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# A MOUSTERIAN STRUCTURAL REMNANT FROM CUEVA MORIN (CANTABRIA, SPAIN)

by

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Cueva Morín is a small cave opening some 20 meters above a valley some 17 km south of the city of Santander, capital of the region of Cantabria. The Mousterian feature discovered in Upper Level 17 at Cueva Morín, while fragmentary, is the only certain structural remnant of this age recovered from a Spanish site to date. It was unearthed in the course of two campaigns of field work undertaken in 1968 and 1969 under the joint direction of J. González Echegaray and the author, and has been described and discussed in several previous publications (GONZÁLEZ ECHEGARAY and FREEMAN, 1971, 1973, 1978 FREEMAN, 1976, 1978). Nevertheless, it is still little known to specialists outside the Iberian Peninsula.

## MOUSTERIAN STRATA AT MORIN

The stratigraphic sequence at Cueva Morín begins with a level of indeterminate Mousterian (22), in temperate deposits, succeeded by a series of sterile cold-indicative layers. Level 17 follows. At its base a thin horizon of moist-temperate deposits containing a Denticulate Mousterian assemblage was clearly distinguishable (Lower Level 17). Upper Leve 17 indicates a shift to cold conditions. The accompanying industry is Typical Mousterian with cleaver-flakes. Level 16 is another cold-climate deposit with similar industrial contents. These levels were provisionally correlated with latest Lower Pleniglacial Würn. A depositional hiatus follows. In Levels 15, 14 and 13, climate has moderated, becoming more temperate. The cleaver-flake rich Typical Mousterian persists. Temperate conditions obtain through levels 12 and 11, both with Denticulate Mousterian assemblages. Levels 15-11 are tentatively correlated with the Hengelo interstadial. Level 10 (Chaelperronian) marks the beginning of a long series of Upper Paleolithic occupations of the cave, and a return to cold climatic conditions – the inter-Hengelo/Denekamp phase (GONZÁLEZ ECHEGARAY and FREEMAN, 1978).

The Mousterian levels are not directly datable. Two charcoal dates on the Chatelperronian level are in disagreement. The youngest is unquestionably wrong (28,610 B.P. ± 6580 SI 951-A).

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Intact site deposits at Morín were excavated over a total of some 40 sq meters. However, not all levels were so extensive. The largest Mousterian occupation surface, Upper Level 17, was exposed over some 20 square meters. And, dense concentrations of materials in this occupation were confined to an area just over 8 sq meters in size, coinciding more or less with the limits of a breccia bounded by an artificial structure wall.

## THE LEVEL 17 LITHIC ASSEMBLAGE

Upper Level 17 is the richest as well as the largest Mousterian occupation at the site. It yielded 506 total retouched flake tools (373 "essential" tools for cumulative graph construction), 1,673 unretouched flakes, blades and debris, 13 "bifaces" (12 of which are cleaver-flakes), 5 discs, 2 pics, 18 cores, 5 hammerstones, 199 cobbles or split cobbles, and 35 fragments of coloring material. Of the flake tools, 299 are in flint, 91 of quartzite, 114 of ophite and 2 of other materials. For unretouched ("waste") pieces, these figures are 1162 flint, 149 quartzite, 322 ophite and 50 other raw materials, while 11 of the "bifaces" are made of ophite and the other two of quartzite.

Statistical analyses presented in the two volumes of the site report (GONZÁLEZ ECHEGARAY and FREEMAN, 1971, 1973) leave no doubt that certain tool types were preferentially made in particular raw materials. Large tools were selectively made in coarser grained materials, probably in part due to the fact that flints do not occur nearby in large sizes, while quartzites and, especially, ophites do. Contrary to what might seem most reasonable, from *a priori* judgements about ease of manufacture and utility, more than a fair share of scraper edges were made in quartzite, and less in flint, and more than a fair share of notches and denticulates were made in flint and fewer in quartzite in light of their relative abundance as raw materials for other kinds of flake tools. The relatively small proportion of waste, cores and hammerstones to finished pieces strongly suggests that on-the-spot stone tool manufacture was not an important part of the activities undertaken by the occupants of Level 17.

The characteristics of the Upper 17 assemblage are as follows: the collection is non-Levallois and unfacetted; Levallois tools are not abundant; in the "essential" list there are about 28 % denticulates (more than one expects in an ordinary Typical Mousterian horizon), 24 % "Mousterian" types, and 21 % "Upper Paleolithic" types; sidescrapers (23 %) are less abundant than denticulates, and the index of Charentian types is low (Table 1, Fig. 1). Bifaces including cleaver-flakes are less than 3.5 % of "essential" tools. The lithic assemblage is classified as an anomalous Typical Mousterian with cleaver-flakes.

