

# The Stratigraphic Sequence at Altamira, 1880-1981

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Sponsored by the Ministry of Culture, a major multidisciplinary restudy of the cave of Altamira, under the overall coordination of Dr. J. González Echegaray, then Director of the Altamira Museum and Research Center, was begun in 1977. As part of this program a short campaign of excavations was conducted at the site from 30 December 1980 through 12 January 1981. Their aim was the verification and possible refinement of the stratigraphic sequence reported by earlier workers, gathering a large enough sample of artifacts from intact Magdalenian deposits for reliable identification of the industrial phases represented, and the recovery of substantial samples of faunal remains, pollen, and organic matter for radiometric dating. We additionally expected that the new excavations might provide more information on the nature of activities undertaken in the cave vestibule by authors of paintings for which Altamira is so famous.

The sediments, biotic materials, pollen samples and artifactual materials we recovered are still under study. The description of those materials in the following pages is only preliminary; complete results will appear in the final monographic report on the restudy of Altamira.

## HISTORY OF PREVIOUS EXCAVATIONS

Prior to our work, Altamira had been excavated on numerous occasions. The first to dig there was the discoverer of the site's magnificent

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polychromes, Don Marcelino Sanz de Sautuola. In Sautuola's time, the present vestibule and the western end of the Great Hall were continuous. In addition to unreported explorations in the Great Hall itself, (He reports only that the paintings begin at the edge of the archeological deposit) he evidently worked in the middle of the vestibule and towards the cave entry. Under a deep layer of modern rubble, produced by a massive roof collapse postdating his first explorations in 1875, he found a flowstone about a centimeter thick, underlain by up to a meter of black ashy deposit which he likened to the Danish shellmiddens; it contained thousands of shells of *Patella* and *Littorina*, a great deal of ochre and other coloring material, fragmentary mammal bones, fish remains, and bone and stone tools. These deposits rested atop two layers of blocks and slabs from earlier roof falls, which he apparently did not penetrate. All the material he illustrates is Magdalenian; Obermaier shows only one characteristically Solutrean piece from the Sautuola collections (Sautuola, 1880: 13-17; Breuil and Obermaier, 1935: fig. 129).

Following Sautuola's discovery of the site, several other investigators, including E. Harlé, J. Vilanova, E. de la Pedraja, and Taylor Ballota, dug here and there in the cave —mostly in a large heap of fallen boulders today partially incorporated into the artificial wall that helps sustain the roof while it isolates the Great Hall from what today's visitor sees as the vestibule (Breuil and Obermaier, 1935: 173).

Harlé, who may be examined first to have recognized Solutrean tools at the site, must also have examined the sediments under the paintings in the Great Hall, since he remarks that the strata there were extensively disturbed by earlier excavations (Harlé, 1881: 279-281). Despite his opinion, there were still archeological materials, and even intact strata, in the Great Hall: in 1902, Don Eduardo Sainz found a lot of loose artifactual and fauna material (including a perforated baton decorated with engravings of ruminants) in rubble on the floor on the right side of the painted gallery; both Alcalde del Río (in 1902), and Obermaier (in 1924 and 1925) excavated in that area; and artifactual material was also recovered during excavations to lower the floor so that visitors might see but not touch the paintings.

Hermilio Alcalde del Río dug systematically at Altamira for more than a month during the winter of 1902/3, establishing the basic outlines of the site's stratigraphy as it is known today. He worked both in the area of the vestibule and in the Great Hall (Madariaga, 1972: 32-27). Alcalde dug principally between fallen blocks in the vestibule and in the angle between the vestibule and the western part of the Great Hall, where stratigraphy was clearest. There he found two superimposed strata: the upper one

between 35 and 45 cm of slate-colored ashy shell-midden with abundant small stream cobbles, quantities of colorant (red hematite, manganese, charcoal, ochre), mediocre stone tools, better made bone tools, and much triturated bone; the lower from 40 to 80 cm of limestone-rich clays, with fewer shellfish, more abundant coloring material, finely made stone tools, considerably fewer bone implements, and larger, less fragmented bones. The strata were in intimate contact without intervening sterile layers, and in places, the contact between them was principally recognizable from their artifact contents. Alcalde recognized that the contents of the upper level were Magdalenian, the lower, Solutrean (Alcalde del Río, 1906:28-40; Cartailhac and Breuil, 1906). His excavation must have been extensive, since he claims to have extracted some 20 tons of bone fragments from the site, and reports that his excavations in the corner between the vestibule and the Great Hall removed sediments over more than 20 square meters (Alcalde del Río, 1906:29, 36).

