BULLETIN

OF THE

American School of Prehistoric Research

IN AFFILIATION WITH THE

ARCHAEOLOGICAL INSTITUTE OF AMERICA

Founded 1921: Incorporated under the laws of the District of Columbia, 1926

Edited by George Grant MacCurdy, Director

NUMBER SEVEN APRIL 1931

TRUSTEES AND OFFICERS
REPORT OF THE DIRECTOR
ACCOMPANYING PAPERS

OFFICE OF THE SCHOOL
PEABODY MUSEUM, NEW HAVEN, CONN.

BULLETIN

OF THE

American School of Prehistoric Research

IN AFFILIATION WITH THE

ARCHAEOLOGICAL INSTITUTE OF AMERICA

Founded 1921: Incorporated under the laws of the District of Columbia, 1926

Edited by George Grant MacCurdy, Director

NUMBER SEVEN — APRIL 1931

TRUSTEES AND OFFICERS
REPORT OF THE DIRECTOR
ACCOMPANYING PAPERS

OFFICE OF THE SCHOOL
PEABODY MUSEUM, NEW HAVEN, CONN.

BOARD OF TRUSTEES

Elective Members

HERMON C. BUMPUS, Waban, Mass. (Dec., 1934)
GEORGE W. DAVISON, New York City. (Dec., 1932)
CHARLES G. DAWES, American Embassy, London. (Dec., 1936)
ADDISON L. GREEN, Holyoke, Mass. (Dec., 1932)
MRS. JULIUS H. HAASS, Grosse Pointe Farms, Detroit, Mich. (Dec., 1936)
EDGAR L. HEWETT, School of American Research, Santa Fe, N. M. (Dec., 1934)
EARNEST A. HOOTON, Harvard University. (Dec., 1932)
ALES HRDLICKA, United States National Museum, Washington, D. C. (Dec., 1936)
ALFRED V. KIDDER, Carnegie Institution, Washington, D. C. (Dec., 1934)
GEORGE GRANT MacCURDY, Yale University. (Dec., 1936)
EDWARD K. PUTNAM, Davenport, Iowa. (Dec., 1932)
J. TOWNSEND RUSSELL, Jr., U. S. National Museum, Washington, D. C. (Dec., 1934)

Members, *ex-officiis*

ALBERT BILLHEIMER, General Secretary Archæological Institute of America, New York University
ARTHUR DALY, Treasurer, Archæological Institute of America, New York City
WILLIAM K. GREGORY, Chairman Section H Anthropology, American Association for the Advancement of Science, American Museum of Natural History, New York City
GEORGE GRANT MacCURDY, President American Anthropological Association, Yale University
RALPH V. D. MAGOFFIN, President Archæological Institute of America, New York University

OFFICERS

ADDISON L. GREEN, *Chairman, Board of Trustees,* Holyoke, Mass.
HORACE H. F. JAYNE, *Secretary,* University Museum, Philadelphia, Pa.
G. HAROLD WELCH, *Treasurer,* New Haven Bank N. B. A., New Haven, Conn.
GEORGE GRANT MacCURDY, *Director of the School,* Peabody Museum, New Haven, Conn.

PARTICIPATING MEMBERS

DAVENPORT PUBLIC MUSEUM
MOUNT HOLYOKE COLLEGE
WESLEYAN UNIVERSITY
YALE UNIVERSITY
UNIVERSITY MUSEUM, PHILADELPHIA

CO-OPERATING MEMBERS

ARCHÆOLOGICAL SOCIETY OF WASHINGTON
STANFORD UNIVERSITY
UNIVERSITY OF CHICAGO
UNIVERSITY OF MICHIGAN
WELLESLEY COLLEGE

REPORT BY THE DIRECTOR ON THE WORK OF THE TENTH SUMMER SESSION

To the Board of Trustees of the American School of Prehistoric Research:

The tenth annual session of the American School of Prehistoric Research opened in Paris on July 1, and closed in Prague on September 3. Twelve students, ten men and two women, all but two of them graduate students, were enrolled: Lloyd Cabot Briggs, Harvard University; Miss Jeanne Ernst, Mount Holyoke College; John P. Gillin, University of Wisconsin; Robert F. Greenlee, Northwestern University; Theodore D. McCown, University of California; Robert H. Merrill, University of Michigan; John Z. Miller, Lehigh University; Panchanan Mitra, Yale and the University of Calcutta; Cornelius B. Osgood, University of Chicago; Froehlich G. Rainey, University of Illinois; Miss Lucile Serrem, Columbia University; Sol Tax, University of Wisconsin. J. Townsend Russell, Jr., a former student of the School, assisted the Director, who also had the assistance of two other former students after the group reached Czechoslovakia, viz.: V. J. Fewkes of the University of Pennsylvania, and Robert W. Ehrich of Harvard University.

The itinerary included parts of France, Spain, Switzerland, southern Germany, and Czechoslovakia. Digging was done in three sites, representing various culture levels: thirteen days in the Abri des Merveilles (Dordogne), with three horizons—two Mousterian and one Aurignacian; three days in the cavern of El Pendo (Prov. Santander), Spain, with four horizons—Mousterian, Solutrean, Magdalenian, and Azilian; and seven days at Homolka, near Prague, with late Neolithic and early metal cultures.

This gave the students a wide range of experience not only in the art of digging, but also practice in the determination of specimens from various epochs as well as from various phases of a given epoch. It was our good fortune at El Pendo to help in the discovery of two works of art dating from the Magdalenian Epoch—a stag engraved on bone and a horse, likewise engraved on bone.

The actual digging was supplemented by visits to fifty prehistoric sites representing practically every phase of prehistory and by the study of museum and private collections. Coincident with the digging and the visits to sites and museums, forty-two conferences were given—eleven by

the Director and thirty-one by foreign specialists and by certain of the students. For these conferences we are indebted to the Abbé Breuil, Harper Kelley, Z. Le Rouzic, G. Chauvet, Etienne Patte, Count Begouen, Louis Begouen, and D. Peyrony, in France; Carballo in Spain; D. Viollier and Emil Bächler in Switzerland; F. Birkner and K. Hörmann in Germany; and J. Schranil and J. Skutil in Czechoslovakia. The students who gave conferences were Greenlee, McCown, Merrill, and Tax; a former student—Fewkes—also gave conferences.

Toward the end of the term, thanks to the assistance of Russell, Fewkes, and Ehrich, it was possible for Mrs. MacCurdy and myself to remain behind in France in order to make a prehistoric pilgrimage through France and Spain with General Charles G. Dawes, our Ambassador to Great Britain, who met us in Périgueux on August 23 and remained with us until the end of the month. At the same time there also joined our party Mr. Addison L. Green, chairman of our Board of Trustees, and his son Marshall Green. We visited the principal prehistoric sites of the Vézère valley; then went to northern Spain to see the cavern of Altamira and the prehistoric museum in Santander. In Madrid, we visited the Archæological Museum and the Museum of Natural History; and in Seville, the Archivo de Indias. From Seville, we made a two-day excursion to the museum at Niebla, the dolmen de Soto, and the prehistoric copper mines at Rio Tinto.

During the spring months our School dug jointly with the British School of Archæology, Jerusalem, at the cave of the valley near Athlit, and south of Haifa, Palestine. This was our second season at this site. Miss Dorothy Garrod, representing the British School, was again in charge; our two representatives were Dr. Martha Hackett of Mount Holyoke College, and Theodore D. McCown of the University of California. This second season's excavations yielded some 20,000 specimens dating from the Mousterian, Aurignacian, Mesolithic, and later epochs. Joint excavations were resumed here on April 1, 1931.

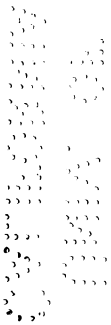
In March, 1930, there was published Bulletin No. 6 of the School (43 pages), containing the Director's report and Miss Dorothy Garrod's paper entitled: "The Paleolithic of southern Kurdistan," which describes the joint explorations and excavations of our school and the Percy Sladen Fund (British) during the autumn of 1928.

Respectfully submitted,

GEORGE GRANT MACCURDY,

Director.

New Haven, Conn., April, 1931.