In earlier publications, I have commented that this is an arbitrary classification, and that if one admits the cleaver flakes as the regional equivalent of true bifaces, the collection from Upper Level 17 looks as similar to some Mousterian of Acheulean Tradition assemblages as it does to the Typical Mousterian. On the other hand, my experience with Cantabrian Mousterian collections suggests that at least there the facies may be no more than polar extremes of an arbitrarily-segmented continuum of assemblage variation (see FREEMAN, 1980: 71-74). This is not the time to belabor the issue; to do so would require a reassessment of the philosophical basis of the facies concept as well as a thorough review of masses of data.

## WORKED BONE FROM CUEVA MORIN

More than 400 pieces of flaked, battered and abraded bone were recovered from Upper Level 17 in our excavations. Of these, 124 flaked pieces are surprisingly formally analogous to well-defined flaked stone tools (GONZÁLEZ ECHEGARAY and FREEMAN, 1978; FREEMAN, 1978). However, the artifactual nature of the flaked bones has been questioned.

White has suggested that geological agencies might be responsible for apparent flake scars on some of these pieces (comment in FREEMAN, 1983). This criticism may be dismissed. The nature of the deposits effectively rules out geological agencies as an alternative explanation.

The interpretation of the bones as deliberate artifacts has also been challenged by BINFORD, who claims that the Morín pieces are formally indistinguishable from bones chipped by carnivore gnawing (1981; comment in WHITE, 1982; comment in FREEMAN, 1983). Though he has only seen a very small number of the pieces, Binford's observations are interesting, and it is quite possible that some of the smaller bone fragments showing such chipping might result from carnivore activity, or at least that they cannot consistently be distinguished from carnivore-gnawed bone. However, I have elsewhere discussed why his observations will not explain the whole assemblage, and why that is at least partly artifactual (FREEMAN, 1983).

The flaked bones are not randomly distributed nor does their local abundance vary in proportion to the abundance of other unworked bone. Rather, they are mostly amassed in those restricted areas where stone cleaver flakes are most abundant. Some of the bones are simply too large for carnivore gnawing to explain their markings; other characteristics Binford claims as distinctive of carnivore-gnawed assemblages are not true for the Morín assemblage. Some of the bones are charred, and others are cut in patterns that can have nothing to do with carnivores and are obviously products of human activity (see ECHEGARAY' s paper for this symposium). Weathering cracks on the bones were sometimes produced before flaking took place. Experiments show that such pieces were exposed to the elements for perhaps as much as a year before they were flaked. Exposure of large bones for this length of time removes or loosens the periosteum that is a major obstacle to controlled flaking, and the bone still works very well despite the presence of superficial weathering cracks.

## THE STRUCTURAL REMNANT

Earlier excavators had removed some of Upper Level 17 by digging a deep trench along the West wall of the cave, leaving a narrow witness section separated from the rest of the cave deposits by the 3-meter wide **sondage**. The trench destroyed part of the structure. We left another part unexcavated because it was overlain by strongly cemented layers beneath a flowstone column, and excavation would have been too laborious and costly for our means. Despite this, we recovered enough of the feature (some 3.6 meters of a wall and about 7 square meters of the space it bounded) to permit an assessment of its characteristics and significance (Fig. 2).

During excavation, we piece plotted all artifacts and bones, and all unworked stones with a maximum dimension of 5 cm or more. Natural stones were abundant in the level, so this was a laborious procedure. Through the 1968 season the distribution of unworked stone showed little sign of patterning. However, care and perseverance were eventually rewarded; as a larger area was uncovered in 1969, and the excavation was deepened in areas previously open, patterning in the arrangement of stones became obvious, and their real significance became apparent.

Upper Level 17 includes an areally restricted dense bone and tool breccia; sediments in and underlying this breccia are strongly discolored. The breccia varies in thickness from 5 cm to about 25 cm. The greatest depth of accumulation occurs at stone piles, and where two or more especially massive bones or stone tools lie one atop the other. Sediments in and under the brecciated deposit are strongly discolored to an intense reddish brown. This discoloration, contrasting markedly with the grey or light cream-colored sediments of Upper

17 outside the brecciated area, is due to high concentrations of chemical products of organic decomposition, particularly phosphates (see SCHMID, 1969: 159-160). It is continuous even in those areas where there are gaps in the breccia, suggesting that it is not simply the result of the decomposition of the bones found in that deposit. Bones and stone artifacts occur, but are relatively rare, in the grayish sediments beyond the breccia, and there we found no "worked" bone at all. This seems not to be due to differing conditions of bone preservation; bone outside the discolored zone is preserved as well as that within the discoloration. Stone artifacts outside the brecciated area are mostly unretouched. There are almost no large "natural" stones in grey sediments beyond the breccia (Fig. 3).

