undertaken by V.N.Stanko. It seems likely to suppose that this study will shed light on the chrono-genetical position of these groups.

The next stages of the steppes Upper Palaeolithic development are reflected in some periodizations (STANKO *et al.*, 1989; GRIGORIEVA, 1992), presented below:

I stage - beginning of Ostashkovo cold episode: Sagaidak I, Vladimirovka (I.8, 7), Osokorovka (I.6-5a) (radiocarbon data : see Table.1);

II stage - maximum Ostashkovo cold: Anetovka I, II, Vladimirovka (I.6-4), Muralovka and Zolotovka I;

III stage - beginning of the Late Glacial: Amvrosievka, Kamannie balka I, II, Kaistrova balka IV, Osokorovka (IIIv), Chobruchi;

IV stage - Postglacial: Bol'shaya Akkardza, Ivashkova VI, Vladimirovka (I.2, 1), Yanisol'.

This scheme reflects a general tendency in the development of the Upper Palaeolithic in the steppes area. However, the dating of some sites is a subject of debate. Geological data from the Yami site (23 -22000 BP) (KROTOVA, 1986) indicate that it belongs to the first stage also. In accordance with the data from Amvrosievka (21500+/-340 BP) (KROTOVA, BELAN, 1993, p.128, 129), this site has a similar age. For Bol'shaya Akkardza, a well-founded estimation leads to the conclusion that the site is contemporaneous with Anetovka II (SAPOZNIKOVA *et al.*, 1995). The most recent geological examination of the Bolshaya Akkardza profile supports this idea (V.F.PETRUN, S.COVALENCO, 1995, p. 156). The sites of the Kamennaya balka culture (Kamennie balki I, II, Fedorovka) are younger than Amvrosievka. Following the Kamennaya balka II radiocarbon data (LEONOVA, 1994, p. 201), this culture can be seen as affiliated with the Dryas I. The

assemblages from the Skalistiy rockshelter (I.VII-IV) have the same age (Table.1).

It is necessary to outline the Azov-Pontic region group of sites which are not represented in this periodization (Shankobian assemblages of the Crimea; Belolesie, Tzarinka, Gavrilov Yar, Leontievka - right bank of the Dnieper; Rogalik-Peredelsk group - near Azov Sea and Borshevo (up. 1.) - Kostenki). The majority of these sites has been estimated to belong to before the Mesolithic (Preboreal period). The tendency of the re-dating must be recorded in the last years (COHEN, 1992). According to radiocarbon data from Skalistiy, the early Shankobian stage is located at the end of Dryas II. The assemblage from Rogalikw is connected with Alleröd soils and underlying deposits. Both palynological and faunal analyses have recorded an open landscape with cold climatic conditions, corresponding to the Dryas II stadial (GORELIK, 1993; GERASIMENKO, 1993; SAPOZNIKOVA *et al.*, 1995, p.155). The upper level of Borshevo II has the following radiocarbon dates: 12300+/-100 BP (GIN 88), 13210+/-270 BP (LU 742), 11760+/-240 BP (MO-6366) (SVEZHENTSEV, 1993, Table 3). This assemblage can entirely be seen as belonging to the Bölling interstadial - Dryas II stadial. Thus, the group of sites listed above belong to the last stage of the Azov-Pontic Upper Palaeolithic (final Palaeolithic) in the Dryas II - Dryas III chronological frame (Shankobian horizon).

Under conditions of both radiocarbon data scarcity and restricted chronostratigraphic methods in this case, the evolution of the Upper Palaeolithic in the steppes and in the Crimea may be summarized today as a sequence of separate chronological horizons:

**Bacho-Kiro h.** (44000 BP) - Il'inka (?);

**Siuren I (mid. 1.) h.** (Interstadial Stillfried B - 30-28000 BP) - Siuren I (mid. 1);

**Zeleniy Hutor h.** (end of Mologoshekskinskogo interstadial (?)) - Zeleniy Hutor I, II, Kuludar', Nenasitetz III, Anetovka 13;

**Sagaidak h.** (beg. - mid. of maximum Ostashkovo cold) - Sagaidak I, Yami, Osokorovka (I.6-5a) (?), Siuren I (up. 1.) (?);

**Anetovka - Amvrosievka h.** - (end of the maximum of Ostashkovo cold) - Anetovka I, II, Amvrosievka, Muralovka, Zolotovka I, Bolshaya Akkardza, Leski, Vladimirovka (I. 6-4) (?), Siuren (up. 1.) (?);

**Kamennaya balka h.** - (beg. of Late Glacial - Dryas I - Bolling) - Kamennaya balka I, II, Fedorovka, Skalistiy (I.VII-IV), Vladimirovka (I.2, 1);

**Shan-Koba h** - (end of Late Glacial - Dryas II, Alleröd, Dryas III) - Skalistiy (I.III-I), Shan-Koba (I.6, 5) and others, Borshevo II (up. 1.), Rogalik, Leontievka, Tzarinka, Voloshkiy cemetery, Yanisol', Govoruha, Sredinniy gorb, Belolesye, Siuren II.

#### STEPPE AND CRIMEA (CULTURAL DIVISION)

The cultural division of the Upper Palaeolithic of the steppes area is possibly a subject outside this study. Nevertheless, it is necessary to outline the anticipated scenarios which could be connected with the reassessment of the chronology.

The modern tendency in Upper Palaeolithic studies of this region are connected with a multicultural approach (Anetovskaya, Lower Siuren I, Upper Siuren I, Amvrosievskaya, Akkardzanskaya cultures, etc.). It is preferable to use broad groupings (technocomplexes) in the context of this approach.

According to interpretations of cultural background by A.N.Rogachev and M.V.Anikovich, the Upper Palaeolithic of the steppes area represents two technocomplexes or "routes of development": the Aurignacian and Eastern Gravettian ones (1984). According to these taxonomic definitions, it could not embrace such wide chronological time segments from the Interpleniglacial to the end of the Late Glacial. The most exact estimation presents the Upper Palaeolithic of Eastern Europe in the light of the evolution of three technocomplexes: Aurignacian, Eastern Gravettian and Eastern Epigravettian (KOZLOWSKI, 1986, Fig.3.1). However, the boundaries between them were conditionally estimated. On the other hand, the young age

of the Eastern Gravettian-Epigravettian transition in comparison with the Mediterranean and Central European areas develops from the general idea of population movement responsible for the Gravettian in the East under Solutrean impact (KOZLOWSKI, 1986, p. 132).

The middle level of Siuren I represents an Aurignacian technocomplex. It can not be seen as belonging to the Anetovka-Amvrosievka horizon according to chronological distinctions (Table 1).

Three initial chronological episodes of the steppes Upper Palaeolithic are connected with the Aurignacian. However, even a preliminary approach to these data confirms obvious typological distinctions between them. In this way, Siuren I (m.l.) entirely reflects the typological structure of the Central Europe Aurignacian (of Krems type). The assemblages of Zeleniy Hutor type are connected with the underlying Middle Palaeolithic tradition (?). Thus one simple genetic chain cannot account for the Aurignacian episodes in the steppes area.

The sites from the Sagaidak horizons are not homogeneous in a cultural sense. Sagaidak I has obvious Aurignacian typological features (STANKO *et al.*, 1989). The Yami site reflects a short episode due to an intrusive population responsible for the Willendorf - Kostenki unit (KROTOVA, 1986). Osokorovka (low.l.) presents a specific typological tool kit, and Vladimirovka (l.8, 7) belongs to the Molodova culture of the Dniestr area.

There are two cultural evaluations of sites that could be assigned to the Anetovka-Amvrosievka chronological horizon. These were affected by the spread of the Polish Aurignacian (Gura Pulavskaya) into the Pontic Steppes during the maximum Ostashkovo cold (STANKO *et al.*, 1989). Another point of view places these assemblages at the end of the continuum of the Zeleniy Hutor tradition (SAPOZNIKOVA *et al.*, 1995).

There is an obvious chronological hiatus between the Polish Aurignacian (37-30000 BP) and the Anetovka-Amvrosievka horizon (SACHSE-KOZLOWSKA, 1978; LEONOVA, 1994, p.199). The Aurignacian from Gura Pulavskaya represents a facies of

the Krems culture. Hence, there is not a reason to restrict an anticipated area of Aurignacian influences in the frame of the Polish Lowland. According to the radiocarbon data, the middle level of Siuren I partly covers the chronological break between the Central European Aurignacian and the Anetovka-Amvrosievka chronological group. It offers a general connection between the Lower Siuren culture and the Eastern Gravettian group with developed Aurignacian typological components (Anetovka, Amvrosievka, Bolshaya Akkardza).

The sites of Kamennaya balka horizon are entirely contemporaneous to the Magdalenian of Western Europe. They are not homogeneous in their cultural aspect. The industries of the Kamennaya balka culture are firmly connected with the Imeretian Upper Palaeolithic tradition (GVOZDOVER, 1967; LEONOVA, 1994). Furthermore, other sites are connected to the Eastern Epigravettian. As a rule, the industries of this horizon contain series of geometric microliths.

The growth of cultural diversity must be recorded during the Shankobian chronological stage. It can be observed in the following appropriation: cultures of the Mediterranean circle (Shankobian, Beloles'e), Eastern Epigravettian (Borshevo II, up. 1., Osokorovka, Leontievka, Tzarinka), heterogeneous cultures with leaf points (Siuren II) and a particular unit of Vyazovok-Zimovniki-Surskoy V separate from both Central and Western Europe Upper Palaeolithic taxons.

Relevant to the palaeoeconomic situation in the steppes, three different approaches must be recorded:

- This range reflects a prehistoric example of bison hunting economy which involved different cultural groups (BORISKOVSKI, 1993; PRASLOV *et al.*, 1989; STANKO *et al.*, 1989);

- steppes are neither a united cultural or economical area (GRIGOR'EVA, 1992);

- the existing data do not allow reference to steppes as a separate economic region (LEONOVA, 1994, p. 175).

Actually, different points of view affected by unequal evaluation of spatial structures could be adopted by Upper Palaeolithic hunter/gatherers. The background idea has been pronounced by P.I. Boriskovski: broad ecological area as an adaptive object.

New aspects of this problem must be taken into account. First, the steppes Upper Palaeolithic sites are connected with microecological niches along the Bug (STANKO *et al.*, 1989), Kodima region (SMOLYANINOVA, 1990), Dniestr valley (BORZIYAK, 1993), valleys of Dnieper and Don. Second, these sites have both different structures of cultural levels and different settlement patterns (LEONOVA, 1993; SAPOZNIKOVA *et al.*, 1995). The available territory for hunter/gatherers is almost always restricted. The most general confirmation of this thesis is connected with idea of a natural home base requirement in the framework of an annual subsistence territory (CLARK, 1975). In this context, the steppes area could be subdivided into some enclaves with different types of adaptation. So, both Dniestr valley and part of Bug region represent a reindeer economy (BORZIYAK, 1993). The narrow strip between Southern Bud and Northern Donetz is exclusively connected with bison hunting adaptation (Anetovka, Bolshaya Akkardza, Amvrosievka). The specific conditions relevant to land use of the Don area depend on local landscape peculiarities. In this connection, the subsistence of the Upper Palaeolithic of the Crimea represents a model of a montane landscape adaptation which changed from one to another over time.

