



THE TRANSITION FROM MAGDALENIAN TO EPIPALAEOLITHIC IN THE SPANISH MEDITERRANEAN : EL TOSSAL DE LA ROCA.

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Tossal de la Roca is situated in the Vall d'Alcala, in the north eastern part of Alicante province, at about 640 metres above sea level, 25 kms. from the Mediterranean in a straight line (Fig. 1). It is a large rock shelter open to the west, at the foot of a vertical limestone wall which limits the left margin of the Penegrí ravine.

This site shows an exceptional sequence where the different transformation processes are shown: palaeoenvironmental (relief, climate, vegetation, fauna), economic (use of animal and plant resources), social and technological (evolution of assemblages) among others, from 15,000 to 7,000 B.P., which means that it is one of the best exponents of the transition from Late Glacial to Holocene in the Spanish Mediterranean (Fig. 2).

CHRONOLOGY AND PALAEOECOLOGY

The first moment of occupation of the rock shelter, level IV of the inside sector, has been dated by C- 14 at 15360 ± 1100 B.P.(CACHO,C., FUMANAL,P., LÓPEZ,P., LÓPEZ,N. 1983). Its lack of precision makes

certain caution advisable when evaluating this radiocarbon datation, the reliability of which is logically very low.

The sediment-pollinic data, basically, place this first phase in a cold and dry period, in which the physical weathering processes are marked due to the frequency and intensity of the freezing-thawing cycles (FUMANAL,P. 1995). The plant landscape would be dominated by a sparse conifer forest, (pine-fir trees) in which the pine, as occurs in the rest of the Late Glacial sequence, plays an essential role. Along with these forests, semi-steppe type meadowland of *quenopodiace*, *artemisian* and *gramineas* would develop (LÓPEZ,P. ,LÓPEZ, J.A.1995).

Next, level III is characterised by a milder and wetter climate than that of the previous phase, with the first presence of allothonous detritic materials taking place. As a result of some milder temperatures, the arboreal coverage, with the pine as practically the only representative, progresses until it reaches its maximum values in this sequence.

A new cold and even very cold pulsation, drier than that of level IV, has been detected in level II. Now the production of frost slabs from the ceiling of the rock shelter is intensified to the point that they form a "eboulis sec" (canchal) at the foot of the limestone wall. Tree vegetation dominates, the predominating taxons being the pine and the fir tree once more, as occurs in Level IV, although with low percentages.

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Some meadowland of *artemesias*, *chenopodiaceae*, *poaceae*, as well as *cyperaceae* exist in the wettest valleys. Radiocarbon measurements place this phase at 12480 ± 210 and 12390 ± 250 B.P. (CACHO, C., FUMANAL, P., LÓPEZ, P., LÓPEZ, N. 1983).

From this moment, an important palaeoenvironmental change occurs which is not only shown in the sediment-pollinic data but which has also been shown through the anthracologic analysis and the archaeozoological study of the macro- and meso-fauna. From level I of this inside zone some climatic conditions are observed which are much more temperate and wetter than those predominant during the whole Late Glacial sequence. Now the cryoclastic and weathering phenomena activated by the frost are halted. The sedimentary data of this level points to an overflowing of the river or a flooding phase - prior to its narrowing and deepening - possible origin of the erosion which has dismantled the upper part of the underlying level (level II of the inside sector) (FUMANAL, P. 1995). Tree vegetation passes from the monotony of the conifer forests to a greater richness and diversity of taxons, especially of the most thermophiles which increase or appear for the first time. A reduction of the pine and the disappearance of the fir tree occur, parallel to the start of the advance of the green oak/oak (Mediterranean forest) which will have its greatest development during the later phases, corresponding to the Postglacial levels of the outside sector (LÓPEZ, P., LÓPEZ, J.A. 1995).

From the point of view of fauna, significant variations are recorded with respect to earlier periods. Thus, the wild boar, present from level III, becomes more frequent, and the chamois appears for the first time, precisely when the rabbit decreases. In this way, the new palaeoenvironmental conditions are formed, which will endure throughout the later occupational phases (initial Holocene), and which, as in the case of plants, are characterised by an increase and greater diversity of the fauna spectrum, especially the ungulates and carnivora (PÉREZ RIPOLL, M., MARTINEZ VALLE, R. 1995).

This unit I, which culminates the sequence of the inside sector, has not been dated by C-14, but all the paleoenvironmental data points to its being placed at approximately 10000 B.P.

After an indeterminate period of time, which must be defined in the future but which in any case, according to the data available at present, does not appear to be very long, and during which the courses of the river system are formed, the sequence represented in the external zone of the rock shelter is formed with appearance of allocthonous detritic materials, which give rise to formations of the slope deposits. This sequence begins in the base of level II, dated by 14C at 9150 ± 100 and 90 B.P. (IIb) and 8350 and 8050 ± 120 B.P. (IIa) (CACHO, C. 1986). This stratigraphic unit, subdivided in IIb and IIa, corresponds to an accumulative episode or filling phase of the river system. The vegetation is Mediterranean type forest with *Quercus t. faginea* and *Quercus ilex coccifera* which little by little disappears permitting the development of the pine. The climate at this time has been interpreted as cool and contrasted in the base of this level but gradually, throughout the IIa the climatic conditions become wetter.

After the formation of this unit II of the outside sector, a new deepening and narrowing of the river takes place. This erosional phase causes a sharp incline in the river banks. These topographical modifications of the immediate surroundings nearest to the rock shelter, like those witnessed during the narrowing process of the river system, must have a repercussion, though we do not know what, on the living conditions themselves of Tossal de la Roca.

Lastly, level I of this sector, dated 7660 and 7560 ± 80 B.P. (CACHO, C. 1986), corresponds to a new phase of filling and crowning of the valley. The herbaceous vegetation is now dominant and the forest appears very much altered. The cooler climatic conditions, accompanied by heavy rainfalls place this occupation at pre-Atlantic or beginning of the Atlantic period (Fig. 3)

EXPLOITATION OF NATURAL RESOURCES

The alimentary diet which as we see was based fundamentally on the consumption of lagomorphs and ibex, in addition to some partridges (SÁNCHEZ MARCO, 1995) during the Tardiglacial, is enriched with the advent of the Holocene. New species are now included such as chamois and wild boar and the importance of the deer increases considerably, at the same time as that of the rabbit and partridge diminishes (Fig. 4). Few fish remains (eel, scorpion fish, trout and barbel) are witness to the existence of fishing as a food source, although this is a marginal element (MORALES, A., ROSELLO, E., 1995).

This alimentary diet was completed with some plants, such as vetch (a type of *Leguminosae*) and *Silene* as well as fruits (acorns), the difficult conservation of which has meant that this vegetable consumption is only shown in the epipalaeolithic levels (ARNANZ, A. 1995).