While stones in the brecciated area sometimes occur singly, they were frequently stacked in piles. In the western part of the brecciated area, there are a few cases of piles of 4 or 5 stones, but never more than 6 together. Along its eastern edge, however, stone piles were much larger, including from 17 to 27 individual rocks. The largest of these heaps still stood 25 cm high. There are gaps between piles, where no solid stones are preserved, but on the eastern edge of the breccia the gaps are often filled by hollow limestone "shells" and white stains that indicate the former presence of other now-vanished limestone chunks. The larger stone piles follow the edge of the breccia, bounding it and the discoloration.

The color contrast between the reddish brown and grey areas in this level is a highly visible indication of the margin of the brecciated area, following the edge of the stone piles that mark its limit. Even in those areas on the eastern side of the breccia where stones are locally scarce, or only represented by small patches of decayed limestone, the discoloration is still present, showing the continuing trajectory of some sort of physical boundary. The edge of the discolored zone exposed so far is arcuate rather than straight, measuring 3.6 meters along the curve (The chord uniting the ends of the arc is 3.25 meters long). While it is not exactly regular, the curve closely approximates an arc of a circle 8 meters in diameter. But there would not be room inside the cave mouth to accommodate a complete circle 8 meters in diameter whose circumference coincides with the boundary of the discoloration. The distance between the southern terminus of the curve and the western cave wall is 5.27 meters and that between the northern terminus and the cave wall is 6.5 meters.

In the west witness section of the cave, Upper Level 17 is noticeably darker than the levels above and below, full of gritty concretions and decayed limestone and rich in tools and bone fragments. These characteristics are points of similarity between the level in the witness section and the brecciated area across the deep sondage made by earlier excavators. It is very likely that the brecciated area extends into the witness section.

The eastern edge of the discoloration more or less coincides with the present limits of penetration of good natural daylight into the cave. Its curved boundary apparently ran from side to side of the cave, trending SW from square 6E to contact the SW wall of the cave entry in the West witness section somewhere near our grid line 7. From square 4G it probably continues across the cave to the NE wall of the entry. The breccia and accompanying red-brown color, bounded by heaps of stone, would in this interpretation coincide with or bound a well lit area of intensive human utilization, setting it off from the darker remainder of the cave interior.

The distribution of the breccia stops cleanly and abruptly immediately west of the color contact. The edge of the discoloration is a smoothly curved color change, rather than an irregular margin. The large stone heaps follow this termination. The fact that the breccia and discolored area both end abruptly at a smooth boundary, rather than thinning irregularly and terminating gradually in patches suggests that during the occupation of Upper Level 17 there was some effective barrier to the movement of items and people from one side to the other of that boundary. The stone piles that follow the color contact must have some direct relationship to that postulated barrier. It seems most probable that the stone piles are either the remnants of a fallen dry stone wall, or vestiges of stone heaps used to support the base

of a curtain wall of some sort, and that this wall was the obstacle demarcating the zone of intense human occupation from the rest of the cave. The absence of evidence for post holes or other interior or peripheral wall or roof supports suggests that the vanished material used in wall construction must have been very light. The zone of human occupation in this interpretation would be the brecciated area nearest the cave entry, where artifact and bone distributions are densest.

An alternative interpretation, that the breccia is intentionally discarded garbage produced by people living in the cleaner part of the cave interior, cannot be absolutely rejected, but neither is it supported by any positive evidence. The postulated occupants of the darker cave interior would have needed some source of light even during the day, and no hearths or ash accumulations were discovered there. The impression given by the bone and artifact distributions in all Mousterian levels is that utilization of the cave interior was sporadic at most, and that it was generally avoided throughout the period.

## MATERIAL DISTRIBUTIONS

A statistical analysis of the distribution of artifacts in Upper Level 17 was performed, to determine whether or not meaningful spatial associations and differences in areal utilization could be discerned (GONZÁLEZ ECHEGARAY and FREEMAN, 1978: 323-333). The tests showed that the interior of the vestibule beyond the breccia, particularly square VI F, was especially rich in unretouched flakes, blades and debris. The breccia itself includes three distinctive zones with very different characteristics. The first, consisting of squares V D and V E, is characterized by exceptionally high proportions of cleaver flakes and chipped bone fragments, with very little else. The second, consisting of square IV E, had high proportions of flaked bones and cleaver-flakes, but also unexpectedly large quantities of endscrapers, notches, heavily utilized flakes, whole and split cobbles, and bones with marks of slicing on their surfaces. Square IV F, like the squares outside the breccia, contained large proportions of unretouched stone "waste". The squares that fall along the boundary of the discolored area, including some amount of brecciated and some of unbrecciated area, are, as one might expect, intermediate in contents: they contain moderate quantities of each of these different kinds of material.