Alcalde found areal differentiation in the deposits as well as vertical stratigraphy, observing more abundant ash layers and other traces of fire (burnt bones and shells in a matrix where tools were relatively rare) closer to the entrance, in the zone since known as the «Cocina». Of particular importance was his discovery in (the uppermost part of) the Solutrean level of what seems to have been a localized concentration of fragments of scapulae of horses and deer, bearing engraved figures of animals; especially notable for their bearing on the dating of the wall art are 3 engraved heads of cervids, in a style virtually identical to that used in other figures of deer in the cave's final gallery (Alcalde del Río, 1906: 32). Characteristic Solutrean points were reported to have been found in direct association with some of these pieces (Breuil and Obermaier, 1935: 183-4, figs. 149-51).

In 1924-25, excavations were renewed by Hugo Obermaier, as part of a major revision of the monographic study of the site published by Cartailhac and Breuil in 1906. Most of his 20 days' effort in 1924 was devoted to clearing the largest part of the large fallen blocks from the surface of the vestibule. The second field season, of two months' duration, removed deposits over a surface of some 50 sq m (a trench about 5 meters wide extending some 10 meters from near the NE corner of the vestibule toward the middle of the room) and reaching a maximum depth of about 2.5 meters below the original surface (Breuil and Obermaier, 1935: 193-196).

The stratigraphy Obermaier found corresponded well to that reported by Alcalde del Río. Beneath surface deposits a meter deep, consisting of two layers of recent roof fall (designated 1 and 2), he found up to 50 cm.

of deposit containing Magdalenian remains. Below a first, very black layer made up of ash, charcoal, clays and burnt or decomposed limestone fragments, he reported a another horizon of fallen block (3), the more ashy deposits. The upper ashy layer was locally brecciated, while the lower began as a looser, partially leached horizon that at base became a moist blackened clay. The ashy layers contained an abundance of shellfish, burnt and broken bones (including many deliberately split cervid phalanges). Represented fauna, in addition to mollusks (principally *Patella*) and crustaceans, included numerous red deer, less abundant large bovines (probably *Bisón*) and horse, frequent *Rupicapra*, relatively abundant *Capra*, rare roe deer, wolf and hare, bird and fish remains, and some pieces of supposed ivory originally attributed to woolly mammoth but later identified by Altuna as horse hyoid fragments (Altuna and Straus, 1976). Magdalenian tools in both stone and bone, including square, round and oval-sectioned *sagaies*, fragmentary eyed needles, worked bird bone tubes, perforated teeth and fragments of engraved scapulae in a «deplorable» state of preservation were also recovered (Breuil and Obermaier, 1935:195-6, 198, 208-213).

There was no clear stratigraphic distinction between the base of the Magdalenian and the top of the Solutrean deposits, though in general the Solutrean sediments were more reddish in color. Close to the wall of the cave, the Solutrean deposits were dry and brecciated, while towards the base, atop an impermeable stalactitic layer, (sealing beneath in roof fall layer 5) they were very moist and blackened. The average depth of the Solutrean deposit was some 30 to 35 cm.