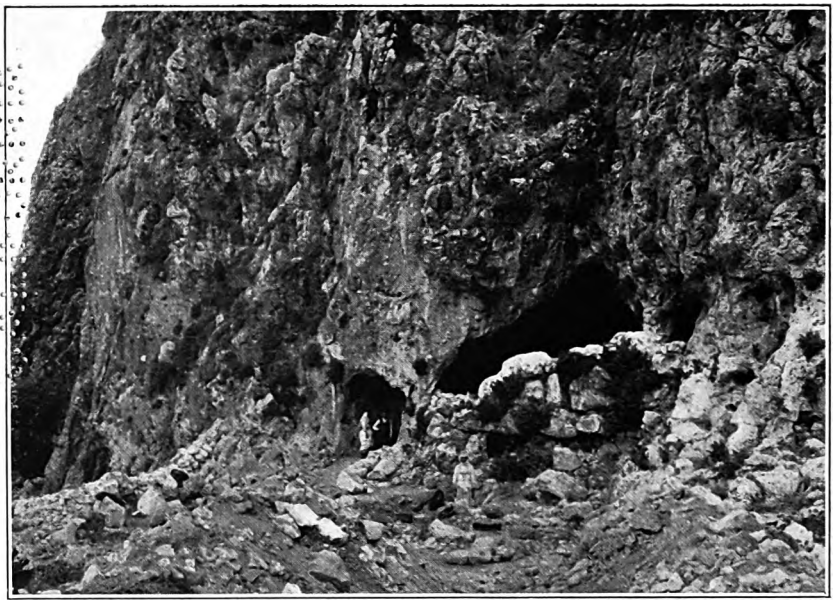


FIGURE 1. 1. Entrance to the cave of Mugharet-el-Wad.
2. Chamber II of Mugharet-el-Wad before excavations were begun.

EXCAVATIONS IN THE CAVES OF THE WADY-EL-MUGHARA, 1929-30

By D. A. E. Garrod, M.A., B.Sc.,

Research Fellow of Newnham College, Cambridge

The Wady-el-Mughara (Valley of the Caves) lies in the western slope of Mt. Carmel, 5.6 km. S.E. of the Crusaders' Castle at Athlit. Two limestone bluffs face each other across the wady at the point where it opens on to the coastal plain, here barely 3.2 km. wide, and the caves lie in the southern bluff, at the foot of a vertical cliff of limestone which is a prominent landmark for some miles along the plain.

The excavations at the Wady-el-Mughara were undertaken by the British School of Archæology in Jerusalem, at the special request of the Director of Antiquities, who in the autumn of 1928 had caused a sounding to be made in the largest of the caves, with promising results. We were fortunate in securing for this work the collaboration of the American School of Prehistoric Research, who have not only borne half the cost, but have each year sent one or more of their students to take part in the excavations. As in former years, the work of the British School in this field has been made possible by the generosity of Mr. Robert Mond, to whom Palestinian prehistory owes an incalculable debt.

The work at the Wady-el-Mughara has so far extended over two seasons, of three months each—April, May, and June, 1929; and April, May, and June, 1930, and systematic excavation has been confined to the largest of the caves, the Mugharet-el-Wad.

The Mugharet-el-Wad faces N. W., and has a commanding view of the coastal plain. It consists of a large outer chamber, I, and a smaller inner chamber, II, from the back of which opens a lofty corridor over 60 metres in length. The cave has three openings, lying side by side, of which the central one is the largest, and must have been the main entrance in prehistoric times, the two lateral ones being merely windows in the rock-façade (Fig. 1, No. 1). At a later date, probably in Byzantine times, a massive wall was built across the main opening, and the left-hand one was enlarged and shaped to take a door. Immediately in front of these entrances is a small terrace, from the edge of which the ground falls rapidly to the level of the plain.

In the course of excavation chambers I and II of the cave have been completely emptied, a large trench has been dug to bed-rock on the terrace and a series of soundings has been made in the inner corridor.

Pending detailed publication of our results it is sufficient to say that Chamber I had been extensively disturbed, and that the complete sequence of layers was present only in Chamber II (Fig. 1, No. 2). The maximum depth of the deposits in this chamber was 2.80 metres, and seven levels were present, of which six were prehistoric. They were as follows. counting from above downward:

A. Bronze age to recent (Fig. 2, No. 1).
B. Mesolithic (Fig. 2, No. 2).
C. Upper Palæolithic of Capsian affinities.
D. Middle Aurignacian.
E. Lower Middle Aurignacian.
F. Layer of erosion, containing both Aurignacian and Mousterian forms.
G. Mousterian. This was present only in an alcove opening in the N. E wall, in which the rock floor was one metre below the level of the main part of the chambers.

This is by far the most complete prehistoric sequence yet found in Palestine. I myself already had found a mesolithic industry in the cave of Shukba, in 1928, and the Mousterian was known from that cave and from Mr. Turville Petre's excavations in Galilee, but the industries of C, D, and E are completely new for this region.

All the prehistoric levels except F were made up of cave-earth containing quantities of charcoal and animal bones broken by man. There were no sterile deposits between the archæological layers, but the passage from one to another was marked by slight changes of colour and consistency in the deposit.

Layer F was made up almost entirely of flint implements, with practically no earth between, and the majority of these are more or less abraded, and some are heavily rolled. Both Mousterian and Aurignacian types are present, but Mousterian predominates. There can be little doubt that this layer was formed by water action during a period of intense rainfall, when preëxisting Mousterian and Upper Palæolithic layers were destroyed by erosion.

As I have said, Chamber I was extensively disturbed, and at the N. E. end this disturbance reached down to the level of layer F. At the S. W. end, however, a patch of black earth, 50 cm. thick, lay in place between

the base of the disturbed deposit and the surface of F. In this we found a collective burial of eleven skeletons (4 adults and 7 children) disposed in layers in the extended position, each skeleton resting on a hearth, and packed in with large fragments of limestone. The associated industry was the mesolithic of layer B, and this burial must represent the bottom of a grave dug in mesolithic times right through the Upper Palæolithic layers which must formerly have existed in Chamber I. Later disturbance has obliterated all traces of the grave, leaving only this isolated patch of mesolithic deposit resting immediately on F, 80 cm. below the base of the mesolithic layer in Chamber II.

Layer F was in place all over Chamber I, and beneath it was a grey phosphatic layer which filled an immense pit occupying the whole area of Chamber I. This chamber was, in fact, a great well, with sides coming gradually together until, at a depth of 10.50 metres from the original surface of the deposits the hole became too narrow for excavation. The phosphatic bed, which reached a maximum thickness of 7.50 metres, contained Mousterian implements scattered through its entire depth, the majority of them being slightly abraded. Except in rare instances bones had not been preserved, but one of the fortunate exceptions was a human molar, found at 4.50 metres from the surface.

The excavations in Chambers I and II practically exhausted the prehistoric interest of the cave. Soundings made at intervals in the corridor showed that stratification ceased, and only a mixed deposit was present.

A large trench was dug on the terrace of the cave, and the following section established:

A. Stony earth—1-2 metres. Bronze age to recent.
B. Tough red earth. 50 cm.—1.20 metres. This deposit, which was completely undisturbed, contained the same industry as layer B inside the cave, and provided final proof that no pottery is associated with this culture, which may therefore be confidently classified as Mesolithic.

Layer B rested on bed-rock, and in the north end of the trench a remarkable series of "works" or constructions were found at the base of the deposit. Three human skeletons were found in this trench, lying just above the rock. Two of these were near the mouth of the cave, one lying on its side in a crouching position, and the other on its face with the legs drawn up. The third, which was at the north end of the trench, lay on its left side, with legs drawn up, and head turned to face upwards. All

three bodies had been placed on hearths containing animal bones, and were packed down with large fragments of limestone.

I must now give a brief account of the industries obtained from the prehistoric levels. The materials used for all of them is flint or chert, and in the Upper Palæolithic layers tabular flint, which is found in place on the upper slopes of Carmel, is exceedingly common.

To begin with the oldest deposit, G, the Mousterian industry of this level closely resembles that which I found at Shukba, and differs only by the absence of hand-axes from the Mousterian found by Mr. Turville-Petre in the Robber's Cave. All these industries are marked by a preponderance of the Levallois flake; and well-made, typical triangular points are more abundant than side-scrapers.

In layer F, which contains both Mousterian and Aurignacian forms, the former are identical with those found in G, but the Aurignacian is not very typical, and cannot at present be assigned to any particular subdivision of that culture.

The industry of layer E corresponds to a fairly ancient stage of the Middle Aurignacian of Europe. The implements are rather massive; they include well-made steep scrapers and rostrate scrapers, and large flakes with marginal retouch. Gravers are fairly abundant, but on the whole roughly made. The most completely characteristic implement is a small, spiky flint point, carefully retouched on both edges, which is in marked contrast with the rather heavy scrapers and gravers. This point is found in Europe at Krems, in Lower Austria, and at Font-Yves, near Brive, both sites which belong to an early stage of the Middle Aurignacian.

A few bone points made from metacarpals of gazelle were found in this layer.