Both features of vertical succession and horizontal intercultural links are inherent to the steppes Upper Palaeolithic. Obviously, we cannot explain these facts viewed from common emergency only. So if economic strategy, supplying local groups of available resources, took place on a microregional level, a macrolevel of economy would be represented only hypothetically because migration territories of ungulates are always wider than the hunter/gatherer subsistence areas. For example, the formation of a reindeer economy in the Dniestr valley develops from the particular structure of the reindeer annual migration along some climatic regions (COHEN, in press). It is likely that bison hunting specialization

coincides with central grazing areas of this species. And again, if the wide steppes area is only a hypothetical unit in economic estimation, it could be a prehistoric reality viewed from a social point of view. Thus, the unity of the steppes area in the Upper Palaeolithic completely reflects a "social space" definition.

According to comparisons between both steppes and Periglacial models (Willendorf-Kostenki) (OTTE, 1982; KOZLOWSKI, 1986; SOFFER, 1993), we can conclude that there were not only differences in adaptive models, but differences in types of social space also.

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Types/ Sites	Shan-Koba.L.2		Alimovskiy.L.I		Petrovskaya Balka		Fatma-Koba.L.3		Fatma-Koba.L.2		Fatma-Koba.L.1		Shan-Koba.L.1a	
	Quantity	%	Quantity	%	Quantity	%	Quantity	%	Quantity	%	Quantity	%	Quantity	%
Cores	5	4.4	9	1.4	68	0.9	24	2	70	1.9	15	2.4	3	2.5
Flakes & Debris	12	10.6	353	57.1	4509	60	645	55.6	2251	62.8	307	50	49	41.5
Blades & Sections	26	23	137	22.1	2149	28.8	98	8.4	704	19.6	18	2.9	26	22
Other spalls			1		150	2			31	0.8	5			
Burin spalls			2		15	0.2	2	0.1	18	0.5	2			
Tools	70	61	116	18.7	533	7	362	31	508	14.1	261	42.9	40	33
Retouched blades	28	24.7	11	1.7	137	1.8	157	13.5	170	4.7	66	10.8	8	6.7
Retouched sections			11	1.7	8	0.09	67	5.7	43	1.2	79	12.9	4	3.3
Retouched flakes	1		6	0.9	20	0.2	14	1.2	38	1	12	1.9	6	5
Truncated blades					15	0.2	4		7		6			
End scrapers	21	18.5	5	0.8	90	1.2	28	2.4	40	1.1	17	2.7	7	5.9
-on the blades	8	7	4		38	5					9			
-on the flakes	13	11.5	1		52	0.6					8			
Burns	4	3.5			9		16	1.3	24	0.6	4	0.6	1	
Push-planes					1									
Knives					4		3				2			
Punches					3									
Adzes					5		1		2		2			
Borers	1				4		2		1					
Side scrapers					6									
Combined tools					1									
Axes														
Backed blades	1				8		2		1		1			
Kukrek inserts					1		1		6					
Pseudoinserts					1				1					
Geometrical microliths	11	9.7	80	12.9	190	2.5	55	4.7	139	3.8	60	9.8	12	10.1
Trapezes	11	9.7	68	11	156	2	50	4.3	92	2.5	50	8.2	11	9.3
tr. with abrupt ret.	8	7			63		19	1.6	47	1.3	9	1.4		
tr. Alimovskiy	3	2.6			63		20	1.7	17	0.4	33	5.4		
tr. with flat ret. of surface					14		11	0.9	27	0.7	8	1.3		
blanks of tr.					14									
tr. Alekseevskaya zasuha					1									
Crescents			12	1.9	33		5		8	0.2	9	1.4	1	
cr. with abrupt ret.					9		1		4					
cr. with sloping ret.					12		4		1		4			
cr. with flate ret.					12				3		5			
Triangles					1				1		1			
Rectangles									4					
Points	4	3.5	2	0.3	30	0.4	11	0.9	34	0.9	12	1.9		
ungeometrical p.	4	3.5			14		5		19	0.5	6			
geometrical p.					16		4		10	0.2	2			
bifacial p.					1		2		5	0.1	1		2	
with concave base											3			
TOTAL	113	100	618	100	7450	100	1160	100	3582	100	608	100	118	100

Table I. Selected Neolithic assemblages of the Crimea.

SPECIES / TERRITORIES	MOUNTAIN						KERTCH			STEPPE	
	AT-BASH	KAYA-ARAS	TASH-AIR L. VIII	TASH-AIR L. VII	TASH-AIR L. VI	PETROVSKAYA BALK	ALIMOVSKIY	FRONTOVOE I L. III	FRONTOVOE I L. II	LENINSKOE I L. II	MARTINOVKA
<b>WILDS</b>											
Capreolus capreolus (roedeer)	*	*	*	*	*		*				
Cervus elaphus (red deer)	*	*	*	*	*	*	*	*			*
Sus scrofa (wildboar)	*		*	*	*	*	*				
Bos sp.					*	*	*				
Bos and Bison sp.						*	*	*	*	*	*
Equus asinus hydruntinus (donkey)				*		*	*	*	*	*	*
Equus sp. (horse)						*	*	*	*	*	*
Saiga tatarica (saiga)								*			
Ovis argoloides (goat)											*
Vulpes vulpes (fox)				*							
Felis silvestris (wild cat)				*							
Lepus europaeus (hare)			*	*	*		*				
<b>DOMESTICS</b>											
Sus domestica (pig)		*	*	*	*	*	*				
Bos domestica (cattle ?)					*			*	*	*	
Sheep / Goat								*	*	*	
Canis familiaris (dog)										*	

Table 2 Theriofauna from main Neolithic sites of Crimea

Periods	Stages	Sites	Pottery	Technology	Radiocarbon data	
Neolithic	II	Fat'ma-Koba, I.1-"ground"	shallow base pottery: undecorated, with drawn lines, noched stamp or with "pearls"	triangular points with concave base	2. 635 +/- 90 unc. B.C. Gursufskaya	
		Kurtsi				
		Druzhnoye Kaya-Arasi, I.1 Laspi				
	I	6	Gurzufskaya Petrovskaya Baika	sharp-base pottery: with comb stamp; shallow base pottery: undecorated	bifacial points	3342 -3108; 3328 3034; 3090- 2924; 3620-3354 cal. B.C. Petrovskaya Baika
			Fat'ma-Koba, I.2,3 Shan-Koba, I.1a Martinovka Denisovka			
		5	Kaya-Arasi, I.2 Kaya-Arasi, I.2			
Late Mesolithic	IV-1	4	sharp base pottery with drawn lines and pins	Microolithic tradition of the "MK"-culture		
			At-Bash Tash-Air, I.6			
		3	sharp base pottery with plants admixture in the clay			
	2	Alimovskiy, I.1 Tash-Air, I. YII Kafka-Bogaz				
	1	Shan-Koba, I.2 Alimovskiy, I.2,3, Tash-Air, I. YIII				