Solutrean fauna remains included very abundant red deer, horse and large bovines (cf. *Bison*), quite numerous *Capra* and *Rupicapra* bones, and scarce remains of wild boar, roe deer, bear, fox, wolf, *Lynx*, reindeer (a single antler fragment), seal (one tooth), and several perforated and engraved plaquettes of what is identified as woolly mammoth ivory. A possible *Dama* is also reported, but the identification is doubtful. There are also shellfish, but in much smaller numbers than in the Magdalenian. Bone tools reported were *sagaies* with round or rectangular section, sometimes with single bevelled bases, a bone wedge or chisel, and several receptacles prepared from the glenoids of scapulae, acetabula of pelves or distal epiphyses of equid tibiae. Stone tools included bifacial laurel and willow leaf points, a few examples with thinned concave bases, and some shouldered bifacial points (Breuil and Obermaier, 1935:196-8, 201-8).

Beneath these layers, probably between the rocks of roof fall 5, Obermaier reported the presence of other levels, including remains of deer,

horse and *Patella*, but the precarious state of the roof, in imminent danger of collapse, kept him from investigating the systematically.

Despite the fact that Obermaier did not deny Alcalde's claim to have found engraved scapulae in Solutrean deposits in his 1906 excavations, Breuil and Obermaier made a special point of noting that «in the systematic excavations of H. Obermaier the engraved scapulae, unfortunately all very fragmented, appeared in their totality in the Magdalenian level never in layers that were clearly and unquestionably Solutrean» (1935:188, n. 73). Given the admitted difficulties these investigators had in distinguishing the Solutrean from the Magdalenian deposits, and the fact that the Magdalenian occupants deliberately dug into intact archaeological levels (see below), the exact stratigraphic provenience of the scapulae Alcalde del Río collected is unfortunately still a moot question in my opinion.

Obermaier also explored a small subterranean crevice discovered while clearing a path in his Gallery 5 in the interior of the cave. Emptying this of its fill of yellow clay, he found a fox mandible and some rodent bones, with three poorly made stone blades, two quartz flakes, a flat cobble decorated with engraved lines and red ochre, and three scallop shells (*Pecten* sp.) perforated for suspension (Breuil and Obermaier, 1935:213-214).

Obermaier's are the last adequately published excavations at Altamira. It is known that some other materials were removed from deposits during the construction of walls to support the weakened roof in 1925 and 1926, (and perhaps even later) but their provenience is not recorded.

The collections from these pioneering excavations, made long ago, and without refinements of technique that are commonplace today, have since become lost, dispersed or mixed in curation to the point where they cannot be relied on to provide the sorts of information that one needs to understand the exact place of the Altamira deposits in the regional history of Paleolithic industrial evolution, or to make inferences about the behavior or prehistoric populations. There are no detailed plans of the excavations, and the published stratigraphy sections are too sketchy and generalized to be much use. The published information concerning those older investigations, though respectable for its time, leaves unanswered most of the questions that would be most interesting to prehistorians today. Considering the importance of the site, those facts called for renewed excavations at Altamira.

## EXCAVATIONS IN 1980-1981: METHODS

Our own excavations were planned to take best advantage of the clearest intact stratigraphy available. Previous excavators had removed a great deal of the sediment from the area of the vestibule known as the «Cocina», but the North wall of the vestibule to the East of the stairway was still intact and suitable for our purposes. The flowstone that originally covered the floor of the vestibule was still present over the two and a half to three meters closest to the limestone cave wall. Perhaps because of the increasing thickness of that flowstone, that part of the sediments had been respected as a sort of witness section.

A grid of 1 meter squares was laid out to approximately coincide with the witness section. Each North-South column of squares was given a letter designation, and each East-West row a number. The squares actually opened during our limited field work are the partial squares K8-M8 and the complete squares K9-N9 (Figure 1).

Though the area we were able to excavate in the limited time available was extremely restricted, the archeological content of the deposits was very rich, and stratigraphy clear enough that we were able to meet major goals for clarification of stratigraphy and securing adequate samples of materials from the Magdalenian deposits established at the outset of our work. Substantial numbers of bone tools, particularly *sagaies*, 106 retouched stone tools, and a relatively large sample of biotic material were recovered from the Magdalenian level, which proved to be a single, probably relatively short-term, though laterally differentiated occupation horizon. Papers by González Echegaray, Bernaldo de Quirós and Cabrera in this volumen discuss the recovered artifacts in more detail. We recovered matter for another carbon-14 date of  $15.910 \pm 230$  B.P. (I-12012) on Magdalenian Level 2 (in substantial agreement with the date of  $15.500 \pm 700$  B.P. provided years ago by the University of Michigan), and took eight pollen samples that are now being processed. Further research is, however, still needed to gather comparable information from the Solutrean and pre-Solutrean deposits.