On centering our attention on the most - hunted animals, such as the ungulates, we observe some significant differences, both in the age of the examples and in the animal parts shown. Thus, during the Magdalenian culture adult or sub-adult ibex were hunted. The importance of the remains of front and back limbs and the practical non-existence of remains of back legs indicates that the animal was not transported whole to the site, but only the parts richest in meat, rejecting due to their poor alimentary interest other portions such as the legs, which must have been left at the hunting site. There are few skull remains from which it is deduced that the brain was left behind or consumed at the time of hunting. There is also a moderate percentage of jaws, which implies their transportation to the site for later consumption.

During the Epipalaeolithic occupations sub-adult (about three years' old) deer were hunted specially and adult or sub-adult groups of ibex, although an important number of remains of young animals also exists. There are, therefore, certain differences in the hunting strategy compared with previous times also shown through the analysis of the different skeletal parts found.

Thus, now, in addition to remains of front and back limbs being recorded, the remains of phalanxes are frequent and those of the axial part and the head increase. In short, and with the exception of feet, above all the back ones, all anatomical parts are shown. This indicates that the animal was transported practically intact to the site. A small variation exists within the Epipalaeolithic itself, for during the Epipalaeolithic with geometrics the presence of the animals' feet has been recorded, which would imply its transportation whole. However, there is no selective process at the time of hunting during these occupations with geometrics. The selection is slightly moderated in the first epipalaeolithic phases and specially marked during the Magdalenian. The absence of a selection process during the last occupations of the site (Epipalaeolithic with geometrics) is logical if we take into account the existence of greater stability during the Holocene occupations.

The study of the fragmentation of the bones has provided us with valuable information on the different uses of these food sources. In this sense, the state of fracture of the diaphyses in the Magdalenian levels has been interpreted as the result of marrow extraction, while the joint parts were crushed to extract the fat, which as also obtained in the phalanxes and the jaws after being beaten. The process observed in the Holocene levels appears to be very different, especially during the Epipalaeolithic with geometrics, where there are few fragments of diaphyses with direct fractures compared with a high percentage of those situated in joint parts. The explanation for this is not easy and perhaps the frequent bioturbations in the exterior sector make their reading more difficult (PÉREZ RIPOLL, M. y MARTÍNEZ VALLE, R. 1995).

EVOLUTION OF LITHIC ASSEMBLAGES

Practically all the Tossal de la Roca site industries are made on flint (or limestone siliceous) from the surroundings nearest to the rock shelter and no significant variations are observed in the use of the different types throughout the whole sequence, although there is a preferential selection of silex of better quality, such as honey - coloured, for

the manufacture of certain tools (backed bladelets and geometric microlithics) (GARCIA CARRILLO, M., CACHO, C., RIPOLL, S. 1991) (Fig. 5).

The Magdalenian levels (Tossal IV, III and II of the inside sector) contain an essentially microlaminar industry although the flakes are also well represented and are used as support for the group of endscrapers, backed tools, truncated blades and the few burins (Figs. 6 & 7). In general, there is a strong dominance of the microliths - which include truncated bladelets, backed bladelets, "microgravettes" (straight backed points) and even some triangles - which is very much higher than that of other sites of similar chronology, such as that of Matutano, with which it certainly has many features in common, in spite of certain differences (proportional representation of the microliths, bone industry,...) (OLARIA, C. GUSI, F., ESTEVEZ, J., CASABÓ, J., ROVIRA, M.L. 1985).

Apart from the exact cultural attribution made of these occupations when we have more information, what is deduced from this sequence is the existence of a slow process of transformation in which no ups and downs or sudden ruptures are observed. This fact can be observed in the typological study of the retouched material, and has been corroborated by the technological analysis of the whole lithic repertory and in a certain way is maintained in the epipalaeolithic levels of the outside sector. The continuity of this process, combined with the variability typical of the Magdalenian period, hampers the "labelling" of these industries and, to be precise, the boundary of the Magdalenian - Epipalaeolithic cultures.

Tossal IIb (outside sector) maintains some features which make it similar to Tossal I (inside sector), although the microliths decrease as against a greater increase in endscrapers. A few segments also appear (Fig. 8). Perhaps the greatest innovation is the appearance of macrolithic assemblage with notches and denticulate retouch, of which at this time there are low percentages but which increase progressively during Tossal IIa at the same time as the endscrapers and the microliths diminish, to reach their greatest peak in Tossal I (outside sector). Now there are fairly low percentages of endscrapers

although not so low as microliths, and a fairly high number of trapezes appear (Figs. 9 & 10) (CACHO, C. 1995).

LAND USE AND SEASONALITY

The Tossal de la Roca rock shelter is located in the base of a rocky escarpment more than 600 m. above sea level in surroundings with extreme topographic ruptures, in which, together with ravines (like those of Penegrí, des Roches and de la Gleda, among others) and small knolls, important highlands appear such as the Sierra de Alfaro and, the nearest one, Sierra de la Foradada. This environment is especially favourable to the ibex, species dominant in the fauna record of the Late Glacial occupations, and well represented in the later phases of initial Holocene.

Next to these rugged surroundings there are gentle valleys such as Vall d 'Alcalá, 2 kms. east of Tossal, where the presence of the forest converts it into a biotope propitious for the deer, particularly well represented in the postglacial period. In these valleys meadowland also develops where different types of herbaceous plants grew which would serve as food for herds of horses and bovids, whose remains have been found, although in smaller proportion, in the Holocene levels.

The geographical location of Tossal de la Roca in an area characterized by sharp contrasts in relief permitted the human groups who inhabited this site to have easy access to two well differentiated biotopes, propitious to the majority of species of fauna represented and in particular for the two most frequent types of ungulates in the successive occupations of the rock shelter, and in this way, to control the hunting lands of their immediate surroundings.

This intensive control of the environment nearest to the settlement is also evident through the analysis of the raw material supply sources. Their study has made it possible to locate the sources of most of the flint types differentiated in the site. These outcrops, with the exception of one, are situated in a radius of 4 kms. around the settlement.

Together with other data, more exists which makes it possible to deduce displacements somewhat further afield. Thus, some remains of the ictiofauna would not be found near to the site and making it necessary to go to lower levels, in the middle or low zone of some river course to catch the barbel, or even to the coastal zones to obtain scorpion fish.

Among the raw materials used in Tossal de la Roca, one of them, flint honey-coloured, has its nearest supply source -at least according to the results of our prospections up to now- in Penella, about 20 kms. away, which implies once more the existence of displacements to more distant. This hypothesis is strengthened by the fact that the outcrops of raw materials are almost always situated in zones of passage or access routes to the coast, which could be reached easily either through the Vall de Gallinera or the Vall d' Ebo. We believe that the coast was visited frequently thanks to the presence of numerous ornaments on marine molluscan valves, although this fact could be interpreted as the product of an exchange system. In any case, the data shown above speaks of certain mobility which, as we shall see further on, develops with time, although this is an aspect which is still difficult to assess.