Some fragmentary human remains were found: two lower jaws, a small piece of frontal bone, some fragments of a child's skull, and an astragalus.

The Middle Aurignacian of D differs from that of E in the greater delicacy of the specimens, and in the absence of the Krems-Font-Yves point. Some of the best implements found in the cave come from this level, the most typical being the rostrate scrapers and beaked gravers, both thoroughly characteristic of the Middle Aurignacian.

With layer C comes a break in the typological sequences. I find it very difficult to fit this industry into any of the existing sub-divisions of the Upper Palæolithic. I have previously called it Capsian, on account of the presence of large curved flint knives of Châtelperron type identical with those found in the Lower and Middle Capsian of North Africa. Apart from these which are relatively few in number, the characteristic

feature of this industry is an extraordinary abundance of steep scrapers and rough gravers, mostly made from tabular flint.

The Mesolithic of B differs completely from any of the preceding industries. The implements fall into two series: one, in which the artifacts, made of flint, range from fair-sized blades to true microliths, and the other consisting of a relatively small number of massive tools made of chert, of which the most interesting type is a kind of rough pick.

The form which is by far the most abundant is the microlithic crescent, or lunate, of which we found many thousands. Other tools which are very common are the parallel-sided dos rabattu blade, with slightly concave back, and the typical sickle-blade, worked down the back and across the ends, with the peculiar highly-polished edge produced by cutting straw. Over three hundred Tardenoisian microgravers were found, but the ordinary graver is rare. The collection of tools and other objects made of bone from this level is large and varied. It includes:

Points and pins (Fig. 3, No. 1).

Three fragments of harpoons, all small and delicate, with barbs on one side only.

Sickle-blade hafts made from ribs or shaped pieces of long bone deeply grooved down one edge. One of these has two flint blades still in place in the groove.

Skin rubbers, made from pieces of the antler of *Dama mesopotamica*, cut obliquely across one end and smoothed by use (Fig. 4).

Bone pendants and beads. The majority are more or less pear-shaped, and are probably copied from the canine tooth of a deer (Fig. 3, No. 2).

This layer also yielded two remarkable works of art. One, found by Mr. Lambert in his sounding, represents a young deer, carved in the round on the end of a fragment of long bone; the other, discovered by us at the base of the collective burial, is a small human head roughly carved from a piece of banded calcite.

In addition to the material in flint and bone, layer B yielded a rough limestone mortar, with an exceptionally deep, narrow cavity, and a number of fragments of large basalt pestles.

I come now to the "works" already mentioned, found at the base of the Mesolithic layer on the terrace. When the deposits had been removed over the whole area of our trench, we found that the rock sloped fairly steeply downwards away from the cave, and that in the lower end of the trench the surface of the rock had been artificially levelled so as to

make a little platform about 10.50 metres square. The marks of some kind of rough pick were clearly visible all over the levelled area. In the middle of this platform a stone basin, 30 cm. deep, had been cut in the rock. This has a V-shaped section, and the walls are not smoothed in any way, the marks of the pick being still visible. Round the mouth of this basin the levelling of the rock had left a flat rim, and placed on this were two blocks of limestone set at right angles. Three smaller basins were found in the rock to the east of this one and outside the levelled area, but they are not so well-made and have no rims. To the north of the basin a number of flat, more or less quadrangular slabs of limestone have been set carefully side by side to form a kind of curb, or enclosure, and immediately behind them a narrow trough has been cut in the rock. The outer ends of the slabs rest on the tough red earth which forms the base of the archæological deposit, so it is clear that the bed-rock falls fairly steeply away at this point, to a depth still unknown. Just outside the curb or wall, and at a slightly lower level, was found one of the three burials described above, and there is evidence that further excavation will lead to the finding of other skeletons close at hand.

This discovery came at the end of the season, and there was no time to go further. Next year, however, I hope to excavate the terrace completely, and we may get some clue to the purpose of these arrangements. Meanwhile, it is difficult to think that the holes were used for grinding or pounding, as they show no trace of wear. On the other hand, the theory that the whole thing is connected with a cult of the dead, though not impossible, needs stronger evidence than we possess at present.

I need not emphasize the interest of this find, at the base of an undisturbed Mesolithic deposit. As far as I know it is the earliest example of its kind so far discovered.

Another point in connection with this Mesolithic culture on which I should like to lay stress is the evidence for a primitive form of agriculture afforded by the large number of sickle-blades and hafts discovered. It is generally held that in Europe agriculture and pottery arrive together, at the beginning of the Neolithic, but here in Palestine we have a people who were practicing some form of agriculture before they had any knowledge of pottery. This seems to suggest, either that the two arts originated in different regions, and only came together at a later date, or else that agriculture is definitely the older of the two.

In conclusion I must say a few words about the affinities of the different prehistoric industries found in the cave. The Mousterian is of a type peculiar to this region, and may be described as a highly-evolved form

of Breuil's Levalloisian, with an admixture of types foreshadowing the Upper Palæolithic.

I have already pointed out the European affinities of the Aurignacian from D and E. Until recently the Middle Aurignacian stage was thought to be confined to Europe, but a year or two ago Breuil and Passemard pointed out the presence of Middle Aurignacian forms in the collections from Antelias, near Beirut. The Mugharet-el-Wad now shows clearly what an important part the Middle Aurignacian plays in the Upper Palæolithic of Palestine, and since it is absent from North Africa and Egypt, it seems likely that it entered this region from the north—unless of course, its center of distribution is actually further to the east.

The industry from layer C remains something of a puzzle, but it has certain affinities with the Capsian, and provisionally I classify it as a local—possibly a hybrid-form of that industry.

In spite of certain original features, the Mesolithic of the Mugharet-el-Wad is closely related to the Mesolithic of the Shukba cave, and to the microlithic industry found on the surface at Heluan. The works of art, however, remain at present without a parallel; they seem to bear no relation either to the earlier art of Magdalenian Europe, or the later art of predynastic Egypt.

THE ABRI DES MERVEILLES AT CASTEL-MERLE NEAR SERGEAC (DORDOGNE)

By GEORGE GRANT MACCURDY, Director
American School of Prehistoric Research

The Site.—That the Abri des Merveilles had been inhabited by Paleolithic man was first noted by Reverdit in 1878. It is in the commune of Sergeac, on the left bank of the Vézère at an elevation of some 45 to 50 meters above the river and a few hundred meters down the river from the village of Sergeac. The rock shelter faces north and is under the rock on which the farmhouse, known as Castel-Merle, stands. From the shelter, one has a magnificent view up the Vézère valley with Sergeac and its fortified church in the foreground. It might have been that Reverdit* chose the name *Abri des Merveilles* for this station on account of the wonderful view. In describing the locality he says: "Les premiers rochers faisant face à Sergeac sont ceux designés sous le nom de Castel-Merle. Sous ces rochers existe une vaste et magnifique abri. Au pied de cet abri, les silex sont nombreux dans les terres cultivées. J'ai aujourd'hui acquis la certitude que l'abri de Castel-Merle a été une station. De légères fouilles m'ont permis de trouver les silex en place. Parmi eux deux hachettes (hand axes), deux pointes, des racloirs (scrapers) et autres, tous du type du Moustier."

The rock of Castel-Merle is shaped like a flatiron with point turned toward the west. The northern margin faces on the Vézère, while the southern faces on a tiny branch of the Vézère known as the ruisseau des roches (Fig. 5). It will be seen from the plan that two stations, including the Abri des Merveilles, are under the northern face of the rock and two stations are under its southern face. On the opposite margin of the little valley of the ruisseau des roches, are five more prehistoric stations. The Abri des Merveilles is thus one of a group of nine Paleolithic stations, all of which have yielded important data on the Old Stone Age. It and the one adjoining (No. 9), known as Blanchard II, or Sous Castel-Merle, are the only ones of the group that were inhabited by Neandertal man (Mousterian Epoch); these two sites also agree in having a superficial hearth level dating from the Aurignacian Epoch. The deposits in all

* Bull. Soc. historique et archéologique du Périgord, V, 407, 1878.