Table 3. The Periodisation of Murzak-koba Neolithic culture

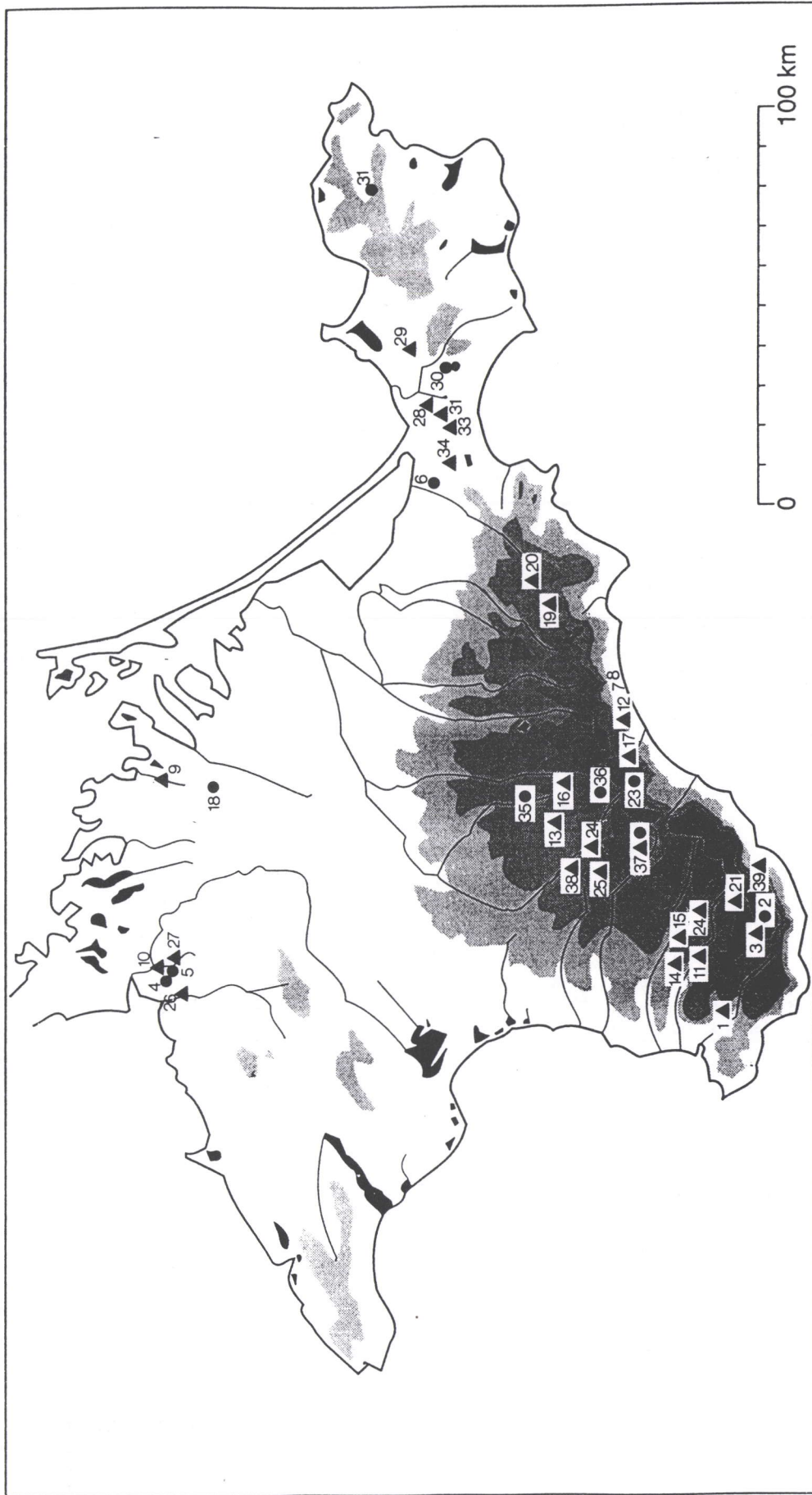


Fig. 1 The main Neolithic sites of the Crimea

1. Kafka-Bogaz, 2. Balin-Kosh, 3. R. SH. Vodopadnyy, 4. Ishunskaya, 5. Dolinka, 6. Alekseevskay Zasuha, 7. Su-AI I-IV, 8. Ala-Chuk, 9. Martinovka, 10. Dolinka, 11. Alimovski, 12. Adzi-Koba III, 13. Zuya, 14. Tash-Air I, 15. Kaya-Arasi, 16. Kukrek, 17. Orta-Sari, 18. Dzan koy, 19. Churuk-Su, 20. Batakash, 21. Yusupovskiy bassain, 22. Tepe-Kermen, 23. Sarigol, 24. Maiiy Salgir, 25. Petrovskaya Balka, 26. Vorontsovskaya, 27. Orlovskaya, 28. Frontovoe I, 29. Leninskoe, 30. Lugovoe I, 31. Tasunovo, 32. Koy-Asan II, 33. Koy-Asan I, 34. Shubino, 35. Shipan-Koba, 36. Kalash-Bair II, 37. Domehi-Kaya, 38. Chokurecha III, 39. At-Bash.

▲ - Murzak-Koba neolithic culture

● - Assemblages with kukrek typological components

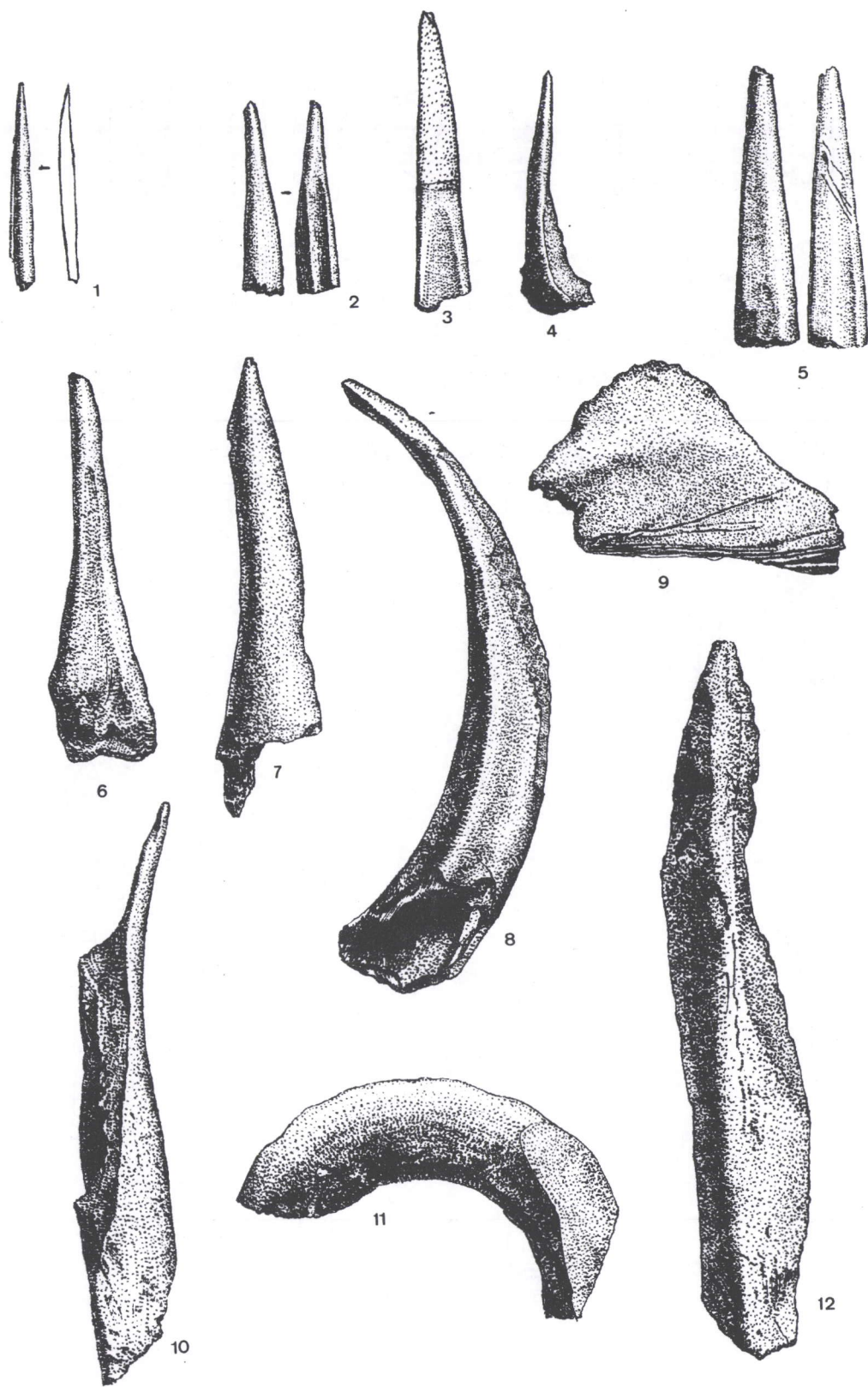


Fig. 2. Shan-Koba, I. 1a. Bone industry.