All the materials in Upper Level 17 were deposited during the course of a single occupation of the cave: they are thus archeologically contemporaneous. They are neither sorted nor otherwise rearranged by geological processes. The groups of items that were found to have different spatial distributions include some that consist exclusively of stone artifacts and others that combine stone tools and different kinds of "worked" bone. It has been suggested by others that the flaked bones in the Morín collection are actually not artifactual, but the result of carnivore gnawing. However, while carnivore gnawing might result in spatial accumulations of gnawed bones, no one has yet explained how it could separate the gnawed bones from otherwise similar bones bearing marks of cutting and slicing, nor how it could regularly separate different kinds of stone tools, nor how it could consistently combine flaked bones with stone cleaver flakes, as is here the case – unless the critics wish to suggest that these stone tools are actually carnivore-gnawed rocks (As far as I know, Wile E. Coyote and a few of his cartoon relatives are the only carnivores who engage in that kind of behavior). A substantial portion of the apparently retouched bone edges show striations that are regularly patterned and suggest striae resulting from edge wear. When all these observations are taken into consideration, it seems most likely that the distinctly individualized item distributions in Upper Level 17 reflect the ways in which the Mousterian cave occupants used different areas in the performance of different activities.

The nature of those activities is open to discussion. There is, however, some information bearing on the subject. There is no evidence of hearths (though some of the bones are burned) or of the wide range of routine activities one might expect in a true living

site or home base, and the number of distinct types of areas indicated is small. One of them is probably partly related to trimming or resharpening stone tools, though not to other phases of stone-knapping. It may also partly result from slicing with unretouched, sharp-edged stone implements. The others all involve bones, many of them apparently flaked to a scraper-like edge. While the bones are usually weathered, their surfaces are not generally corroded. The phosphate staining of the brecciated level is so intense that it must come from something more than chemical discoloration produced by decay of the bones we recovered. The more probable sources of such intense phosphate staining are rotting flesh, or hides, or urine or fecal material. Among the cut bones are some that look as though they have been used as rests or supporting surfaces atop which relatively soft materials such as thongs or skins were cut. The size of the differentiated areas is so tiny– usually 1 to 2 square meters – and there are so few of them that the total number of different individuals who might have simultaneously taken part in different activities in Upper Level 17 is very restricted.

## CONCLUSIONS

The peculiar distribution of materials found in Upper Level 17 is the only evidence of a Middle Paleolithic structure known to date from Spain. The fragmentary structural feature is evidently not a hut foundation, but the stone supports for an arcuate screen wall or similar physical barrier setting off a well-lit and heavily utilized area closest to the cave entry from an infrequently utilized and darker cave interior. The cave mouth as a whole may have been the focus of the activities attested by these residues, and it is possible that a true contemporary dwelling area might have been located on a small terrace outside (Paleolithic materials were found in strata on the terrace, but resources were not sufficient to support their excavation).

There are a number of other Mousterian structural remnants from Western Europe. There are precise distribution plans for only a few of them. Among the most similar to the structure from Upper Level 17 is the structure from Couche 4 of Pech de l'Azé I B. There an arcuate dry stone wall, 25 cm high, in the front of the cave entry prolonged the left wall of the cave (BORDE, 1954/1955). The stone wall might have served as a support for tree trunks or limbs leaned against the cave ceiling to close its entry. However, there were hearths inside the stone wall at Pech de l'Azé, a point of difference from the Morín case.

At Morín, internal spatial segregation of materials including stone artifacts and problematic but in part apparently artifactual bone suggests that the occupied area was utilized for a small number of specialized, related but well-differentiated activities. A byproduct of these activities was intense phosphate staining due to the decay of quantities of organic material such as bone, scraps of flesh, bits of hide, feces or urine. Among the activities attested is the slicing of some soft, resilient material over bone supports. In earlier publications, I have suggested that activities related to hideworking might have produced the ensemble of characteristics noted for this level, but that remains only a plausible inference, rather than an established conclusion. Confirmation would require much more data than are now available. It is regrettable that the accessible part of the Upper Level 17 structure is too small to permit a more detailed interpretation.

