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THE SANTA MARTA ROCK SHELTER OCOZOCOAUTLA, CHIAPAS, MEXICO

by

RICHARD S. MacNEISH AND FREDRICK A. PETERSON

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THE REGION

AN IMPORTANT RESULT of the extensive archeological explorations conducted in the Central Depression of Chiapas, Mexico, during recent years has been the identification of a preceramic occupation in a dry shelter cave near Ocozocoautla, on Santa Marta ranch. It is the earliest culture so far identified in southern Mexico. This first-reported example of a positively identified preceramic culture in the peripheral Maya region is an encouraging development in the search for the origins of the later civilizations.

The shelter is about 5 km. northwest of the town of Ocozocoautla. It is reached by a dirt road, leading off to the north of the Pan-American Highway at a point called "Paso Hondo," which goes to the Piedra Parada ruin (Stirling, 1945, 1947) and points north (Fig. 1). The shelter is on Santa Marta ranch, the property of Sr. Ernesto Maza Espinoza to whom the authors extend thanks for his generous aid and permission to excavate on his lands. The ranch is on a flat, long, sandy plain called Ribera Piedra Parada, delimited on its eastern end by the *meseta* of Ocuilapa. This meseta is formed by steep rock cliffs of heights varying from 50 to 200 m. These cliffs, of weathered sandstone, with some intrusive eroded limestone, contain one huge water-erosion cave, called "Cueva de la Cotorra," which may be seen from the Pan-American Highway. A reconnaissance of this cave showed no evidence of human habitation but served the purpose of leading to the discovery of a rock shelter about 200 m. distant. This other cave, running approximately north to south, was in an eroded part of the cliff and had a very high floor made of erosion-process talus. This shelter was named "Santa Marta" because of its location on the ranch lands of the same name. The top part of the shelter may be seen from the Santa Marta ranch-house, but the rest of it is obscured from view by thick vegetation (Pl. 1, *a, b*).

Santa Marta shelter is located in the northernmost end of the Central Depression of Chiapas, at approximately 16°42′ North latitude and 93°25′ West longitude. The Central Depression parallels the Sierra Madre mountains which lie to its west and southwest, while to the east are the Chiapas highlands. To the north, the great Northern Mountains rise and to the southeast are the Cuchumatanes Mountains of Guatemala. The Central Depression, so named by Federico Müllerried (1957), has a surface of approximately 9,000 square miles. It is roughly 250 km. long and varies greatly in width, from 20 to 55 km. Its height above sea level varies from 450 to 750 m., with the greatest height at the northeastern end of the Depression.

According to Müllerried (*op. cit.*) the geological formation of the Central Depression is mainly of strata of the Mesozoic era. These strata reach a thickness of approximately 3,500 m., with a slight inclination of 10 to 15 degrees to the northeast. Only to the northwest of Ocozocoautla and Santa Marta do they

Figure 1. MAPS OF MEXICO AND CHIAPAS

show some wide folds, on Cerro Colmena. These thick strata often contain fossils. Near Santa Marta the strata are all of sedimentary rock—at least no igneous or metamorphic rock strata were noted near Santa Marta. The surrounding area is composed of sandstones, conglomerates, and maritime limestone. The limestone and sandstone landscape is quite visible, with many protruding rock formations and other superficial forms such as eroded mesas and large concavities, due to the varied composition of the geological strata.

In general, the area around Santa Marta is a plain on which are hills, valleys, mesetas and mesas, and some slightly rolling landscape. According to soil maps (Vivó, 1949), the Central Depression has Chernozem soils with slight calcification, generally with hydrosilicates and frequently with quartz grains. Some of the soil is gray with some calcium carbonate, clay and sand.

The Central Depression of Chiapas is really the depression formed by the Grijalva River and its several large tributaries, with its lower limit at the mouth of the Sumidero Canyon, near Chiapa de Corzo. The general course of this river has been adequately described in both Müllerried (1957) and Lowe (1959), and so will not be repeated here. The only surface water of any importance near Santa Marta is a spring which feeds a small creek near Piedra Parada, although during the rainy season there are numerous run-offs and waterfalls from the Ocuilapa meseta above. Most of the surface water disappears completely in the October-to-May dry season. The greater part of the surface water infiltrates into cracks in the limestone strata and forms underground streams. Several ranchers have spent large sums of money attempting to locate these subterranean streams to avoid the trouble and expense of hauling water for their cattle. That these streams exist is evident to anyone who has gone down the La Venta River Canyon, for at frequent intervals the mouths of caves are seen with water gushing from them.

In general the region around Santa Marta shelter is of a dry or semi-dry tropical climate, although its position near the meseta of Ocuilapa and its proximity to the Northern Mountains often result in mist and chilly weather. Great rain-forests cover the eastern slopes of the Northern Mountains, but the western slopes which face the Central Depression are semi-dry with a long dry season and a short rainy season. Santa Marta is in a transitional zone between the moderately dry edge of the Central Depression and that of the nearby El Ocote rain-forest country.

Botanically (according to verbal communication with Mr. Thomas MacDougall) the Santa Marta region is subdeciduous, as is to be expected with a long dry season. Some epiphitic species are to be seen and several evergreen species. Probably most typical of the taller vegetation is the short dry-country oak on the nearby hills. Santa Marta vegetation is generally sparse and low, due principally to the shallow depth of sandy soil with numerous extrusions of surface limestone and sandstone. The vegetation today is mainly tropical savannah with low sparse bushes, herbaceous plants, some xerophytic plants, and with only a few areas of woodlands (mainly around the Piedra Parada Creek and the foot and top of the meseta of Ocuilapa). It is evident that this region was once heavily forested and probably much moister. The removal of the forests to make grazing lands and the inevitable *milpas* has had considerable effect on the vegetation of the region. The pasture lands are full of short herbaceous plants with many *Leguminosae* which resist drought very well.

Other aspects of this region will be described in another publication by F. A. Peterson, dealing with New World Archaeological Foundation reconnaissance in the municipalities of Ocozocoautla, Cintalapa and Jiquipilas.

PROBLEMS, METHODS, AND TECHNIQUES

This region was investigated and this specific cave dug for a number of reasons. First and foremost, it was studied in an attempt to elucidate its cultural sequence. This was a general problem of the New World Archaeological Foundation, and work in the Ocozocoautla region was assigned to F. A. Peterson. However, the actual excavation of this cave was made in an attempt to find preceramic remains in the region and to reconstruct the way of life of the people of that time-period. It was felt that such an endeavor might throw light on how "uncivilized" food collectors had become "civilized" food producers, as well as on the problem of why civilizations actually

arise. R. S. MacNeish, of the National Museum of Canada, was more concerned with these latter specific problems.

How these problems became defined and how the excavation of Santa Marta cave began were due to rather peculiar coincidental circumstances. As a background to the work they seem worth relating. There are two parts to the story because there are two people involved. The first part concerns Peterson. He was assigned by the New World Archaeological Foundation to make an archeological survey of the Ocozocoautla area, seeking sites of the Preclassic period for excavation. In the course of his survey and excavations Peterson found that he could obtain adequate ceramic samples by investigating caves. There are many limestone sink-hole caves of water-erosion origin in this area, many of which contain pots grouped for some sort of ceremonial purpose. During his search for such caves he found Santa Marta cave not far from Ocozocoautla. Since it had no whole pots and seemed likely to provide ceramic stratigraphy, he put a small test trench in it and also noted that it had a great deal of flint, unlike other caves and unlike the large ruins in the local area. In due course these lithic and ceramic materials from the cave were catalogued and stored in the Foundation's field headquarters in Tuxtla Gutierrez, Chiapas.

The other part of the story concerns MacNeish. He had worked on early preceramic remains in Tamaulipas where some of the caves had early food remains (MacNeish, 1958). The problems of this time-period were, therefore, of particular interest to him. After he had completed his preliminary work in Tamaulipas, it was suggested by his colleagues that he move further south into what appears to be the center of Mesoamerica and attempt to find similar materials. During the winter of 1958 he undertook a survey of Guatemala and Honduras. Since this survey was relatively unsuccessful, in the next season he moved to southernmost Mexico, which seemed to be close to the hypothetical center of Mesoamerican civilization. Due to limited rainfall in the area and the fact that a number of pieces of prehistoric cloth had been found in Chiapas (O'Neale, 1942; Wauchope, 1942), he decided to concentrate his efforts in one of these areas. When MacNeish came to Mexico in January of 1959, Dr. Ignacio Bernal of the Instituto Nacional de Antropología e Historia suggested that while in Chiapas he ought to consult Peterson. Thus Peterson and MacNeish met. After some discussion, they thought there might be a possibility of finding preceramic material at Santa Marta, so the next day they visited the cave. A few hours of cleaning and digging at the bottom of Peterson's old trench, which fortunately remained open, convinced them that at last preceramic remains had been found in Chiapas.

Next, Gareth W. Lowe, then Field Director of the New World Archaeological Foundation, offered the facilities and services of the institution for the excavation of the cave. The undertaking that followed was one of cooperation and harmony. MacNeish asked for the equipment that he found useful in cave excavations, while Peterson got such equipment, engaged the labor, and secured the necessary permission to excavate in the local area which he knew so well. Further, MacNeish's companion for the survey was William Edwards, an expert photographer who was experienced in archeological photography as well as with working under rather trying field conditions. To cap all this good luck the cave turned out to have excellent stratigraphy. In reality, the one month's work of excavation and analysis at this cave would under normal conditions have taken more than twice as long. For this reason we are extremely grateful to the New World Archaeological Foundation and its officers for the opportunity to do this important cooperative investigation.

The area of excavation was decided by two factors. First, the cave (Fig. 2) was a long (over 70 m.), narrow rock shelter (about 8 m. wide), with an overhang from 8 to 10 m. Secondly, Peterson had dug a trench from the entrance of the cave to the back wall, about 8 to 10 m. long, and, since the trench had remained open, strata could be seen in this 2-meter-deep trench, termed Trench A. After looking at the stratigraphy on both walls of Trench A and other general features such as levelness of the cave floor and the absence of large rocks, it was decided to put in a 3-meter-wide trench, termed Trench B, roughly east and west, parallel to Trench A.

Preliminary to digging this trench it was necessary to stake out the area. First, a line of stakes 1 m. apart, roughly in an east-westerly direction, was set up just north of Trench

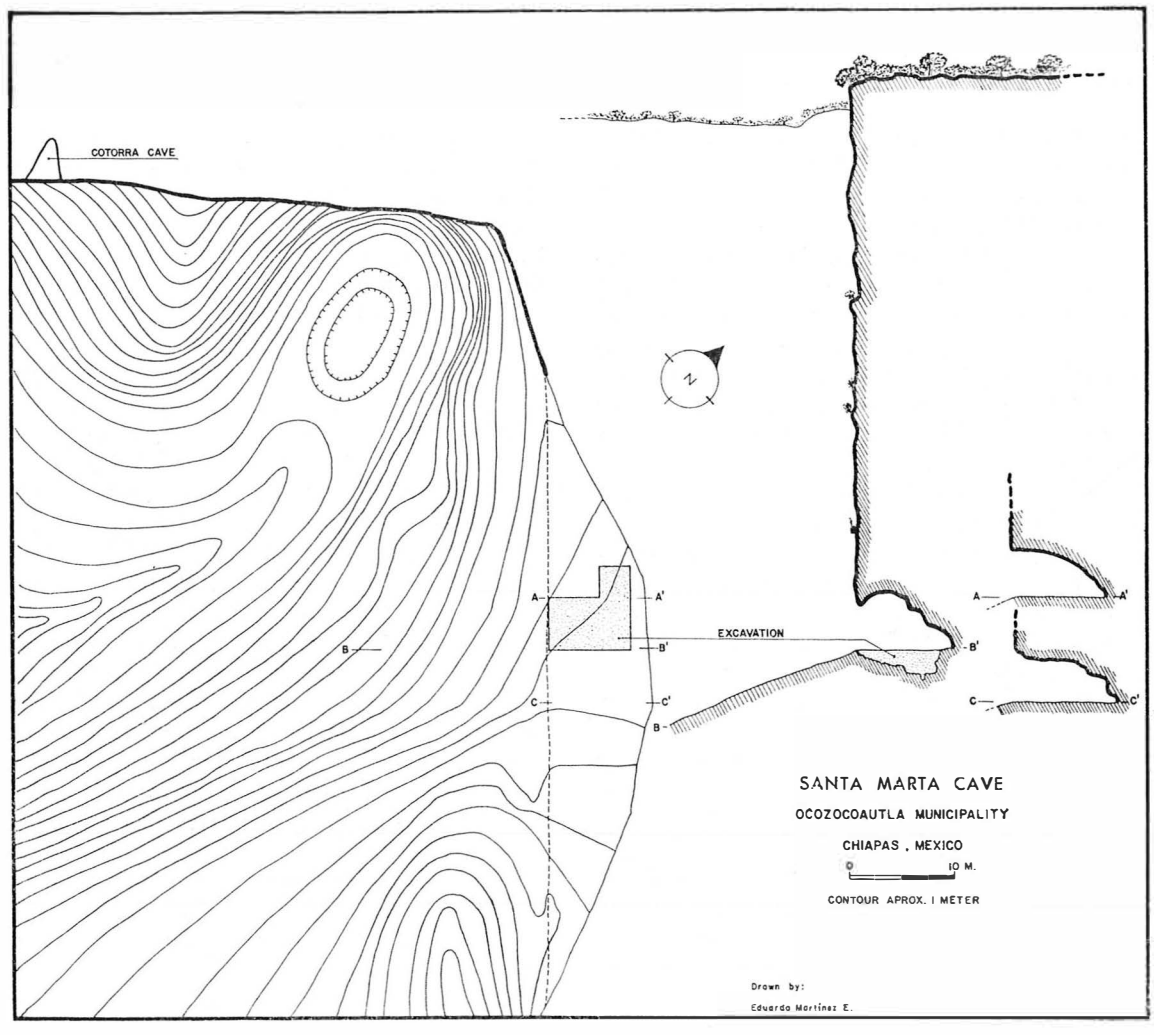

Figure 2. MAP OF SANTA MARTA CAVE AND AREA OF EXCAVATION

A. This was considered the east-west line, and one stake 4 m. from the back wall of the cave was considered the zero stake; the first stake to the east was called E-1, the first stake to the west W-1, and so forth. Using the zero stake in this line as a basis, the next step was a line of stakes set up at right angles to the first axis, which became the north-south axis. The stake 1 m. to the south of the zero-zero stake was termed S-1, and that 2 m. to the south (on the other side of Trench A) was termed S-2. In such a manner, stakes for a trench 5 m. wide and 8 m. long were set up and numbered for the major area of excavation. As far as the actual squares themselves were concerned, every square was surrounded by four stakes. The stake in the southeast corner of each square gave the name to that square; thus a stake surrounded by N-1, O, W-1, and N-1 W-1 was called the zero square.

The technique of digging was determined by two considerations. Peterson's trench showed a series of well-defined strata or zones. It was attempted to excavate in such a manner that this factor was utilized, thereby making it easier to discern the vertical stratigraphical position of each artifact. Another problem in cave excavation has to do with the removal of large boulders. In Tamaulipas, MacNeish often found that extracting boulders disturbed the strata and the position of artifacts, and so the trench had to be dug in

such a manner that large rocks could be removed without disrupting excavation. The excavation technique decided upon was that of vertical slicing; that is, an attempt was made to get a series of vertical profiles between 1.5 and 2 m. in height, clean these so that the strata could be seen clearly, and then move in about 1 m. from the vertical face, stripping off one stratum after another from that section until another vertical face was formed.

In order to do this excavation it was necessary first to clean very carefully the vertical walls of Trench A so that the various strata could be more easily discerned. Using the north wall as a datum point, an outside trench between W-4 and W-6 was then driven northward from the north edge of the trench to the N-3 profile. In excavating this trench along the W-6 axis, the trench was only a few feet deep, but at W-4 it was 1.5 m. Thus in the outside trench there was a sloping floor. This would allow one to pry large rocks out of the vertical profile, drop them onto the floor, and roll them up the floor and outside the cave. In this way, besides getting rid of the boulders easily, all the artifacts were found in situ.

At the same time that this cut was being prepared, a trench was driven between the E-1 and E-2 axis line, northward from the edge of the cleaned profile of Trench A to the N-3 axis. When these preliminary trenches were finished, a block remained, surrounded on three sides, with vertical profiles of about 2 m. (Pl. 1, *c*). This block was, horizontally, 5 by 3 m. Then the vertical slicing technique was begun in earnest. First, the vertical profiles were cleaned off and the various strata marked either by pegs or by incision with a trowel. As well, the vertical profiles were photographed and drawn on graph paper. Each level was either a complete stratum, or, if the stratum was over 20 cm. in thickness, an arbitrary 20 cm. level within a particular zone was termed a level.

In excavating a vertical profile a team of four men was used—a troweler, a cleaner, a carrier, and a screener. The troweler excavated as carefully as he could back from the vertical profile a convenient distance, usually about 1 m. or half a meter, stripping off just the indicated layer. The second man was a cleaner; he removed the dirt that the first man had troweled out and put it into a basket. The third man took this basket and brought it to the screens, so that, if either the first or second had missed certain artifacts, they could still be discovered by the fourth man at the screen. This fourth man also bagged the artifacts.

After the preliminary top layer had been taken off the whole length of a single trench, then the second stratum was stripped off in the same manner. This continued until the bottom of the trench was reached. When this was completed, a new profile appeared and the technique was continued into a few face. Since one could see the vertical profiles on two or three faces there was extremely effective control of the strippings of the actual strata. Once the top 1.5 m. or 2 m. block was removed, this technique was then continued down to the sterile soil at about 2.5 m. Somewhat later, another block was removed by the same method. This block was the northeastern part of the excavation and measured, horizontally, 3 by 3 m. Thus by the time the excavation was completed there was a large "L"-shaped trench, 8 m. long and 3 m. wide on its north-south axis against the back wall of the cave, and 8 m. long and 5 m. wide in the east-west axis from the back of the cave to its mouth.