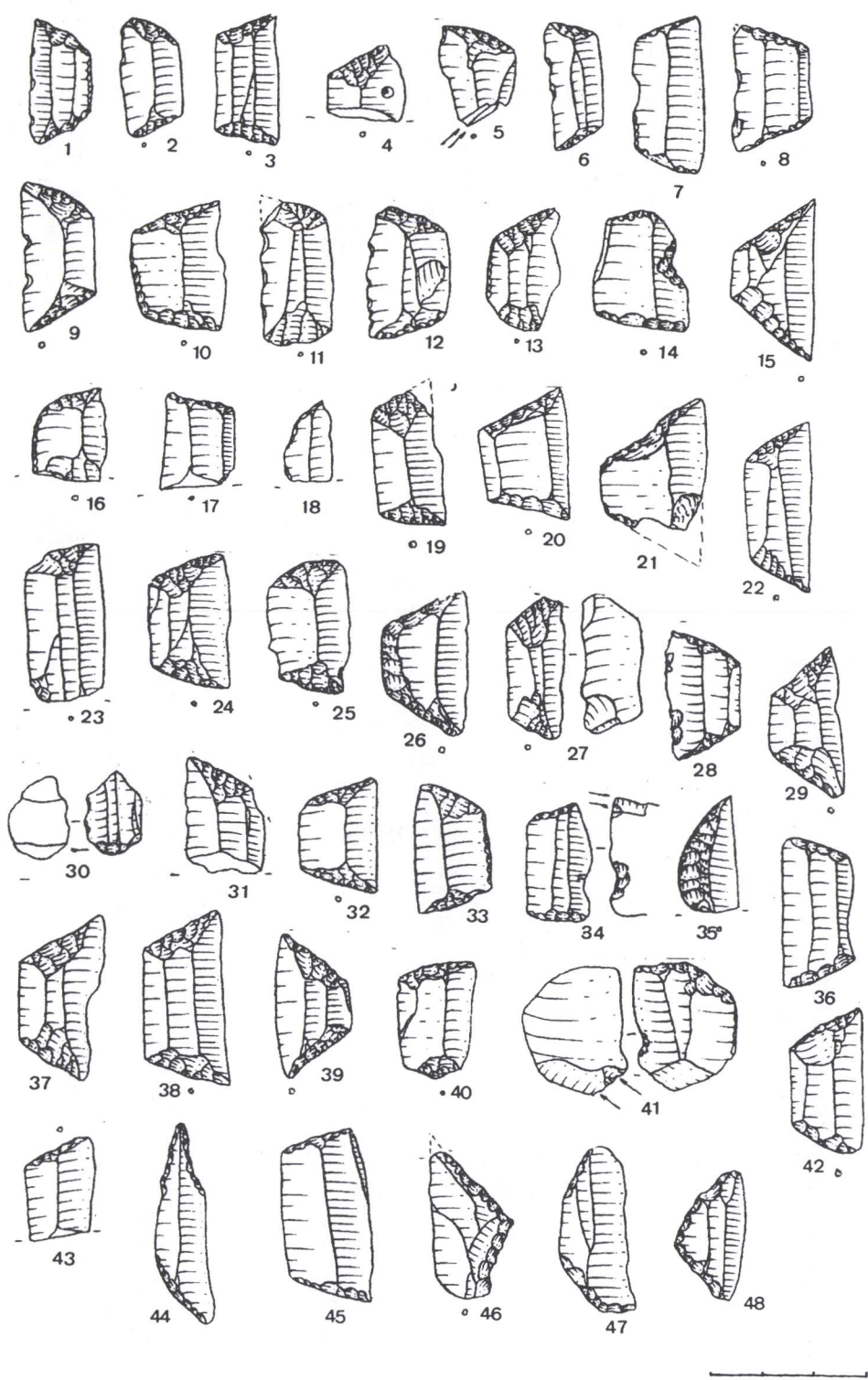


Fig. 3. Rock shelter Alimovskiy. Geometrical microliths

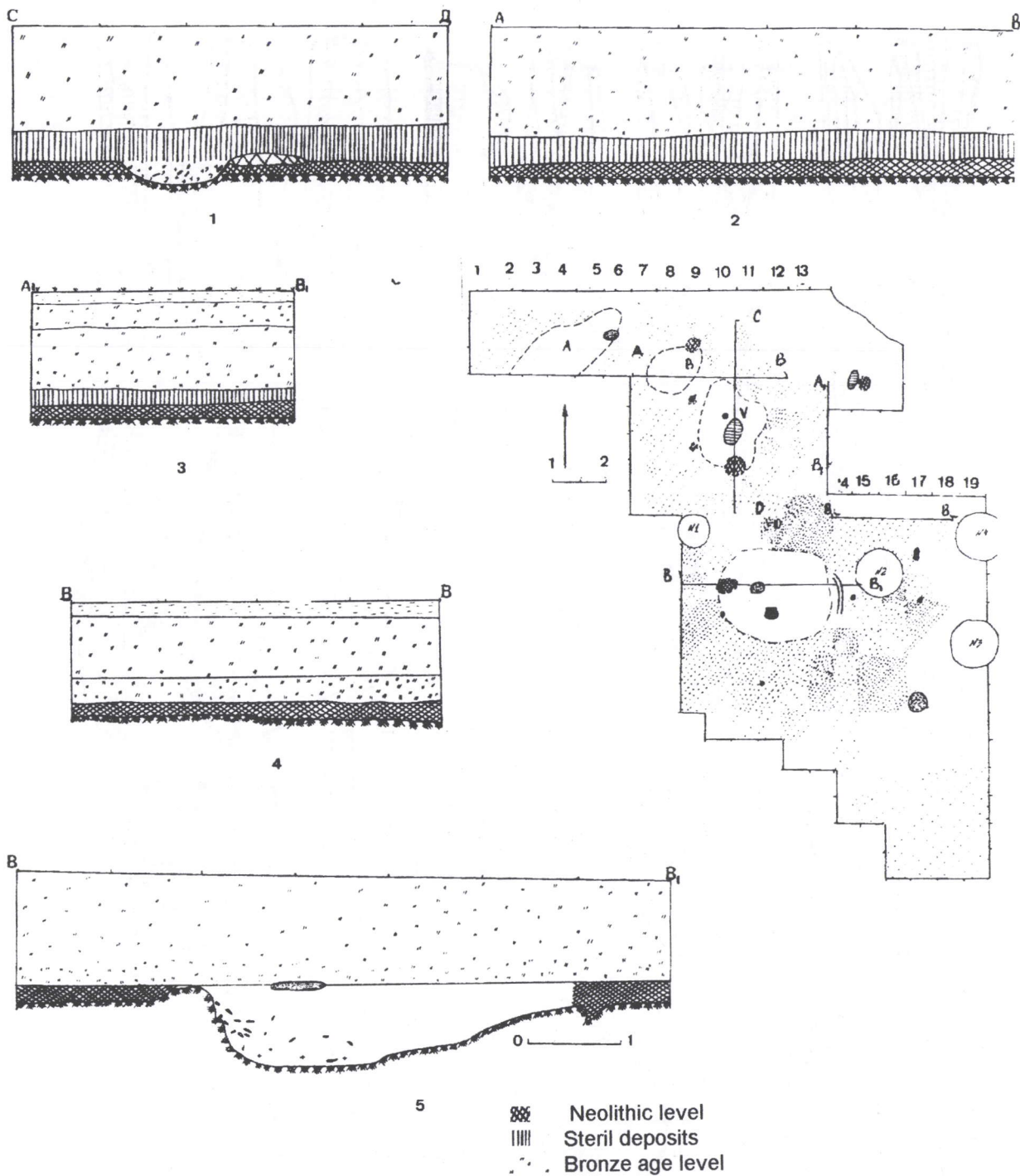


Fig.4. Petrovskaya balka. Plan and profiles.  
 N. 1-3 - 1985 year excavation  
 N 4,5 - 1986 year excavations

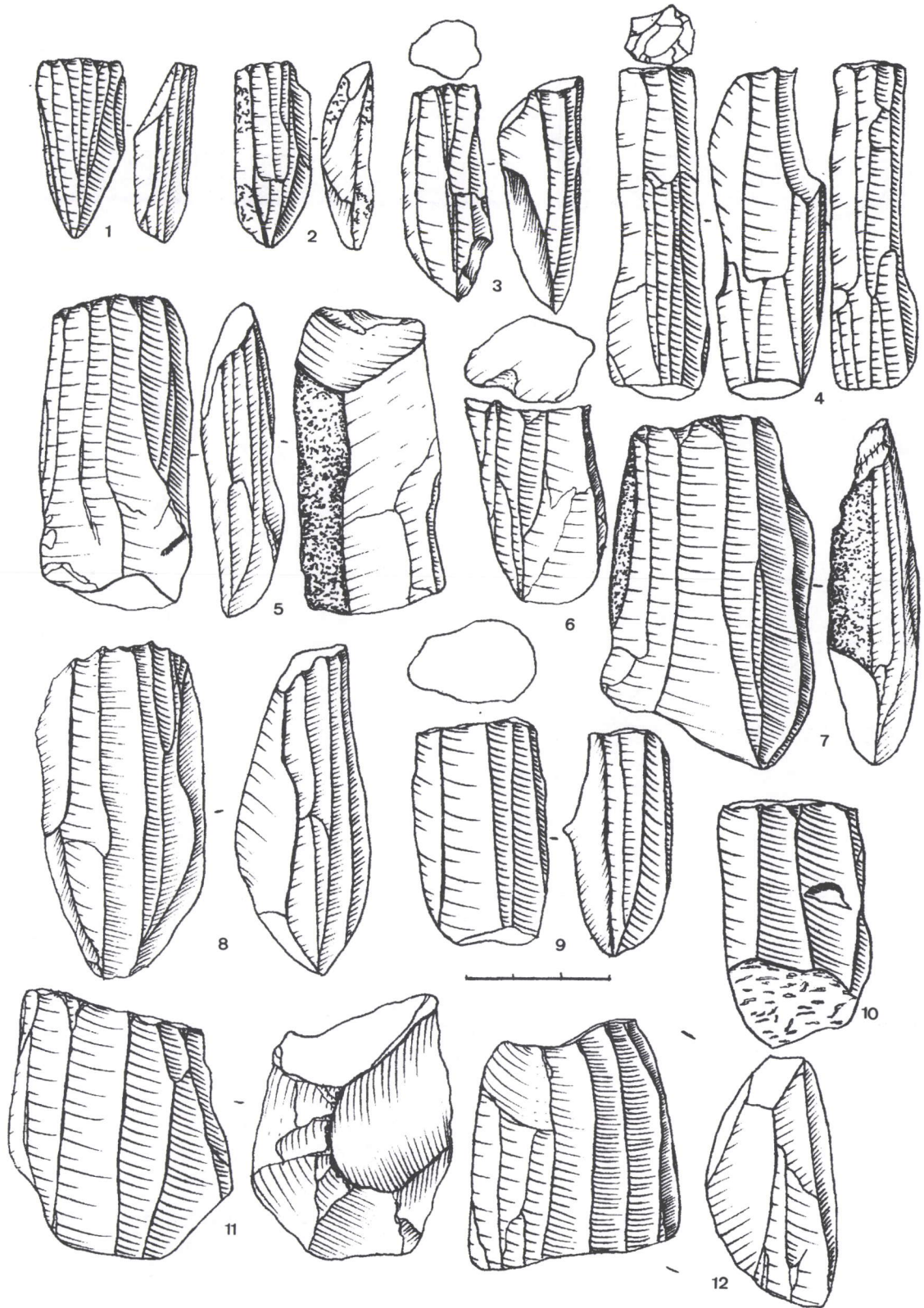


Fig. 5 Petrovskaya balka. Selected cores.

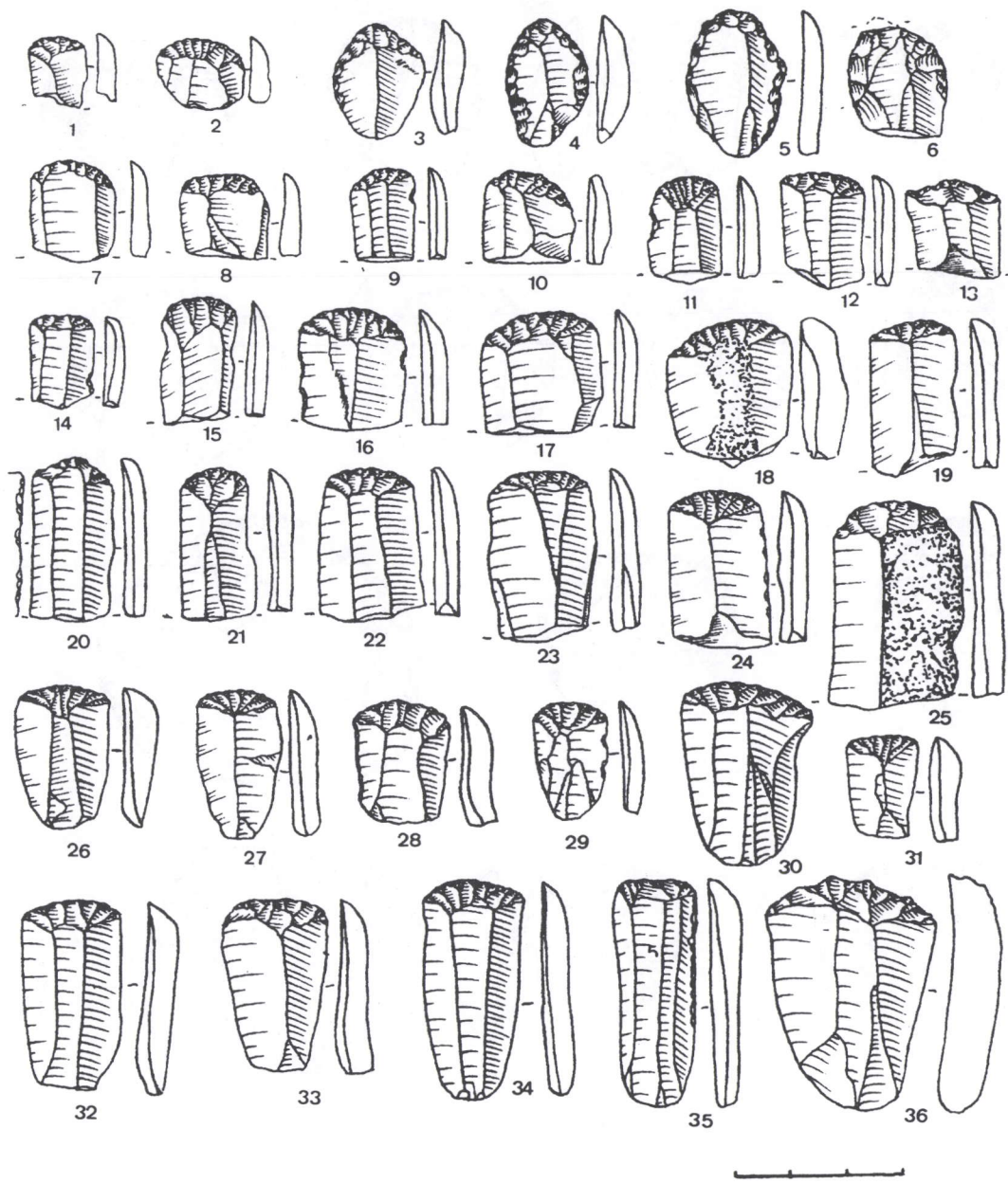


Fig. 6 Petrovskaya balka. End scrapers.