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TABLE 1

Morín Upper 17

| Type | Num | Percen R | Cum Percen R | ES Num | ES Percen | Cum ES |
|---|---|---|---|---|---|---|
| 1 | 9 | 0.0178 | 0.01779 | 0 | 0.0000 | 0.00000 |
| 2 | 32 | 0.0632 | 0.08103 | 0 | 0.0000 | 0.00000 |
| 3 | 0 | 0.0000 | 0.08103 | 0 | 0.0000 | 0.00000 |
| 4 | 0 | 0.0000 | 0.08103 | 0 | 0.0000 | 0.00000 |
| 5 | 4 | 0.0079 | 0.08893 | 4 | 0.0107 | 0.01072 |
| 6 | 1 | 0.0020 | 0.09091 | 1 | 0.0027 | 0.01340 |
| 7 | 1 | 0.0020 | 0.09289 | 1 | 0.0027 | 0.01609 |
| 8 | 0 | 0.0000 | 0.09289 | 0 | 0.0000 | 0.01609 |
| 9 | 8 | 0.0158 | 0.10870 | 8 | 0.0214 | 0.03753 |
| 10 | 36 | 0.0711 | 0.17984 | 36 | 0.0965 | 0.13405 |
| 11 | 3 | 0.0059 | 0.18577 | 3 | 0.0080 | 0.14209 |
| 12 | 0 | 0.0000 | 0.18577 | 0 | 0.0000 | 0.14209 |
| 13 | 1 | 0.0020 | 0.18775 | 1 | 0.0027 | 0.14477 |
| 14 | 0 | 0.0000 | 0.18775 | 0 | 0.0000 | 0.14477 |
| 15 | 7 | 0.0138 | 0.20158 | 7 | 0.0188 | 0.16354 |
| 16 | 0 | 0.0000 | 0.20158 | 0 | 0.0000 | 0.16354 |
| 17 | 0 | 0.0000 | 0.20158 | 0 | 0.0000 | 0.16354 |
| 18 | 0 | 0.0000 | 0.20158 | 0 | 0.0000 | 0.16354 |
| 19 | 4 | 0.0079 | 0.20949 | 4 | 0.0107 | 0.17426 |
| 20 | 0 | 0.0000 | 0.20949 | 0 | 0.0000 | 0.17426 |
| 21 | 5 | 0.0099 | 0.21937 | 5 | 0.0134 | 0.18767 |
| 22 | 1 | 0.0020 | 0.22134 | 1 | 0.0027 | 0.19035 |
| 23 | 10 | 0.0198 | 0.24111 | 10 | 0.0268 | 0.21716 |
| 24 | 0 | 0.0000 | 0.24111 | 0 | 0.0000 | 0.21716 |
| 25 | 5 | 0.0099 | 0.25099 | 5 | 0.0134 | 0.23056 |
| 26 | 1 | 0.0020 | 0.25296 | 1 | 0.0027 | 0.23324 |
| 27 | 0 | 0.0000 | 0.25296 | 0 | 0.0000 | 0.23324 |
| 28 | 1 | 0.0020 | 0.25494 | 1 | 0.0027 | 0.23592 |
| 29 | 5 | 0.0099 | 0.26482 | 5 | 0.0134 | 0.24933 |
| 30 | 5 | 0.0099 | 0.27470 | 5 | 0.0134 | 0.26273 |
| 31 | 17 | 0.0336 | 0.30830 | 17 | 0.0456 | 0.30831 |
| 32 | 5 | 0.0099 | 0.31818 | 5 | 0.0134 | 0.32172 |
| 33 | 11 | 0.0217 | 0.33992 | 11 | 0.0295 | 0.35121 |
| 34 | 10 | 0.0198 | 0.35968 | 10 | 0.0268 | 0.37802 |
| 35 | 25 | 0.0494 | 0.40909 | 25 | 0.0670 | 0.44504 |
| 36 | 0 | 0.0000 | 0.40909 | 0 | 0.0000 | 0.44504 |
| 37 | 3 | 0.0059 | 0.41502 | 3 | 0.0080 | 0.45308 |
| 38 | 6 | 0.0119 | 0.42688 | 6 | 0.0161 | 0.46917 |
| 39 | 0 | 0.0000 | 0.42688 | 0 | 0.0000 | 0.46917 |
| 40 | 2 | 0.0040 | 0.43083 | 2 | 0.0054 | 0.47453 |
| 41 | 0 | 0.0000 | 0.43083 | 0 | 0.0000 | 0.47453 |
| 42 | 46 | 0.0909 | 0.52174 | 46 | 0.1233 | 0.59786 |
| 43 | 106 | 0.2095 | 0.73123 | 106 | 0.2842 | 0.88204 |
| 44 | 9 | 0.0178 | 0.74901 | 9 | 0.0241 | 0.90617 |
| 45 | 4 | 0.0079 | 0.75692 | 0 | 0.0000 | 0.90617 |
| 46 | 20 | 0.0395 | 0.79644 | 0 | 0.0000 | 0.90617 |
| 47 | 21 | 0.0415 | 0.83794 | 0 | 0.0000 | 0.90617 |
| 48 | 23 | 0.0455 | 0.88340 | 0 | 0.0000 | 0.90617 |
| 49 | 23 | 0.0455 | 0.92885 | 0 | 0.0000 | 0.90617 |
| 50 | 1 | 0.0020 | 0.93083 | 0 | 0.0000 | 0.90617 |
| 51 | 2 | 0.0040 | 0.93478 | 2 | 0.0054 | 0.91153 |