Recording of the techniques and of what was found was done simultaneously with the excavation. In the initial cleaning of the profile of Trench A the actual zones were determined. During excavation, the levels removed from within these zones were noted. Such data as the square, level, zone, and other features were recorded on the cloth bags as well as in the daily diary. During the excavation a diary of what happened, what features were found and what strata excavated, etc., was kept, as well as catalogues of photographs, carbon specimens uncovered, soil specimens uncovered, and skeletons. In addition to the written notes, drawings of every 1-meter profile as well as of specific features were made on graph paper. Perhaps more important than the drawings were the many photographs taken by Edwards. These were not only of the profiles but of features, working techniques, actual artifacts *in situ,* and other details. The excavation began on February 10th and was completed on February 21st, 1959.

Once the last artifacts had been taken from

the ground the team returned to Tuxtla Gutierrez to the New World Archaeological Foundation laboratory, where the analysis began. First came the washing and numbering of specimens. All specimens were given a fractional designation, with the square number, such as N-1 or E-2, over the specific level numbers. Thus north-one, east-one over two ($\frac{N1E1}{2}$) signified square north-one, east-one, level two, zone A. Then the specimens were separated into cultural categories such as potsherds, projectile points, scrapers, blades, bones, and shells.

Specimens of each variety were laid on tables by stratigraphic levels, types were established, and the specimens measured. Next a brief artifact description was written. Later a plate for publication was made, illustrating each type of artifact. Next the congeries of types of each layer were compared. This was to establish phases or cultural complexes of artifacts. Also these phases were compared with others from surrounding areas when possible.

Besides the analysis of artifacts, a number of auxiliary aids were used. The carbon from the various layers was sent to the University of Michigan for carbon-14 analysis to determine dates of the layers. Soil was sent to Dr. Paul Sears and Monika Bopp, then of Yale University, to see if there were any indications of changes in climate and in plants used from one layer to the next. The charred corncobs went to Dr. Paul Mangelsdorf at the Botanical Museum of Harvard University for analysis. The animal bones, after being laid on our table by stratigraphic level and separated into tentative categories, were identified by Dr. Miguel Alvarez del Toro of the Zoological Garden of the State of Chiapas.

RESULTS OF THE EXCAVATIONS

THE NATURAL STRATIGRAPHY

UNDERLYING all the cultural material in the cave was a layer of whitish sand, often consolidated and filled with large rocks; this was called Zone I. Zone I along the W-6 profile was only about 1 m. to 75 cm. below the surface, but sloped downward toward the E-2 profile where it was 2.4 to 2.6 m. below the surface (Fig. 3; Pl. 1, *e, f*). A square dug into it at N1E1 reached a depth of about 3 m. below the surface and was completely sterile of human products. This stratum is believed to be the original floor of the cave when men first occupied it. Its peculiar formation, being very much higher near the front of the cave than at the back, is thought to have been caused by an accumulation of sand and rock washed off from the face and the top of the cliff. This action would have piled up sand and rock at the W-6 profile where it spread downward toward the back of the cave.

Overlying this sterile Zone I in the back of the shelter was a thin gray stratum never more than 2.5 cm. thick, designated Zone H. This zone seemed to be composed of charcoal which had become mixed with the original whitish sand. It contained bones, chips, and a scraper, but otherwise was sterile of cultural remains. This represents the first occupation, and the stratum (Zone H) is also recognized as Floor 1, Occupation 1. Its spread was fairly limited; it extended from the south wall of the excavation in S-2 to about N-3.4, and from the inner wall of E-2 to about the zero axis. Covering much of this stratum in the back of the cave was a huge, flat slab of rock that had sheared off of the back wall of the cave. Excavation Level 10 came from this zone.

Overlying the large rock, and underlying an even larger one that also had scaled off the back wall of the cave, was Zone G, Level 9. This zone was of an orange-pink soil that contained a thin 1-centimeter layer of charcoal about 5 cm. from its top. This charcoal floor, just barely underneath the large rock, was called Floor 2, Occupation 2, and contained artifacts as well as charcoal and animal bones. This stratum covered a larger area than the earlier floor. However, it reached only from E-2 to the W-1 profile, an east-west width of only 3 m., though it extended 8 m. along the back of the trench from almost the N-6 axis to the S-1 axis. The charcoal floor also extended to the N-6 axis.

Continuing out from the large rock overlying Zone G was a thin orange stratum, Zone F. It contained a large amount of rock fill, probably from the big rock itself, as well as minute specks of charcoal, animal bones, and a few artifacts. This was Level 8, Occupation 3. It occupied about the same territory as Level 9, Zone G, but was somewhat thicker (about 3 cm.). No well-determined floor was found associated with this zone, even though it contained artifacts.

Zone F, Level 8, gradually faded into the cream-colored sandy layer, Zone E, Level 7, above the large rock. It reached north and south the whole length of the 8-meter trench and from E-2.5 out to W-2. In a few spots, in the northern part of our east-west trench, it extended to W-3. At irregular and disconnected intervals within this stratum was a 5 cm. layer of white ash or grayish charcoal, called Floor 3, Occupation 4. It was extremely rich in artifacts, and most of the preceramic artifacts came from it. There were also a large number of bones, many of which were burnt.

Above Zone E, Level 7, was a distinctive hard, red, brick-colored stratum, called Zone D, Level 6. Its color and hardness suggest repeated burning. It has also been suggested that its red color may be due to leaching processes during a wetter period, but pollen studies indicate a dry period, so it is likely its red color is due to firing. It ran 8 m. east and west in the trench and 8 m. north and south. To the west, between W-4 and W-6, it was indistinct. In one place there was a small patch of ash, Floor 4, Occupation 5. In the west end of the trench was a large burial pit containing four burials, three of which were flexed, and one was laid on top of the other three. They were all covered by rocks. The stratum averaged between 20 cm. and 30 cm. thick. It was one of the most extensive cultural layers in the cave and seemed to represent a slightly longer occupation than any of the others. Preceramic artifacts were fairly abundant. Charred vegetable material and numerous animal bones were present.

Capping Zone D was Zone C, Level 5, which is somewhat difficult to characterize. In the interior of the trench there was a layer of charcoal 10 cm. thick. This extended to about the W-1 axis. Then the charcoal gradually blended into a thicker dark brownish, hard, clay-like soil. Both of these soil varieties are considered to be the same stratum, Zone C, Occupation 6. The interior is obviously a floor and is called Floor 5. It was from this zone that our first potsherds came, which resemble those of Phase I (Cotorra) of Chiapa de Corzo.

Above it, in the back of the cave, was a thin layer of rock fill. It ranged between 8 and 30 cm. in thickness, and varied from loose yellow sand to rather large slabs. It reached out from the back of the cave to its mouth. The rocks became less numerous toward the front of the cave where they were replaced by yellow soil. Although much of this stratum may represent fallen roof debris there were a few artifacts in it. This is known as Zone B, Occupation 7, and Level 4 pertained to it.

Above this Zone B was a thick layer of brown soil, called Zone A, which varied between 60 cm. and 1 m. in thickness. It covered the entire cave floor and evidently sloped down the outer bank. Level 3 was removed from the lower part of this zone. This represents Occupation 8. Above this level were discontinuous patches of burned clay—Floor 6. Level 2 extended from 20 cm. below the surface to just below these patches and seems to be Occupation 9 (we say "seems to be" because among the Classic period artifacts there are some Postclassic ones). The top 20 cm. of the cave were still within Zone A. In the northeast corner of the excavation a series of small lenses of ash appeared; these are considered as representing Floor 7, Occupation 10. Although much of the material is like the earlier levels, there are a few more sherds of a later period.

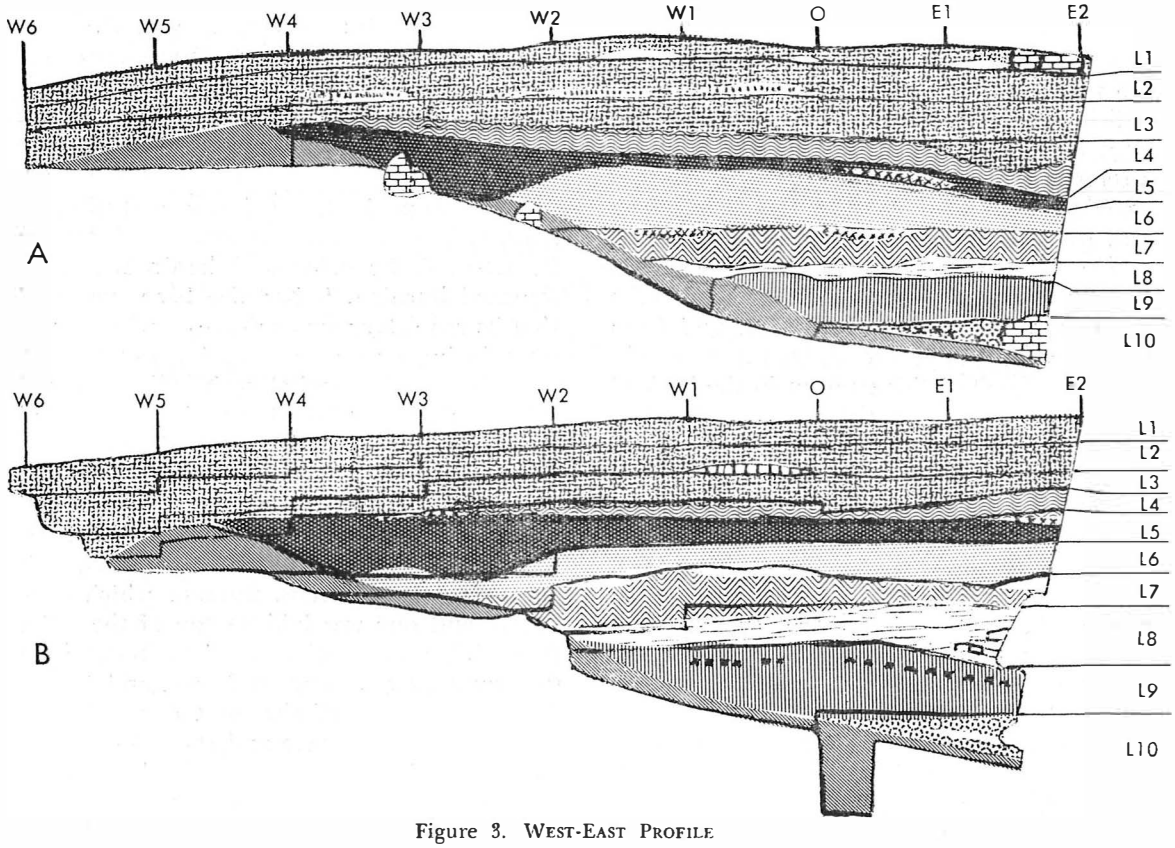

Figure 3. WEST-EAST PROFILE

a: South-Two Profile. *b:* North-Three Profile.

In total there are ten levels and nine distinctive strata, eight of which had evidences of human occupation in them. There were seven floors, one on top of another in the cave, and evidences of at least ten occupations. The pictures and profile drawings clearly indicate the natural stratigraphy.

THE CULTURAL SEQUENCE

The first evidence of occupation in Santa Marta cave is in Floor 1, Zone H, Level 10. Here was found a small, dark layer of charcoal which seems to represent a very temporary camp by a few individuals or a microband (MacNeish, 1958: 137). The bones associated were of squirrel. There were a few flint chips and one large side-scraper. Exactly who these people were is difficult to say at present on the basis of our slim evidence. They were probably food-gatherers and their occupation was extremely temporary. Monika Bopp has suggested that it might have occurred during a dry period, as pollen is very scarce.

In Zone G is found Floor 2 which represents our second occupation. In excavation this was called Level 9. Here there was a much larger charcoal floor, not very thick, but covering a larger area. This was probably a temporary camp of a much larger group, perhaps a macroband. Carbon-14 analysis yielded a date of 6770 B.C. ±400 for this occupation. The bone material was mainly of small animals, squirrel, armadillo, bird, snail, and a few land crabs. The color of the soil associated as well as the pollen content seem to indicate that it was formed during a dry period. Artifacts were relatively sparse; there were two thick side-scrapers, a pebble mano, and a nut-stone. Although the evidence is slim, these materials seem to represent a type of material culture that we are calling the Santa Marta phase.

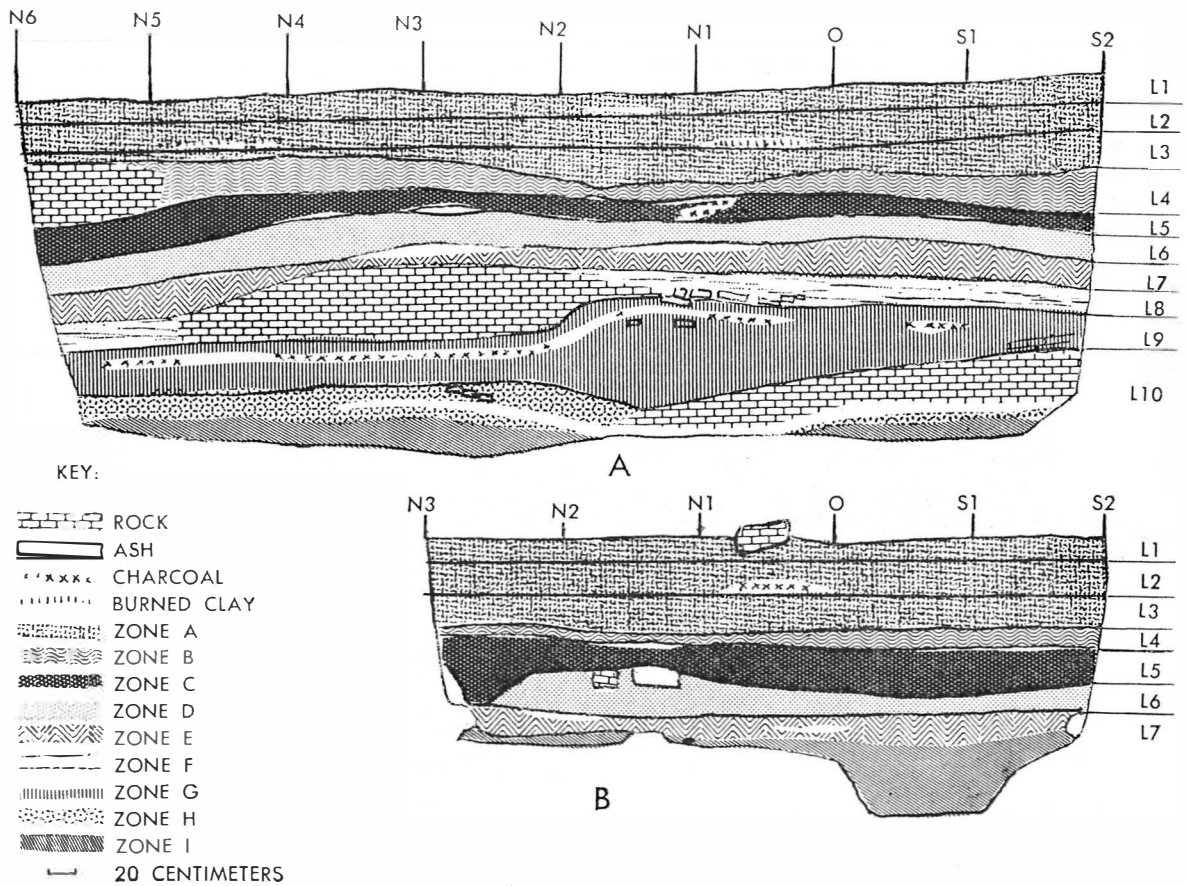

Figure 4. NORTH-SOUTH PROFILE

a: East-Two Profile. *b:* West-Two Profile.

Above this temporary camp of Santa Marta is a more extensive layer; this is Occupation 3 in Zone F, Level 8. Here was a relatively thick layer covering a very large area. This was probably a seasonal camp, and the size of the group was what might be called a macroband (MacNeish, 1958: 137). Again limited pollen may indicate a dry period. Animal bones were of white-tailed deer, peccary, tepescuintle, armadillo, bird and crab. Although some of these animals might have been hunted, many of them also could have been snared in traps. Other items of the material culture suggest that these people were basically plant-collectors. Artifacts include thin side-scrapers, a flat-top scraper plane, a nodule chopper, and a number of rude blades. On the basis of rather inadequate evidence this poorly defined component has been classified as also belonging to the Santa Marta phase.