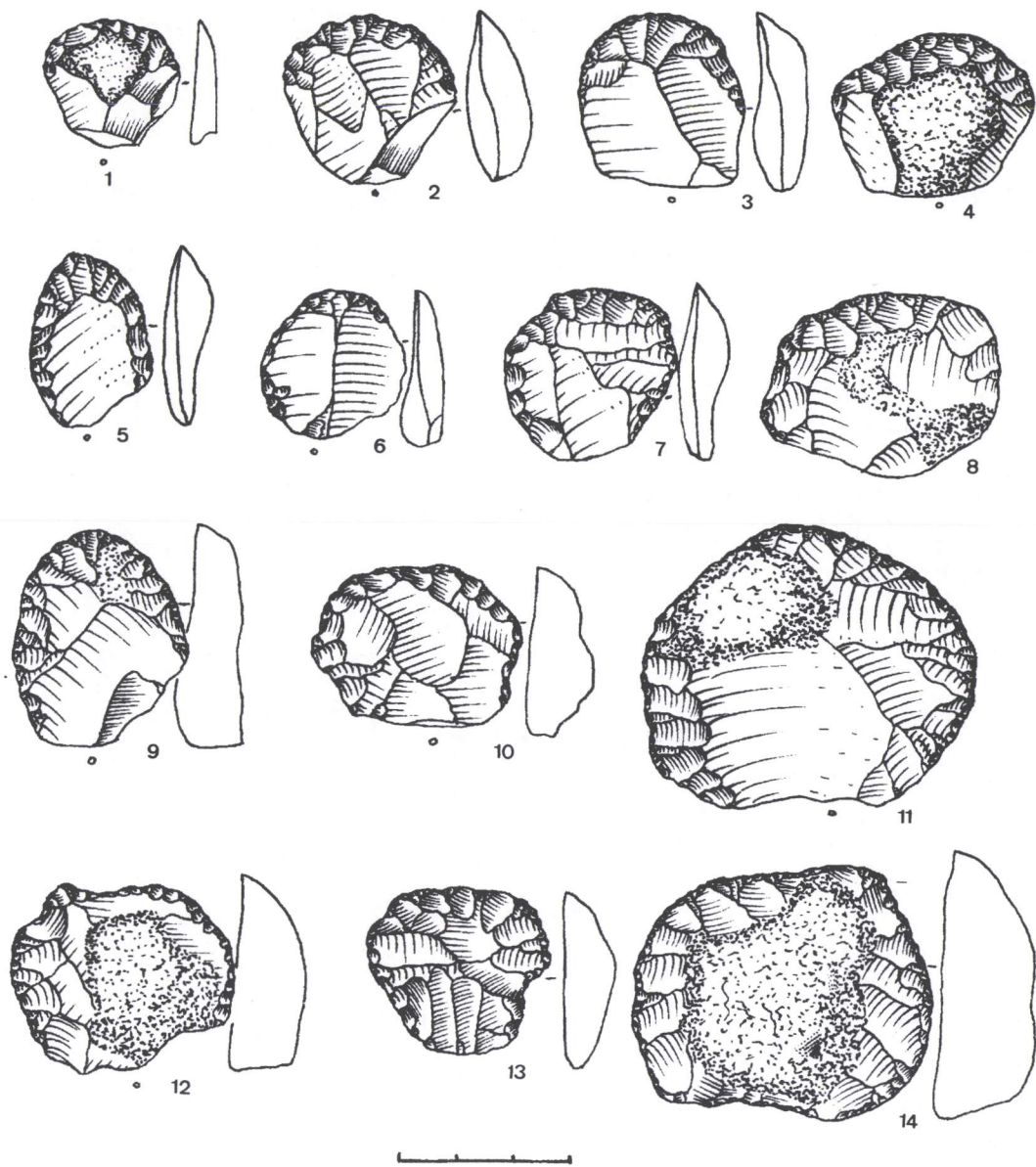


Fig. 7 Petrovskaya balka. End scrapers.

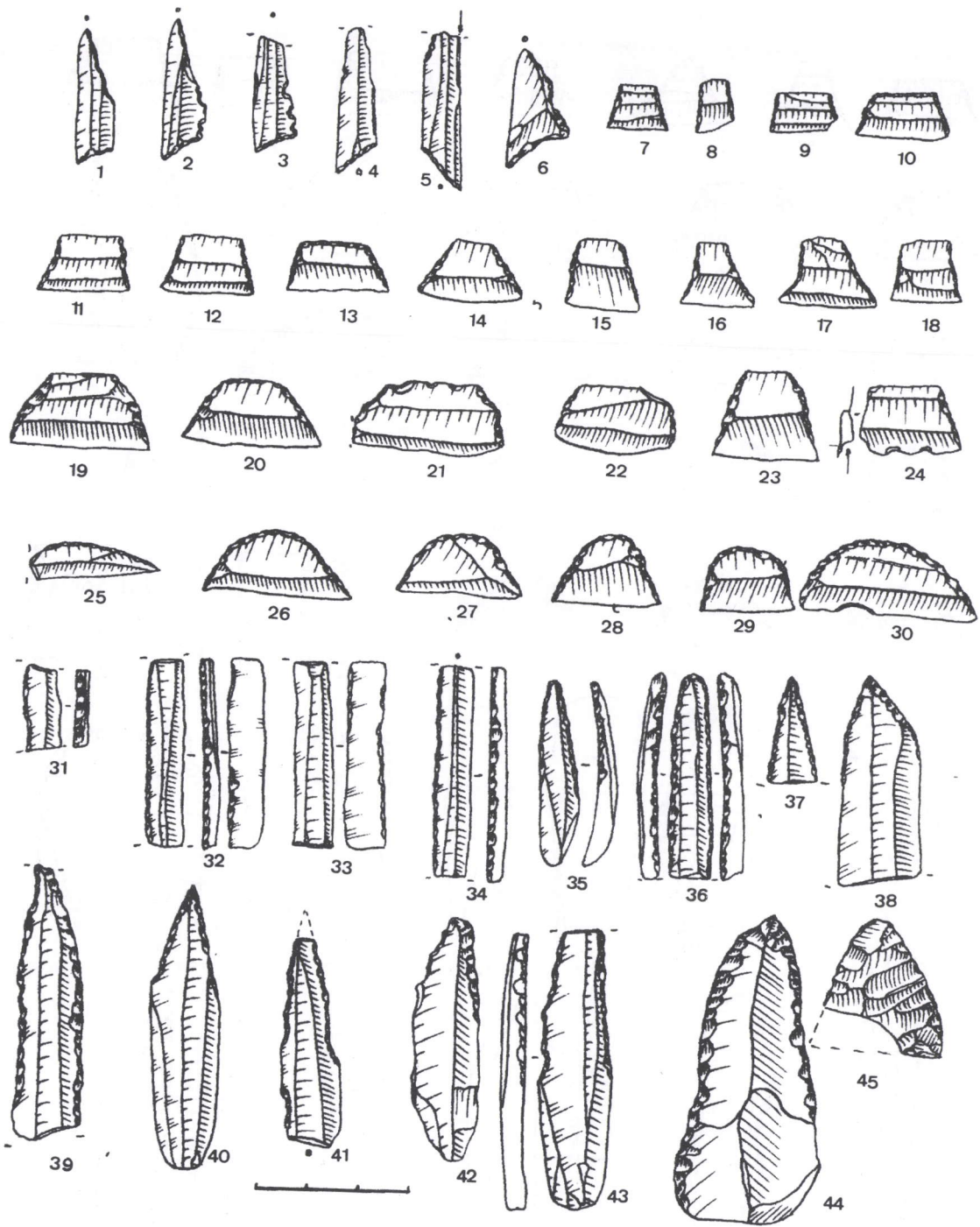


Fig.8 Petrovskaya balka. Flint assemblage.

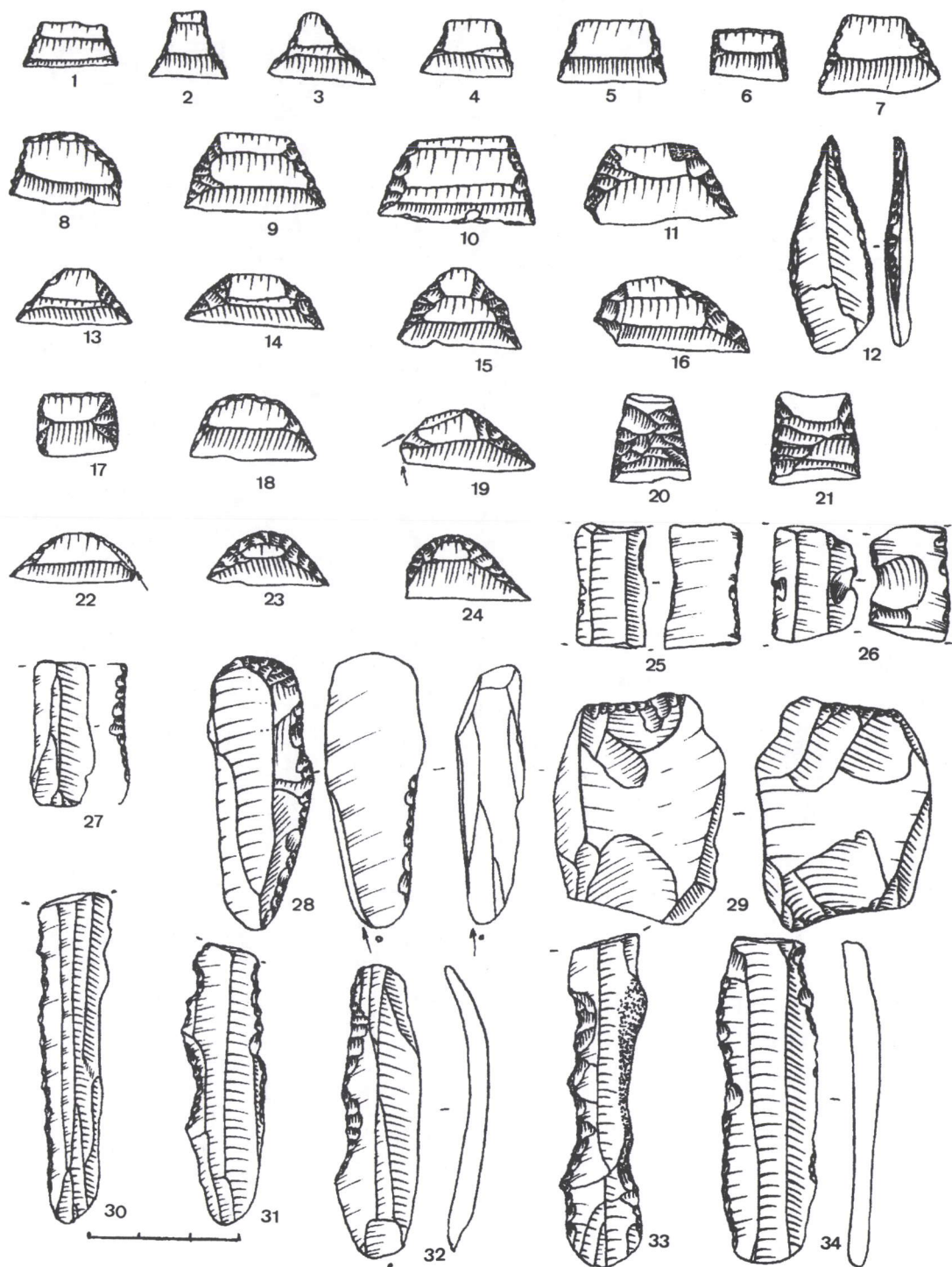


Fig. 9 Petrovskaya balka. Flint assemblage.