TABLE 1 (continuation)

Morín Upper 17

| Type | Num | Percen R | Cum Percen R | ES Num | ES Percen | Cum ES |
|---|---|---|---|---|---|---|
| 52 | 2 | 0.0040 | 0.93874 | 2 | 0.0054 | 0.91689 |
| 53 | 0 | 0.0000 | 0.93874 | 0 | 0.0000 | 0.91689 |
| 54 | 9 | 0.0178 | 0.95652 | 9 | 0.0241 | 0.94102 |
| 55 | 0 | 0.0000 | 0.95652 | 0 | 0.0000 | 0.94102 |
| 56 | 0 | 0.0000 | 0.95652 | 0 | 0.0000 | 0.94102 |
| 57 | 0 | 0.0000 | 0.95652 | 0 | 0.0000 | 0.94102 |
| 58 | 0 | 0.0000 | 0.95652 | 0 | 0.0000 | 0.94102 |
| 59 | 2 | 0.0040 | 0.96047 | 2 | 0.0054 | 0.94638 |
| 60 | 0 | 0.0000 | 0.96047 | 0 | 0.0000 | 0.94638 |
| 61 | 3 | 0.0059 | 0.96640 | 3 | 0.0080 | 0.95442 |
| 62 | 17 | 0.0336 | 1.00000 | 17 | 0.0456 | 1.00000 |
| 63 | 0 | 0.0000 | 1.00000 | 0 | 0.0000 | 1.00000 |

| | |
|---|---|
| Total | 506 |
| Total ES | 373 |
| Bifaces | 13 |

Indices

| | |
|---|---|
| ILty | 8.103 |
| IR | 17.194 |
| IR(es) | 23.324 |
| IAu | 0.593 |
| IAu(e) | 0.804 |
| IB | 2.505 |
| IB (es) | 3.368 |
| GpI | 8.103 |
| GpII | 17.589 |
| GpII(e) | 23.861 |
| GpIII | 15.415 |
| GpIII(e) | 20.912 |
| GpIV | 20.949 |
| GpIV(e) | 28.418 |