Before excavation, we cleaned, examined, photographed and drew the S and W walls of the standing section. Excavation and recording followed in general outline the guidelines since published in *IPIGUIDE* (Freeman and González Echegaray 1984) except that the fine screens used had 2mm mesh, and sediments were washed (rather than subjected

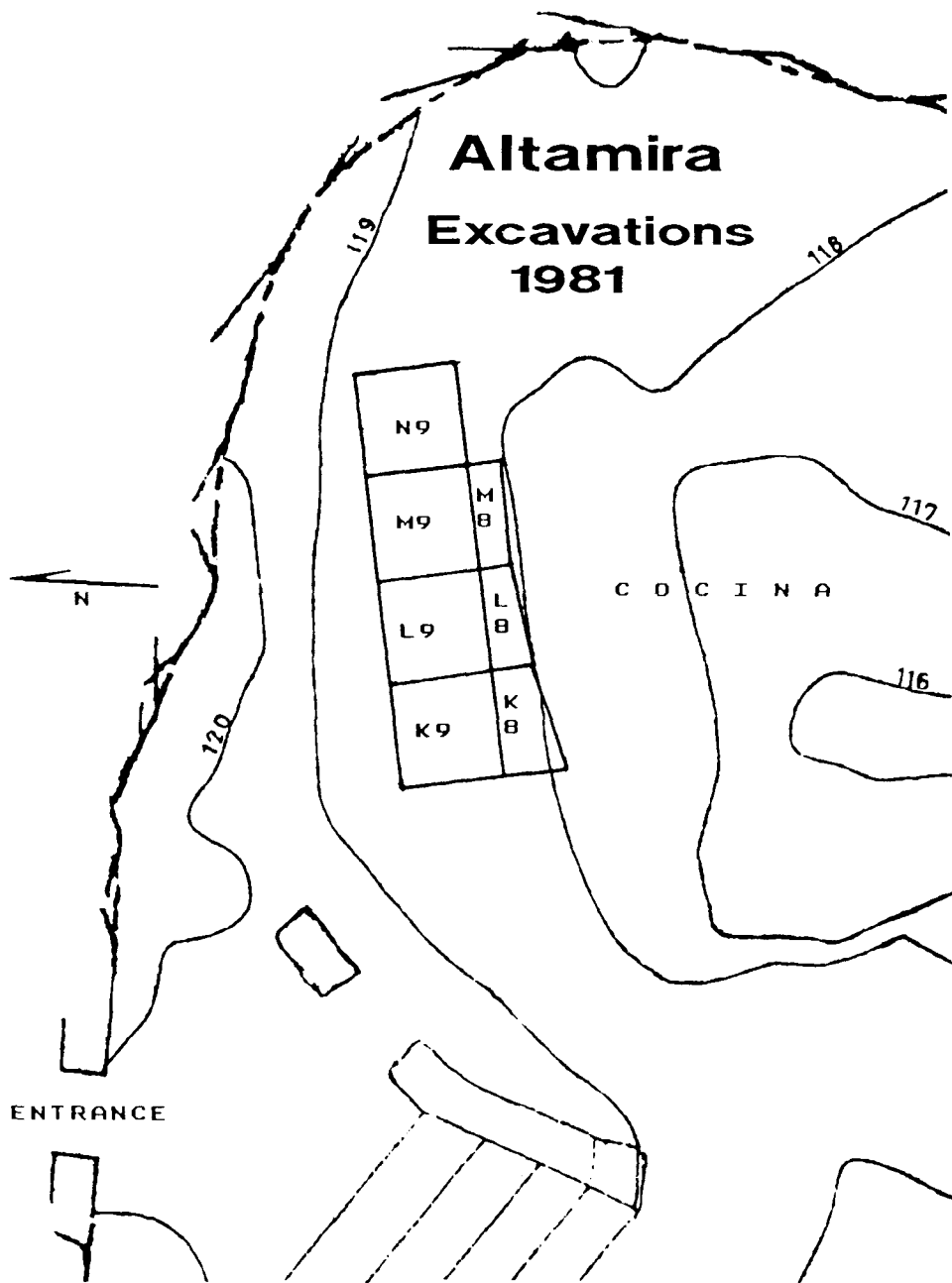


Fig. 1. Situation of the squares in the «cocina».

to disaggregation by slaking in a wetting agent and flotation, practises introduced for all our work after 1982).

Excavation proceeded by natural level, with additional vertical control provided by depths from an arbitrary datum plane taken with a Wild NK-10 optical level. All worked bone and stone seen during the course of excavation was plotted on a plan by square and level, as were all stones more than 5 cm in maximum diameter. Horizontal control over location of piece-plotted finds within a square was provided by measurements from lines between the corner stakes marking two sides of that square. All plans and sections were drawn at a scale of 1:10. Photographic coverage, in color, consists of some 90 35 mm slides, 10 6cm × 7cm slides and 20 stereo pairs.

Field drawings were archived electronically, using a Datacopy Scanner and Epson *Equity III* computer. Selected plans and sections were edited for final publication with *Publisher's Paintbrush* by Z-Soft.

## **EXCAVATIONS IN 1980-1981: RESULTS**

Originally the Paleolithic levels in the witness section were covered by a flowstone of variable thickness, but in the area we excavated, this had been broken and mostly removed in modern times. The strata in the cleaned standing wall rise gently from West to East, (dipping from the walls to the center of the vestibule). The results of our excavations generally confirm those of our predecessors, complementing and amplifying them with detail. The depositional sequence we observed is altered several times by prehistoric cultural features. Due to the effect of these on the accumulation of sediments, the stratigraphic situation is far more complex than any previous investigators noted.