In Zone E was found Floor 3, Level 7, which represents the fourth occupation. Carbon from this floor has been dated at 5360 B.C. ±300. Like Occupation 3, the refuse covered a relatively large area and was fairly thick. These factors suggest it was a seasonal camp by a macroband. Bones were relatively few; peccary, ocelot, agouti, armadillo, squirrel, bird and crab occurred. This faunal evidence suggests that these people were not hunters but rather trappers. The manos, metates, and sinew-stones suggest that they not only collected wild plants but possibly were engaged in some sort of incipient agriculture (although corn pollen did not occur). Artifacts were fairly numerous, and this layer is one of our best components of the Santa Marta complex. Projectile points include Abasolo, Almagre, and Nogales types (MacNeish, 1958). Scrapers include thick and thin side-scrapers, domed and flat scraper-planes, end-of-blade scrapers, ovoid plano-convex scrapers; there was also a gouge. Other artifacts include

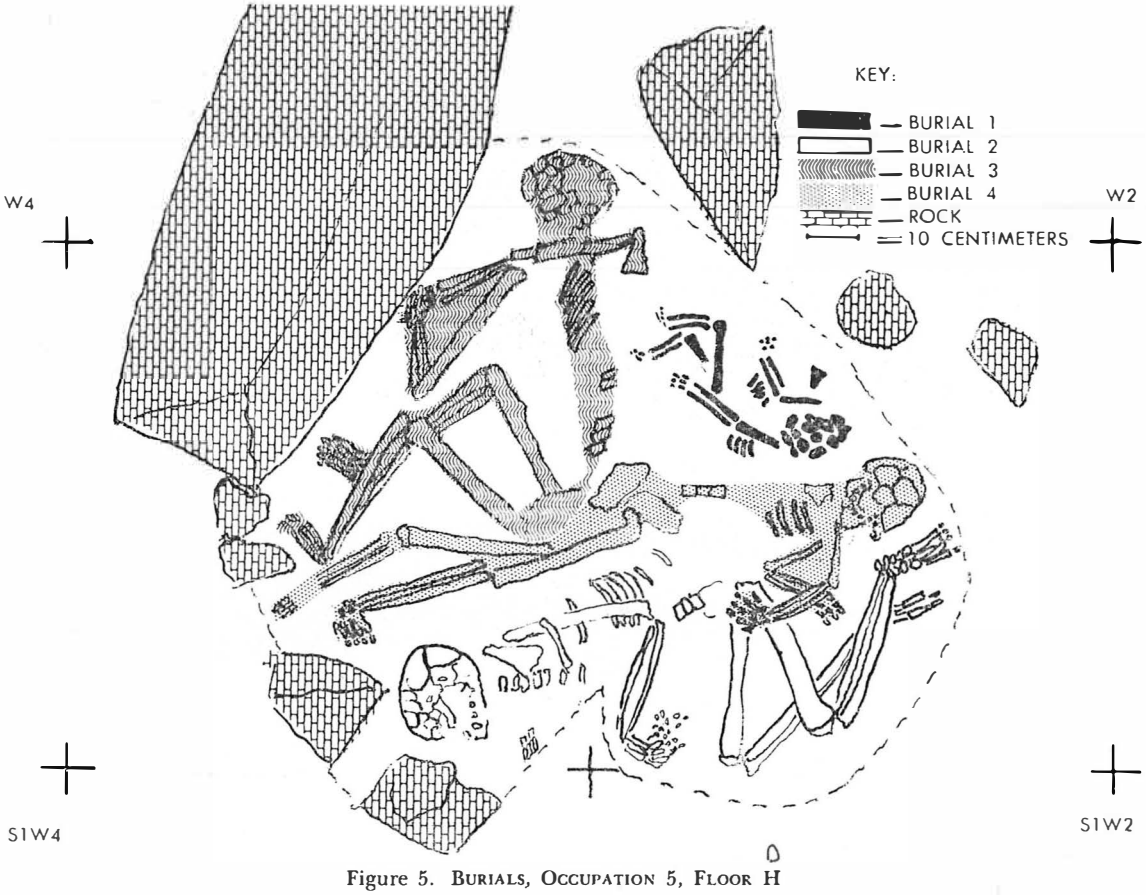

Figure 5. BURIALS, OCCUPATION 5, FLOOR H

rude blades and conical cores, flat choppers, possibly part of a needle, and one flake biface. Pollen from this zone contained larger amounts of pine and indicates that the climate was slightly more moist.

The climate seems to have changed again during Occupation 5, Floor 4. This was Level 6 from Zone D. Pollen is absent and it may have been very dry. Again we seem to have a seasonal camp of a macroband. Animal bones include red deer, peccary, tepescuintle, wildcat, agouti, armadillo, spider monkey, bird, snake and crab. The boulder metates and manos may be evidence of some sort of agriculture while the hammerstones and nutstones are obvious evidence of food-gathering. But the larger animals in the refuse certainly suggest that the people did some hunting. Artifacts were typically Santa Marta phase; in total there are 53. These included Almagre, Nogales, and Matamoros projectile points (MacNeish, 1958), thick and thin side-scrapers, flat and domed scraper-planes, chipped spokeshaves, end-of-blade scrapers, ovoid plano-convex scrapers, rude blades, conical cores, nodule and slab choppers, flaked bifaces, manos, nutstones, a hammerstone, three fragments of boulder metates, and a bone awl. A mass burial of four individuals, three flexed and one extended on top of them, also occurred during this occupation (Fig. 5).

As far as the stratigraphic evidence goes there seems to be no definite break between this layer (Zone D), estimated as having been deposited at about 3500 B.C., and Zone C, where Occupation 6, Floor 5 occurred. However, the carbon-14 date of 1320 B.C. ±200 for Floor 5 reveals that there must have been a large temporal gap. In Zone C the first pottery was found. Pollen characteristics suggest a dry climate. Animal bones include red deer, white-tailed deer, tapir, peccary, armadillo, squirrel, agouti, iguana and bird. The extent of the refuse seems to suggest a macroband. The stratum's thickness suggests relatively short although fairly extensive occupations, perhaps during a harvesting or planting season. Large amounts of corn pollen indicate that these people were farmers. The numerous large mammal bones may mean that the cave was also a base for hunting activities. Other artifacts include rude and fine blades, pottery and pottery-smoothers. The pottery is very much like that of the Chiapa de Corzo site in the earliest Preclassic period, which we are here calling the Cotorra phase. This same phase name has been adopted at Chiapa de Corzo (Lowe and Agrinier, 1960, Table I), in the Frailesca region of Chiapas (Navarrete, 1960), and at Santa Cruz (Sanders, 1961).

Zone B is mainly rock in which there is little evidence of human culture. It is called Occupation 7 and covers the Early Preclassic remains. It may represent a fairly lengthy break with little or no occupation in the cave. If this was a true occupation, it certainly was a temporary one by a very limited number of people. The pottery is a mixture of Preclassic and Classic. Flat-flake end-scrapers, fine and rude blades, and a true metate were found. Animal bones were fairly few and include tropical red deer, armadillo and bird. Corn pollen occurs along with pine pollen, and it would appear that this was a much wetter period.

Occupation 8, from the lower part of Zone A, Level 3, is more difficult to interpret. There was a great deal of mixed pottery with no well-defined floors. Animal bones include red deer, tapir, peccary, armadillo, hawk and other birds, snake, crab, and fish. Artifacts include a Nogales point (MacNeish, 1958), Santa Marta points, gouges, round scrapers, flat-flake scrapers, fine and rude blades, a shell tinkler, and shell pendants. The potsherds, however, are mixed Preclassic, Classic, and Postclassic, some of which are not unlike those found on the surface at the nearby Piedra Parada ruin. The soil coloring, pollen, and the animal bones suggest a fairly tropical environment, not unlike that of today. A possible hypothesis about this occupation would be that it represents a series of very brief habitations by travelers when they were passing from south of Ocozocoautla to Piedra Parada. Later undiscernable pitting has further mixed the remains of these brief visits.

Floor 6, Level 2, in Zone A seems to be Occupation 9. It has been dated as occurring at 90 A.D. ±200. Again much of the material from this level may be due to temporary camps of people traveling from one site to another; pitting or other earth-moving processes give us a rather heterogeneous cultural complex. However, Floor 6 certainly looks like the remains of a seasonal camp by a fairly large group. The corncobs and corn pollen in it and some of the artifacts suggest that per-

haps these were left by a band that occupied the cave during corn-harvesting or corn-planting season or seasons. Projectile points included Gary, Santa Marta, Ensor, and Teotihuacan types (MacNeish, 1958). Other artifacts were thick and thin side-scrapers, fine and rude blades (many of which were retouched), a shell pendant, a piece of ground stone, and perhaps one shell disk. Animal bones were fairly rare and include tapir, coati *(tejón),* armadillo, squirrel, iguana, crab and fish. The soil coloring, pollen, and the animal bones again suggested a tropical climate. While much of the pottery seems to be like the unclassified ceramics of Piedra Parada, some is definitely earlier and some is probably later.

Floor 7, Occupation 10, from Zone A at the top level of the cave, evidently represents a mixture of several periods. Many of the potsherds were of Classic period, but some were Preclassic and Postclassic. Many of the flint artifacts seem to be of the Postclassic period but there were also preceramic types. Artifacts included thick and thin side-scrapers, flat and domed end-scrapers, end-of-blade scrapers, ovoid scrapers, flat flakes, fine and rude blades, saw-toothed fine blades, ovoid choppers and other bifaces. There were numerous animal bones including red deer *(mazama),* white-tailed deer, puma, tapir, peccary, coati *(tejón),* monkey, squirrel, armadillo, bird, snake and crab. These animal remains in conjunction with a number of projectile points including Nogales, Santa Marta, Teotihuacan and Tula types, plus numerous scrapers and other chipped artifacts, suggest that we are dealing with seasonal hunting camps.

Occupation Periods

The first five occupations of the cave seem to have been by people having artifacts belonging to the Santa Marta phase. These occupations were both temporary and seasonal by both microbands and macrobands. The climates during the first three of these occupations seem to have been somewhat drier than at present as evidenced by the lack of arboreal pollen but may have become wetter in the fourth and, during the fifth, much drier. The subsistence seems to have been mainly food-gathering, some hunting or trapping, with possibly incipient seed agriculture. Pollen seems to indicate that corn did not occur at this time in this region. Artifacts diagnostic of this stage would be Abasolo, Nogales, and Matamoros points, flaked bifaces, conical polyhedral cores, ovoid plano-convex end-scrapers, end-of-blade scrapers, flat scraper-planes, domed scraper-planes, pebble hammer, flat choppers, nodule choppers, nut-stones, spoke-shaves, gouges, sinew-stones, boulder metates, pebble manos, and a bone needle. Blades and Almagre points, though they appear in later horizons, also are diagnostic of this period. More general traits found in these components were an awl, bifaces, and thick and thin side-scrapers. Carbon-14 dating reveals the phase to have existed between 7000 and 3500 B.C.

Occupation 6 seems to have been basically a brief seasonal occupation or occupations, by a macroband or bands having a material culture quite similar to the earliest remains at the Chiapa de Corzo site which are called the Cotorra phase. Obsidian blades occur as well as rude flint blades and a pebble pottery-polisher. The pottery is mainly from vessels of *tecomate* form. These may be brushed, zone-brushed, punctated, red-painted or plain. Also one flat shallow bowl of polished black occurred. This is an Early Preclassic component which was found in a well-defined stratum that sealed in the preceramic remains and was completely separated from later strata. Carbon-14 dates reveal that it occurred between 1100 and 1500 B.C.

The possible seventh, eighth, and ninth occupations of the cave all seem to be of somewhat mixed components. The occupations during this time are difficult to classify with precision because of the occurrence of various Classic period ceramic types along with Preclassic and Postclassic. The carbon-14 date of 90 A.D. for the ninth occupation, however, shows that some of it was during Late Preclassic times. Other artifacts are metates made of volcanic tuff, flat-flake end-scrapers, retouched obsidian blades, Santa Marta points, Teotihuacan points, Gary stemmed points, ground stone, a fragment of a celt, shell disk end-pendants, and shell tinklers.

The final occupation is even more poorly defined. All of the previous ceramic types occurred plus some new unclassified types that appear to be of Postclassic times. Other artifacts which might be characteristic of this final occupation are: saw-edged blades, Tula triangular points, a drill made from a blade,

and a piece of a rectangular celt. However, there are many projectile points as well as scrapers like those of the Santa Marta phase. Only further work on other sites can really define the Postclassic phase or phases.

Thus, in toto, we appear to have occupations by at least four entirely different cultural groups. The five early preceramic components and the Early Preclassic occupation are well defined while the two (or more) later ones were difficult to discern in our cave deposits.

TABLE 1. DISTRIBUTION OF ARTIFACTS

OCCUPATION	1	2	3	4	5	6	7	8	9	10
Fine orange pottery										8
Aztec purple pottery										1
Black-on-brown pottery										1
Black-on-orange pottery										1
Engraved black										1
Tula triangular projectile point										1
Fine saw-edge blades										6
Blade drill										1
Polished celt										1
Ground slate									1	
Teotihuacan side-notched projectile point									1	4
Ensor side-notched projectile point									1	
Santa Marta uniface projectile point								1	2	11
Shell tinkler								1		
Shell disk (pendant)								1	1	
Polished black pottery								1	4	
Negative-paint pottery									3	
Teotihuacan-like pottery							1		1	1
Classic ollas							4	7	10	18
Bichrome pottery								7	38	37
Polychrome pottery								1	6	4
Service-ware pottery								169	255	300
Black-on-white lug							1			
Brown crazed pottery							16	36	17	16
Orange slip							6	16	11	22
Filleted							5	1	2	3
Brown-red ware (with zoned punctations)							99	43	97	106
White-surface pottery						1	10	8	5	8
Gary stemmed projectile point							X	X	1 (?)	X
Retouched fine blades							1	2	4	16
Flat-flake end-scrapers							1	1		1
Metate of tufa							1			
Pebble polishers						1				
Fine blades						1	1	3	4	12
Black-ware pottery						1				
Gray-ware pottery						22	21	10	8	13
Smudged-ware pottery						36	30	76	138	146
Smoothed-ware pottery						83	20	9	37	104
Plain tecomate pottery						11		4		1
Brushed tecomate pottery						185	105	61	69	54
Red-rim tecomate pottery						14	1			
Zone punctate pottery						12				

TABLE 1. DISTRIBUTION OF ARTIFACTS *(Continued)*

OCCUPATION	1	2	3	4	5	6	7	8	9	10
Bifaces					1					1
Awl					1					
Pebble hammers					2					
Matamoros point					1					
Boulder metates					3				?	?
Almagre point				1	2	?	?	?	?	?
Nogales point				1	1			1		1
Ovoid plano-convex end-scrapers				2	3					1
End-of-blade end-scrapers				1	2					2
Slab choppers				2	3					1
Gouge				1			1			
Conical core				2	2					
Flake biface				1	1					
Spokeshave				1	2					
Dome scraper-plane				1	2					
Abasolo point				1						
Needle(?)										
Sinew stone				1						
Small thin flake side-scraper			1	4	5				5	15
Crude blades			5	10	7	2		2	3	16
Flat scraping planes			1	4	4					5
Nodule chopper			2		3					
Pebble mano		2		3	4					
Nut-stone		1			1					
Large thick flake side-scraper	1	2		2	3				1	4

(X—indicates presence, but statistics lacking.)

CULTURAL RELATIONSHIPS

Santa Marta Phase

An attempt to determine relationships of the Santa Marta phase is hampered by two factors. First, the sample of artifacts from the Santa Marta components is very limited in number and, second, comparative material from preceramic horizons in the rest of Mesoamerica is not numerous.

The preceramic materials nearest geographically to Santa Marta were found by J. L. Lorenzo in 1960 near Comitán, Chiapas (personal communication). In excavation he discovered only a few chips in the rock shelters but surface collections netted a number of tools that probably were preceramic. Except for a few side-scrapers of very general forms not a single one of these artifacts is like those from Santa Marta. Of an equally unsatisfactory nature are artifacts uncovered by Lorenzo in 1955 from the Yuzanu open site near Yanhuitlán, Oaxaca. At this site 7 (or 8) artifacts, 58 flint chips and other cultural features were unearthed from a well-defined, deeply buried stratum that had become exposed in the back of an arroyo (Lorenzo, 1958). This occupation has been dated as 2094 B.C. ±200 (W497) and 1984 B.C. ±200 (W480). All of the tools are similar to those from Santa Marta, but they are of such a general nature that one would expect to find them in almost any preceramic site in Mexico.

Recent (1961) excavations in two caves in the Tehuacán, Puebla, region by M. Fowler, A. G. Cook, F. A. Peterson and R. S. MacNeish for the R. S. Peabody Foundation for Archaeology have revealed a long sequence including at least three preceramic complexes (MacNeish, 1961). As yet these investigations have not been completed nor have the materials uncovered been thoroughly analyzed. The earliest complex, called Ajuereado, with Lerma points, flake choppers, snub-nosed end-scrapers, blades, etc., and the latest preceramic complex, called Coxcatlán (dated at 3600 B.C. ±250; M—1089), with stone bowls, side-notched and wide-barbed projectile points, disk choppers, small scraping planes, pebble manos, boulder metates, and incipient agriculture, bear little resemblance to Santa Marta. The middle preceramic complex, called El Riego, however, does resemble it. They have in common a whole series of scrapers and scraping planes, gouges, choppers, pebble hammers, pebble manos, blades and conical polyhedral cores, and nut-stones, as well as Abasolo, Nogales, and Almagre points. Let us hasten to add that the more abundantly represented El Riego complex has a large series of traits and artifacts not found in our meagerly represented Santa Marta phase. In spite of this we believe that they are somehow related.

The next sets of material are those that Helmut de Terra found and excavated in the Valley of Mexico (De Terra, 1949). There are three main comparable phases or possible phases of roughly comparable age; the reputedly earliest one is called the Tepexpan industry. Most of these materials were found at only one site on an El Risco beach not far from the Iztapan mammoth site (Aveleyra, 1956) and the Tepexpan skeleton (De Terra, 1949). The number and kind of artifacts again are extremely limited. On the basis of this evidence there seems to be little reason for differentiating this set of artifacts from the ones that De Terra has called the Chalco industry. This latter industry is reputedly relatively widespread in the Valley of Mexico and there are numerous collections of artifacts, from different places. One site, possibly belonging to the Chalco complex (but also possibly to a separate phase) and from which we have actual excavated material is Chicoloapan (De Terra, 1959: 563). The materials from this site, on the same general time-level as Santa Marta, are probably the most reliable from the Valley of Mexico. Unfortunately, here again we must deal with limited samples.

Moving further northward, De Terra found a few non-ceramic materials in a cave near Cerritos in the State of San Luis Potosí (De Terra, 1949); these he classified as belonging to the Tepexpan industry. In reality they are so similar to nearby materials from Tamaulipas that we feel sure they are surface finds of components of the Ocampo phase. A few choppers and scrapers have also been found in San Luis Potosí which De Terra assigned to the Chalco industry. These again may very

well come from components belonging to the Ocampo phase of southwest Tamaulipas.