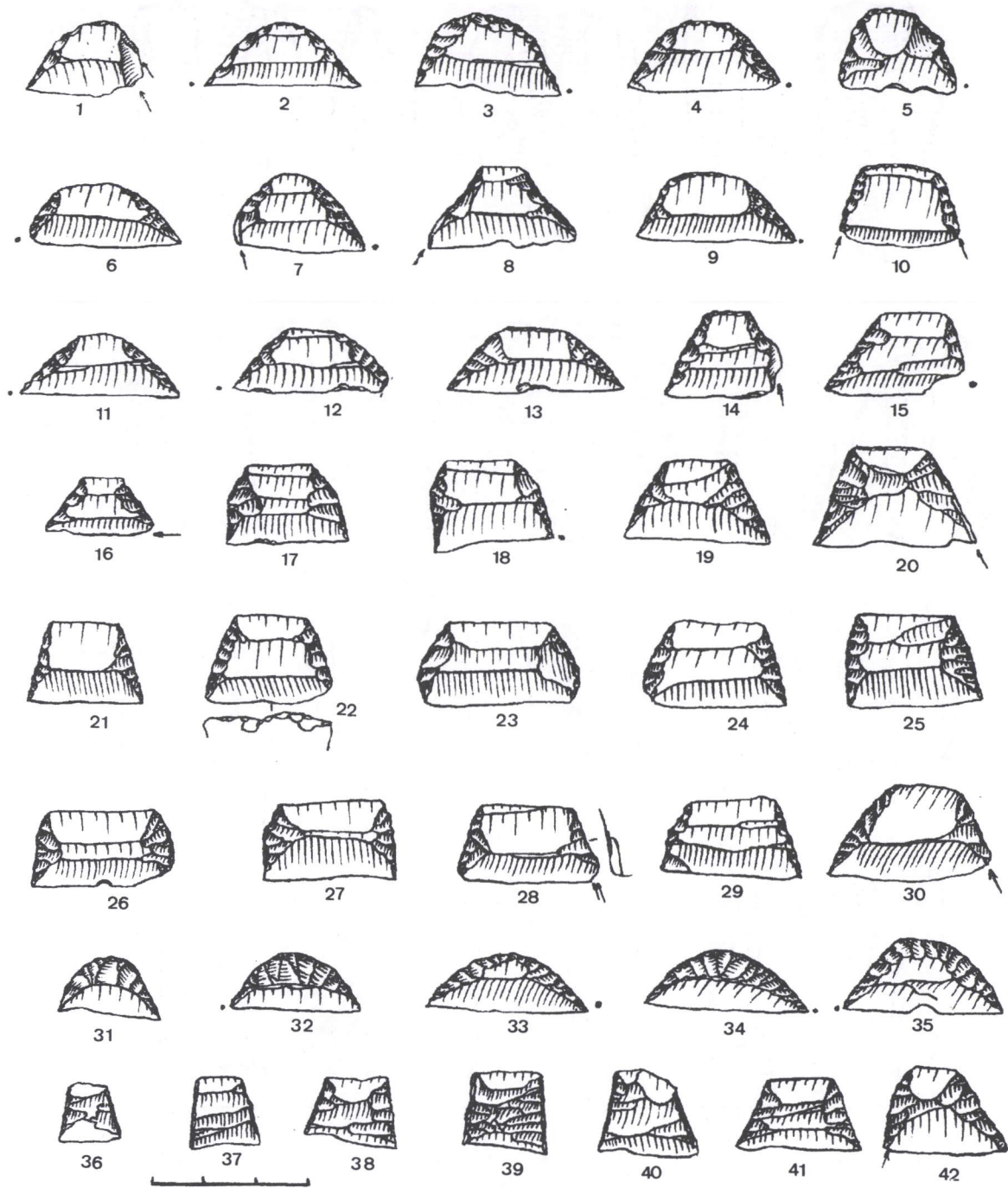


Fig.10 Petrovskaya balka. Flint assemblage.

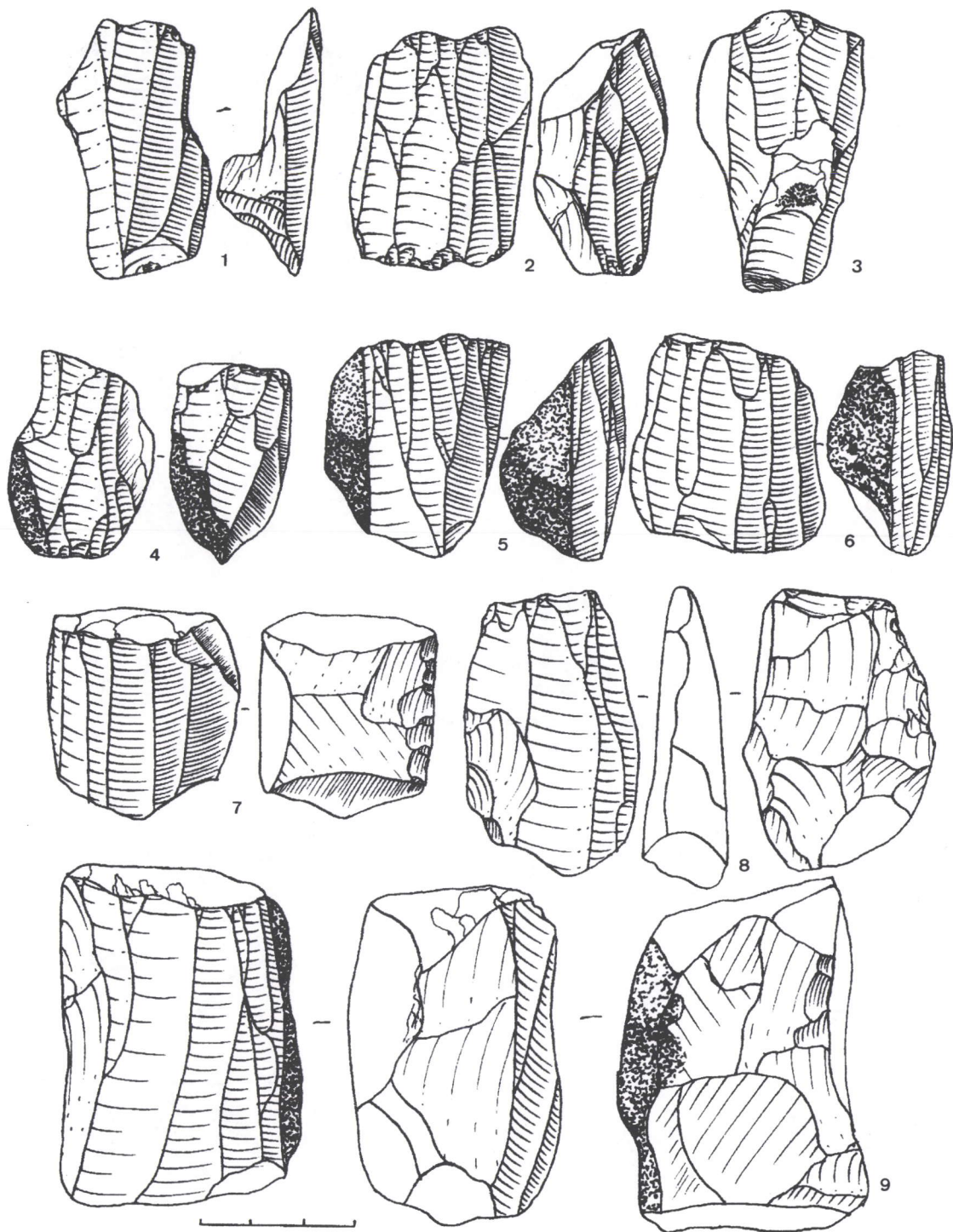


Fig. 11 Fat'ma-Koba, 1.3 "ground". Selected cores.