With respect to the seasonality of the successive occupations of the Tossal, little can be said in connection with the Magdalenian levels, taking into account the scarcity of remains which point to a more seasonal occupation of the settlement (winter/spring?). In contrast, during the Epipalaeolithic there would be more frequent visiting of the site and stays would be longer. The analysis of the carpological remains situate these occupations in summer for it is at that time that the *Silene* and vetch plants bear fruit, as well as in the autumn season when the acorns ripen and probably their harvesting would occur. In a parallel way, the study of the fauna remains records continual hunting of the ibex throughout the year, although two intense moments are observed which would be summer and autumn. In contrast, the deer would be hunted preferably in the spring. In short, the multi-seasonality of these occupations of the initial Holocene, faithful reflection of the improvement in the climate and the extension

of the fauna and flora spectra, contrasts with a much more limited occupation in time which characterized the different Late Glacial period (CACHO, C. *et alii.*, 1996).

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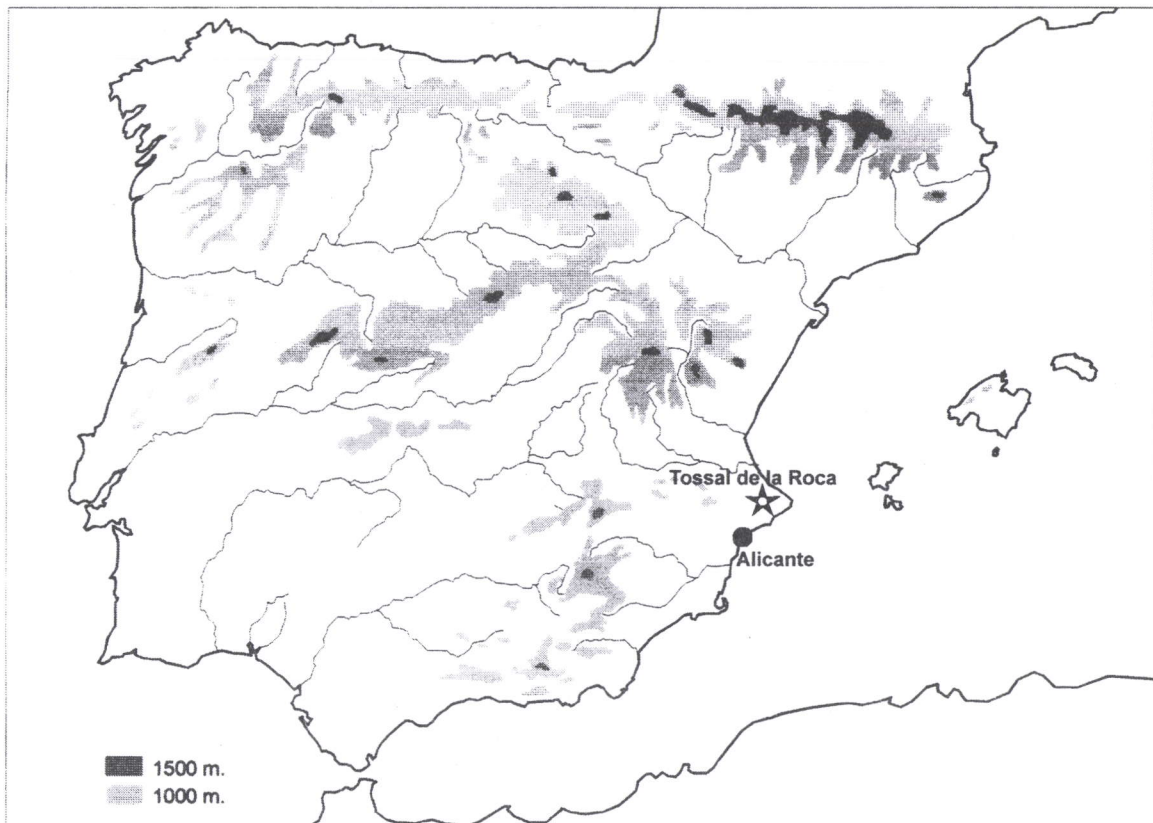
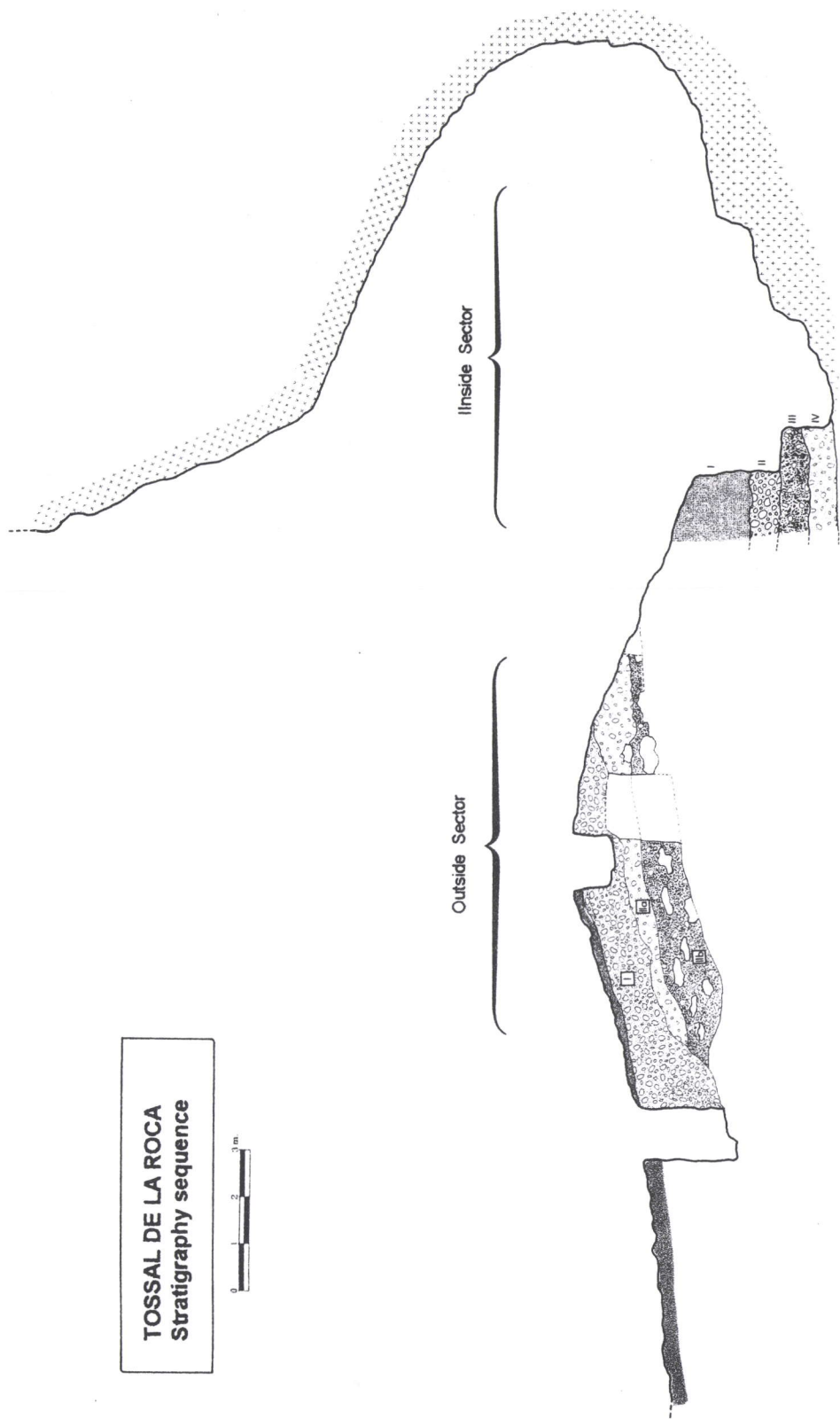