There is no such thing as a «typical section» at Altamira, at least not in the area where we worked. The stratigraphy observed at one point on a section wall is often very different from that just a decimeter or so away. That is not, however, to say that the stratigraphy is unclear, disturbed or uninterpretable. To the contrary, strata are well-differentiated, both in color and texture, and the order of deposits at any particular place is discernible with sufficient care. But it does imply that lateral stratigraphic differentiation is as important to interpretation as is differentiation vertically. Unless lateral variation is understood, no reliable reconstruction of the vertical, temporal order of accumulation of deposits is possible.



The wall cleaned before excavation at first seemed quite simple, but that apparent simplicity proved deceptive. Beneath a modern layer (Level 1), yellowed by crushed fragments of trampled stalagmite, was a greyish-brown layer from 5 to 35 cm thick, packed with bone, shell, artifacts, and rocks. Towards the top, bones and shells were more fragmented than in the lower part of the horizon. This level was underlain by 5-10 cm of blackened, greasy, carbon-rich, clayey earth that subdivides in the Eastern part of the section; subdivisions are lost further East where they end against blocks projecting up from the following level. That is from 5-25 cm of brownish deposits, once again densely packed with shells, bones, and artifacts to form a real shell-midden, leached and lighter in the Eastern part of the section, and incorporating several large limestone chunks and blocks. Another 5 to 10 cm blackened clayey deposit, also sometimes subdivided, lay below this. Underneath was a brownish deposit, some 10-30 cm deep, with shellfish, bones, tools, and blackened ashy lenses, partly incorporating another layer of subangular limestone blocks. The blocks partly lie in a third black clayey seam, thicker (up to 20 cm) than the previous ones.