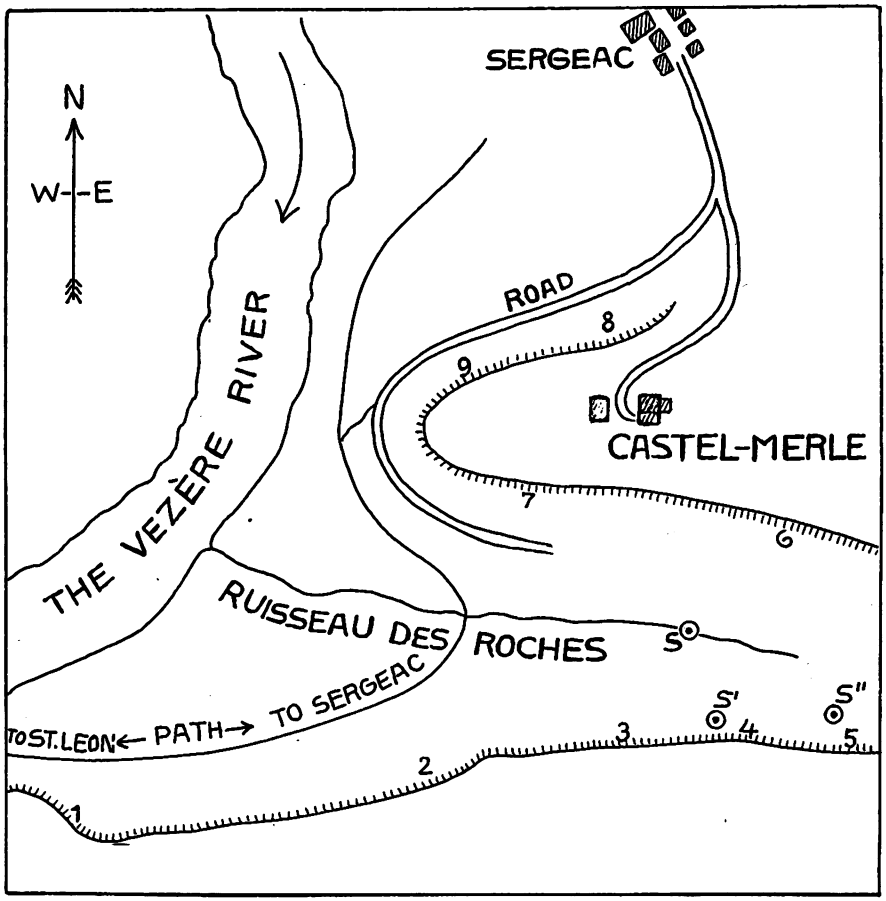


FIGURE 5. Paleolithic stations at Castel-Marle, Sergeac.
1. La Souquette: Middle and Upper Aurignacian, Magdalenian.
2. Labatut: Upper Aurignacian (two levels), Solutrean.
3. Roc de l'Acier: Upper Aurignacian.
4. Reverdit: Lower Magdalenian, including mural figures.
5. Reverdit II: Magdalenian.
6. Castanet: Aurignacian.
7. Blanchard: Aurignacian (two levels).
8. Les Merveilles: Mousterian (two levels), Upper Aurignacian.
9. Sous Castel-Merle: Mousterian (two levels), Upper Aurignacian.

the other stations are limited to the Upper Paleolithic (Aurignacian, Solutrean, and Magdalenian Epochs).

Down the Vézère river from Castel-Merle about 2.5 kilometers is Le Moustier with the two classic rock shelters of the same name. Some 10

kilometers further down the river is Les Eyzies, the center of prehistoric cavedom in the Dordogne. The Abri des Merveilles is thus admirably situated as a site where students of prehistory might have practice in digging and at the same time opportunity to study scores of other sites situated within easy reach and representing almost every phase of prehistory. Within easy reach also are three museums of prehistory—two at Les Eyzies and one in Périgueux. For these reasons, in August, 1924, the Director of the American School of Prehistoric Research leased the Abri des Merveilles on behalf of the Archæological Society of Washington, reserving to the School the right to excavate the site. Leasing of the site was done with the permission of the Ministère de l'Instruction Publique et des Beaux-Arts, and with the approval of Mons. D. Peyrony, local inspector of prehistoric monuments. The lessor is Marcel Castanet, owner of Castel-Merle. Students of the School have dug at the Abri des Merveilles under the direction of the author for seven seasons, the ground covered by each season's work being represented on the accompanying ground plan (Fig. 6). The preliminary reports, one for each of the first three seasons of digging, have already been published.* It is now proposed to summarize the work of all seven seasons.

Culture Sequence.—The plan shows the area covered by each season's work. We began at the foot of the slope leading down from the overhanging rock and at the margin of the cultivated field. It was not possible to distinguish definite hearth levels until after we had progressed some meters back from the margin of the field. Then two Mousterian hearth levels became distinguishable. The thickness of the sterile deposit between these gradually increased until at a point just below the road, they were separated by at least a meter. Above the road the sterile deposit separating the two Mousterian levels was in places at least a meter in thickness. On three different occasions, we made soundings to ascertain if there might not be a still lower level, but always with negative results.

In the superficial deposit above the upper Mousterian level, relics of the Aurignacian Epoch were found sporadically and only above the roadway (Fig. 7). Peyrony found the same sequence of cultures in station No. 9 only a few meters removed from the western boundary of our site. The two adjoining sites were inhabited at the same time or rather at intervals during the same long period of prehistoric time. The location has many points in its favor: well-drained but near splendid springs in the little valley of the ruisseau des roches, a fine outlook up the river, with fishing

* Art and Archæol. XIX, 121-130, March, 1925; ibid. XXI, 75-81, Feb. 1926; Bull. No. 3, Amer. School of Preh. Research, March, 1927.

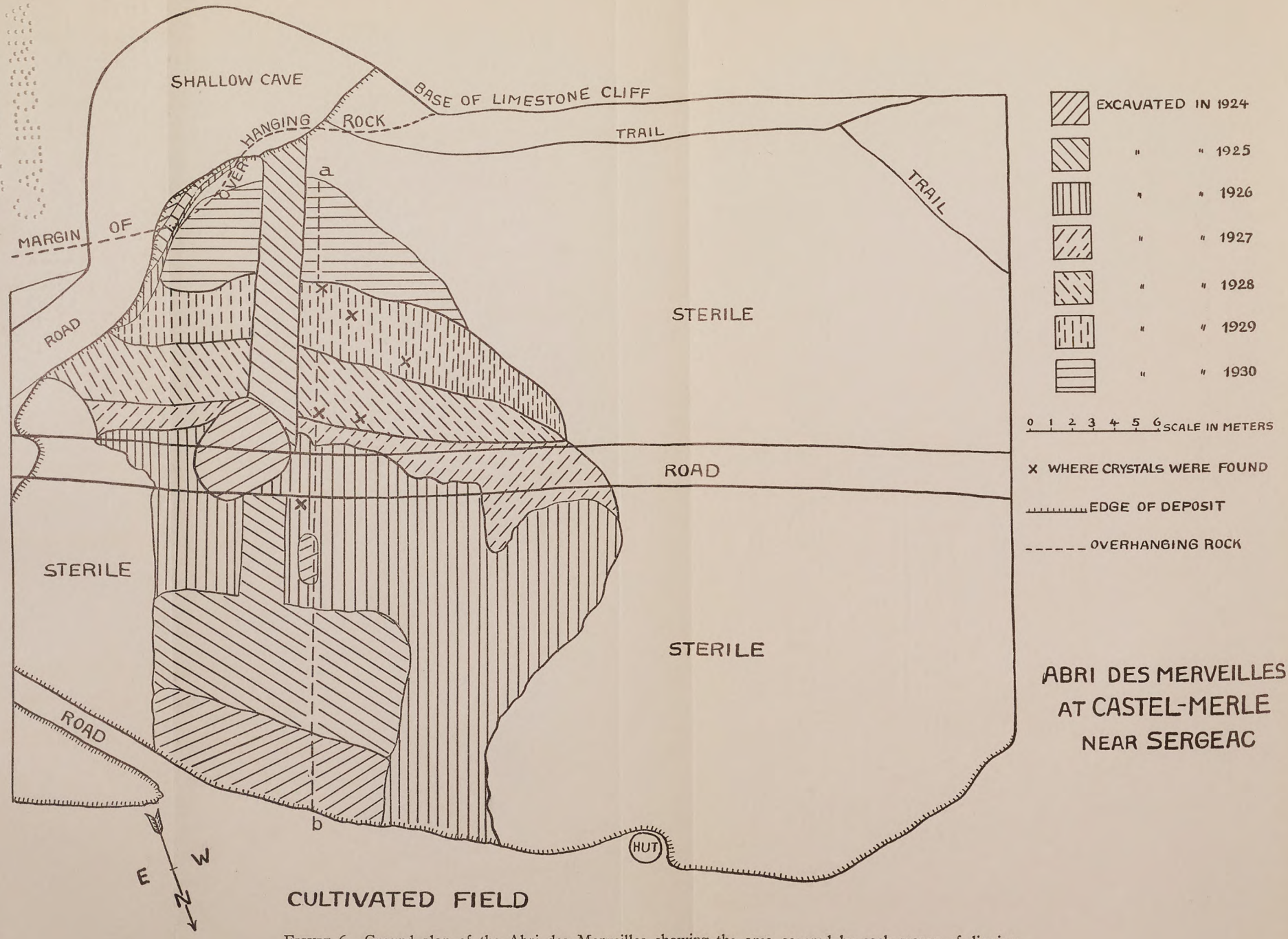


FIGURE 6. Ground plan of the Abri des Merveilles showing the area covered by each season of digging.