Fig. 1 : Location of Tossal de la Roca in the Iberian Peninsula.



TOSSAL DE LA ROCA
Stratigraphy sequence



Fig. 2 : Stratigraphy sequence of the site.

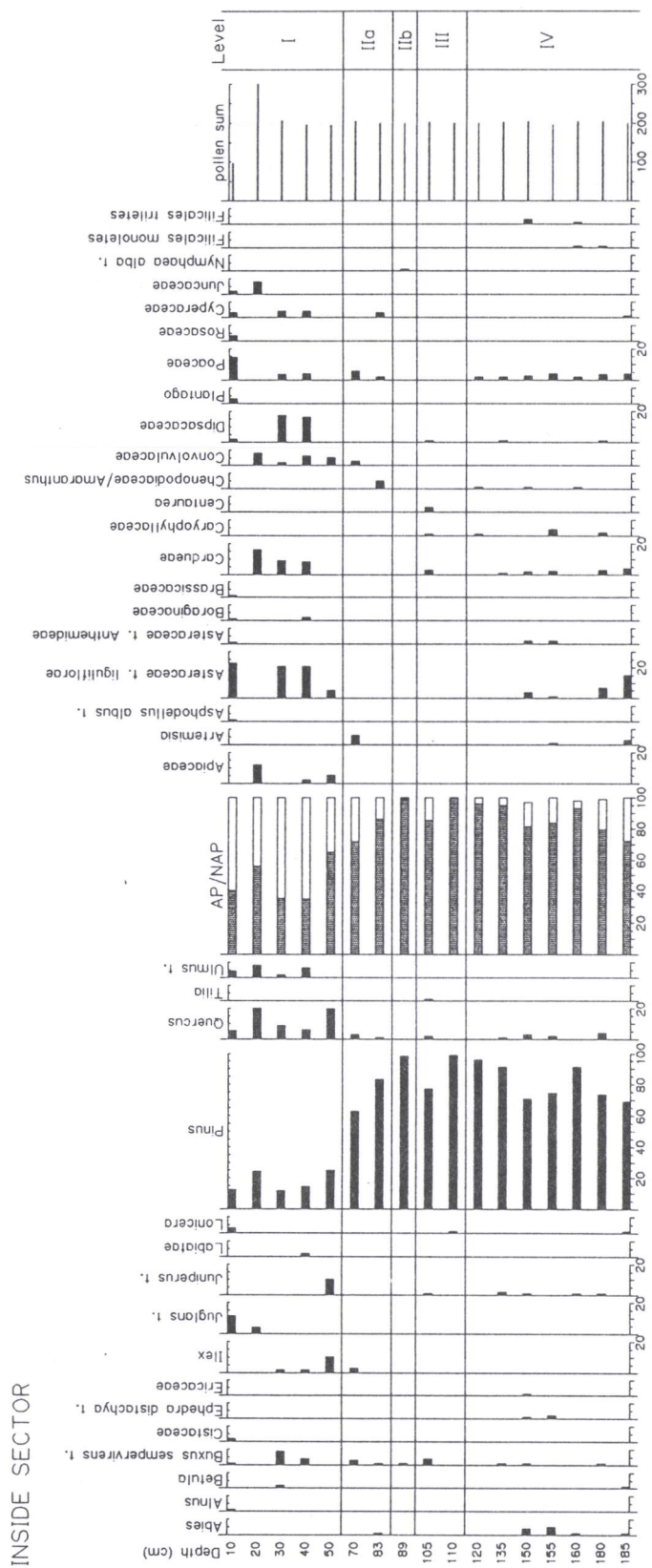
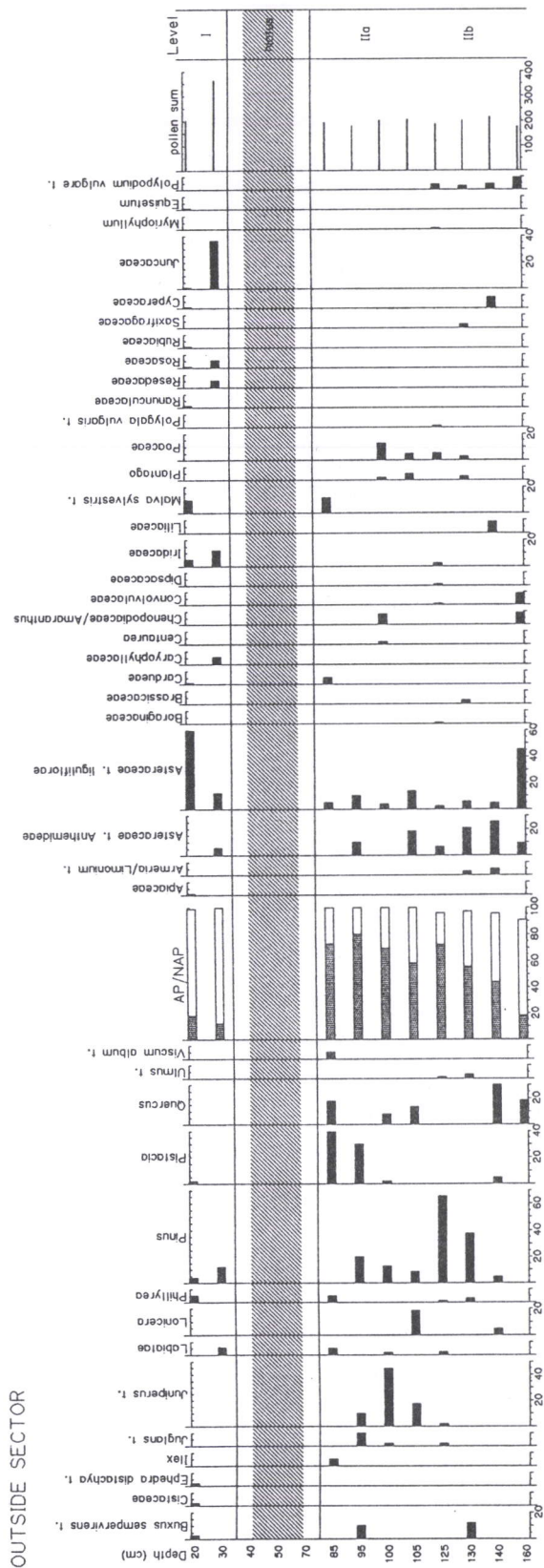


Fig. 3 : Pollinic diagram of the inside and outside sector of the site.