These levels are all known to contain only Magdalenian artifacts, and all were designated subdivisions of Level 2. However, the clear and apparently temporal sequence in this section is misleading: other profiles show that the strata result in large part from the repeated excavation, use, and refilling of pits during Magdalenian times. All these levels are later than the underlying block of sediments, but local vertical superimposition within the Magdalenian series need not indicate a strict temporal order, and the length of time separating one phase of pit utilization from the next is indeterminate and may have been very short indeed.

Below the Level 2 complex we found a thick deposit (25-50 cm) of brownish, sandier clays, interrupted by occasional ash lenses atop patches of orange burnt earth. This horizon (Level 3, with subdivisions) contained bones, tools, and many large chunks of ochre. There is reason to believe that the cultural content of this set of deposits is exclusively Solutrean, but it has only been cursorily sampled. At base, the strata are juxtaposed to immense, flattish, angular, limestone blocks (more than 1 meter thick, in some cases), that obviously resulted from a massive roof fall.

The term «Cocina» traditionally applied to this area is entirely appropriate for the activities attested by recovered residues, which are overwhelmingly the remains of processes of food preparation and the disposal of the garbage from meals. The bulk of the remains is shell, predominantly from the genus *Patella*. The Magdalenian deposits from a true shell

midden like that at El Juyo. Faunal remains have been examined by Richard Klein of the University of Chicago. He identified remains of 14 red deer, 2 bison, 3 roe deer, 1 horse, 1 bear, 1 fox and 1 wolf (Freeman, *et al.* 1988: 29). The list includes all the animals prominently depicted in Altamira's cave art. Salmon, traces of other fish, and bird remains were also recovered, as were thousands of limpet shells (*genus Patella*), of comparatively large sizes. The distribution of most kinds of residues was spatially patterned. For example, there are localized concentrations of cervid vertebrae, specific stone tool types, and antler *sagaies*. These will be described in detail in the final report of our excavations.

Figure 2 is a profile of the Magdalenian levels exposed on the North wall of our excavation (along our 9 line) at its termination, and Figure 3 a plan of structural features in the Magdalenian deposits. The effects of pit building on the stratigraphy are abundantly evident. Two pits, «B» and «X», are shown on the plan, and Pit «B» appears in the section. Pit B apparently had an original diameter of almost 2 meters (Pit B1), but when reutilized (Pit B2) was redug on a smaller scale, measuring approximately a meter across. Pit X is just slightly smaller. While most of the blocks that surround the walls or line the bottom of the pits could have been collected from the rubble of earlier rock falls, they were not incorporated accidentally: among them are quartzite cobbles and one large grindstone. Their inclusion and location in the deposits is due to a deliberate cultural act.

The edges of Pit B and Pit X were clearly visible in section. Nonetheless, the details of their construction could best be appreciated only when they were exposed in plan as well. In fact, it was only after Pit X was excavated and understood in plan that we realized that its sides had been visible as irregularities in the standing South wall of the witness section drawn at the outset of excavation.

Both B and X seem to have been functionally similar. They were a kind of cooking pit, later used for waste disposal. Apparently, in both cases the sequence of activities involving the use of the pits was as follows. First, a pit, 1 meter or more in diameter and some 35 cm deep, was dug in the midden deposits; the walls and bottom were sometimes stone-lined. Then combustible materials were burnt in the bottom of the pit. A layer of smaller stones was deposited atop the ashes, and we suppose that shellfish and meat were added to the pit, which was then covered. Whether the food was steamed or roast has not yet been determined: some bones show signs of burning and must have come into direct contact with hot stones or embers, but they might be the residues of previous meals atop which new fires were lit. When cooking was done, the pit was opened, the food removed, and then shell and bone waste