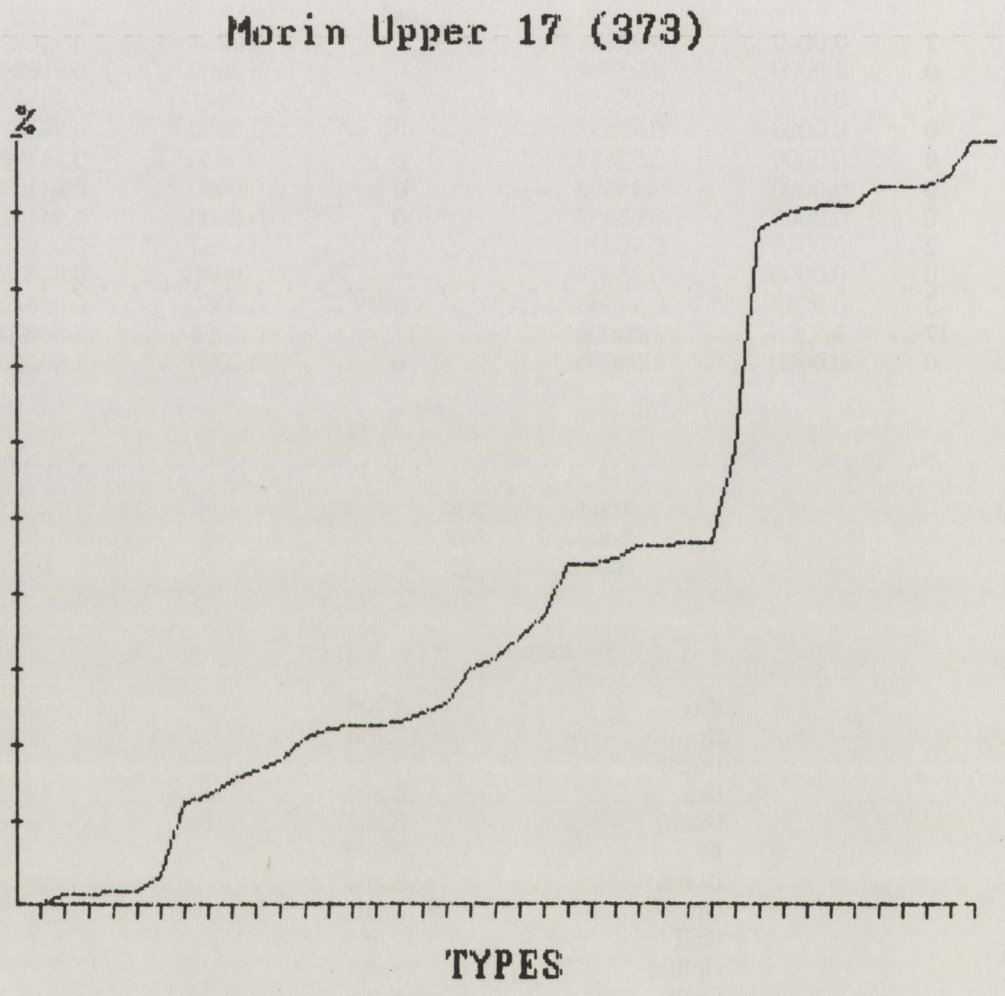


*FIGURE 1*

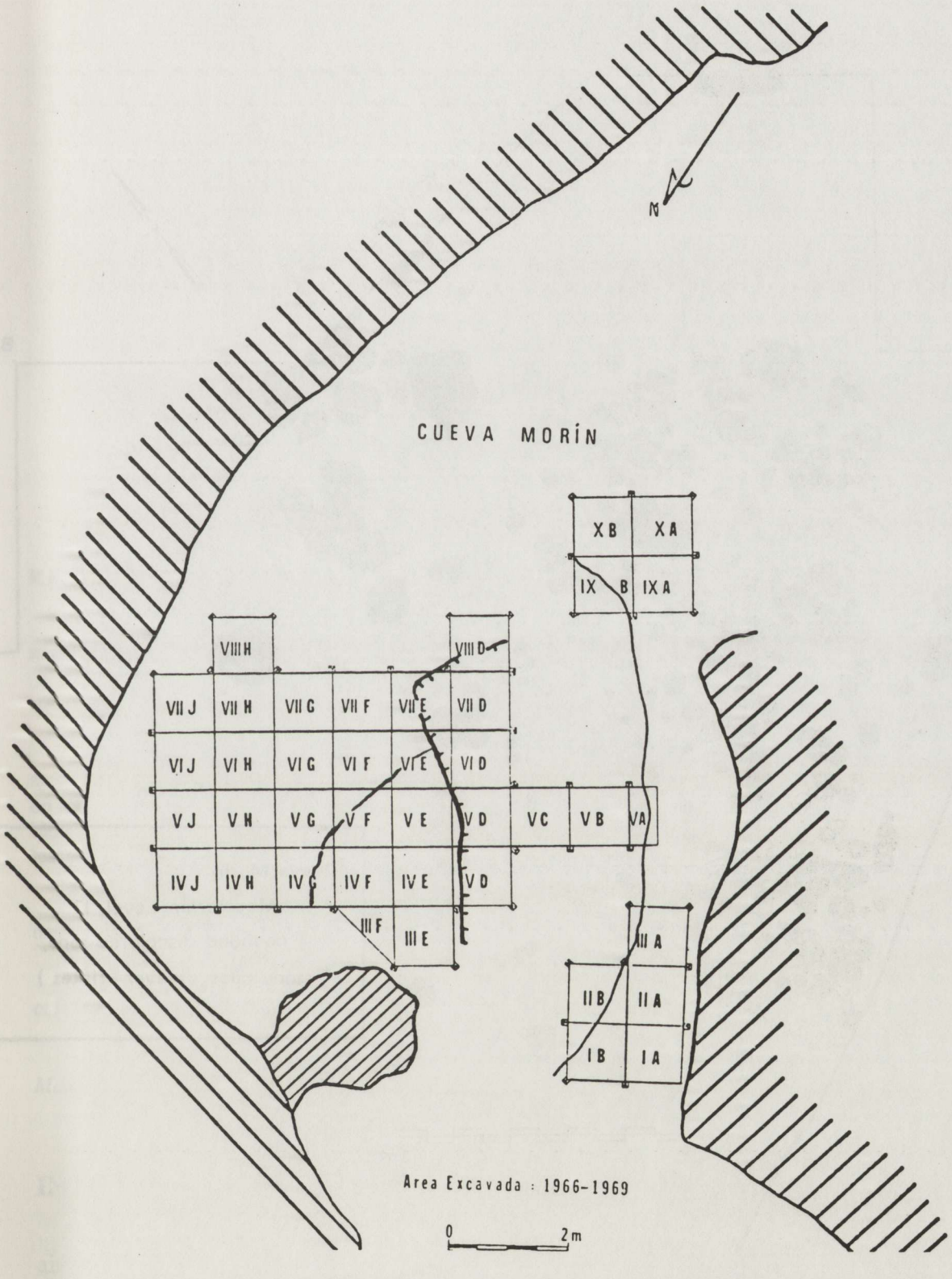


*FIGURE 2*

*Cueva Morín: Area Excavated 1966-1969*