The most abundant material we have to compare with Santa Marta is from various complexes in Tamaulipas (MacNeish, 1958). It is unfortunate that our best material is the farthest away, but, as we shall see, there are some rather significant similarities between them. In southwestern Tamaulipas we have, from early to late: the Infiernillo phase, the Ocampo phase, and the Flacco phase. These range in time between about 9,000 and 4,000 years ago (Kaplan and MacNeish, 1960). To the east of these materials in the Sierra de Tamaulipas we have a comparable sequence of culture from 7,000 to 3,500 years ago. The earliest is Nogales, next is La Perra, and finally Almagre (MacNeish, 1958).

In the following Table 2 these various preceramic phases or sites have been compared with Santa Marta. It becomes immediately apparent that three sets of materials have the greatest similarities. These are Santa Marta, El Riego and Almagre. These similarities are perhaps significant for this time stage. They include conical polyhedral cores, Almagre (or Gary) stemmed points, perhaps Abasolo and Nogales points, rude blades, flat choppers, nodule choppers, end-of-blade scrapers, flat scraper-planes, domed scraper-planes, spokeshaves, pebble manos, and boulder metates or mullers. There are some more general features in common which include plano-convex end-scrapers, thick and thin side-scrapers, ovoid bifaces, pebble hammers, and awls. The next greatest similarity is with Coxcatlán, La Perra, Flacco, and the ill-defined Chalco and/or Chicoloapan complex of the Valley of Mexico. It is possible that the Chalco, Chicoloapan, and Tepexpan industries are all one and the same thing. The other preceramic sites in Mesoamerica bear much less similarity to Santa Marta than the ones just mentioned.

Before going further, however, one must also say that some of the Cochise materials, particularly those from the early levels (Amargosa-like phases) of Ventana cave (Haury, 1950) in Arizona and the Peralta complex of Sonora (Fay, 1956), bear resemblance to those of Santa Marta and the complexes just mentioned. Some of the scraper-planes, manos, mullers and choppers are very similar. However, there are some significant differences. The notched projectile points, drills, and end-scrapers in the late Cochise sites are dissimilar. Also the gouge is absent in Cochise and as yet no blades or conical polyhedral cores have been recorded from those cultures.

Thus, tentatively, at the approximate time of the Santa Marta complex (7000 to 3500 B.C.) there were at least two traditions existing in Mexico, one in the northwest which might go under the name of Cochise, and another in the northeast extending from Tamaulipas into the Valley of Mexico and to Chiapas, which might be called the Abasolo tradition. Within the Abasolo tradition we have Santa Marta, Almagre, Flacco, Chicoloapan, El Riego, La Perra, Ocampo, Nogales, and probably Chalco. The Yanhuitlán site also might be similar. Infiernillo might vaguely be construed to be at the beginning stage of such a complex. It is our impression that these two traditions are more similar in the earlier part of their histories. That is, Santa Marta, El Riego and Infiernillo with their more abundant scraping planes, choppers, mullers and Almagre points are more like early Cochise than the later manifestations. Considerable more evidence is, however, needed, both to define these traditions as well as to determine the relationship between them.

There is another set of relationships that might be made, that is, between the Santa Marta culture and those Preclassic complexes that follow it in the Chiapas region. In Chiapa de Corzo I or Cotorra there are quite a few similarities with Santa Marta traits such as basin or boulder metates (Dixon, 1959: 19; Fig. 53, *e-g*), Almagre points, rude blades, thick and thin side-scrapers, and plano-convex end-scrapers (Personal observations on specimens found at Chiapa de Corzo). Thus there are some hints of continuity from Santa Marta to the earliest phase of the Preclassic in Chiapas. However, the problem of whether the numerous differences between them are due to the fact that the transitional stage is as yet still unfound, or whether the Preclassic stage represents an invasion of new people who adopted a few Santa Marta tools, cannot be definitely determined on the basis of present available evidence. The carbon-14 dates for Santa Marta and Cotorra which show them to be separated by 2,000 years would tend to confirm the former hypothesis.

Cotorra Ceramic Complex

Level 5 ceramic material definitely belongs to the first ceramic complex found in Santa Marta cave, and, furthermore, formed part of a widespread ceramic system. Material comparable to that in Santa Marta Level 5 has been found at Chiapa de Corzo in considerable quantity and has been studied in part by Keith Dixon (1959:4-19). The greater part of the Chiapa de Corzo material is still being studied by Bruce Warren.

The tecomate and cylindrical vessel sherds found at Santa Marta in Level 5 have been compared with material from Chiapa de Corzo of the earliest complex and, allowing for local variations of firing and other variables, have been found to be practically identical. The differences noted between Chiapa de Corzo sherds and those at Santa Marta are that Santa Marta sherds are thinner, of rougher surface, less elaborate, and generally are from smaller vessels. Chiapa de Corzo sherds

Table 2.

Occurrence of Santa Marta Artifact Types in Other Preceramic Complexes or Phases in Mexico

	SANTA MARTA, CHIAPAS	EL RIEGO, PUEBLA	ALMAGRE, TAMAULIPAS	COXCATLAN, PUEBLA	LA PERRA, TAMAULIPAS	CHALCO, VALLEY OF MEXICO	FLACCO, TAMAULIPAS	OCAMPO, TAMAULIPAS	NOGALES, TAMAULIPAS	INFIERNILLO, TAMAULIPAS	CHICOLOAPAN, VALLEY OF MEXICO	TEPEXPAN, VALLEY OF MEXICO	YANHUITLAN, OAXACA
Sinew stone	1												
Slab bifaces	2	X		X									
Nut-stones	2	X		X									
Matamoros points	1		4	X									
Conical polyhedral cores	4	X	3	X									
Rude blades	22	X	7	X									
End-of-blade scrapers	3	X	3	X	1						X		
Spokeshaves	3	X	1	X	1						X		
Flat-top scraper-planes	9	X				X	16	X		X			
Battered nodules (mentioned with nodule chopper)	1?	X	3		14	X	2		1				
Gouges	1	X	8		5	X	1	3	7	3			
Split bone awls	2	X	1	X	2	X	2	1		3			
Almagre points	3	X	8	X	3	X	1			4	X		
Slab choppers	5	X			1	X	4	26	1	47		4	
Ovoid bifaces	1	X	30	X	9	X	1		26		X		
Domed scraper-planes	3	X	22		10	X	2	8	5	15	X		
Nogales points	2	X	12	X	12	X	3	2	24			X	
Boulder metate or mullers	3	X	10	X	9	X	2	5	2	6?			
Abasolo points	1	X	35	X	23	X	9	17	64	3		X	
Pebble manos	9	X	8	X	7	X	3	2	6		X		X
Nodule choppers	4	X	5		1	X	1	5	2	13	X	X	X
Pebble hammers	2	X	9	X	11	X	1	1	10	1	X		X
Large thick side-scrapers	8	X	1	X	13	X	37	9	14	3	X	X	X
Thin side-scrapers	10	X	11	X	28	X	76	15	14	3	X	X	X
Number of Santa Marta types	24	22	19	17	17	16	16	13	13	12	10	6	5

(X—indicates presence, but statistics lacking.)

have a much higher percentage of hornblende temper. On the basis of ceramic typology, we are inclined to believe that Santa Marta Level 5 sherds may be slightly earlier than those of Chiapa de Corzo. The carbon-14 date of 1320 B.C. for Level 5 of Santa Marta and the date of 1292 B.C. for the earliest levels of Chiapa de Corzo tend to confirm this opinion.

Similar material has also been found in the Ocos component at La Victoria, Guatemala, by Michael Coe (1959, 1961), at El Mirador in Chiapas by Fredrick Peterson (in preparation), at Padre Piedra by Carlos Navarrete (1960: 10-12; Figs. 22-24), and at Santa Cruz by William Sanders (1961). Pottery from Level 5 of Santa Marta is also prior to Mamom (Ricketson and Ricketson, 1937). It would seem, therefore, that Santa Marta Level 5 ceramics at 1100 to 1500 B.C. are, at present, among the earliest found in southern Mexico.

It is strange that few similarities have been noted in the earliest components in the surrounding states of Oaxaca and Tabasco. It would seem that the earliest pottery found there would correspond to the Chiapa II phase. Recently, Chiapa II ceramic materials were found in Ajalpan in southern Puebla by the authors, but as yet no Chiapa I has been located. Yet the ceramic technology of the Chiapa I phase is considerably advanced, suggesting origin elsewhere. This situation requires further studies before definitive statements should be made as to ceramic origins.

Later Complexes

In the upper materials there are obviously at least two phases represented. One of these contains ceramics much like those found at Piedra Parada by Stirling (1945, 1947). At present we feel it would be presumptuous of us to plot the relationship of these materials. In the first place, our materials are limited in number and, second, the strata in which we uncovered them have obviously, to an undetermined extent, been disturbed. Last and most important, the numerous ceramics of Piedra Parada may be analyzed in the near future and relationships so determined will be far better than any we might plot. In fact, any attempt of ours to introduce a new ceramic typology might seriously inconvenience future work on Piedra Parada materials. Thus, all we shall say of our specimens is that they are above Preclassic remains and are probably of the Classic period and date about 90 A. D. The majority of the sherds are like those found at Piedra Parada during surface reconnaissance, and have some sort of connection with the Classic of the rest of Mesoamerica.

The other set of materials seems to be Postclassic, and here we find ourselves at an even greater disadvantage. Not only are the number of specimens limited and found under disturbed contexts, but no Postclassic sites have been studied in this region. So the less said the better.

HISTORICAL RECONSTRUCTION

The present report may seem premature and we are all well aware that many things should have been done to make it more complete. Soils were collected and sent to be studied as to their formation and we have no reports on them as yet. Similarly a number of corncobs and some carbonized vegetable material were sent for identification. Obsidian chips were to be studied for age determination. A more adequate sample of preceramic artifacts from Santa Marta would be desirable. Finally, we have longed for still unpublished information on the later complexes from nearby sites that might give us a better understanding of the few sherds we found in our cave.

Be that as it may, since these are the first preceramic materials found in southern Mexico they are significant. We feel that our colleagues should know of them and we also feel that the New World Archaeological Foundation should receive credit for their discovery and publication. In terms of the two academic crimes, not publishing and thereby holding up the advance of our science, or publishing prematurely with the possibility of some misinterpretation, we prefer to be guilty of the latter rather than of the former.

Thus we will conclude this report with a brief attempt to reconstruct the lives of the peoples who left their remains in the Santa Marta cave.

First we shall try to construct the way of life of the people whose remains we are calling the Santa Marta phase. Carbon-14 dates of two floors indicate that they may have occupied the cave from about 3500 to 7000 B.C. Various faunal and pollen changes and differences in soil coloring show that when they first came into the cave the climate was perhaps

TABLE 3. TENTATIVE CORRELATION OF SANTA MARTA SEQUENCE WITH OTHERS OF MEXICO

CHIAPAS	SOUTHERN PUEBLA	OAXACA	VALLEY OF MEXICO	SOUTHWEST TAMAULIPAS	SIERRA DE TAMAULIPAS
Ocozocoautla	Venta Salada	Mitla	Aztec	San Antonio	Los Angeles
			Tula-Mazapan	San Lorenzo	
	Palo Blanco	Monte Alban IV	Teotihuacan IV		La Salta
		Monte Alban III	Teotihuacan II-III	Palmillas	Eslabones
Piedra Parada	Santa Maria	Monte Alban II	Teotihuacan I Ticoman Middle Zacatenco		Laguna
			Tlatilco		
	Ajalpan	Monte Alban I	Early Zacatenco		
			Early El Arbolillo		
Chiapa de Corzo I	?			Mesa de Guaje Guerra	
		Yanhuitlan	Chicoloapan	Flacco	Almagre
	Coxcatlan		and		
			Chalco		La Perra
			and		
			Tepexpan	Ocampo	
Santa Marta	El Riego		Industry		
					Nogales
				Infiernillo	
	Ajuereado		Ixtapan		Lerma
					Diablo

drier than at present, that during the fourth occupancy it had started to become wetter, but in the fifth it was very much drier. We think there is a possibility that the late dry period represented may be the early part of the Post-glacial Optimum and that the Santa Marta peoples lived during the Anathermal period and disappeared just after it in the Altithermal period. From the size and thickness of the occupational deposits we feel fairly sure that they were not sedentary peoples. The exact size of the groups probably varied somewhat during their five initial occupations but it never could have been very large. The extent of refuse during the early occupations would seem to indicate that they were very small microbands and perhaps had increased to the size of macrobands by the end of their occupations. We greatly suspect that many of their occupation sites were probably small camps outside of rock shelters as well as in them.

The part of their life that we see most clearly is connected with subsistence activities. That they acquired some of their food by hunting is indicated by the bones of animals such as deer and peccary. The size of the projectile points suggests that these animals were killed with either atlatl darts or spears. The meat and skins were cut by numerous sharpened flakes and blades. Further, the bones were often broken for the extraction of marrow. Patches of carbon with occasional fire-cracked rock probably indicate that they roasted some of the meat over the coals. The bones of many of the smaller animals such as squirrel, iguana and the like suggest that this game may have been caught in various kinds of snares or traps.

There is evidence that they were food-collectors. In fact, the relatively small proportion of bones per cubic foot of refuse and the numerous shells may indicate that this was one of the main forms of subsistence. The burned shells and cracked shells of a number of varieties as well as the carbonized vegetal remains further confirm this deduction. The scraper planes, the manos, the metates and nut-stones may have been the implements used in preparing these collected foods.

There is a possibility that they had an incipient agriculture—certainly this is true of

related cultures of roughly the same time-period in Tamaulipas and Puebla. The lack of corn pollen, however, would tend to show that corn was not known. Perhaps the manos and metates found with our Santa Marta materials may have been used for the preparation of beans, squash or other domesticated plants that would not leave traces in pollen profiles.

The artifacts themselves give us some glimpses into their technology. A great many of the remains result from chipping flint. One of the techniques used was the bifacial pressure and percussion chipping of large flakes to form such tools as projectile points, knives, choppers and scrapers. Other tools such as the larger scrapers and choppers were often made by simple unifacial percussion flaking. A more advanced flint technique may be seen in their conical polyhedral cores made by pressure-flaking with the resultant prismatic blades. These prismatic blades were retouched, by pressure, into a variety of cutting, drilling and scraping tools.

That they did some wood-working is indicated by the spokeshaves and bifacial gouges. It also seems plausible to suppose that they worked hides, as there are numerous scrapers for cutting and preparing skins as well as awls and drills that could have been used to pierce hides. The grinding of stone seems to have been more accidental than purposeful and resulted in the manufacture of rude manos and metates from various pebbles or boulders.

The one multiple burial gives us a hint as to their religious activities and probable belief in an after-life.

As yet, this is all we may say about the life of these most ancient people of the Santa Marta cave, but we feel confident that future work will greatly supplement our present meager knowledge.

Following these earliest peoples we have the complex of tools which forms our Cotorra phase. The way of life of these people was very different. Carbon-14 dates indicate that they lived there by 1320 B.C. and there are hints that their culture may have existed from 1500 to 1100 B.C.

The faunal and pollen remains indicate that the climate was probably drier than that of today. Subsistence activities were very different from those of the previous period. In Cotorra levels we found charred corncobs and a large proportion of corn pollen, indicating that the habitants were probably intensive corn-agriculturists. Comparable data suggest that many other domesticated plants were also grown. The snail shells and vegetal pollen show they did some food-collecting. Animal bones imply that hunting still occurred, and the size of the few projectile points indicates that it was probably still done with spear or dart. The blades and flake-scrapers may have been used for the slaughter and preparation of the animals. However, it is interesting to note that there are few scrapers in this time-period and that hide-working seems to have become an unimportant activity.

Is it possible that hide-working was being replaced by cloth-weaving? Disappointingly, the few fragments of figurines found in early levels at Chiapa de Corzo were not helpful on this score, as few show evidence of woven cloth.

In terms of technology no new flint-working techniques seem to have been developed, and most of the old ones continued with some refinement, and greater use of obsidian. Perhaps the most obvious new facet of their technology was the making of pottery, and they also manufactured a large number of domestic vessels. In the making of their pottery they evidently selected and kneaded special deposits of clay in which they blended quartz, sand, and some hornblende as temper. This was then modeled into tecomates, flaring-mouthed ollas, cylindrical jars with flat bottoms, and, occasionally, wide-everted-rim flat-bottom bowls. They decorated their pottery by a number of techniques; often the rims and lips of tecomates were decorated with red, brown, or yellowish paint, and usually the bodies of these vessels were brushed, though sometimes merely smoothed. Occasionally the potters made patterns or zones by brushing, and fingernail impressions around the rim. In rare cases they blackened and polished the outer surfaces. At the related Chiapa de Corzo component they sometimes decorated the surface with rocker-stamping. Some of the vessels were probably fired in poorly controlled kilns while others may have merely been fired in hearths.

Religious activities are indicated by the figurines of Chiapa de Corzo I-II which hint that they had some belief in supernatural beings or agencies. Excavations at Chiapa de Corzo also indicate that they often lived in villages composed of wattle-and-daub houses,

though, of course, our cave remains show that at least seasonally some of the peoples of this time-period resided in a rock shelter. Seashells and obsidian perhaps show that they engaged in trade.

On the basis of what we have found in the cave, reconstruction of the way of life of the later cultural phases does not warrant detailed description. Certainly we can say that they had advanced to a much greater complexity in all the realms of activity mentioned previously. The reconstruction of their way of life will be almost totally dependent upon studies of remains from other nearby sites. Publications by Gareth Lowe, Pierre Agrinier, J. Alden Mason, Frederic Hicks and Charles Rozaire in N.W.A.F. Publication No. 7 (Papers 8-11) have elucidated the architectural sequence of Chiapa de Corzo, while studies by Bruce Warren on the region's tremendously long ceramic sequence will do much to clarify the position of Santa Marta upper-level materials.

Although what we have found in our limited excavation in a small portion of the Santa Marta cave is neither spectacular nor particularly numerous, we feel we have contributed a little to the first chapter of a long complex story of the development of civilization in this area. It is hoped that these initial endeavors into the unknown will stimulate further research.

