The Second Mammoth and Associated Artifacts
At Santa Isabel Iztapan, Mexico*

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Among the numerous problems still to be resolved in the archaeology of Mexico, one could not find a more captivating, more fundamental, and at the same time, less known one, than the early genesis of the native civilizations of Mesoamerica. Lack of knowledge of preceramic developments, which are the truly formative ones of the high pre-Hispanic cultures, leaves the whole complicated sequence of better-studied civilizations without a real foundation. The investigation of this field requires collaborative research in the geological and paleontological sciences.

Curiously enough, these initial phases of prehistory in Mexico, in which a great scarcity of data is to be expected, already reveal a cultural picture of a definite form. The existence of a level of nomadic hunters of paleolithic type, at the end of the Pleistocene and within a natural environment different from the present in landscape, flora, and fauna, has been established definitely in the Valley of Mexico, and furnishes a point of departure for the study of human activity in the center of the country.

The present work reports a new discovery related to this phase of prehistory in the Valley of Mexico. The results obtained are not new, but rather, complementary to previous investigations. The coexistence of man and fauna now extinct in this region was already indicated in the recent work of Mexican and foreign geologists (Arellano

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1946a; Bryan 1946, 1948; de Terra 1946, 1949), and confirmed later by investigations and findings of the Dirección de Prehistoria of the Instituto Nacional de Antropología e Historia (Maldonado-Koerdell and Aveleyra 1949; Aveleyra and Maldonado-Koerdell 1952, 1953; Martínez del Río 1952).

Antecedents

The extraordinary prehistoric riches in the vicinity of Tepexpan in the northeast part of the Valley of Mexico, and the associations obtained there of man and fauna in the Pleistocene, render this zone one of the most important on the continent for the study of “paleo-Indian” cultures. Since more than a century and a half ago discoveries of fossil skeletal remains exposed in the plain of Tepexpan and adjacent sites have been made, but have been reported mainly in popular style in newspapers and magazines. Scientific information is, unfortunately, very scarce (Reyes 1923, 1927; Díaz Lozano 1927; Arellano 1946b). The findings of Reyes and Díaz Lozano are not very illustrative of human prehistory in the region, due perhaps to the exploratory techniques directed, from the paleontological point of view, at recovering fossils purely for their taxonomic and museum value. In the case of the mammoth skeleton excavated by Arellano (1946b) a possible association with an obsidian flake is mentioned.

In 1947 the discovery of Tepexpan Man, the first fossil human remains found in Mexico and one of the most remarkable discoveries in America, crowned the patient labor of Arellano and Bryan in the sediments of the Valley, and the integration of these problems achieved by Helmut de Terra.

The finding of Tepexpan Man aroused doubts about its authenticity in certain foreign circles, based principally on faults of observation on the part of the discoverers, and on some methodological dogmas in details of the exploration. This rigorous criticism, it must be warned, although well justified, was the product of a “tele-appreciation” of the facts, and without the appropriate knowledge of the series of previous investigations done by de Terra which were forming a perfectly clear picture of the geological, glacial, and lacustrine landscape of the region. Discoveries achieved a few years later bore out de Terra’s belief in the existence of man as the hunter of mammoths in the Valley of Mexico at the end of the Pleistocene.

In 1952, only a few days after the Dirección de Prehistoria initiated its first field work, it was rewarded with the lucky finding of the first fossil mammoth at Santa Isabel Iztapan, scarcely 2 km from the site of Tepexpan Man (Aveleyra and Maldonado-Koerdell 1952, 1953) and about 20 km northeast of Mexico City. In direct association were six implements of stone, adding in a remarkable way to the picture of prehistoric man as a hunter of mammoths in this vicinity. The presence, in the plain of Tepexpan and nearby sites, of not less than a dozen skeletal remains of mammoth (including the findings of Reyes, Díaz Lozano, Arellano, and others), together with the new discoveries of Tepexpan Man and the first mammoth at Iztapan, all of them in a limited area, was a sure indication that toward the end of the Pleistocene, the zone of Tepexpan-Iztapan must have been the scene of systematic mammoth hunting on the edge of ancient Lake Texcoco.