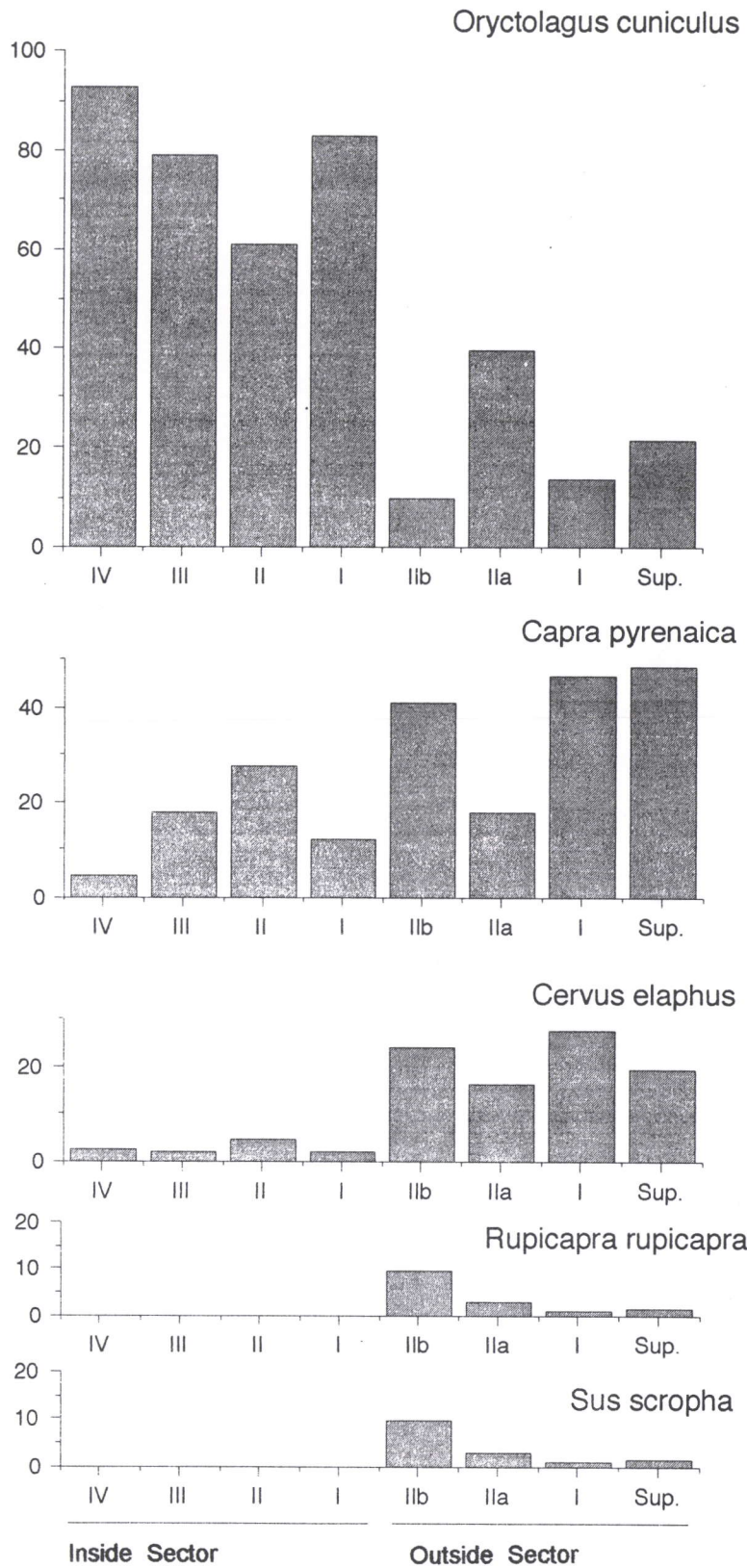


Fig. 4 : Distribution of the most significant faunal remains.



Fig. 5 : Map showing the distribution of the main flint sources in Tossal de la Roca area.