## Altamira 1981

### East-West Sections, 9 Line

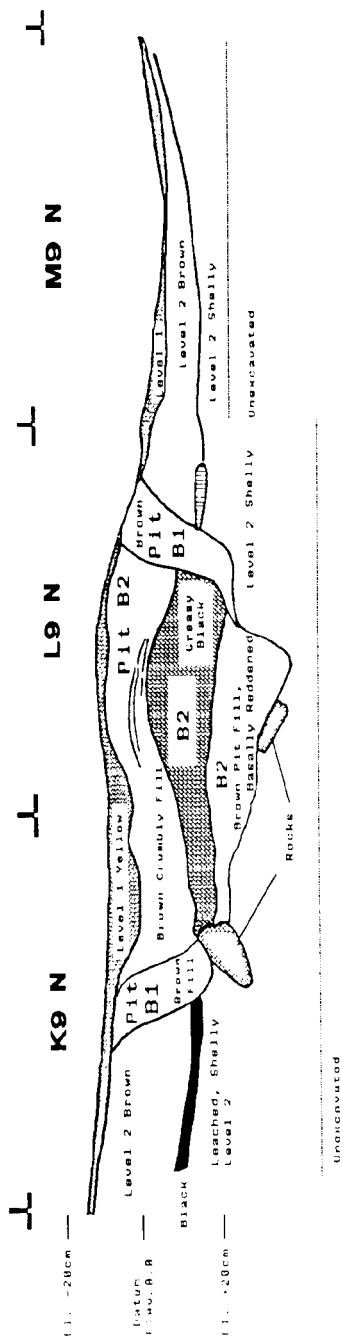
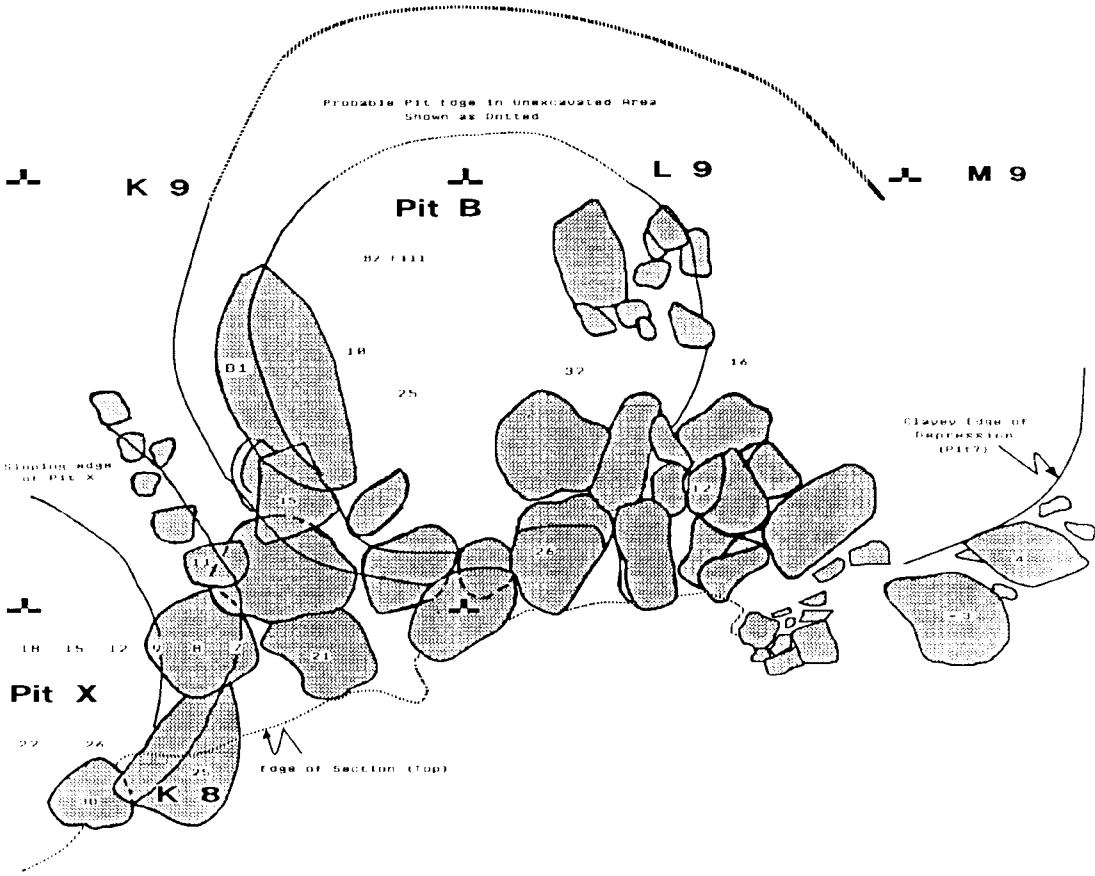


Fig. 2. Profile of the Magdalenian levels exposed on the Nord wall.