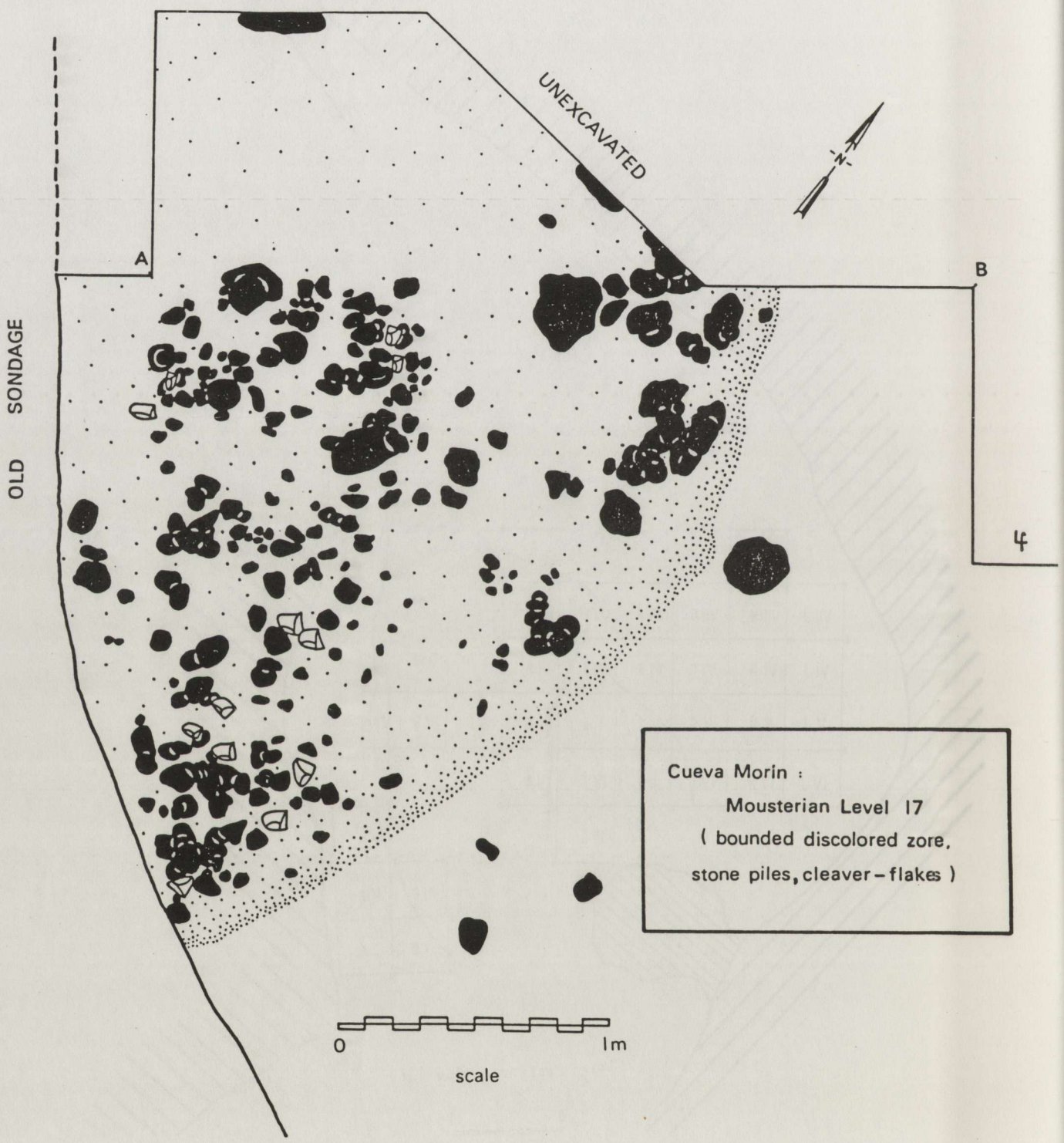
OLD SONDAGE
A
UNEXCAVATED
N
B
4
Cueva Morin :
Mousterian Level 17
( bounded discolored zore,
stone piles, cleaver-flakes )
0
1m
scale

*FIGURE 3*