ARTIFACTS AND OTHER REMAINS

STONE

Projectile Points

THIRTY whole or basal sections and nine tips of projectile points were found in Santa Marta cave. Seven occur with the Santa Marta phase remains, eight with Levels 2 and 3, and twenty-four with the top level or at the surface. Twenty of these from the late levels seem to have been arrowpoints, while the earlier ones were probably spear or dart tips.

In describing and classifying the points we have used the terminology and, when possible, the types established by Krieger (Suhm and Krieger, 1954) for Texas, and MacNeish (1958) for Tamaulipas. The use of types defined for southern Tamaulipas as applied to Chiapas is open to some criticism as there seemingly is not a continuous distribution from one area to the other. However, we believe this lack of areal extension is more apparent than real, for most of the Chiapas types occur in collections we have seen from Puebla, Oaxaca, and the Valley of Mexico. Furthermore, the Valley of Mexico types occur in Hidalgo, San Luis Potosí and Tamaulipas. Secondly, with minimal description of the typology of projectile points from Mesoamerica, the establishment of a series of new types for Chiapas, which may eventually have to be combined with the very adequate sample of Texas and Tamaulipas types, might make for confusion rather than clarity. Thus, at the present time, we would prefer to be "lumpers" rather than "splitters" with the limited sample from Chiapas.

In terms of projectile-point trends the Santa Marta sequence shows fair similarity to the rather inadequately described trends from other parts of Mesoamerica. The preceramic Santa Marta types, Nogales, Abasolo, and Almagre, occur in the middle preceramic complexes of Tamaulipas and southern Puebla. All these types plus Matamoros occur with the late preceramic phases, Flacco and Almagre, from Tamaulipas. Almagre and Nogales points also occur in early Preclassic remains in Tamaulipas, in the Valley of Mexico, in southern Puebla and in the Peten. Associated with Classic period sherds were Ensor, Teotihuacan, and probably Gary types. These points seem to occur in Late Classic remains in the Peten, southern Puebla, Valley of Mexico, Monte Alban, Tamaulipas, and the Huasteca. Teotihuacan and Tula points occur in Postclassic remains in Puebla, the Valley of Mexico, and the Maya area. Santa Marta points also seem to occur with Postclassic remains in the Maya region and southern Puebla.

In terms of use of the Santa Marta types there seems to have been a shift from use of spears or darts during the preceramic, Preclassic and Classic times to a predominance of arrows during Postclassic times (although arrows were probably known during Classic times).

Abasolo Points (Pl. 4A, *m*)

Example: 1.

Form and chipping technique: This point from Zone E is roughly teardrop-shape in outline. Rough percussion flakes occur from the edges toward a center hump on both surfaces. One percussion blow was struck on the base removing a basal portion on one surface, thereby thinning the base. The edges were sharpened by poorly controlled percussion flaking and the tip was beveled by steep retouching on opposite edges on opposite surfaces.

Dimensions: Length: 46+ mm.; width: 21.6 mm.; thickness: 12 mm.

Geographical and temporal range: From Texas through northeast Mexico and Puebla to Chiapas during the time period from 9,000 to 3,000 years ago, though in certain areas it may have lasted into more recent times.

Relationship: Exactly what this type is derived from has never been determined. In the Maya area it may be ancestral to finely made types of the same shape that appear with ceramics, particularly in Classic times.

References: Suhm and Krieger, 1954; MacNeish, 1958.

Nogales Points (Pl. 4A, *l*)

Examples: 4.

Form and chipping technique: This sub-triangular type is about as previously described with two examples having basal thinning and one a beveled tip.

Dimensions: Length: 46-60 mm.; width: 23-27 mm.; thickness: 7-8 mm.

Geographical and temporal range: South Texas to Chiapas from 9,000 to 4,000 years ago but perhaps later in the northern part of this range.

Relationship: Possibly derived from Abasolo and ancestral to Matamoros.

References: Suhm and Krieger, 1954; MacNeish, 1958.

Almagre Points (Pl. 4A, *g, j*)

Examples: 3.

Form and chipping technique: These triangular-bodied types have shoulders that blend in a short pointed stem. They are somewhat longer and narrower than the type specimens from the north but fall within the size range and have the same general chipping technique.

Dimensions: Length: more than 50 mm.; width: 20 to more than 25 mm.; thickness: 6-9 mm.; stem length: 8-18 mm.; stem width: 10-16 mm.

Geographical and temporal range: Texas to Chiapas in late preceramic time lasting up to the end of the Classic period in Mesoamerica. Two were found in the excavations at Chiapa de Corzo.

Relationship: Probably derived from the Gypsum Cave type or related types from Coahuila and ancestral to Gary.

References: Suhm and Krieger, 1954; MacNeish, 1958.

Matamoros Points (Pl. 4A, *k*)

Example: 1.

Form and chipping technique: This small, narrow, triangular point has poorly controlled bifacial pressure flaking as well as a basal flake removed from one side, and in most features is like other specimens previously described.

Dimensions: Length: 36 mm.; width: 18 mm.; thickness: 7 mm.

Geographical and temporal range: In southern Mexico it starts perhaps as early as 7,000 B. C. and in the north seems to carry on to historic times. In southwest Tamaulipas these points, unchanged as to form, dimensions and chipping technique, probably shift from being used as small dart-points in early horizons to being used as large arrow-points in late horizons.

Relationships: This has widespread relations with similar points over much of North America.

References: Suhm and Krieger, 1954; MacNeish, 1958.

Gary Points (Pl. 4A, *b*)

No good example was found in the cave excavation though a small obsidian chip might be considered to be the tip of a tang of one. This type, however, occurs in late Preclassic and Classic remains in the area as well as in the rest of Mesoamerica.

Ensor Points (Pl. 4A, *i*)

Example: 1.

Form and chipping technique: This small basal fragment was evidently a point with a convex base, shallow, wide side-notches, and long, convex, tapering lateral edges. It is relatively thin and bears neat bifacial retouching along its edges.

Geographical and temporal range: This occurs from Texas and perhaps the southwest United States southward to the Maya region. It seems to be somewhat earlier north of Mesoamerica. In the latter region it occurs during Classic times.

Relationships: Similar types occur at an early date in the Archaic of the eastern United States, and it may be ancestral to these types. This type may also be ancestral to small side-notched points of the Postclassic.

References: Suhm and Krieger, 1954; MacNeish, 1958.

Teotihuacan Points (Pl. 4A, *e, f*)

Examples: 5.

Form and chipping technique: This type is made from an obsidian prismatic blade; the base is straight and there are small deep side-notches above the base, making the base T-shaped. The sides are parallel for a short distance and then have a short abrupt tip. The blades are formed into points by fine (unifacial or bifacial) pressure flaking at one end.

Dimensions: Length: about 30 mm.; width: 10-12 mm.; thickness: 2.2-5 mm.

Temporal and geographical range: These occur throughout Mesoamerica in (Late?) Classic and Postclassic times.

Relationships: Possibly derived from concepts involved in Ensor points and ancestral to Tula points.

Reference: MacNeish, 1958.

Tula Points (Pl. 4A, *a*)

Example: 1.

Form and chipping technique: This was an obsidian blade that had been pressure-flaked along its edges to become a long, narrow, isosceles triangle.

Dimensions: Length: 21 mm.; width: 12 mm.; thickness: 2.5 mm.

Temporal and geographical range: MacNeish picked up one example from Tula, and Kidder records those from Postclassic horizons in the Maya region.

References: Kidder, 1947; MacNeish, 1958.

Santa Marta Points (Pl. 4A, *b-d*)

Examples: 14.

Form and chipping technique: These points were made from random flat flakes that have one end retouched unifacially, bifacially, or on opposite sides on opposite edges to form points. They vary in outline from lenticular to teardrop-shape, to sub-triangular. However, their form is due to the shape of the flake chosen rather than from being worked into their particular form.

TABLE 4. PROJECTILE-POINT TYPES

ZONE	LEVEL	ABASOLO	ALMAGRE	NOGALES	MATAMOROS	GARY	SANTA MARTA	ENSOR	TEOTIHUACAN	TULA	POINT OR BODY FRAGMENT	TOTAL
A	1		?	1			11		4	1	8	25
A	2					X	2	1	1			4
A	3			1		X	1				1	3
B	4					X						
C	5		?									
D	6		2	1	1							4
E	7	1	1	1								3
	TOTAL	1	3	4	1		14	1	5	1	9	39

Dimensions: Length: 28-42 mm.; width: 17-27 mm.; thickness: 4-8 mm.

Temporal and geographical range: In Chiapa a few occur in the Classic period but most are Postclassic. Kidder records similar ones from other parts of the Maya region in Postclassic contexts. The ethnological arrow-tips of the Lacandon seem to be of this type.

References: Kidder, 1947.

UNIFACIAL SCRAPER TYPES

Eighty-one unifacially flaked artifacts were uncovered from all but Level 5 in excavations. Forty-three side-scrapers, that is, flakes retouched along one or more of their longer edges, seem to show little temporal significance. The end-scrapers, however, with six types in preceramic times and one in the Classic and Postclassic levels, do become good time-markers. Furthermore, many of the preceramic scraper types link Santa Marta with other early phases of Mesoamerica.

Large Thick Side-Scrapers and Knives (Pl. 5B, *k*)

Examples: 13.

Form and chipping technique: These side-scrapers are made from relatively large, thick, elongated flakes of chert or chalcedony. One of the edges, usually on a fairly steep side, has retouching on it. These implements probably were used as some sort of scraper, though a few, of course, might have been used as choppers or knives.

Dimensions: Length: 33-72 mm.; width: 25-58 mm.; thickness: 12-26 mm.; length of retouched edge: 8-63 mm.

Temporal and geographical range; Relationship: As far as Chiapas is concerned these scrapers run from the early part of the sequence to the late. They are too general to comment on their wider distribution or relationships.

Thin Side-Scrapers and Knives (Pl. 5B, *i*)

Examples: 30.

Form and chipping technique: These are made from flakes with a wide variety of outlines and all they have in common is that they have one or two sides longer than the others. One of these longer sides will show definite retouching by pressure flaking on ventral or unflattened surface on only one edge. Such implements could have served as hide-scrapers, but more likely they would have been used as some sort of small slitting-knife.

Dimensions: Length: 16-44 mm.; width: 12-28 mm.; thickness: 2-16 mm.; length of retouch: 3-30 mm.

Relationships: Very general.

Flat-Top Scraper-Planes (Pl. 4B, *g*)

Examples: 14.

Form and chipping technique: These were made from flat slabs of chert or limestone. In outline they vary from almost round to elongated. Along one edge there are usually percussion blows against one of the steeper sides, either for a short distance above the face or from the base to the top, to form a scraping end.

Dimensions: Length: 33 to more than 65 mm.; width: 33 to more than 70 mm.; thickness: 18 to 42 mm.

Temporal and geographical range: In Chiapas flat scraper-planes seem to predominate in the Santa Marta preceramic phase. However, five did occur in Level 1 of Zone A. These may have been dug up by later people, or may perhaps indicate a reuse of an old type; we suspect the former. Geographically, scraper-planes such as these extended up the east coast of Mexico as far as

Tamaulipas during preceramic times. They also extended up the west coast of Mexico into the Southwest and Great Basin, where they are an integral part of the so-called Desert Culture tradition.

Domed Scraper-Planes (Pl. 4B, *f*)

Examples: 5.

Form and chipping technique: These were made of slabs of quartz or chert. One flat surface of the slab was left intact, while the other surface was chipped by percussion to form a more or less peaked or highly convex raised surface. One of the edges of this domed surface received a number of finer percussion blows to give it a cutting edge. Some of these blows may be the result of use, while others—a few—the result of pressure flaking.

Dimensions: Length: 33-57+ mm.; width: 35-68 mm.; thickness: 21-41 mm.

Temporal and geographical range: Domed scrapers have about the same range as the flat scraper-planes, both temporally and spacially.

Gouges (Pl. 4B, *d*)

Examples: 2.

Form and chipping technique: Both of these are roughly triangular in outline with the two longer edges slightly convex and the shorter end concave. They are made from thick slabs of chert and have a great deal of percussion flaking on the slightly convex surface, and only a little on the flatter surface. The narrow end has definite evidence of pressure flaking to make it concave. This concavity is roughly 3 to 4 mm. deep.

Dimensions: Length: 65-70 mm.; width: 33-37 mm.; thickness: 16 and 10 mm.

Temporal and geographical range: These appear sparingly in preceramic horizons in Chiapas and Puebla, and there may be one from the Valley of Mexico. But they are most common in Tamaulipas and in Texas where again they seem to be in the general time-range of from 2,000 to 7,000 years ago.

Spokeshaves (Pl. 4B, *c*)

Examples: 3.

Form and chipping technique: These are made from relatively flat elongated flakes of flint. They bear little percussion flaking on either surface. However, one of the longer edges has a definite concavity due to percussion and pressure flaking, thereby making it useful for shaving.

Dimensions: Length: 20-30 mm.; width: 17-62 mm.; thickness: 6-11 mm.; depth of concavity: 1-5 mm.

Temporal and geographical range: As far as Chiapas is concerned, this type of tool seems to be confined to the Santa Marta phase. Elsewhere in Mexico they are relatively rare, but in Tamaulipas a few appear in all but the earliest preceramic complexes.

End-of-Blade Scrapers (Pl. 4B, *b*)

Examples: 5.

Form and chipping technique: All of these are made from crude prismatic blades. One end has usually been retouched from its flat surface to its raised ventral surface, thereby giving it a scraping end. In two cases lateral edges have also been retouched. All of these are retouched unifacially on the raised surface.

Dimensions: Length: 22-42 mm.; width: 15-20 mm.; thickness: 4-10 mm.

Temporal and geographical range: These appear in Chiapas in our Santa Marta preceramic phase. However, they also occur in the Valley of Mexico, Puebla, and in Tamaulipas in preceramic complexes.

Ovoid Plano-Convex End-Scrapers (Pl. 4B, *e*)

Examples: 6.

Form and chipping technique: These are made from nodules of flint that have been split in half so that one surface is more or less flat, bearing the bulb of percussion, and the other surface is convex, bearing the original percussion blows. They are ovoid in outline with one of the shorter ends bearing steep pressure flaking to give a snub-nosed cutting edge.

Dimensions: Length: 45-85 mm.; width: 20-28 mm.; thickness: 7-20 mm.

Temporal and geographical range: This is a widespread tool throughout much of North America.

Flat-Flake End-Scrapers (Pl. 4B, *a*)

Examples: 3.

Form and chipping technique: These are made from thin, flat flakes and are more or less elongated to triangular in outline with the shorter end or the base of the triangle bearing steep pressure flaking, thereby giving them a cutting edge. Some of these would form a category of thumbnail scrapers, while others are somewhat longer.

Dimensions: Length: 24-37 mm.; width: 18-23 mm.; thickness: 6-8 mm.

Temporal and geographical range: Similar scrapers are found over much of North America at various time periods.

Prismatic Blades and Polyhedral Cores

Our sample of blades is 106. Four conical polyhedral cores were found with them. Rude blades with either one or two dorsal ridges, probably struck from crude conical cores, begin in the Santa Marta phase, but there are also a few in levels of later horizons. Probably a re-examination of flint materials from Preclassic, Classic and Postclassic remains

TABLE 5. UNIFACIAL SCRAPER TYPES

ZONE	LEVEL	LARGE, THICK SIDE-SCRAPERS AND KNIVES	THIN SIDE-SCRAPERS AND KNIVES	FLAT-TOP SCRAPER-PLANES	DOMED SCRAPER-PLANES	GOUGES	SPOKESHAVES	END-OF-BLADE SCRAPERS	OVOID PLANO-CONVEX END-SCRAPERS	FLAT-FLAKE END-SCRAPERS	TOTAL
A	1	4	15	5	1			2	1	1	29
A	2	1	5								6
A	3				1	1				1	3
B	4									1	1
C	5										
D	6	3	5	4	2		2	2	3		21
E	7	2	4	4	1	1	1	1	2		16
F	8		1	1							2
G	9	2									2
H	10	1									1
	TOTAL	13	30	14	5	2	3	5	6	3	81

from other areas and sites in Mesoamerica would reveal that rude blades were made in these later horizons in other areas. Starting with the Preclassic in our Santa Marta cave levels, we find finely made blades which were probably struck from cylindrical or elongated conical obsidian cores. Many of the blades, both rude and fine, show evidence of retouching and were used for other purposes than side-blades. A few were made into end-of-blade scrapers while a few had been made into arrow-points. A few are pointed and, of course, may have been used as drills. However, for the most part, they were probably hafted in the side of some bone or wooden handle, either to serve as a knife or as some sort of a sawing instrument.

Conical Polyhedral Cores (Pl. 3, *j,t*)

Examples: 4.

Form and chipping technique: These are made of chert and are roughly conical in outline with the striking platform at a slightly acute angle to the base of the cone and the lateral fluting extending down its pointed section. The base usually bears a series of scars showing evidence of preparing a striking platform on this surface.

Dimensions: Length from base to tip: 25+ to —50 mm.; diameter of base: 20-40 mm.; distance between the ridges: 4-17 mm.

Temporal and geographical range: These crude polyhedral cores seem to have been used from preceramic through later times, as far as Chiapas is concerned. This is probably true of much of the rest of Mesoamerica. Everywhere they seem to be more common in the late preceramic horizons, with the exception of the one blade with the Ixtapan mammoth remains in the Valley of Mexico (Aveleyra, 1956). Here we have evidence of one of the earliest blades in North America. Ultimately, polyhedral cores and their blades were derived from the paleolithic of northeastern Siberia.

Rude Blades (Pl. 3, *k-s*)

Examples: 55.