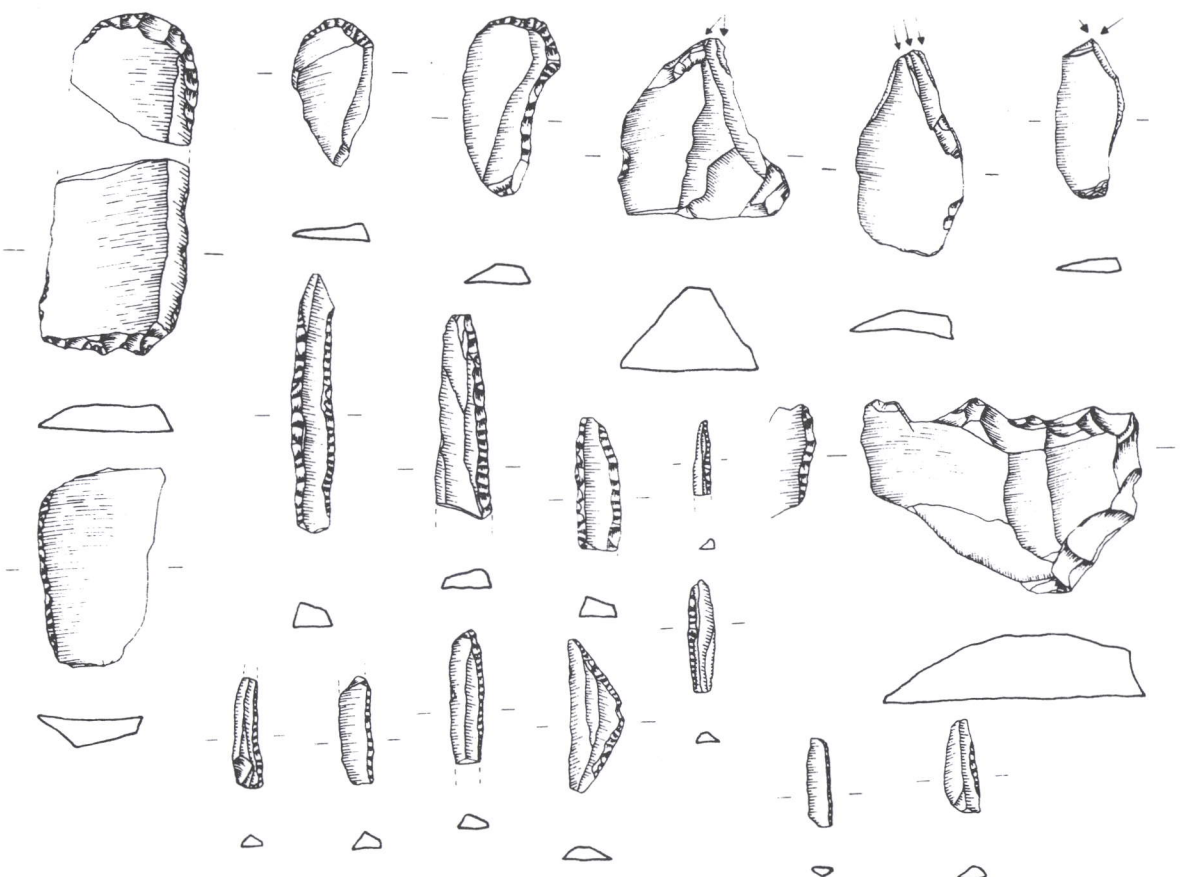
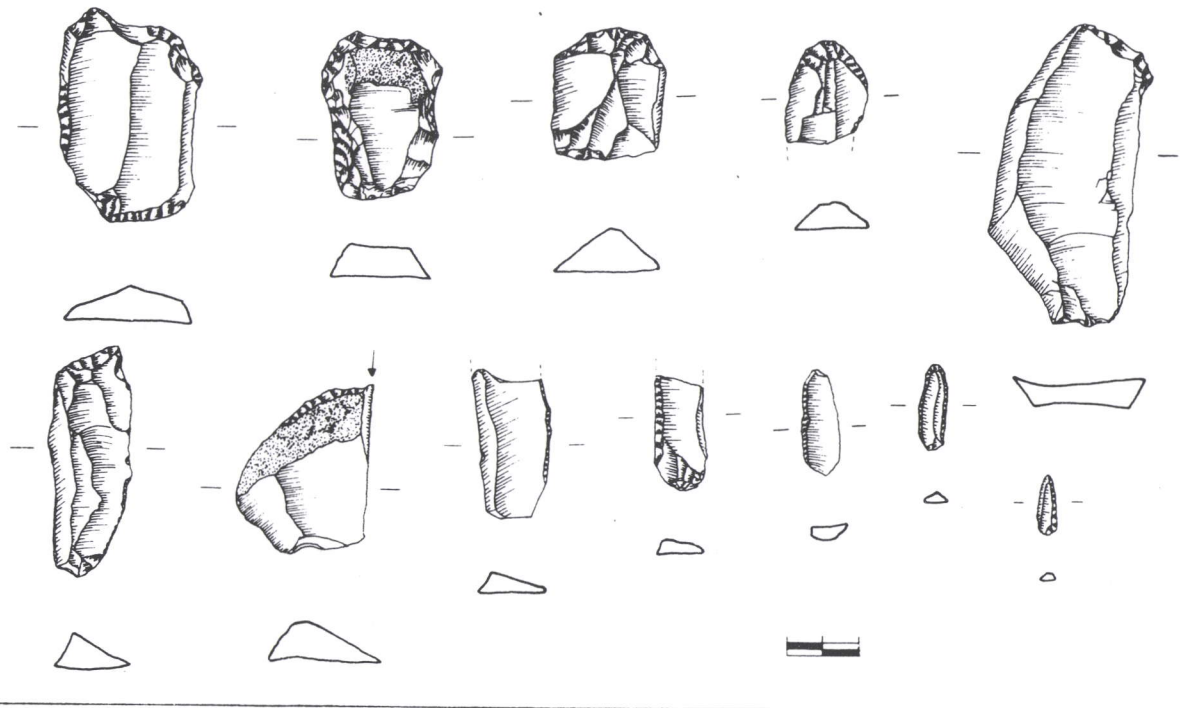


Fig. 6 : Lithic assemblage. Inside sector, level III and IV.