## Altamira 1981

Rocks are shaded; Numbers are spot depths.

Fig. 3. Plan of structural features in the Magdalenian deposits.

from the meal(s) was returned to the pit with enough additional material to fill it, in some cases heaping it up above the original ground level. This process was repeated at least once for each pit.

## **IMPLICATIONS FOR RESEARCH**

Magdalenian strata in the Altamira vestibule are well-differentiated and, we believe, should prove consistently distinguishable from underlying Solutrean deposits. That previous excavators found such a distinction difficult was probably due to a combination of factors: cruder excavating methods and the fact that the contact between the base of the Magdalenian deposits and the top of the Solutrean deposits is not level but irregular, due to the presence of deliberately excavated pits and the incorporation of large blocks of stone in the sediments. An excavation that did not take these factors into account would be bound to confuse the topmost Solutrean deposits with the basal magdalenian deposit. Though we could recognize no Solutrean materials in the Magdalenian levels we excavated, the fact that the artifacts are so often contained in pits dug into the deposits makes it entirely possible that, occasionally, Solutrean pieces might have been incorporated in a pit along with later materials by the Magdalenian pit builders themselves. If that occurred, greater attention to differences in the matrix surrounding the Solutrean pieces than was common in previous excavations would be needed to clarify the situation. Those are the reasons why I believe the attribution by Alcalde del Río of engraved scapulae to the latest Solutrean is questionable.

Our excavations in the Altamira Magdalenian deposits indicate that much can be still be learned there through careful microstratigraphic excavation. However, as Echegaray has recently noted (1984: 265-267), there are several sites in Cantabria where the usual rationale for vertical microstratigraphic excavation—that it will lead to a refinement in our understanding of environmental and industrial change is of extremely limited validity. Altamira is such a site. At Altamira, through the time represented by the Magdalenian strata, there is much more to be learned from patterning in the spatial distribution of residues about the behavior and beliefs of those who lived in the cave in prehistoric times than can be learned about environmental and industrial succession from vertical microstratigraphic analysis.

We expect further excavation to add new information about the age of some of the Altamira depictions, from the nature of pigments and portable art objects recovered in the archeological deposits. Work to date already provides previously unsuspected evidence about other dimensions of cave art. For example, it is usually assumed that Paleolithic artists were not terribly interested in depicting the animals they ate. Altamira is one of several contrary cases. The presence in the midden deposits of all the major animals figured on the ceiling and walls of the site has interesting implications for interpretations of motivations and meaning in Paleolithic art.

Last, our new excavations are important from the standpoint of studies of site formation processes. It has been asserted that in the constrained space offered by many caves, consistent spatial segregation of activities is unlikely or impossible: that people could not regularly re-use the same space for the same distinctively differentiated set of activities. This assertion obviously makes no sense where large durable structures were built in caves to house different activities: that is the case for Magdalenian levels at El Juyo and an Aurignacian occupation at Morín. Altamira is another site where a single area of a dimensionally restricted cave vestibule has consistently been reutilized for one and the same set of activities, and in this case the even more severely constrained space of a single 1 to 2 meterwide pit was repeatedly reused for the same purpose. Obviously, no generalization about cave sites, other than that all are caves, has universal validity. But it seems high time to give up completely the idea that constraints on space inevitably, or even usually, vitiolate interpretations of spatial patterning. There may be more truth to the contrary assertion—that where space is not constrained, there is less reason consistently to perform most narrowly differentiated activities in the same space. Perhaps severe spatial constraints lead to consistent functional differentiation of available space just to keep performance of activities with conflicting requirements or consequences from interfering with each other.

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