Form and chipping technique: These are all elongate, roughly rectangular in outline. They have a basically flat to slightly concave ventral surface with a bulb of percussion near one end. The dorsal surfaces have from one to three ridges on them. Most of these rude blades, one or more ridged, show little evidence of use—however, some do. Five of them were made into end-of-blade scrapers, two others have one shorter end retouched (but this seems to be due more to use than to purposeful retouching). One has two notches along one edge that have been chipped into its dorsal surface by pressure flaking, thereby making a sort of spokeshave. Another has a concavity on opposite edges, giving it a strangled appearance. One has been made into a point,

perhaps a drill bit. Three have retouching on two edges, and three have retouching and wear on one edge. These eventually may be found to be different types, but on the basis of our present evidence and the relatively poor comparative data that we have, there is no justification for separating them at present.

Dimensions: Length: 25-42 mm.; width: 18-23 mm.; thickness: 2-8 mm.

Temporal and geographical range: Since these came from crude conical cores their range and use through time is the same as stated under the previous description.

Fine Obsidian Blades (Pl. 3, *a-i*)

Examples: 56.

Form and chipping technique: In outline these are either rectangular or elongate rectangular. They usually bear two ridges on the dorsal surface and their ventral surfaces are flat except for the bulb of percussion. Most of them seem to have been struck from roughly cylindrical polyhedral cores with a striking platform at right angles to the long fluted surface. As with the previous type, a number of things have been done to the blades after their initial striking from the polyhedral core. Five have been made into arrow-points; two have been pointed, perhaps to form drills. Ten have been retouched or worn on two edges, and eleven have been retouched or worn on one. A few seem to have been made into saws by very deep pressure flaking. Two have been serrated on both their edges, while four have this serrated edge along only one side. Probably all have had a number of functions, and again they eventually may be broken down into a number of types, but our present evidence does not allow us to do so. There is some suggestion that using blades for arrow-points and for saws is of Postclassic times, but our sample is too inadequate to state this definitely.

Dimensions: Length: 25-60 mm.; width: 7-19 mm.; thickness: 1-4.5 mm.

Temporal and geographical range: These first appear here with the Preclassic and carry on to historic times. This seems to be the picture throughout most of Mexico. Our knowledge of other parts of the New World is not sufficient to say exactly what the temporal and geographical distribution of fine blades struck from cylindrical cores was.

Ground and Pecked Stone Tools

Only twenty-two ground or pecked stone tools were uncovered in the excavation, though some of the simpler forms such as the manos and pebble hammers were possibly discarded together with rocks, so there may have been a few more. Most of the ground and pecked stone tools come from the lower levels, that is, the Santa Marta complex, while there are only a few from the upper parts of the refuse. This lower complex includes pebble manos, nut-stones, sinew-stones, pebble hammers, and boulder metates or mullers. Many of these may be connected either with incipient agriculture or food gathering. The

Table 6. Prismatic Blade Types

ZONE	LEVEL	RUDE BLADES, ONE RIDGE	RUDE BLADES, MORE THAN ONE RIDGE	CONICAL POLYHEDRAL CORES	END-OF-BLADE SCRAPERS	OBSIDIAN BLADES—UNRETOUCHED	OBSIDIAN BLADES—RETOUCHED, TWO EDGES	OBSIDIAN BLADES—RETOUCHED, ONE EDGE	POINTED OBSIDIAN BLADES (DRILLS?)	ARROW POINTS OF OBSIDIAN BLADES	DOUBLE OBSIDIAN BLADES, SAW-TOOTH	SINGLE OBSIDIAN BLADES, SAW-TOOTH	RUDE BLADE DRILL	TOTAL
A	1	11	5		2	12	9	6	1	4	2	4	1	57
A	2	2	1			4		3	1	1				12
A	3	2				3		2						7
B	4					1	1							2
C	5		2			1								3
D	6	6	1	2	2									11
E	7	6	4	2	1									13
F	8	2	3											5
	TOTAL	29	16	4	5	21	10	11	2	5	2	4	1	110

few materials from the upper levels are polishing pebbles, a fragment of a metate made of volcanic tufa, a piece of ground stone, and one celt. Thus there is a sharp division between our preceramic and ceramic period materials as far as the ground stone tools are concerned.

Pebble Manos (Pl. 5A, *b*)

Examples: 9.

Manufacturing technique: These are but crude pebbles that have been picked up and used, bearing on one surface, and in two cases on two surfaces, a small amount of wear or polishing due to their use as grinding stones.

Dimensions: Length: about 60-150 mm.; diameter: 50-120 mm.; thickness: 50-130 mm.

Temporal and geographical range: Crude pebble manos are common in preceramic complexes in Mexico; they occur in both the Sierra de Tamaulipas and in southwestern Tamaulipas, in northern Mexico. They also occur with the so-called Chalco complex in the Valley of Mexico, in caves in Puebla, and one was found at the Yanhuitlan site in Oaxaca.

Nut-Stones (Pl. 5A, *e*)

Examples: 2.

Manufacturing technique: These are all made from relatively large flattish pebbles that have a small depression pecked in their center to a considerable depth.

Dimensions: Diameter: about 120 mm.; thickness: about 60 mm.; depth of concavity: about 15 mm.

Temporal and geographical range: While these are common in preceramic stages in the United States, they appear relatively rarely in Mesoamerica, except for a few that are found in northwestern Mexico in Cochise sites and one from Puebla. These are the first found in south-central Mesoamerica to our knowledge.

Sinew-Stones (Pl. 5A, *d*)

Example: 1.

Manufacturing technique: This is made from a soft sandstone pebble and has a series of grooves about 2 to 6 mm. wide and of about the same depth ground across one surface.

Dimensions: Diameter: about 60 mm.; thickness: about 50 mm.

Temporal and geographical range: This is the first one that we know of from Mesoamerica.

Pebble Hammers (Pl. 5A, *a*)

Examples: 2.

These specimens are large river cobbles about 20 cm. long and 10 cm. wide that have evidence of use (pecking) on one end.

Boulder Metates or Mullers (Pl. 5A, *c*)

Examples: 3.

Manufacturing technique: All of these are made from large, flat river pebbles of either limestone or sandstone. One of the flatter surfaces has been ground by some circular rubbing (probably by use of a pebble mano grinding on the surface of a flat boulder) so that it is slightly concave.

Dimensions of the smaller complete specimen—Length: about 20 cm.; width: about 18 cm.; thickness: about 4.5 cm.

Temporal and geographical range: Mullers or metates made in the same manner and probably used for the same purpose are common in northern Mexico in preceramic complexes in the period from 8,000 to 4,000 years ago. In the Valley of Mexico they occur with the Chalco complex and with the El Riego and Coxcatlan complexes in southern Puebla.

Polishing Pebbles

Examples: 2.

Manufacturing technique: These are small river pebbles that have one shiny surface that shows that they have probably been used for polishing. They may have been used for polishing pottery rather than something harder.

Dimensions: Length: about 80 mm.; width: about 40 mm.; thickness: about 30 mm.

Temporal and geographical range: These are relatively common with ceramic complexes throughout Mesoamerica.

Fragment of Metate Made of Volcanic Tufa

Example: 1.

Manufacturing technique: This small fragment is probably part of a metate ground down from a piece of volcanic tufa.

Fragment of Ground Stone

Example: 1.

Manufacturing technique: This is a very small fragment of ground slate that has been polished on one side.

Small Celt (Pl. 5B, *a*)

Example: 1.

Manufacturing technique: This has been fashioned from a hard volcanic stone and has been ground into its petaloid outline with a double convex surface, a cutting edge, and a square poll.

Dimensions: Length: 45 mm.; width: 15 mm.; thickness: 15 mm.

Temporal and geographical range: Celts are common throughout the ceramic periods in Mexico.

TABLE 7. GROUND AND PECKED STONE TOOLS

ZONE	LEVEL	PEBBLE MANOS	NUT-STONES	SINEW-STONES	PEBBLE HAMMERS	BOULDER METATES OR MULLERS	POLISHING PEBBLES	VOLCANIC METATES	GROUND STONES	CELTS	TOTAL
A	1						1			1	2
A	2								1		1
A	3										
B	4							1			1
C	5						1				1
D	6	4	1		2	3					10
E	7	3		1							4
F	8										
G	9	2	1								3
	TOTAL	9	2	1	2	3	2	1	1	1	22

OTHER STONE, SHELL, AND BONE ARTIFACTS

Thirty other tools were found in the excavation. The large flake bifaces, slab choppers, nodule choppers, a needle and an awl came from preceramic deposits. Most of the small ovoid bifaces, a fragment of shell tinkler, and two fragments of shell disk pendants came from ceramic horizons.

Nodule Choppers (Pl. 5B, *j*)

Examples: 5.

Manufacturing technique: These are all made from more or less spherical fragments of chert or flint, either totally of flint or mainly of flint with part of the pebble surface adhering. They have all been bifacially chipped by percussion blows. Cutting edges show not only more evidence of chipping but some evidence of battering. One is a nodule with battering all over it and little evidence of percussion chipping. It has been suggested that besides being used as choppers these may also have served as cores for striking off flakes. The smallness of many of the flake scars casts doubt on this latter suggestion.

Dimensions: Length: 36-65 mm.; width: 30-40 mm.; thickness: 21-34 mm.

Temporal and geographical range: Similar choppers appear in most preceramic horizons from Mesoamerica. This type of implement, however, does not seem to last into ceramic times in Chiapas.

Slab Choppers (Pl. 5B, *f*)

Examples: 6.

Manufacturing technique: All of these are made of flat slabs of limestone or poor-grade flint. One edge usually bears a few flake scars, made by percussion blows, and on the very edge there may be some evidence of battering.

Dimensions: Length: 70-100+ mm.; width: 56-70+ mm.; thickness: 20-40+ mm.

Temporal and geographical range: About the same as nodule choppers.

Slab Bifaces (Pl. 5B, *b*)

Examples: 2.

Manufacturing technique: These are all made from long flakes. On the end opposite to the bulb of percussion, in the thinner section, there are usually three or four percussion flakes removed from both surfaces to give them a cutting or almost pointed cutting edge.

Dimensions: Length: about 68 mm.; width: 53 mm.; thickness: 18 mm.

Temporal and geographical range: A similar one occurred in earliest levels of Coxcatlan Cave, Puebla (MacNeish, 1961).

Bone Needle

This is a very small pointed fragment of polished split (bird?) bone that may have been part of a needle. It was from the uppermost level. An even more doubtful fragment occurred in occupation 4.

Split Bone Awl (Pl. 5B, *b*)

This is a fragment of a split long bone of a deer. One end has been polished to a point with indications that the original awl probably was the whole length of the leg-bone.

TABLE 8. STONE, SHELL, AND BONE ARTIFACTS

ZONE	LEVEL	NODULE CHOPPERS	SLAB CHOPPERS	SPLIT BONE AWLS	SLAB BIFACES	OVOID BIFACES	SHELL TINKLERS, UNPIERCED	SHELL DISK PENDANTS	BONE NEEDLES	TOTAL
A	1		1			11			1	13
A	2							1		1
A	3						1	1		2
B	4									
C	5								?	
D	6	3	3	1	1	1				9
E	7		2	1	1					4
F	8	2								2
	TOTAL	5	6	2	2	12	1	2	1	31

Ovoid Bifaces (Pl. 5B, *g*)

Examples: 12.

Manufacturing technique: All these fragments seem to have been made from chips of chert that were bifacially chipped by percussion flaking. The extremely small amounts of percussion flaking on both surfaces near their edge give them an ovoid cutting edge.

Dimensions: (all fragmentary): Length: 70+ mm.; width: 35+ mm.; thickness: 15+ mm.

Temporal and geographical range: These are very common implements through much of North America.

Shell Tinkler, Unpierced (Pl. 5B, *e*)

Example: 1.

Manufacturing technique: This is made from an *Oliva* shell with its base cut off sharply, and the more pointed end sliced. The implement appears to be incomplete because one part of one face is broken off.

Dimensions: Length: 40 mm.; width: 18 mm.; thickness: 14 mm.

Shell Disk Pendants (Pl. 5B, *c, d*)

Examples: 2.

Manufacturing technique: These are all made from some large bivalve shell such as an oyster; they were first cut into their circular form and then the edges and surfaces ground. One was pierced by drilling with a hand drill from two sides.

Dimensions: Diameter: 15 and 27 mm.; thickness: about 3 mm.

Temporal and geographical range: These are rather common in Mexico though in Chiapas they seem to appear mainly in the Classic period.

THE FIRST PRECLASSIC CERAMIC COMPLEX

Level 5, also termed Zone C, or Occupation 6, of Santa Marta cave produced the earliest ceramics of the excavation. Although the sherd sample from Level 5 was relatively small it was nevertheless homogeneous and more than sufficient to allow us to reach well-defined conclusions. (It also should be noted that several staff members of the New World Archaeological Foundation have published reports on similar remains of this first Preclassic ceramic complex, and have also noted that these are the earliest ceramic manifestations so far found in Chiapas and surrounding areas. Keith A. Dixon [1959] studied similar material from Pit 50 at Chiapa de Corzo, and Carlos Navarrete [1960] made several collections from the Frailesca region of Chiapas. The immense collections excavated at Chiapa de Corzo in the past three years are now being studied by Bruce Warren. Publication of this analysis will greatly amplify the shorter studies of Dixon and Navarrete.) The forms were extremely limited, as were the wares, and of such nature that they are probably time-markers for this area during the early Preclassic period.

TECOMATES

The vast majority of sherds from Level 5 are of the type frequently called "neckless seed-jars," and locally termed *tecomates,* meaning "gourds". They probably served as storage bowls (to hold seeds, liquids and foods), and

TABLE 9. CERAMIC DISTRIBUTION

	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	TOTAL
Variegated lustrous orange	1					1
Aztec purplish hematite	1					1
Orange-rim metallic	2					2
Black-on-brown trickle	1					1
Black-on-orange trickle	1					1
Fine orange	5					5
Engraved or incised black	1					1
Strap handle	1					1
Olla miscellaneous	12					12
Unsmudged hematite	1					1
Black-on-orange polychrome		1				1
Wide-everted rim with applique lug		1				1
Teotihuacan engraved brown	1			1		2
Engraved incurved red	?	1				1
Red on buff	2	1				3
White on red	1	1				2
Purple red—negative black		3				3
Polished thick black	6	4				10
	ring base					
Olla: vertical neck—rolled rim		2				2
short vertical neck—no rim	1	1				2
tall vertical neck—everted rim	1	2	1	1		5
vertical multi-groove		2	2	2		6
short vertical neck—outcurved rim	2	1		1		4
Tecomate streaked white wash		1				1
Yellow brown slip		5				5
Service ware — light brown	109	143	92			363
Service ware — yellow brown			21			
Service ware — dark brown	191	112	56			359
Black-slip dish			1			1
Brown on white			1			1
Smudged dark red flat-lip dish			1			1
Olla lugs	1	1	4			6
Yellow orange over white slip	1	1	1			3
White-rim black	1	1	1			3
Red-and-yellow white	2	1	1			4
Polychrome white-orange black	4	5	1			10
Black and white	7	6	1			14
Yellow white	23	22	1			46
Brown-red miscellaneous (to be differentiated)	47	68	14	75		204
Thin-line fillet	2	1	1	2		6
Thick thumb-impressed fillet	1	1		1		3
Trickle white brown				1		1
Dark brown polished			22	7		29
Thin streaked brown	1			2		3
Black-on-white lug				1		1
White wash	2		1	5		8
Incised fine white	1		1	1		3
Coarse white slip	3	2	2	3		10

TABLE 9. CERAMIC DISTRIBUTION *(Continued)*

	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	TOTAL
Fine white slip	2	3	4	1	1	11
Orange slipped	21	11	16	5		53
Red slipped	57	24	28	21		130
Crazed brown	15	17	14	6		52
Red brown zone punctate	1 red	5 brn	1 red	3 red		
	1 brn					11
Glaze-like orange	1			1		2
Smoked with hematite interior		1		1		2
Tecomate: polished brown with lines radiating from lip					1	1
Slipped black on outflaring bowl					1	1
Fine polished brown					10	10
Plain yellow-brown coarse	104	37	9	20	72	242
Smudged tecomate with ridge					2	2
Brown-ware outflaring bowl					1	1
Grooved ware					1	1
Smudged ware	146	138	76	30	35	425
Black or gray slipped ware—Slipped A	13	8	10	21	22	74
Tecomates: black rim, zone punctate, neck nodes					12	12
red rim and brown body, plain				1	9	10
red rim and brown body, ridged					5	5
brown smooth			1		6	7
smooth, incised line outer rim	1		3		2	6
brushed body, blank incised rim	1			3	1	5
brushed body, blank rim zone	1	1	1	4	5	12
patterned fine brushed	4	2	4	5	14	29
brown fine brushed	26	45	39	44	86	240
Smoked black porous fine brushed	7	13	11	25	49	105
Crude wide brushed	15	8	6	24	30	83
TOTAL	852	703	449	318	365	2687

for cooking purposes. The form of a tecomate is spherical with a reduced mouth. The lips are generally thicker than the sides and their forms may be rounded, sharply rounding, slightly angular, or beveled toward the interior (Pl. 6, *a-i*).

Tecomate paste is fairly coarse, consisting largely of abundant quartz sand temper with a few large quartz crystal occlusions. Some tiny pebbles are also seen on the surface, at times so large that they protrude from both exterior and interior surfaces, presenting a very grainy texture. A few sherds contain occasional flecks of hornblende in combination with quartz sand, probably scooped up from some nearby river bank. The paste color is yellow-brown, grayish-brown, reddish-brown and dark brown, while some sherds have a smudged dark paste with a slightly lustrous black outer surface (Pl. 6, *l*), probably due to culinary usage. It is to be noted that the exterior and interior surfaces of most sherds show smoke smudging or thick carbon deposits from cooking and/or charred food.

Tecomates are essentially monochrome, except for some examples with a dark red band painted around the exterior of the lip (Pl. 6, *i*). Tecomates are fired to several hues and shades of brown, namely light yellowish-brown, grayish light brown, and reddish, as well as smoked black or smoky gray.