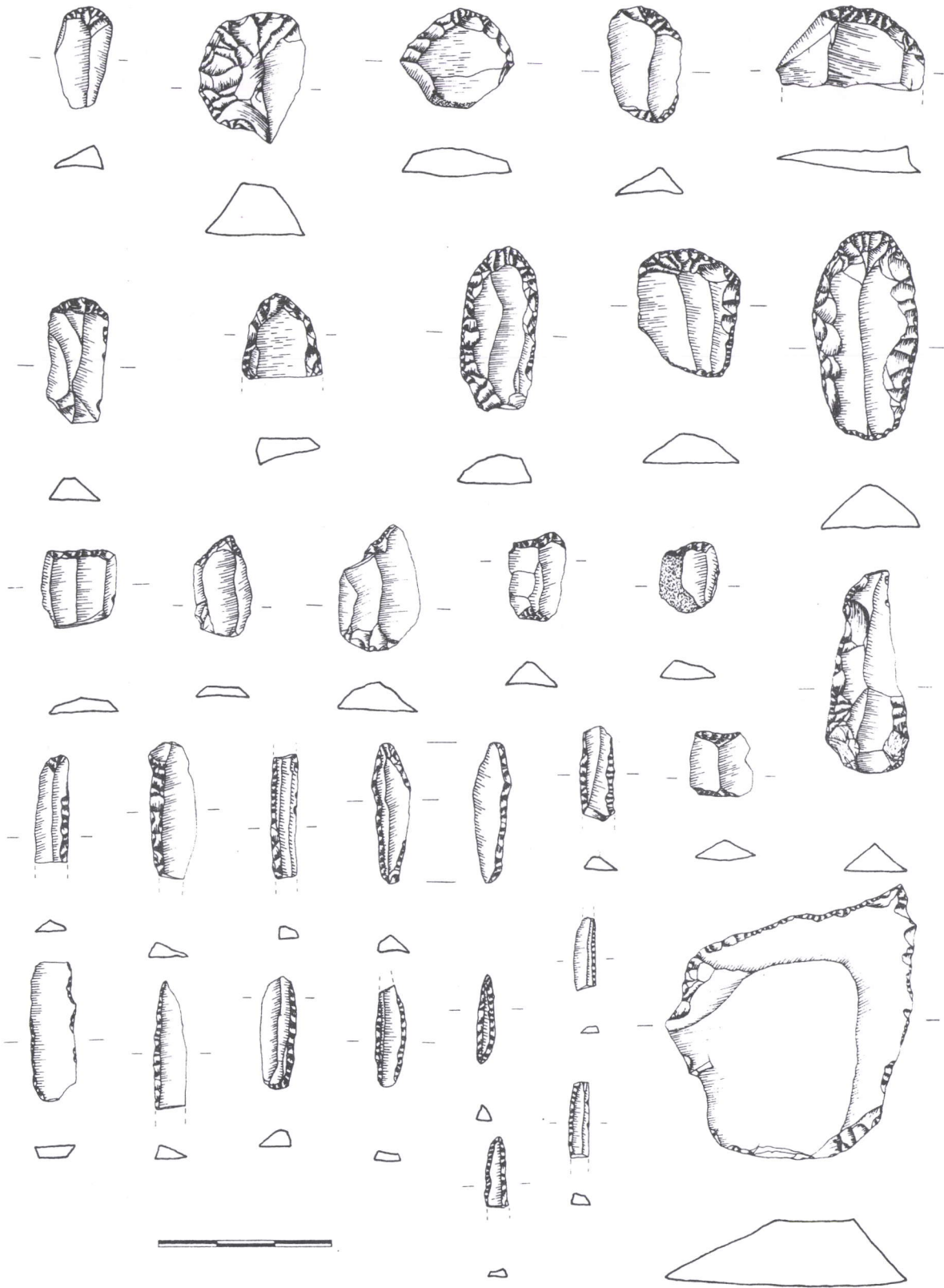


Fig. 7 : Lithic assemblage. Inside sector, level I.