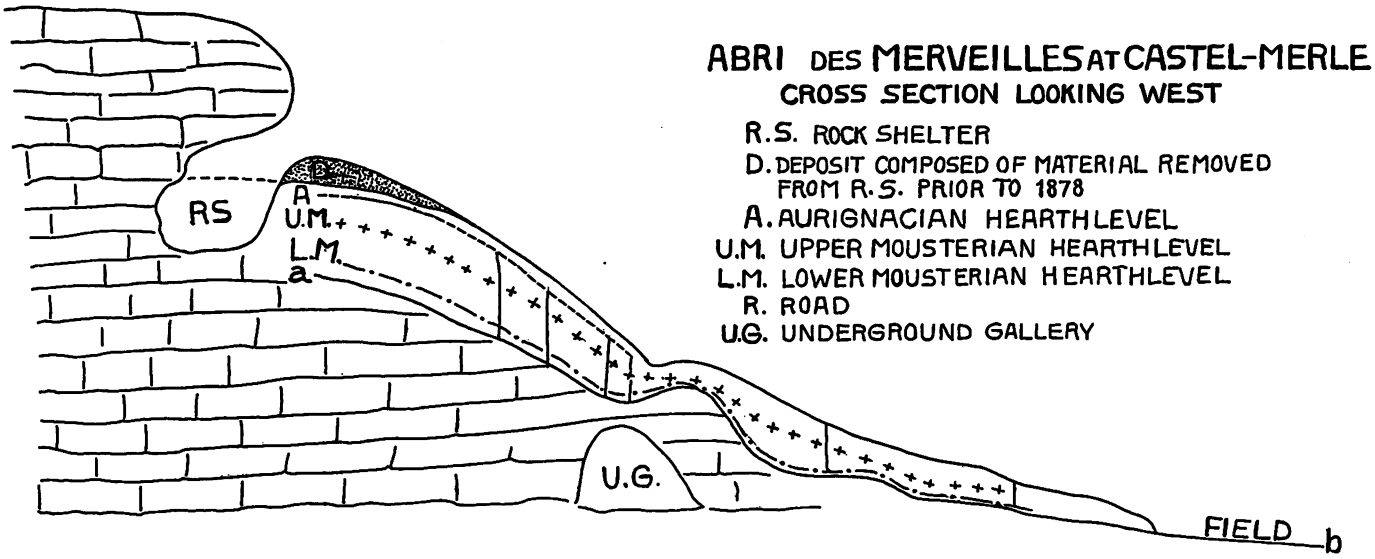


FIGURE 7. Abri des Merveilles. Cross Section a-b (see Fig. 6).

in the Vézère and wild game on every hand. Sources of supply for the making of tools and weapons were near at hand; pebbles for hammerstones in the bed of the river below and a plentiful supply of flint on the plateau above, weathered from seams of flint in the limestone formation of which the plateau is composed. Used hammerstones and flint flakes that can be refitted to their parent cores are proof that the camp site was also a place of manufacture of tools and weapons. Practically all the flint occurs in the form of nodules, tabular flint being rare. Not all the raw material brought up from the river bed or down from the plateau was used in the manufacture of tools and weapons. Many of the quartzite pebbles do not show abrasions and hence were not used as hammerstones, or else used so slightly as to leave no marks. Many intact flint nodules also testify to the workman's foresight in keeping a supply of raw material on hand.

The Mousterian Artifacts.—The two Mousterian levels are separated in some places by a sterile deposit as much as a meter in thickness, testifying to a considerable lapse of time between the two periods of Mousterian occupation. There are also certain differences to be noted among the artifacts, which might be explained by invoking the element of time. For example, the *coup-de-poing,* or hand ax, is found in the upper level but not in the lower; on the other hand, the remarkable rock crystal tools to be described are all from the lower level. In other respects, however, the culture of the lower level is practically repeated in that of the upper level: scrapers, spoke shaves, points, drills, disks, etc. Rarely is a tool made of any other stone than flint and rarely a hammerstone of anything save quartzite. The exceptions that prove the rule are a few scrapers of quartzite and the rock crystal tools, as well as a few round flint nodules that had been used as hammerstones. Bone artifacts are rare.

A striking peculiarity of the flint scrapers from the Abri des Merveilles is the method that was employed in producing scraper blanks from the nodule of flint—method which resulted in the retention of nodular crust on the back and portion opposite the scraping edge. The back thus required no chipping or retouching to make it fit the hand comfortably. The Mousterian craftsman could produce a whole series of scrapers from one shapely flint nodule by beginning at one end and knocking off sections by means of blows directed alternately from opposite sides. Scrapers produced in this manner outnumber all other types found at this site. Even superficial flakes with one face entirely covered by the nodular crust were made to serve as scrapers by retouches which removed the crust along a margin selected for the edge. The toolmakers were not always content

with the somewhat precarious handhold of the ordinary scraper even when it was protected by a coating of nodular crust. They often contrived to utilize a natural prominence of the original mass of flint. Another distinguishing character of the scrapers is the steepness of the retouching to form the edge. One of the objections brought against eoliths has been the steep slope of the retouched face—the objector's argument being that an edge produced in such a manner could have served no useful purpose. Among the scrapers from the Abri des Merveilles, it is not uncommon to find the retouched face making an angle of 45, and in one case fully 90 degrees.

Another peculiarity of the Merveilles scrapers is that so many of them have no prepared striking platform; while in those that do, the striking platform of some is faceted and in others plain. The toolmaker followed no hard and fast rule in this respect. At Les Merveilles, Mousterian scrapers far outnumber points. In the Mousterian caves of Palestine, points are relatively much more plentiful. The only bone artifacts at Les Merveilles are a few bone points and the so-called compressors, in the style of those found by Henri Martin at La Quina and Pittard at Les Rebières.

Rock Crystal Tools.—We are accustomed to think of Neandertal man as devoid of the artistic sense. It is true he left nothing in the way of sculpture, engraving or painting. That he did have a sense of harmony of proportion is evidenced by his handiwork in the shaping of tools. These were for the most part of flint; where flint of a good quality was to be had, the tools are often exquisite for shapeliness. Neandertal man must also be given credit for discernment of beauty and quality of the material employed in his industry. Hexagonal rock crystals attracted his attention, for in the Wincqz exploitation at Soignies (Hainaut), Belgium, three small perfect rock crystals were found in the Mousterian level; these had been carried and left there by Neandertal man but were too small to be chipped into tools.

Rock crystal is comparatively rare and cannot be chipped with the same ease as flint. Perfect tools of rock crystal dating back to the Mousterian Epoch are exceedingly rare. A few indifferently chipped were found in Gudenus Cave, Lower Austria, by Obermaier and Breuil.* In the Massenat collection there are four fairly well-shaped tools found at Chez-Pouré (Corrèze) prior to 1869.† Paul de Givenchy‡ has figured three

* Mitteil. anthrop. Ges. in Wien, XXXVIII, pl. XI, 1908.

† Matériaux, p. 462 and pl. 29, 1869.

‡ Bull. Soc. préh. française, XX, No. 5, 166, 1923.

other rock crystal tools from Chez-Pouré, all of them shapely and one of them especially fine almost identical in shape and size, but not in color, with the first one we found at the Abri des Merveilles. All three were found by Mons. Soulangeas. Crude tools of rock crystal are said to have been found in the cave of La Chapelle-aux-Saints (Corrèze).

The author knows of no rock crystal tools that antedate the Mousterian Epoch. Upper Paleolithic deposits, especially Solutrean and Magdalenian, have yielded several examples. One of the finest is the laurel-leaf point in perfect condition found by Rivière‡ in the cave of Livèyre (Dordogne). Part of a laurel-leaf point was also found at Laugerie-Haute (Dordogne). A rock crystal tool has been reported from the Solutrean of La Balutie (Dordogne), and Obermaier says there is a rock crystal laurel-leaf point in the Barcelona Museum. A Magdalenian rock crystal tool was found at Laugerie-Basse (Dordogne), and two from Haute-Loire.