Tecomates are all unslipped but are easily recognized by their brushed bodies. Pre-firing brushing was done with a handful of vegetable fibers, probably resembling broom straw, which left multiple parallel shallow striations in the soft clay (Pl. 6, *c*). This served the purpose of making an even surface as well as

applying decoration. Santa Marta tecomates were brushed on both exterior and interior surfaces, except for the exterior rims which were nicely smoothed with the fingers or some other smoothing technique (Pl. 6, *a*). Crude heavy brushing as well as fine shallow brushing was used, a variation due probably as much to the quality of vegetable fiber used as to the technique of the potter. Exterior striations were generally vertical in nature while those in the interior were made with horizontal strokes, due primarily to manufacturing exigencies, while the ends of the strokes were slightly curving or swirling, due to a flourish of the potter's hand on finishing the stroke. Patterned brushing was common, in which the striations were either cross-hatched, made with short strokes which overlapped at a slight angle with similar strokes, with swirled ends, with diamond-shaped effects, or made with short vertical hyphen-like striations in concentric fashion with a blank space between eacn series. It was noted, unremarkably, that the heaviest brushing was found on the thicker vessels.

Decoration of tecomates, apart from brushing, was simple but sufficiently varied to avoid complete monotony. Several dark gray tecomates had a narrow band of vivid dark red painted on the exterior rim and lip (Pl. 6, *i*). This paint seems to have been made from specular hematite, because of its sheen. The tecomate form and the use of specular hematite show a remarkable resemblance to the pottery of the Ocos phase at La Victoria which was found by Michael Coe (1959, 1960). The use of a thin white wash on the exterior rim of several Santa Marta tecomates was also noted. Pre-fired incising was common on tecomates, usually a single shallow horizontal line close to the lip (Pl. 6, *b*). Pre-fired grooving was noted on several sherds in which a rounded instrument was dragged lightly across the vessel surface near the rim, leaving a series of grooves and ridges (Pl. 6, *h*). Sherds decorated by grooving also show traces of a thick dark yellow-cream wash which had been applied before grooving (Pl. 6, *h*). One sherd with a polished brown slip, that seemed to be of tecomate form, had some thick incised lines radiating vertically from the rim zone (Pl. 6, *n*). Unfortunately no other sherds of this type were found or are known for comparative purposes. "Fingernail" punctation was common. Such punctations give the impression that a fingernail had been inserted in the wet clay and then pushed forward slightly (Pl. 6, *f*). One such sherd showed the simultaneous use of the repousse technique in making a dimple or node on the neck of the vessel interior (Pl. 6, *f*). This was accomplished by inserting a stick in the interior and pushing it outward slightly without perforating the surface, thus leaving a rounded raised portion on the exterior. A few tecomates had a slight ridge between the decorated rim zone and the lip, while most of them had a smooth or blank rim zone. One small smudged black body sherd had an applique ridge or thumb-impressed fillet on it.

Ollas

Ollas, or necked storage jars, of Santa Marta cannot be reconstructed because of the fragmentary nature of the materials. One small example of an olla neck was found, of slightly incurving form and with a flattish or squared lip (Pl. 6, *g*). The paste was reddish brown with abundant quartz sand temper, and with a dark reddish-brown smoothed outer surface with many pits, cracks and spalls. This seems to be a transition between a neckless jar and a necked olla, like a beaker.

Cylindrical Vessels

A considerable number of body sherds and two rim sherds were found in the form of cylindrical-side vessels with flat bottoms. These were mainly of a reddish-brown paste of quartz sand temper and with a slip of dark yellow-cream, lustrous black, dark reddish-brown, or dark gray. A single small, dark yellow-cream, slipped body-sherd with dark brown underslip was also found. The overslip was thick and appeared to be soft but could barely be scratched with a fingernail. Sometimes the slip was applied unevenly, allowing the paste to show through, presenting a variegated aspect.

Miscellaneous Wares

One small body fragment of lustrous black slip and reddish-brown paste was found. It was decorated by deep post-slip, post-firing incisions in rectilinear designs. It appeared to be part of a wide-everted and incised rim bowl. Similar decoration appears on wide-everted rim bowls at Chiapa de Corzo in the Cotorra (Chiapa I) complex.

Two large body fragments of medium orange-red were found. One was slipped on both sides, while the other had an unslipped interior. Both were probably once part of large cylindrical vessels with flat bottoms and are similar to such vessels found at Chiapa de Corzo in the earliest complex.

Twenty-two slipped sherds of dark brown, dark gray or light black were found, but, unfortunately, we did not find a single rim sherd among them. The slip was applied to a barely smoothed surface, which shows slight humps, ridges, and many other irregularities. The interior surface of many sherds shows thick carbon deposits. The paste is coarse quartz sand with large occlusions. The interiors of many sherds were brushed but the remainder were smoothed or slipped. Some of these sherds probably belonged to ollas and to tecomates while the remainder were probably of cylindrical vessels and thickened rim bowls.

Ceramic Artifacts

One worked sherd was found in Level 5. It is very roughly rounded, or, more literally, squared, to form a six-angled outline. It is of a harlequin nature on one surface, with black and brown slips. This is the only example of such sherd found in Santa Marta, both in form and coloration, and also the only evidence of ceramic use for other than service purposes.

Other Ceramic Remains

No attempt has been made to classify or describe the later ceramic remains from the cave because our sample is extremely small, the strata from whence they came possibly was distorted, and because they will be more adequately described by those analyzing the much larger and better documented sherds from Piedra Parada and from various sites excavated by members of the staff of the New World Archaeological Foundation. In lieu of a description we have merely listed them and their amounts under rather cursory titles in the Table of Ceramic Distribution.

FAUNAL REMAINS

It is most fortunate that we were able to have most of the bones found in the cave identified. This was done by Dr. Miguel Alvarez del Toro, Director of the Museo Zoológico del Estado, Tuxtla Gutiérrez, Chiapas. In the excavation 813 fragments of bone were uncovered; 448 of these were small fragments that were not able to be identified, while 365 were definitely identified by Dr. Alvarez del Toro. It appears that these 365 identifiable bones belonged to at least 115 different animals of 22 species.

All the animals identified still exist in the Chiapas region today. Thus there is no indication of any great lapse of time. However, there may be an indication of slight climatic shifts in this region on the basis of our limited bone materials. This difference is that *iguana* and *mazama,* the red tropical deer, were not found below Level 6. Both these animals are tied closely to a tropical forest. Thus there may be a hint that Levels 6, 8, 9, and 10 existed during a slightly drier period than Levels 1 to 5. This is somewhat confirmed by the soil coloring and pollen. However, the pollen does indicate that Level 7 was during a very wet period that is not reflected in the bones.

The bones give us some hints about the kind of occupation that existed and also about the customs of the occupants. There seem to be four general kinds of faunal material; the earliest are found in Levels 6 to 10. Here large animals and small animals appear in about equal amounts. The smaller may very well have been captured by trapping and the larger ones by hunting. Thus it would seem that we have a relatively sedentary group who were not predominantly hunters. Many of the bones in these levels are split fragments, undoubtedly for the scraping out of marrow. This is a custom, as we shall see, not common to the levels above, and seems to be something that is done by people who are not necessarily agriculturists. Many of the bones are of limbs; this is particularly true of the larger animals. Thus it seems with what little hunting was done, the parts that were brought back to the cave were mainly limbs, the head and vertebrae being left where the animal was killed Heads, ribs, and vertebrae of small animals were brought back because the whole animal could be transported easily.

There seems to have been a shift in the treatment of faunal materials in Level 5. Here we have good evidence of many larger animals (which would have been hunted) and only a few smaller ones. It seems that, though else where they may have been agriculturists, when

they lived in the cave the occupants were basically hunters. It is perhaps interesting that, although they did mainly hunting, they split very few animal bones to take out the marrow. The older custom of eating marrow seems to have gone out with the beginning of agriculture. As far as the kinds of bones that appear in the cave are concerned, there were both heads and limbs as well as backbones and other bones. Thus many of the killed, both of larger and smaller animals, were brought almost *in toto* to the cave.

Levels 2 to 4 seem to represent another kind of treatment of the faunal material. Here we have about as many large animal bones as we have small ones, and all are relatively rare. It appears that these people did little or no hunting and were perhaps travelers who brought some of the animal bones with the meat on them as they entered the cave. Again there are very few split bones and almost as many whole bones as split ones. One slight difference is that there are a few fish bones in these levels.

The top level again seems to have been occupied by a group of hunters, since there were large numbers of large mammal bones. Surprisingly enough, many of the bone fragments were split for marrow. Perhaps at this time-period there was a change in custom and they were going back to eating marrow. Again, the kinds of the fragments of bones from this top level seem to indicate that they took the whole animal into the cave.

TABLE 10. GENERIC NAMES OF ANIMALS FOUND IN SANTA MARTA CAVE

	SCIENTIFIC	SPANISH	ENGLISH
Reptilia	Iguana iguana rhinolopha	Iguana	Lizard
	Crotalus	Cocodrilo	Crocodile
Aves	Buteo	Gavilán	Hawk
	Crax rubra rubra	Hoco faisán	Curassow
	Penelope purpurascens	Cojolita	Crested Guan
	Penelope nigra	Pajuil	Black Chachalaca
	Ortalis vetual	Chachalaca	Chachalaca
Mammalia	Mazama sartorii	Venado montana	Tropical or red deer
	Tayasso angulatus	Jabalí de collar	Peccary
	Dasypus novemcinctus	Armadillo	Armadillo
	Odocoileus virginianus	Venado cola blanca	White-tailed deer
	Tapirella bairdii	Danta	Tapir
	Sciurus	Ardilla	Squirrel
	Dasyprocta mexicana	Guaqueque	Agouti
	Agouti paca	Tepescuintle, Tuza real	Spotted Cavie
	Felis concolor mayensis	Leon	Puma
	Leopardus pardalis	Ocelote	Ocelot
	Felis tigrinus	Tigrillo	Tiger cat, wildcat
	Nasua nasica	Tejón—Pisote	Coatimundi
	Pottos flavus	Martucha—Mico de noche	Kinkajou
	Alouatta	Mono aullador	Howler monkey
Crustacea	Crustacea	Cangrejo	Inland river crab

TABLE 11. FAUNAL DISTRIBUTION

LEVELS	1	2	3	4	5	6	7	8	9	10
Mammalia										
Alouatta										
jaw	1									
Felis concolor mayensis										
canine tooth	1									
Nasua nasica										
canine	1	1								
upper skull with teeth		1								
Tapirella bairdii										
molar	1									
pre-molar		1								
vertebra			1							
Pesca										
vertebrae		1	1							
Aves										
Buteo										
leg (femoral)			7							
Penelope nigra										
ulna						1				
humerus						1				
Reptilia										
Crotalus										
vertebrae	1		1			1				
ribs						4				
skull						1				
Iguana rhinolopha										
vertebrae		3-?			15	2-?				
Mammalia										
Mazama sartorii										
jaw and teeth	1				1					
3 Pm.	1									
phalange	1		1	5	3	8				
astragalus	1				1					
canine	1					2				
F radius				1	2					
skull					1					
vertebrae						4				
ulna						1				
fibula						1				
Pottos flavus										
jaw and teeth						1				
vertebra						1				
Felis tigrinus										
phalange						1				
Dasyprocta mexicana										
jaw					1					
scapula						1				
canine tooth							1			
vertebra							1			
Leopardus pardalis										
scapula							1			

TABLE 11. FAUNAL DISTRIBUTION *(Continued)*

LEVELS	1	2	3	4	5	6	7	8	9	10
Tayasso angulatus										
lower canine	1	1								
lower jaw					5	1	1	2		
vertebrae					1	1	2	1		
ulna					1					
humerus					1					
scapula						1				
femur						1				
canine								1		
Odocoileus virginianus										
sternum	1									
3 Pm.	1	1								
ulna		1								
vertebrae			1		1					
phalange							1	1		
Agouti paca										
jaw						1				
canine						1				
skull						1		1		
Dasypus novemcinctus										
plates	2	35	1	1	7	36	9	1	3	
jaw	1					1				
vertebra						1				
Aves										
Penelope purpurascens										
leg (femoral)	1	1	5			5	7	1	1	
scapula		1								
ulna			1		1	1	2	1	1	
vertebrae				1			1			
Crax rubra rubra										
leg (femoral)	2	2	X	1	4	6	1	3	2	
Crustacea										
Land crab										
claw	1	1	1			3	4	2	1	
Mollusca										
shells	403	903	729	135	442	283	507	201	68	19
Mammalia										
Sciurus										
legs (femora)	2	1			1	4	3	19	42	8
Bone fragments (not identified as to species)										
split bone	42	16	9	12	48	94	45	7	3	3
unsplit bone	17	8	8	10	38	50	36	1	1	1
Estimated Total Animals										
Fish		1	1							
Reptiles	2	2	2		1	4	2	?	?	
Large mammals	5	3	3	1	7	3	3	3		
Birds	2	2	7	2	3	7	5	3	2	
Crustaceans	1	1	1			1	2	1	1	
Land snails	403	903	729	135	442	283	507	201	68	19
Small mammals	4	3	1	1	3	5	3	7	12	4

ANALYSES

CARBON-14

A number of specimens of carbon were collected from the excavations. Four of these were analyzed by the Michigan Memorial–Phoenix Project at the University of Michigan, Ann Arbor, Michigan, under the direction of Dr. H. R. Crane. We would like to thank Dr. J. B. Griffin of the Museum of Anthropology at that University for sending us the results of the laboratory's finding as well as for having them studied so promptly. The following are the age determinations which we believe are essentially correct and which check with the stratigraphy.

M-977 Santa Marta Cave, Classic period, charcoal (bottle 1) sample from N3E1, Level 2, Floor 6, Zone A, Occupation 9, remains of Piedra Parada phase. Was dated as . . . 1870 ± 200 years ago or 90 A.D. ± 200.

M-978 Santa Marta Cave, Preclassic period, charcoal (bottle 2) sample from Square S1E2, Level 5, Floor 5, Zone C, Occupation 6, remains of Chiapa de Corzo I or Cotorra phase. Was dated as . . . 3280 ± 200 years ago or 1320 B.C. ± 200.

M-979 Santa Marta Cave, Preceramic period, charcoal (bottle 3) sample from S1E2, Level 7, Floor 3, Zone E, Occupation 4, remains of Santa Marta complex or phase. Was dated as . . . 7320 ± 300 years ago or 5360 B.C. ± 300.

M-980 Santa Marta Cave, Preceramic period, charcoal (bottles 4, 5) sample from N1E1, Level 9, Floor 2, Zone G, Occupation 2, probably Santa Marta complex. Was dated as . 8730 ± 400 years ago or 6770 B.C. ± 400.

POLLEN

When the O east-west profile was complete, pollen was collected from it. Because of our ignorance of the general technique of the pollen field, we took samples in pint bottles from each of the zones rather than at arbitrary 10 cm. levels. Also we did not collect enough dirt from the earlier levels. In spite of these defects, Dr. Paul B. Sears, then of Yale University, agreed to have our materials studied. He assigned their analysis to Miss Monika Bopp who, at that time, was a graduate student at the above-mentioned institution. She has been most kind in allowing me to publish here in English part of a monograph that will be published in Mexico in Spanish.

"The procedure followed was long and laborious. Besides the initial standard KOH treatment the standard Bromoform method with a slight modification was used in all cases. All the samples of Santa Marta shelter were treated with H_2O_2, a strong oxidant, which was found to improve the final results. The small sand particles were dissolved with cold HF. Acetolysis was also necessary for some of the samples from Santa Marta shelter, to accelerate the lignifraction.

"The pollen grains were mounted on glycerin jelly and stained with basic fuchsine or saffranine O.

"The relative pollen frequency was calculated. The number of grains per slide counted across half of the 22 mm. cover slip are recorded as the total number, from which the percentages were calculated.

"In the samples of the lower levels of Santa Marta shelter, very few grains were found, making it impossible to obtain percentages from these counts.

Pollen Profile of Santa Marta Shelter and Interpretations

"The macroscopic characteristics of the sediments are: coarse sand, mostly quartz, becoming finer toward the bottom; probably eolic in origin; charcoal is present throughout the core, especially abundant in the sample L 6 from 95 cm. depth, Zone D, which was devoid of pollen grains.

"The lower half of the cave was poor in organic material while the upper half was relatively rich in it. At some levels a great number of fern sori were found.

"The bottom of the Table shows only the number of pollen grains found at this level, which can probably be interpreted as very dry and unfavorable environmental conditions. The slight increase in the number of pollen grains at the lowest level most likely indicates a slight relative improvement in climatic conditions, although the grains are extremely small and in general quite destroyed, making it impossible to identify them properly.

"The upper half of the Table shows the percentages with a consistent trend to a more favorable climate. The principal elements of the community show similar floristic affinities—a mixed mesophytic pine-oak forest with certain definite xerophytic tendencies.

"The relative pollen frequency is somewhat disturbed, and the statistical methods do not enable us to correct entirely these distortions of the relationship between species. This is clearly shown by the extremely pronounced peaks of AP and NAP at samples 2 and 3. The influence of man becomes evident by the differential collection of useful plant material. For instance, in samples 2 and 4 (Zones A and B) where Quercus, Salix, Compositae and Umbelliferae, especially the latter, are highly overrepresented. Clusters of pollen grains were found in these samples, which are not included in the count.

"The sample 5 from 80 cm. depth (Zone C) shows a very atypical picture of pollen; the grains are extremely small and have very heavy walls. These characteristics probably were caused by a relatively sudden, short, but very intense change of conditions. This dry period can tentatively be correlated with the dry period prevailing during the flourishing of the Teotihuacan cultural center (Sears, 1952).

"The immediate inferior sample, L 6 from 95 cm. (Zone D), contained very few pollen grains, indicating also unfavorable conditions and a continued dry period. But undoubtedly this is also caused by a more immediate local condition—the fire used by man in the shelter.

"A very curious feature, but very local in significance, is the high percentage of spores compared to the total number of pollen grains, suggesting a certain amount of available moisture in the immediate surroundings and the shaded conditions of the shelter entrance.