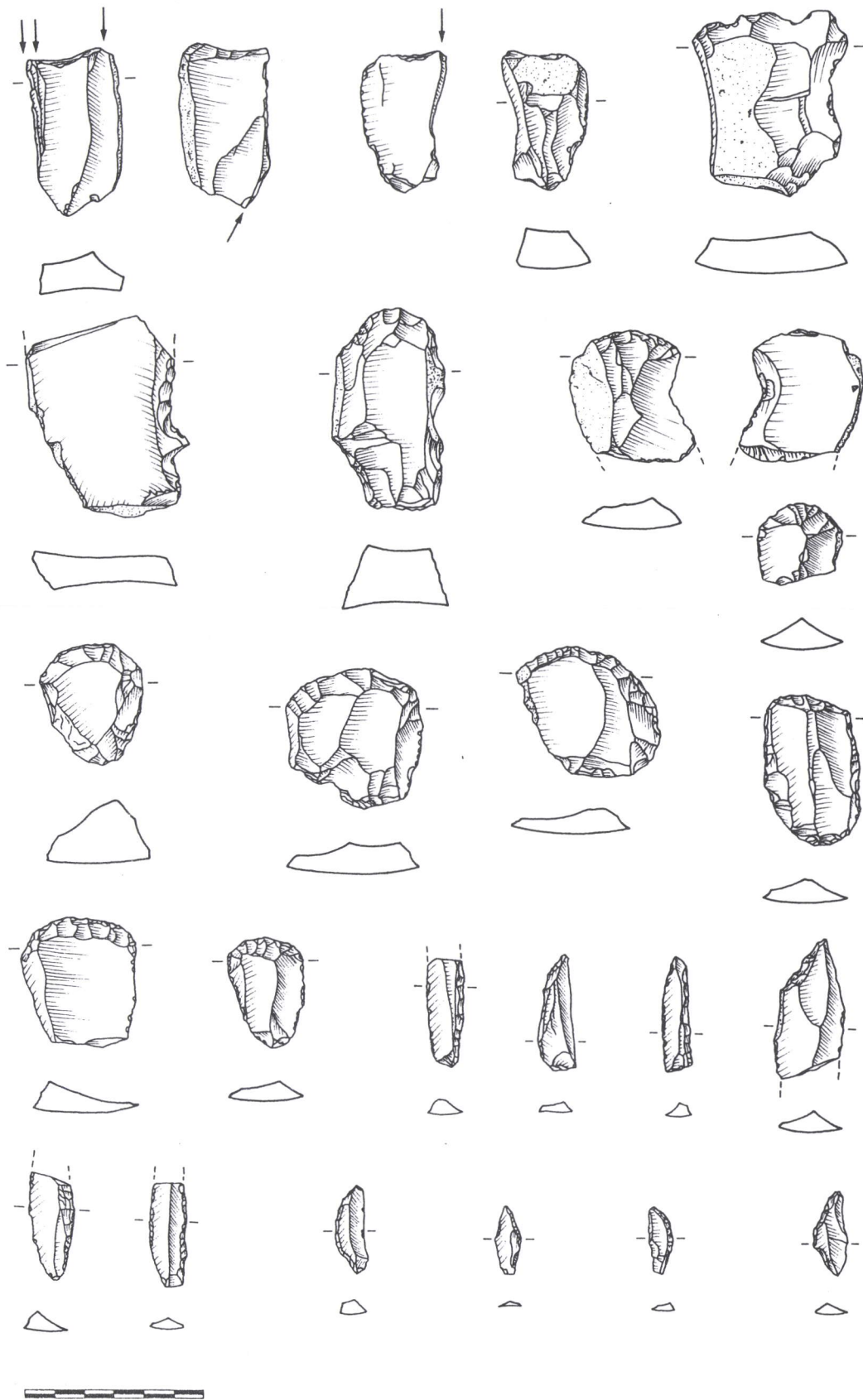


Fig. 8 : Lithic assemblage. Outside sector, level IIB

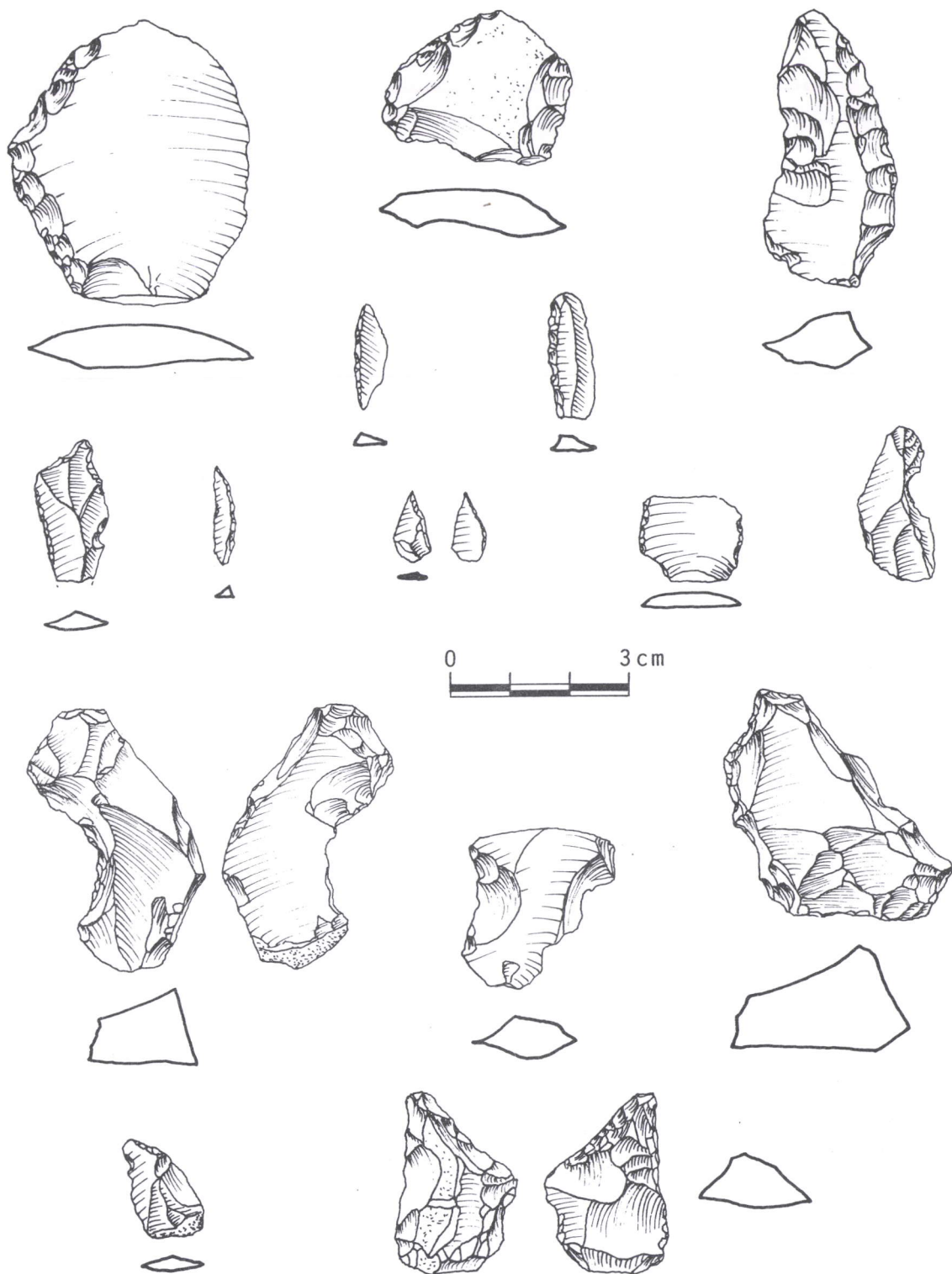


Fig. 9 : Lithic assemblage. Outside sector, level IIa

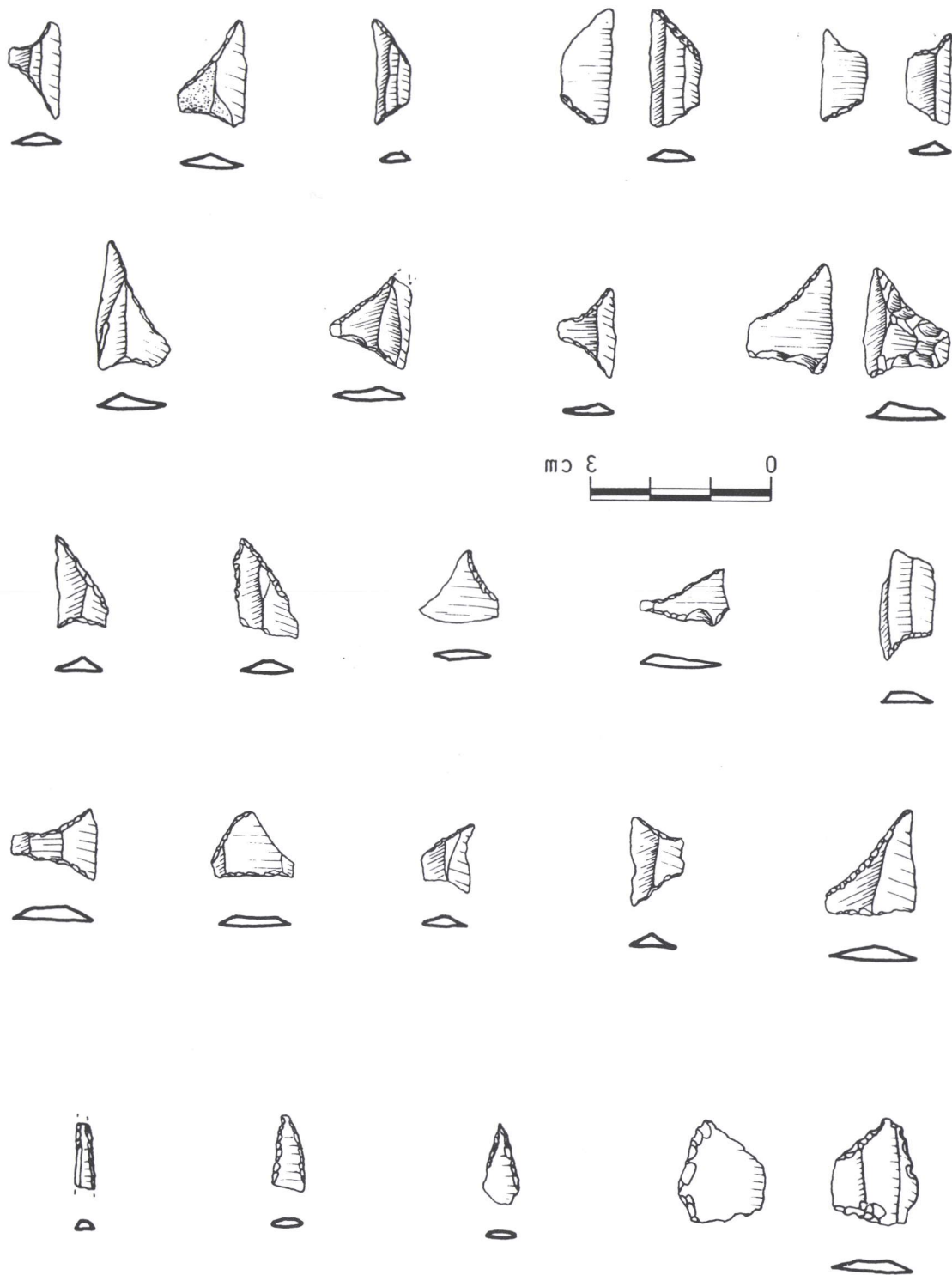


Fig. 10 : Lithic assemblage. Outside sector, level I.