Of the seven tools of rock crystal from Les Merveilles (Fig. 8), No. 1, found in 1924, is transparent and tinged with just enough yellow to give it the appearance of topaz. It is a combination scraper and point. The ventral face is marked by a bulb of percussion and an uneven resin-like surface of fracture. The outer or dorsal face is everywhere reduced by means of chipping except for a small area at the level of the greatest diameter. Half of a scraper of the same quality of rock crystal was found in 1924 in the cultivated field just below and adjoining our leased site.

During the season of 1926 there was found a scraper of purest rock crystal without a tinge of color (No. 2). The portion opposite the edge is perfectly adapted to fit the curve of the forefinger and the dorsal face along the edge has been retouched more than once. The present edge shows the effect of wear; a short bit of it was carried away by a chip accidentally removed in Mousterian times.

Number 3, found in 1928, is amethystine in color. Two of the adjacent hexagonal faces of the original crystal are retained on the part opposite the edge and form a fitting handhold. The edge is retouched along the dorsal face only. During the same season Number 4 was found. It had been struck from an exquisite crystal yellowish in tone, but somewhat paler than the parent core of Number 1. The specimen is completely bounded by a series of delicate retouches confined to the dorsal face only.

Numbers 5, 6 and 7 were all found in 1929. Number 5 resembles Number 4 in shape and size and Number 1 in color. Its dorsal face has been completely retouched except for a small area near the base. Here, as in Number 1, the untouched facet represents a bit of surface of fracture

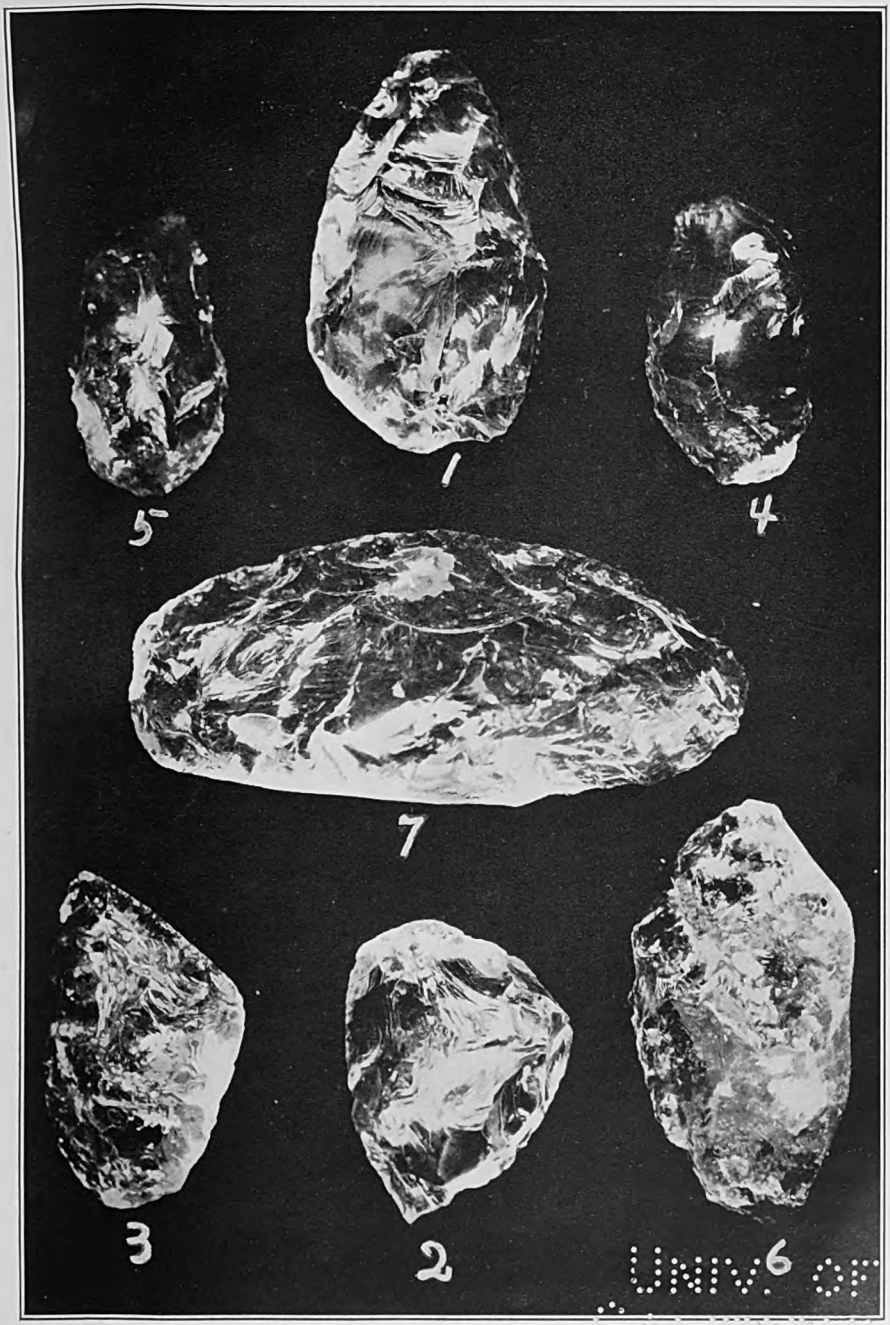
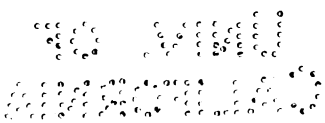


FIGURE 8. Rock crystal tools from the lower Mousterian level, Abri des Merveilles; each one was struck from a different crystal. Scale 7/8.



made at some preceding time rather than a bit of one of the hexagonal faces of the original crystal.

In so far as quality of crystal is concerned, Number 6 is the poorest of the lot. It is colorless but not flawless. That the crystal mass from which it was struck had been reduced to a pebble by water action is shown in the unworked part opposite the edge and reserved as the handhold. The last and largest of the series of rock crystal tools (No. 7), was likewise struck from a crystal that had been reduced to a pebble; but it was not the same pebble as in the preceding case but a much larger one formed from a crystal of great purity—absolutely clear and flawless. On the unretouched end there is a fine bulb of percussion. The dorsal face is completely retouched except at the base and the retained bit of the pebble surface on the lower half of the side opposite the long retouched margin.

The retention of a portion of the pebble surface on two of these rock crystal tools and of a slightly waterworn surface of fracture on two others (1 and 5), may serve as a clue to the original source of rock crystal supply. The nearest source is the region of eruptive rock lying near to and beyond the headwaters of the Vézère in the direction of the Limousin and Puy-de-Dôme. They were carried from this region to Sergeac either by Neandertal man or by the Vézère river. The fact that at least two of the rock crystal tools were struck from pebbles points to their transport by the river. Neandertal man had only to pick up the pebbles in the river bed at the foot of his Abri des Merveilles. They were carried to the rock shelter before the chipping was done just as was the supply of quartzite pebbles for hammerstones. Chips of rock crystal were found *in situ* in the lower Mousterian level. We know that tools of flint were shaped on the spot because we were able to fit one tool to its parent core which when found was only some 15 cm. removed from the tool itself.

The flint tools from the lower Mousterian level are of superior workmanship. The scrapers vary enormously in size. One of the largest, reproduced in Figure 9 (No. 1), has a length of 14 cm. and a maximum breadth of 10 cm. The flint is of fine quality and the surface is patinated to a uniform cream color. The striking platform is perfectly plain. The entire dorsal face has been retouched including the beating down of the margin opposite the edge to make it fit the hand more comfortably. It would be difficult to match this specimen in respect to size and harmony of outline. In contrast to this one, some of the flint scrapers have a maximum dimension of not more than 4 cm. (No. 2).

A large flint chopper was likewise found in the lower Mousterian horizon (No. 3). The length is 15.5 cm. and maximum breadth 8.5 cm.