"The first clear evidence of cultivation of maize is at the sample L 5 from 80 cm. depth (Zone C), where the pollen grains of other graminae are still abundant.

"Umbelliferae (Hydrocotyle) and Compositae to a lesser extent follow immediately after repeated clearing and pasturing wet to moist meadows formerly occupied by mesophytic forest communities (Miranda and Sharp, 1950). This is shown clearly by the immediately following level (L 6) where Umbelliferae (Hydrocotyle) are very abundant.

"The pronounced dominance in Pine at the top level indicates a certain increase in moisture but is also brought about by the fire practiced during the increasing intensity in agriculture. This is shown also by the increase in cultivated graminae at this level."

TABLE 12. POLLEN PROFILE

	DEPTH—CMS.	PINUS	QUERCUS	SALIX	ALNUS	ILEX	CHENOPODIUM	COMPOSITAE	POLYGONUM	PLANTAGO	UMBELLIFERAE	GRAMINEAE	CYPERACEAE	EPILOBIUM	MONOCOTS	OTHERS	TOTAL	SPORES
PERCENTAGES	20	24	4	17	3	2	3	20	4	3	2	7	4			4	90	37
	42	4	43	7	1	2	1	11	7	1	17	3			1	2	281	10
	60	7	5	7		3	5	36	3		19	10	2		3	2	198	29
	70	10		19	3	9	3	19		3	5	13			5	10	97	36
	80	4	6	23	3	6	6	4	3	4	6	11	2	2	4	11	157	18
	95																0	0
	100	2	4	13	3	4	5	3	5	2	8	15	9		9	3	129	27
NUMBER OF GRAINS	115		1	5			2	5			5	1				3	22	8
	122	1		2								1				1	7	6
	150			2			11	6	1		6	3	3		1	3	36	15
	185	1	1	4		2	1	2	2	2	1	7	3			2	28	7
	205	2	2	3	3	1	1	5			5	7	3			10	42	18

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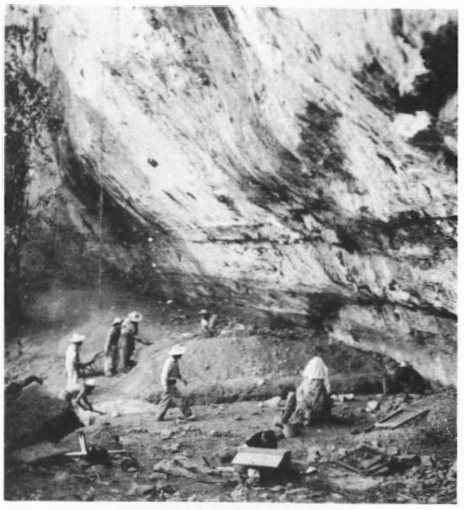
a: Distant view of the cave.

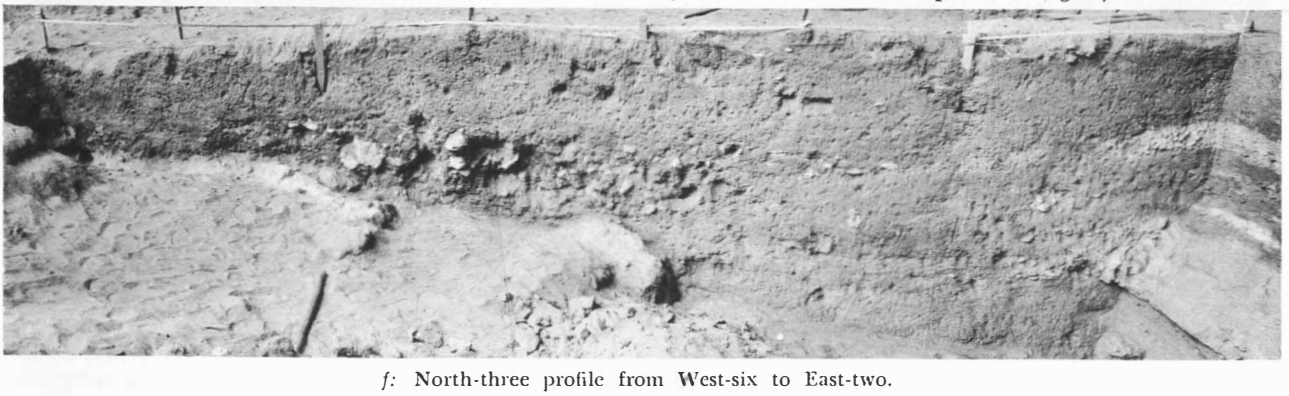


b: Interior of the cave.

c: Method of excavation.

d: Multiple burial.

e: South-two profile from East-two to West-six. (View is reverse from the profile in Fig. 3.)



f: North-three profile from West-six to East-two.

Plate 1. Santa Marta Cave, Excavations, Burials, and Profiles

a: East-two profile from North-three to 0.

b: West-one profile from North-three to 0.

c: West-two profile from North-three to 0.

Plate 2. NORTH-SOUTH PROFILES

Plate 3. Prismatic Blades and Polyhedral Cores

a: Serrated obsidian blade. *b:* Obsidian blade, drill bit. *c:* Obsidian blade, retouched on one side. *d:* Obsidian blade, retouched on two sides. *e:* Long obsidian blade, unretouched. *f:* Obsidian blade, serrated on two edges. *g:* Obsidian blade with one ridge. *h:* Obsidian blade with one ridge, retouched on one side. *i:* Obsidian blade, end retouched. *j:* Cylindrical polyhedral core. *k:* Notched rude blade. *l:* Rude drill bit. *m:* Rude blade with one ridge, retouched on one side. *n:* Rude blade with one ridge, retouched on two sides. *o:* Rude blade with one ridge, not retouched. *p:* Rude blade with two ridges, retouched on two sides. *q:* Rude blade with two ridges, not retouched. *r:* Rude blade with two ridges, retouched on one side. *s:* Rude blade with two ridges, retouched on one end. *t:* Conical polyhedral core.

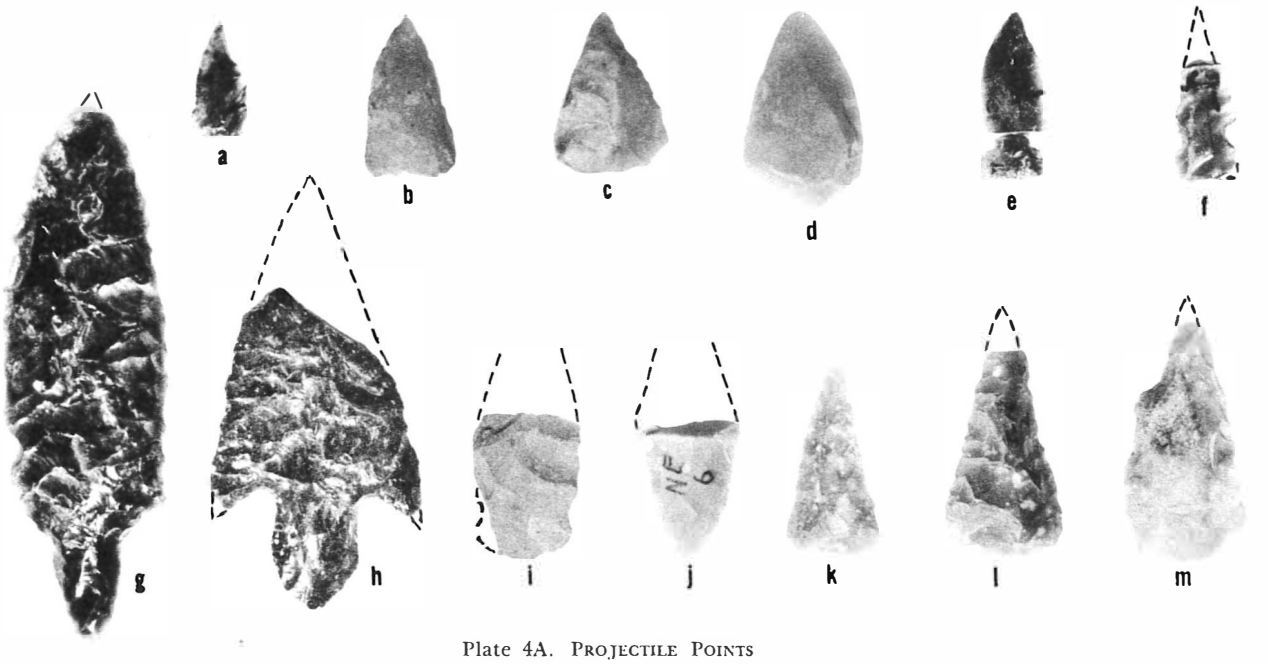


Plate 4A. Projectile Points

a: Tula triangular. *b-d:* Santa Marta biface. *e, f:* Teotihuacan side-notched. *g:* Almagre stemmed. *h:* Gary stemmed. *i:* Ensor side-notched. *j:* Almagre stemmed. *k:* Matamoros triangular. *l:* Nogales triangular. *m:* Abasolo round-base.

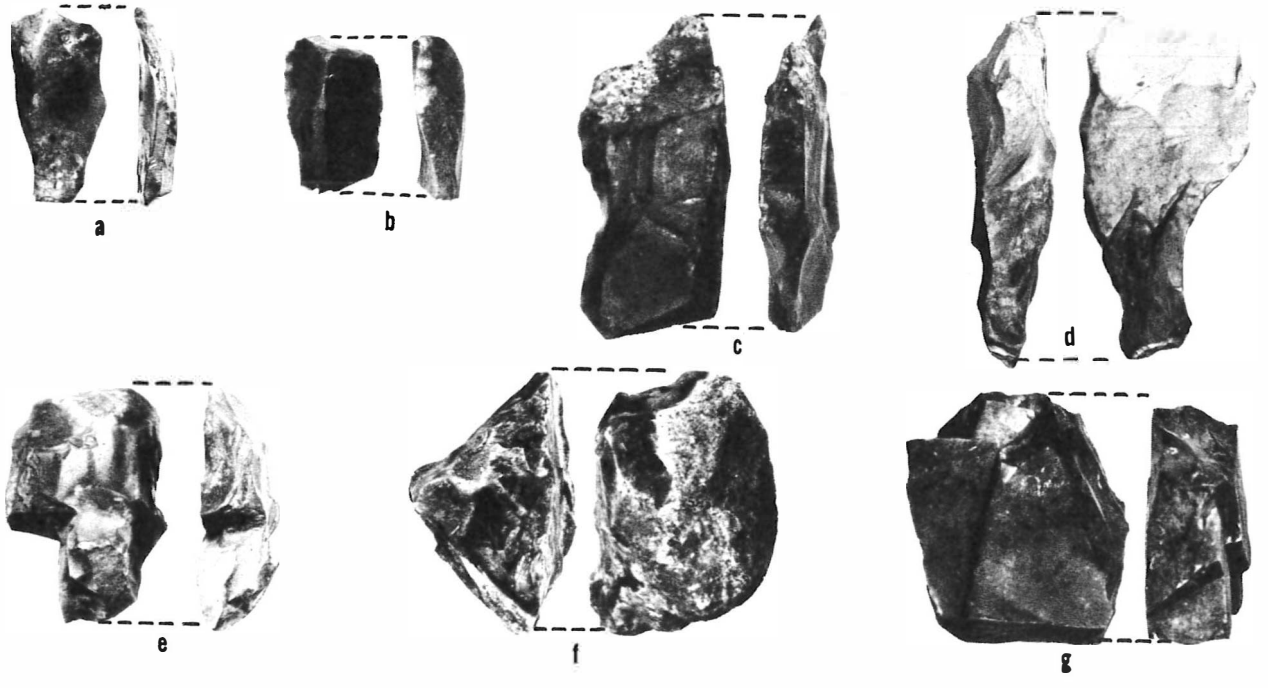


Plate 4B. Scrapers and Gouge

a: Flat-flake end-scraper. *b:* End-of-blade scraper. *c:* Spokeshave. *d:* Gouge. *e:* Ovoid plano-convex end-scraper. *f:* Domed scraper-plane. *g:* Flat-top scraper-plane.

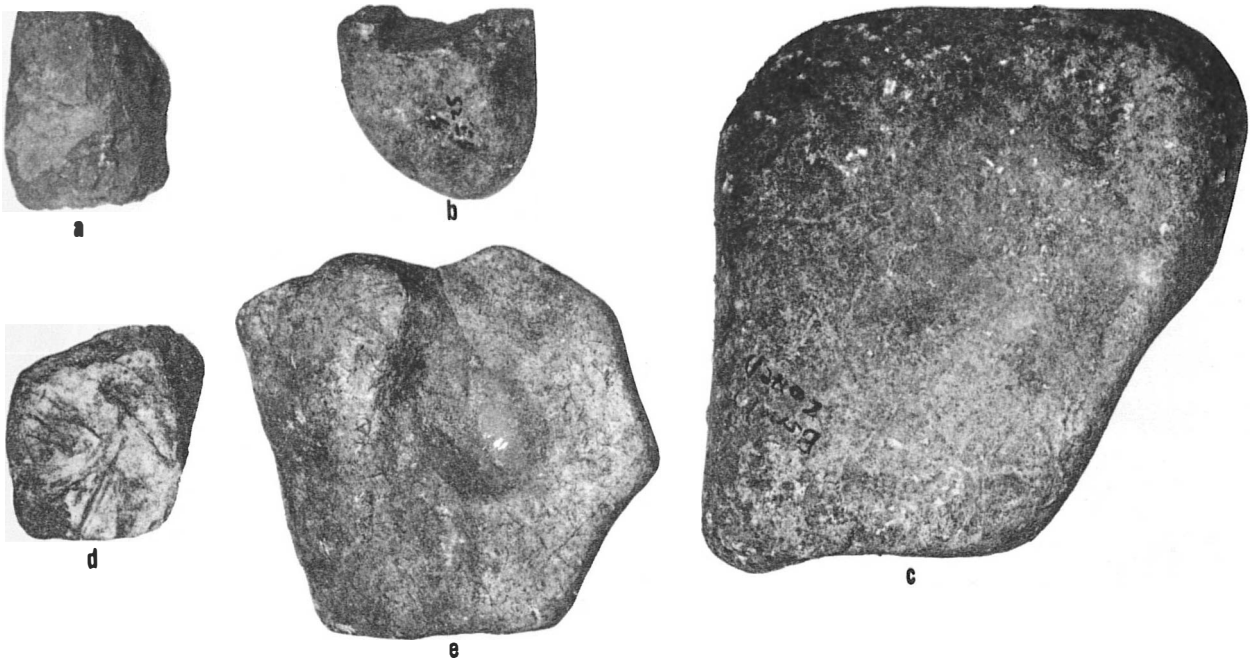


Plate 5A. Ground and Pecked Stone Tools

a: Pebble hammer. *b:* Pebble mano. *c:* Boulder metate or muller. *d:* Sinew stone. *e:* Nut-stone.

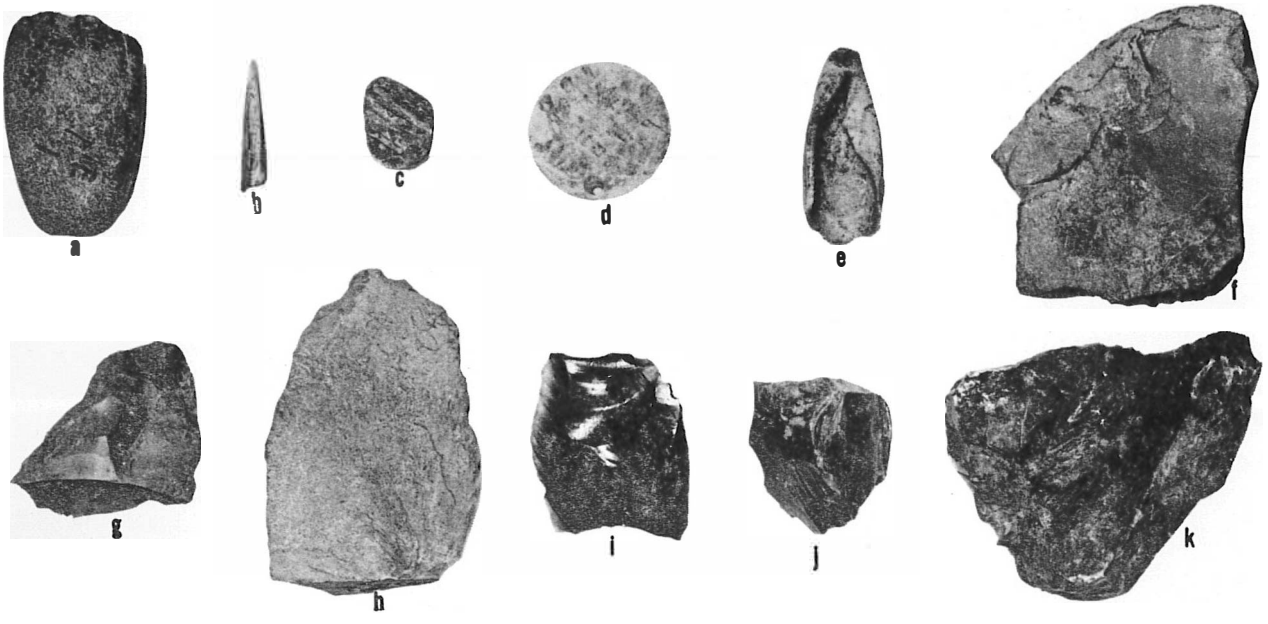


Plate 5B. Stone, Shell, and Bone Artifacts

a: Polished small celt. *b:* Split bone awl. *c, d:* Shell disk pendants. *e:* Shell tinkler. *f:* Slab chopper. *g:* Ovoid biface. *h:* Slab biface. *i:* Thin flake side-scraper. *j:* Nodule chopper. *k:* Large thick side-scraper.

Plate 6. CERAMICS

a-f, h-n: Tecomate potsherds. *g:* Olla potsherd.
m: Worked harlequin potsherd. *n:* Black incised potsherd.

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