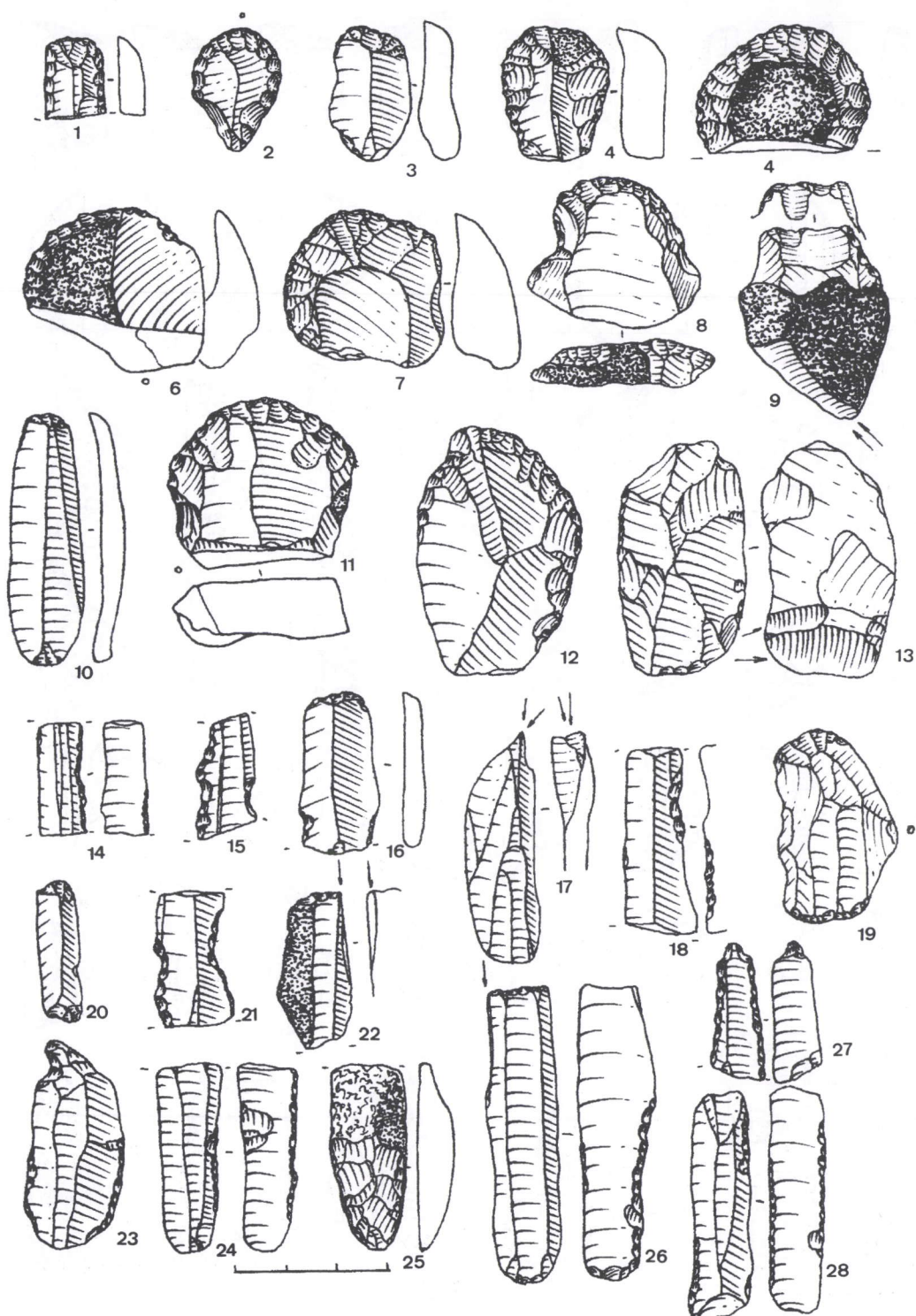


Fig. 12 Fat'ma-Koba, 1.3 "ground". Flint assemblage.

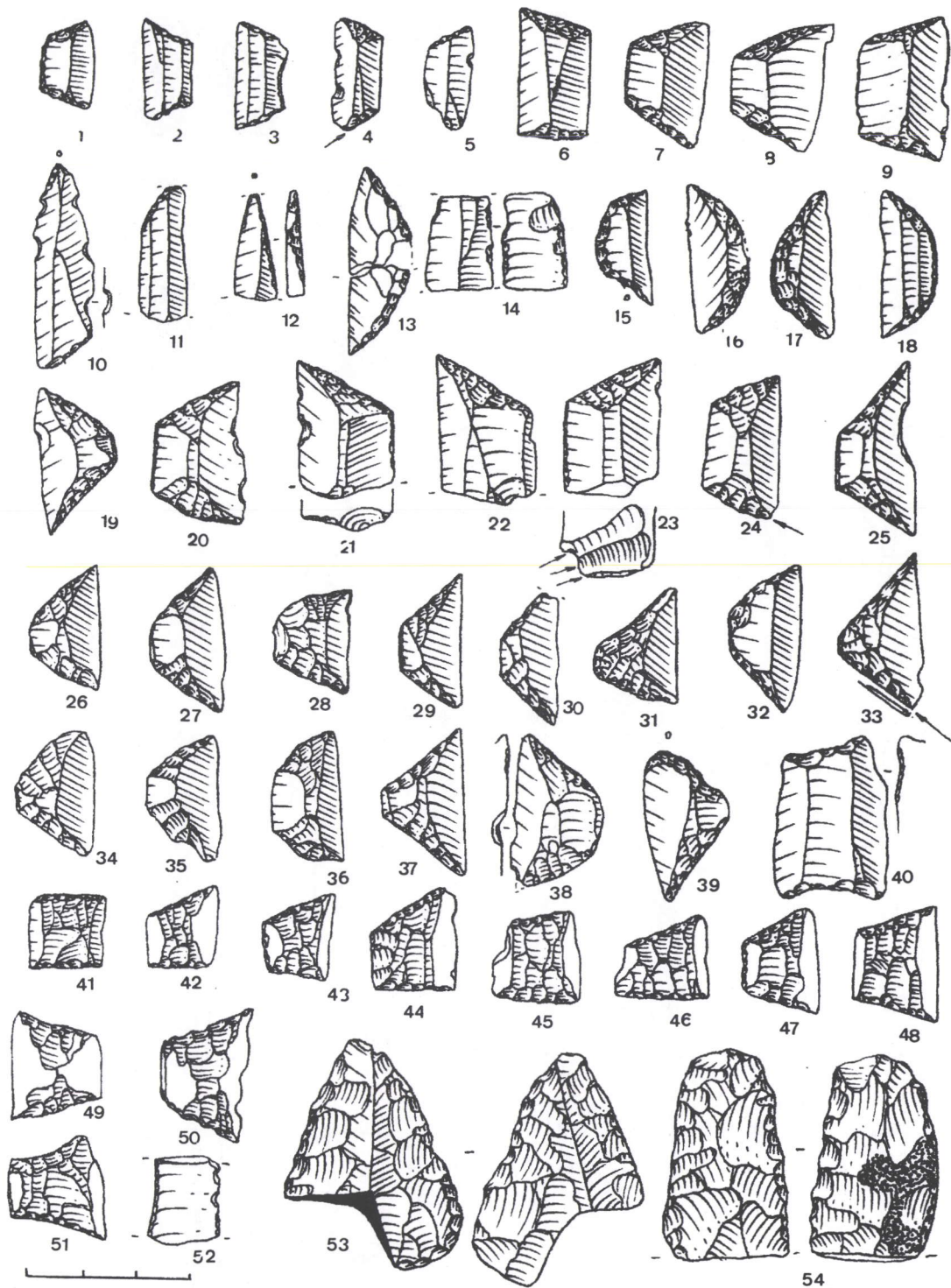


Fig. 13 Fat'ma-Koba, 1.3 "ground". Flint assemblage.

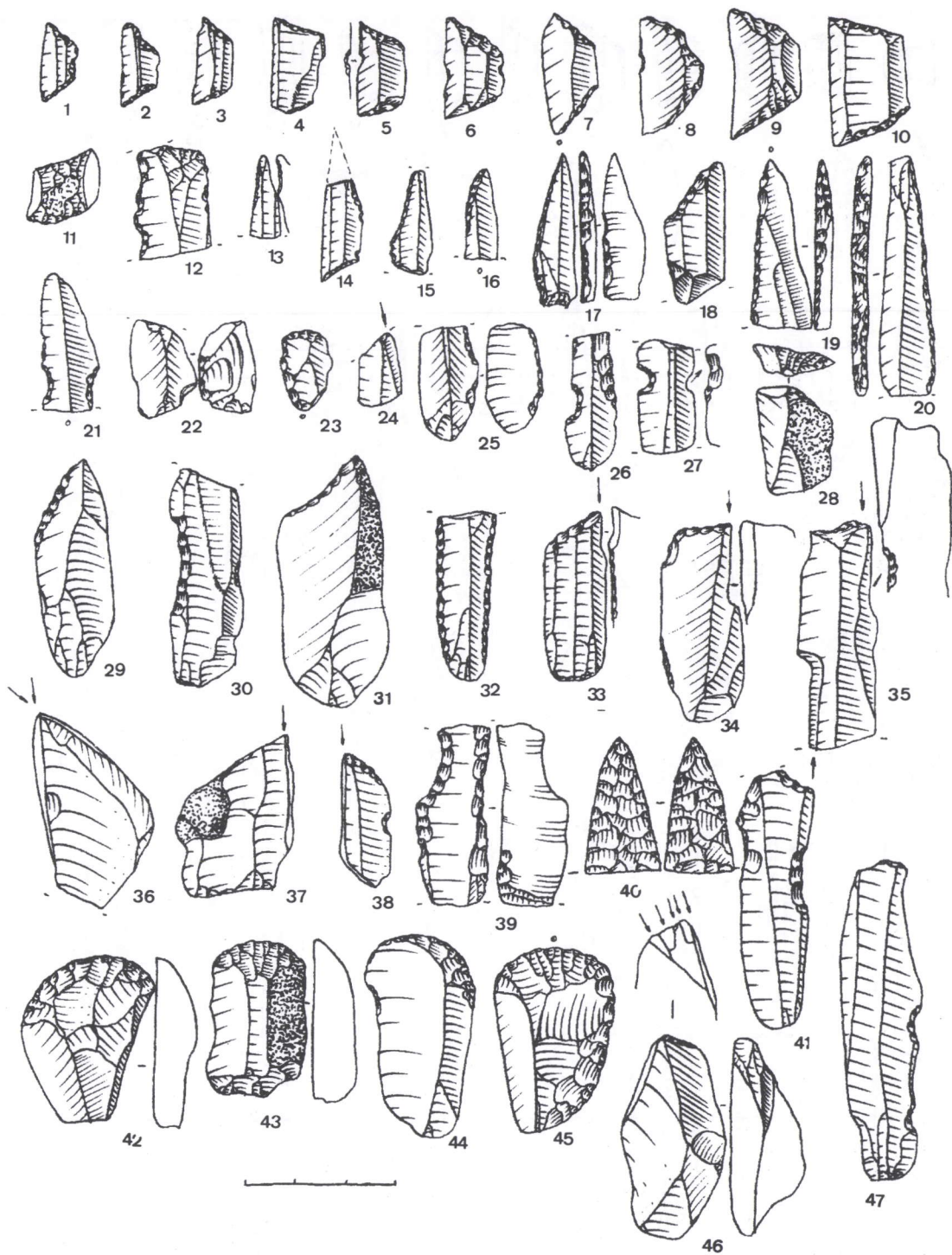


Fig. 14 Fat'ma-Koba, 1.2 "ground". Flint assemblage.