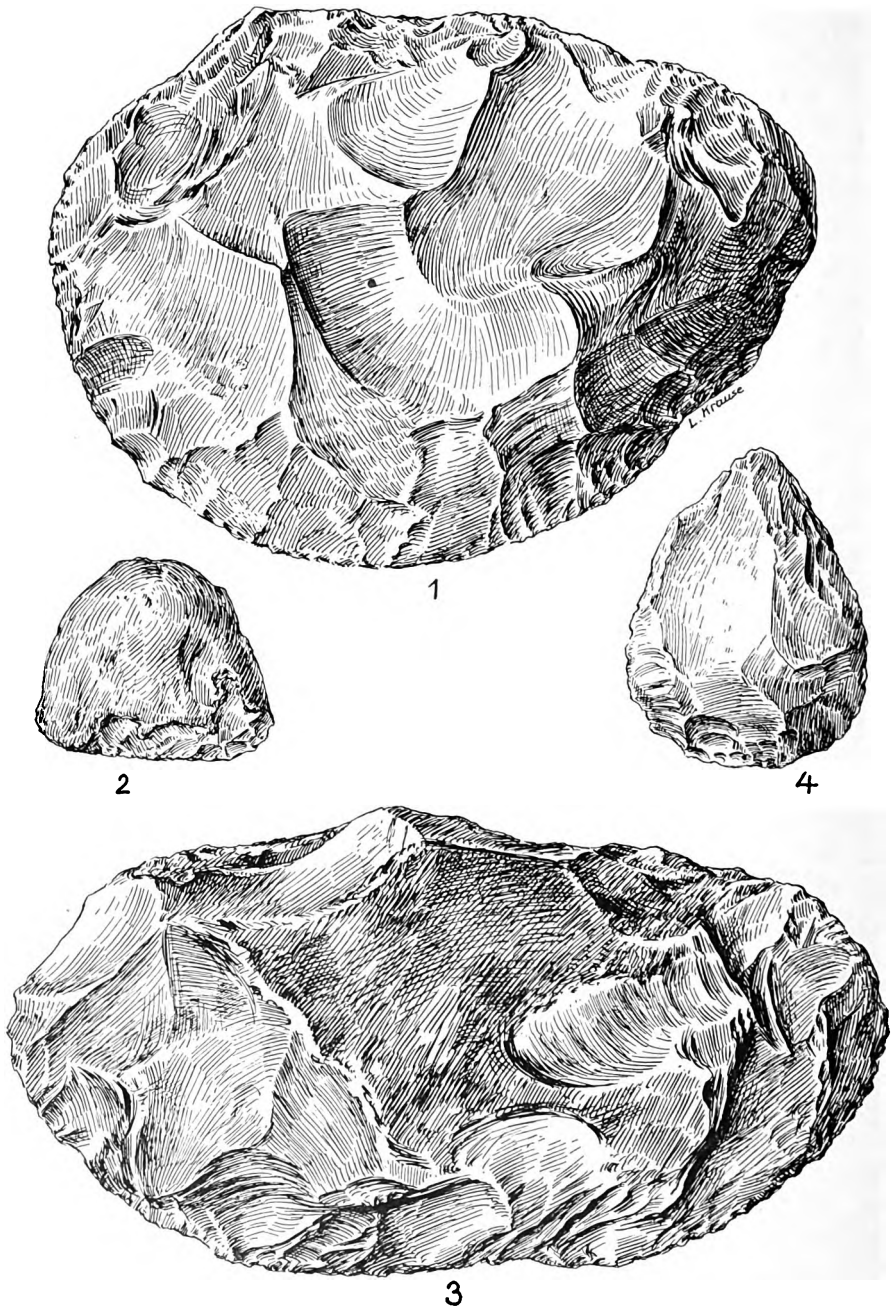


FIGURE 9. Flint scrapers (1 and 2), chopper (3), and point (4) from the lower Mousterian level. Abri des Merveilles. Scale ⅔.

It was chipped, not from a nucleus but from a flat mass of flint with an almost uniform thickness of scarcely more than 2 cm. The crust shows on both faces, especially on the portion opposite the edge. The remainder of each face is reduced by chipping to form a cutting edge the entire length of the specimen and well round the turn at both ends. A typical Mousterian point from the lower level is reproduced in Number 4.

One of the distinguishing features of the upper Mousterian horizon was the presence of the *coup-de-poing,* or hand ax. Specimens belonging to this class are usually not more than 10 to 12 cm. in length, and in some cases the length is reduced to half these figures.

Among the hand axes found in 1926, one is particularly interesting on account of its shape and workmanship. It is a fine and rare example of the triangular type. The base of the triangle is carefully chipped on both faces almost to the thinness of a cutting edge, as if the implement were intended to be set into the socket of a wooden handle. A hand ax, typical as to size, shape and workmanship, is reproduced in Number 2 of Figure 10; one of the smallest is shown in Number 1. Numbers 3 and 4 are good examples of the flint scraper from the upper Mousterian horizon.

The appearance of the hand ax in the upper horizon and its absence in the lower has its parallel at other stations in the Dordogne, for example, Combe-Capelle, Tabaterie, and Pech de l'Azé. On the other hand, the hand ax is present in the lower and absent in the upper Mousterian levels at Laussel and La Rochette. At Le Moustier, only a short distance from Les Merveilles, the Mousterian horizon with hand axes is intercalated between two Mousterian horizons, in both of which the hand ax is absent. The so-called Levallois type occurs sparingly in both Mousterian levels at Les Merveilles. Flint disks are also found in both horizons, likewise a few flint tools with double patina, proof that the older patinated surfaces are from a period antedating the horizons in which we found these specimens.

Bone Implements.—Neither one of the two Mousterian horizons yielded many implements of bone. These consist of bone compressors and fragments showing marks of use as points. The rarity of these may be accounted for in part by the fact that bone was very poorly preserved except for the area in fairly close proximity to the overhanging rock.

Aurignacian Industry.—The Aurignacian horizon was poor—a thin seam limited in extent to the area near the rock. Nevertheless it yielded a few specimens worthy of description (Fig. 11). They belong to the Upper Aurignacian. The flint gravers are of the Noailles type (Nos. 1-3). Number 2 is a rare double graver, each of the beveled points showing

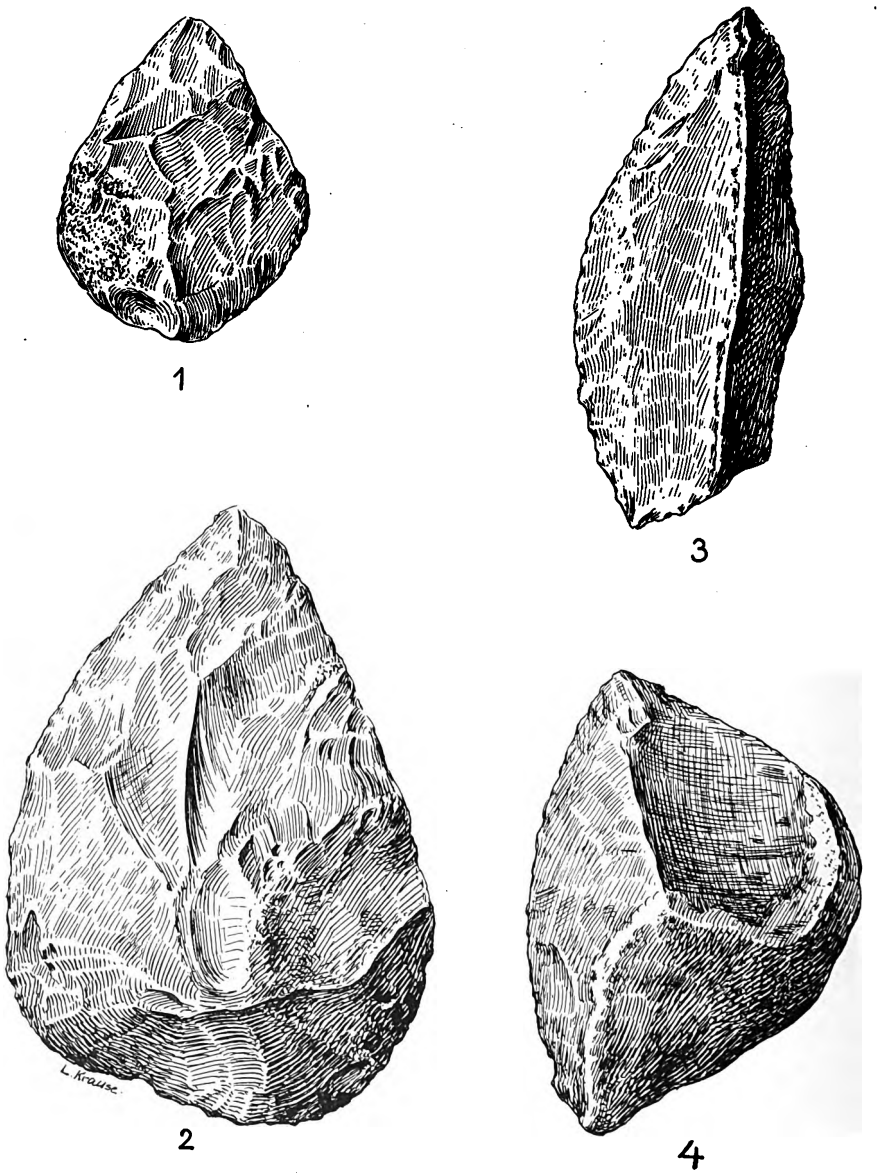


FIGURE 10. Flint hand axes (1-2) and scrapers (3-4) from the upper Mousterian level. Abri des Merveilles. Scale ¾.

equally the effects of wear. In each of the three gravers the worn facets indicate that the tool was always held in the same way when in use; and the position of the facet in each case is such as would be produced when the tool was held by the thumb and the first two fingers of the right hand.