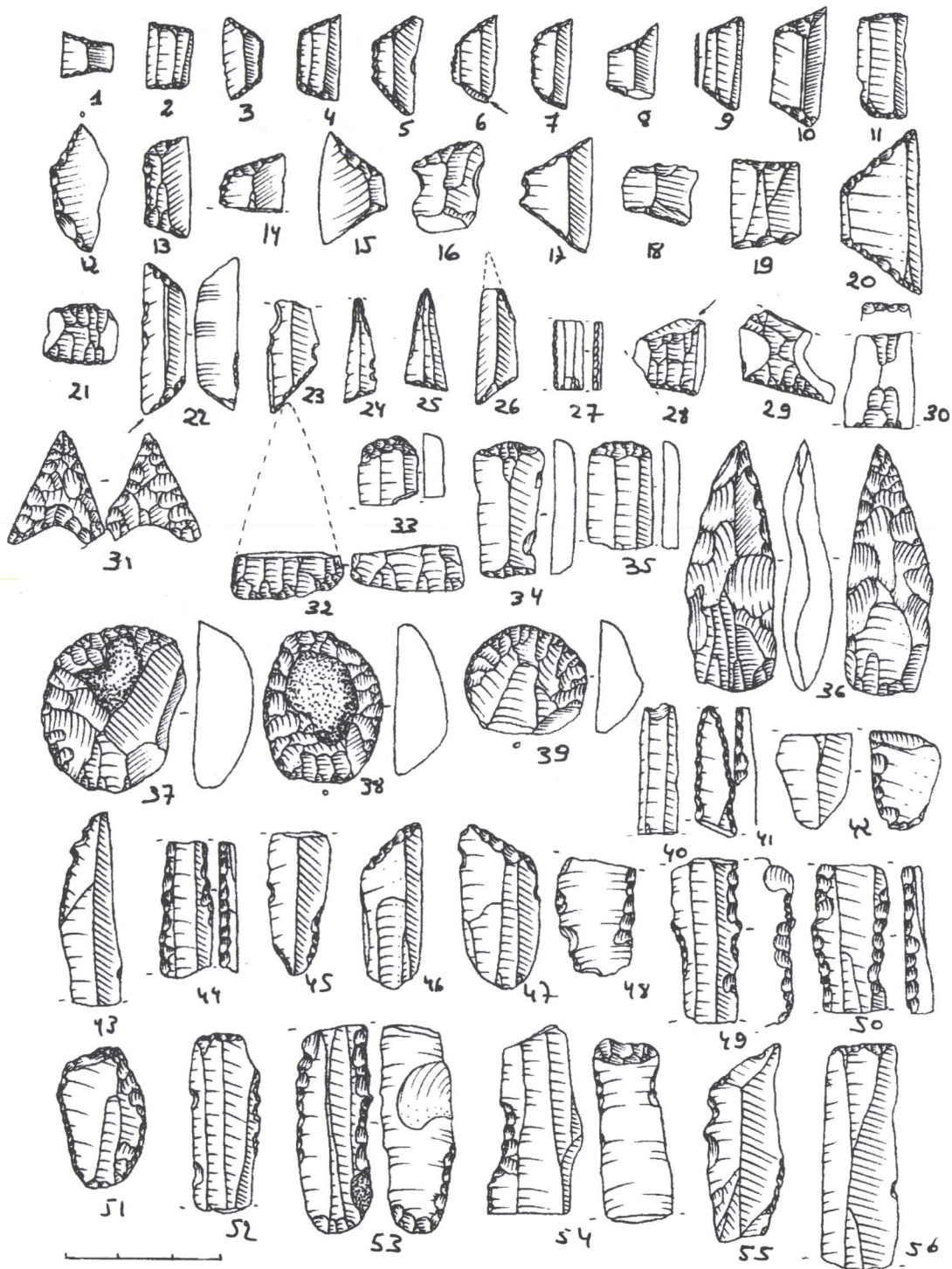


Fig. 15 Fat'ma-Koba 1.2 "ground". Flint assemblage.

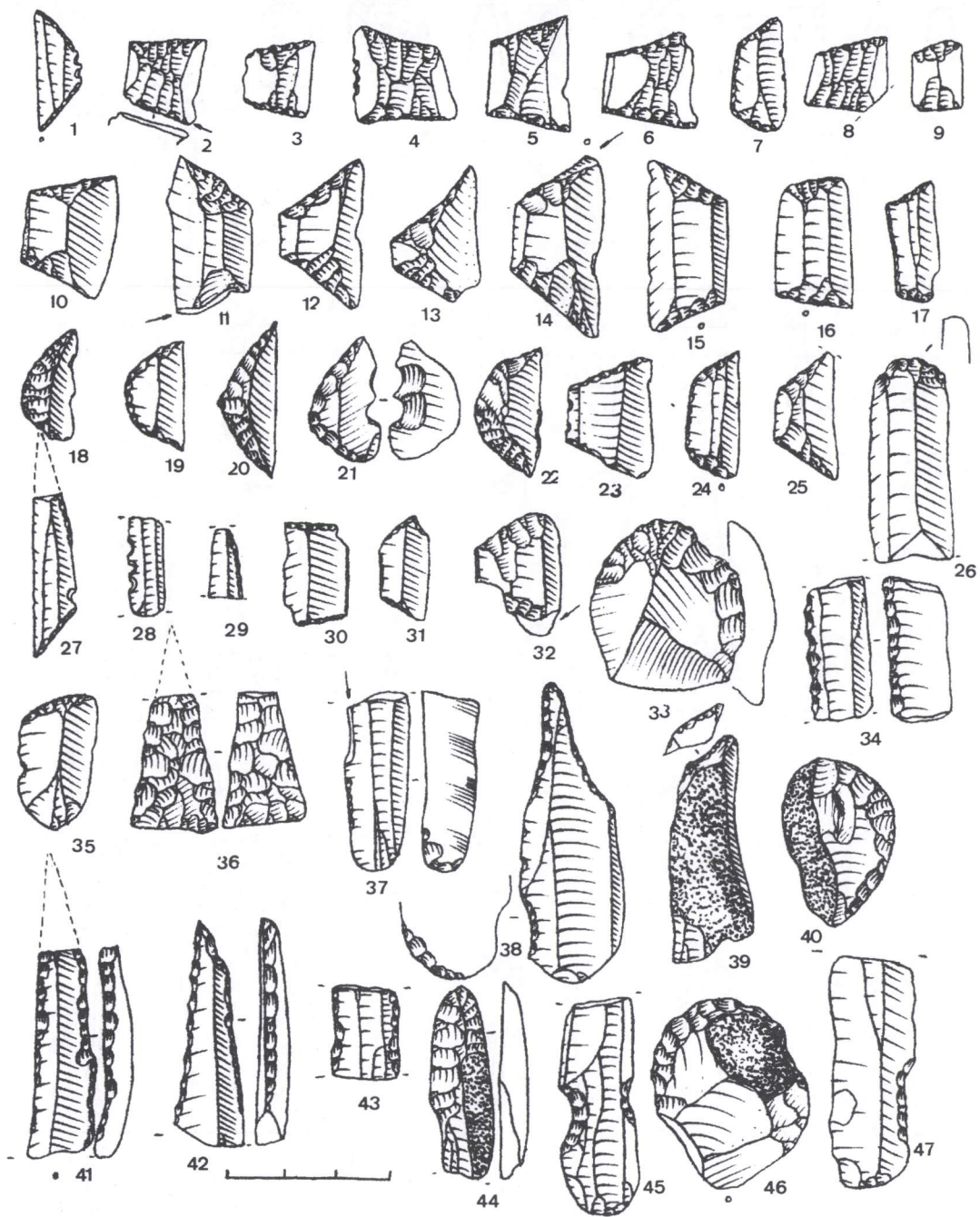


Fig. 16 Fat'ma-Koba, l. 2 "ground". Flint assemblage.

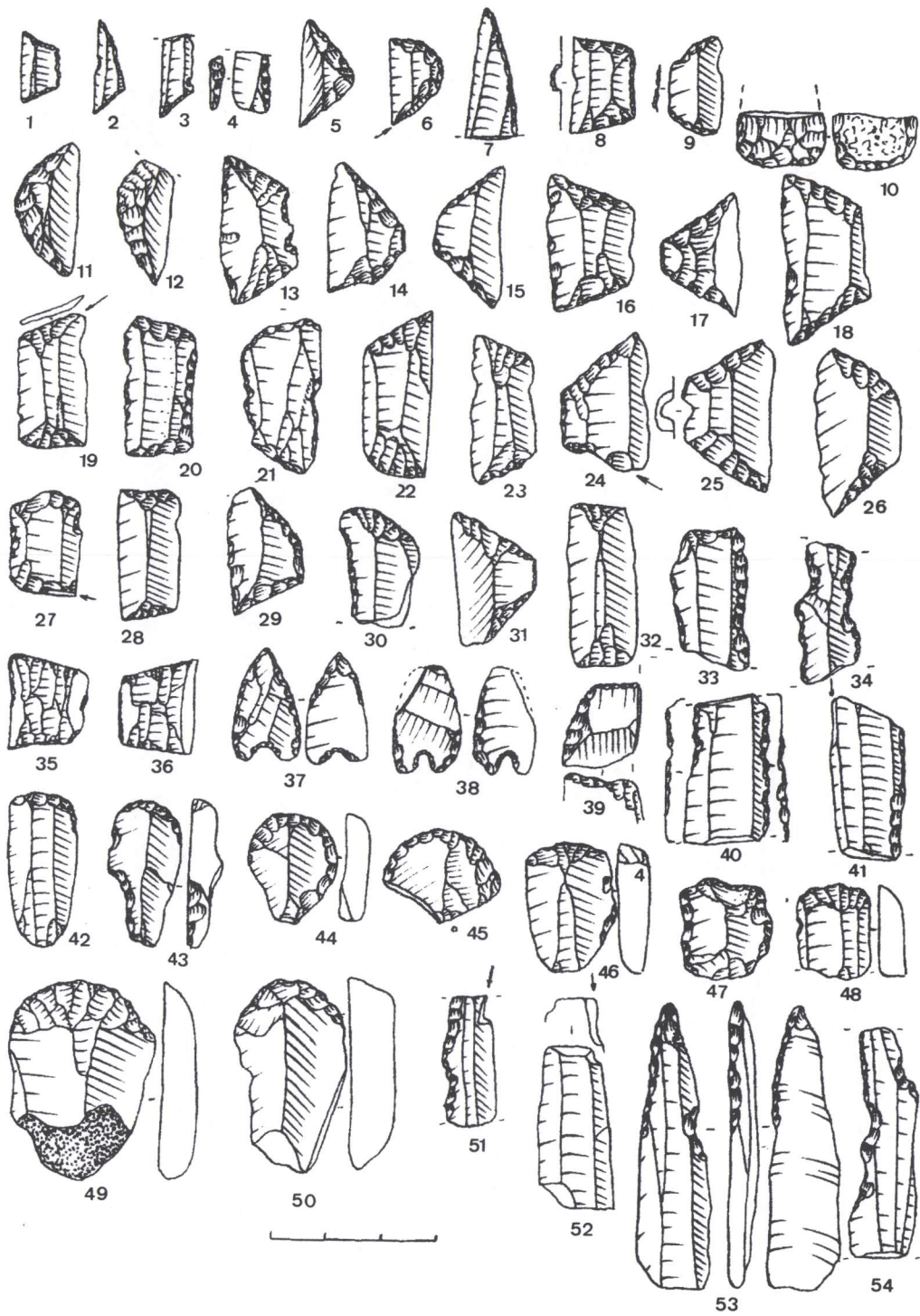


Fig. 17 Fat'ma-Koba, I. 1 "ground". Flint assemblage.