A number of Aurignacian flint knives were found; a few of these have long straight edges with thick, carefully chipped backs. They vary in size (Nos. 6 and 7). Another interesting flint tool is a combination drill, or borer, and strangled blade made from a shapely pointed flake. The point is accentuated by means of reverse working and the two lateral notches are so situated as to make a bilaterally symmetrical whole (No. 4). A piece of worked reindeer horn is shown in No. 5—a sort of wand 11 cm. in length, oval in section and of uniform size throughout. It was originally much longer since both ends are gone. A piece of oxide of manganese, faceted through the removal of coloring matter, was found in the Aurignacian level.

Fauna.—In the deposits below the roadway, the faunal remains, with the exception of teeth, were poorly preserved. Between the roadway and the overhanging rock there was a perceptible improvement in the condition of the bones as well as teeth. For the Mousterian level the list includes reindeer, red deer, bison, *Bos primigenius,* horse, bear, fox, woolly rhinoceros, and wild boar. An adult human lower molar tooth was found in 1926 within less than a meter from one of the rock crystal tools (Fig. 8, No. 2). For the upper Mousterian level the list is practically the same, except that no human teeth or bones were found. The horse and reindeer were dominant in the Aurignacian horizon.

THE AMERICAN SCHOOL OF PREHISTORIC RESEARCH VISITS THE CAVERN OF EL PENDO*

By Don Jesus Carballo, *Director*
Prehistoric Museum, Santander

Dr. MacCurdy having been invited by Dr. Carballo, Director of the Museum of Prehistory of Santander (Spain), to accompany him in exploring the cavern of El Pendo in 1930, we went to Santander and after visiting the famous caverns of Altamira, Castillo, and Pasiega, each containing many examples of Paleolithic mural art, we went to the cavern of El

Figure 12. Harpoon of staghorn with two rows of barbs. Cavern of El Pendo. Magdalenian Epoch. Scale 9/10. Original in Museo Prehistorico, Santander.

Pendo, in which we worked for three days with our students, under the technical direction of Dr. Carballo. The results of this exploration constitute the object of the present article.

The great cavern of El Pendo is in the Valley of Camargo, Province of Santander, in northern Spain. It contains no mural art, but its deposits have yielded a prehistoric industry so abundant and perfect that it may be considered as one of the best in Europe.

The entrance faces South, and the first chamber is more than 100 meters long by 45 meters wide. Because of this size, the most populous tribe could take up its abode in it. And in addition, at its side runs a brook of fresh, pure water. Under such circumstances, one can understand that prehistoric man chose El Pendo as a camp site.

We shall treat only of the discoveries made by digging as guests of Dr. Carballo, and we shall study superficially the most notable objects of art. We selected the Magdalenian level, which is found to the right of the

* Translated by G. Edward Lewis, Yale University.

cavern because there it is distinct and cannot be confused with any other; moreover, it was there that Dr. Carballo had previously discovered his famous incised baton of stag horn, which Solomon Reinach called "the king of paleolithic sceptres."

Our students worked with genuine interest and enthusiasm, with the result that a number of important specimens were discovered. They unearthed flint instruments, such as scrapers, points, small knives, and gravers. Of paleontologic interest were various bones of Cervidae, Suidae, Equidae, and a few of Bison, Canis, and Capra. But that which merits especial mention is the discovery of implements of bone and horn, such as the small lances, harpoons, needles, and an amulet pierced for suspension.

For the first time we found in this cave a Magdalenian harpoon with a double row of barbs (Fig. 12), heretofore, all those encountered had

FIGURE 13. Harpoon of staghorn with single row of barbs and incised animal head. Cavern of El Pendo. Magdalenian Epoch. Actual size. Original in Museo Prehistorico, Santander.

but a single row. This beautiful specimen is made of deer horn, and has engraved upon it five crosses in a row, representing, perhaps, human figures in their most conventionalized form. Also worthy of mention is the harpoon bearing but three barbs (Fig. 13), which has a horse's head finely engraved upon it. It is the only harpoon found which bears a life-like figure, all the others having geometric designs.

Thus far no flat harpoons of the Azilian type have been found at El Pendo; while in other Cantabrian stations the flat harpoon is usually found in the Magdalenian horizon. In other words, a wholly post-Magdalenian type of harpoon for southern France, appeared in northern Spain before the close of the Magdalenian. May one not draw the conclusion, that Azilian culture entered southern France by the way of Spain? In this case the Azilian culture would have had its origin on the Cantabrian coast, in northern Spain, and thence would have spread over the Cordillera of the Pyrenees to southern France, meeting the first Neolithic manifestations which had reached Mas d'Azil by the Mediterranean.

Figure 14 represents a rib with engravings of classic Magdalenian type. On one side is shown a horse in conventionalized style, and the remainder

of the surface is filled with straight lines; the other side bears a serpentine figure, and a group of straight lines. All the engravings of this specimen are deep. We suspect that it may have had its entire surface painted with red ochre.

One of the most interesting specimens dug out at El Pendo by the

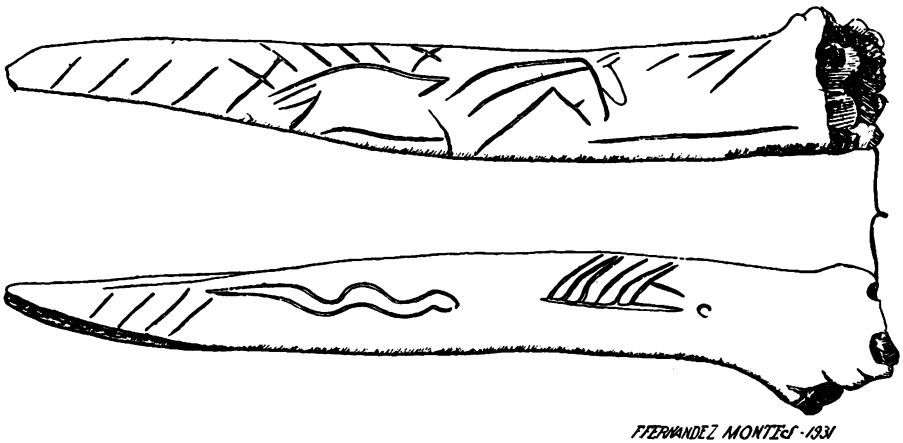


FIGURE 14. Rib with incised figure of horse on one side and serpent on the other. Cavern of El Pendo. Magdalenian Epoch. Scale 7/10. Original in Museo Prehistorico, Santander.

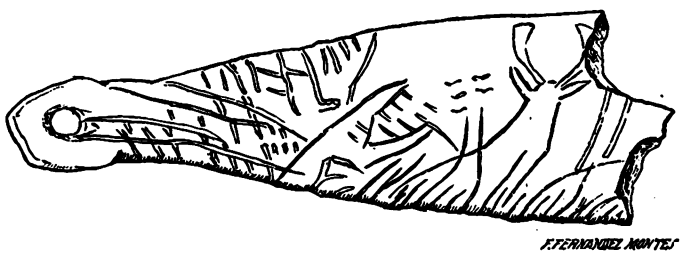


FIGURE 15. Pendant of staghorn with incised representation of a stag. Cavern of El Pendo. Magdalenian Epoch. Actual size. Original in Museo Prehistorico, Santander.

students is reproduced in Figure 15. It is a pendant of staghorn with a portion missing from the end opposite the perforation. By way of decoration the artist has essayed a pose for his model which is rare in paleolithic art. He has attempted to portray a stag with head turned away from the beholder. The body is partly visible above the tops of tall grass. The head is turned in such a manner as to hide the face and nose and bring

out prominently the ears and horns. To the left of this figure are incised lines, the meaning of which it would be difficult to determine. Piette found at Lortet (Hautes-Pyrénées) the end of a Magdalenian bone spatula* with incised figures of a stag in the same style and pose as this stag from El Pendo, except in the piece from Lortet, there is nothing to suggest a composition. In the example from El Pendo, there is such a suggestion in the growth of vegetation about the stag and perhaps also in the undecipherable combinations of incised lines at the left.

* S. Reinach, Repertoire de l'art quaternaire, p. 128.