The discovery of the second mammoth at Santa Isabel Iztapan also resulted from the plans for exploration of the Dirección de Prehistoria in this region. At the beginning of excavation of the first mammoth in March, 1952, a special effort was made to encourage local people and authorities to inform the Dirección about all “giant bones” they would find when excavating ditches and wells. At the end of May, 1954, notice was received of large bones found in digging an irrigation ditch in the village of
Santa Isabel Iztapan. On inspecting the place it was proved that the bones in view were in situ and consisted of a portion of the base of the cranium and the proximal sectors of both tusks of a mammoth. Fortunately in this case, unlike the case of the first mammoth in which the cranium was destroyed by the local people when trying to extract it, the parts originally discovered were left in place and protected until the arrival of the Dirección de Prehistoria. The only pieces removed from their original place were both upper molars (the first part of the skeleton which the picks encountered on deepening the ditch) which were kept in a safe place and later given to the author.

The exploration began on June 1, 1954, and ended on the 12th. The author and Arturo Romano Pacheco, physical anthropologist of the Dirección, to whom should be credited the unsurpassed excavation technique employed, were in charge of the exploration. Manuel Maldonado-Koerdell was in charge of the geological study (see Appendix) and collaborated actively in the excavation, as did a student of the Escuela Nacional de Antropología e Historia, Francisco Gonzáles Rul. In some phases of the exploration we also had the help of Pablo Martínez del Río, Joaquín Cortina Gorbar, and the students Lilia Trejo de la Rosa, Mónica Bopp, and Carmen Block.

We must acknowledge the invaluable financial help received from several persons: the important annual subsidy received from Petróleos Mexicanos through its director, Antonio J. Bermúdez, has been indispensable to almost all the investigations achieved by the Dirección since the date of its foundation; the sum annually donated by Bruno Pagliai beginning in 1955 will permit the Dirección to devote full time to the works related to the prehistory of Mexico; and to Gilberto Loyo, Secretario de Economía Nacional, are due the legal procedures which culminated in the acquisition of additional mobile equipment. José Kimball took the photographs of the artifacts. Most of the other photographs were taken by the anthropologist Arturo Romano. Miguel Ricardez, cartographer of the Secretaría de la Defensa Nacional, kindly prepared the map of the region which is included here (Fig. 1). Finally, it is necessary to mention the decisive collaboration of the local authorities of Santa Isabel Iztapan, especially the enthusiastic help of the brothers José and Rosendo Cortés, who originally reported the finding and made possible the exploration on their property.

**Location of the Discovery and Local Topography**

The second mammoth at Iztapan was found approximately 350 m south of the first one (Aveleyra and Maldonado-Koerdell 1952), and some 2600 m south (and slightly west) of the site of Tepexpan Man (Fig. 1). The locality, together with the plain of Tepexpan toward the north and the surrounding terrain, forms part of the great sloping plain resulting from the retreat of the waters of the present Lake Texcoco in its northeast portion. The plain shows all the distinctive characteristics of the ancient lacustrine deposits except where modern cultivation has modified the surface of the terrain. In the surroundings of Santa Isabel Iztapan and the neighboring town of Tequisistlán there are plots of maize and vegetables, and some isolated ahuejote trees which may indicate the presence of pre-Hispanic chinampas in the region. The non-cultivated zones, such as the plain of Tepexpan, are covered by thin, coarse pasture, dotted with alkali spots bare of vegetation.

The most important nearby elevations are located to the north and northeast of the site. These are the hills of Chiconautla and Tlahuilco, formed by volcanic breccia, ashes, and lava flows. Precisely on the slopes of these hills were located the prehistoric shores which correspond to the Pleistocene levels of the Lake Texcoco. The hill of Chiconautla with an elevation of 2630 m forms the eastern margin of the
"bottle-neck" which still connected the lakes of Texcoco and Xaltocan in colonial times.

The courses of the present streams in this zone empty into the lake toward the west and southwest of Santa Isabel Iztapan and are not of permanent character. Most of them are branches of the delta of the Río San Juan, and they are known by the names of Río Iztapan, Río Nexquipayac, and Río Nuevo from north to south, respectively. None of these channels, however, pass sufficiently near the site of the mammoths at Iztapan to alter, or to have altered in any form, the stratigraphy resulting from the slow deposition of mud in the lacustrine depths. This circumstance, as will be seen later, is important in connection with the position of the mammoth remains.

The remains of both Iztapan mammoths were located considerably farther into the lake basin than the site of Tepexpan Man. Toward the end of the Pleistocene, in the times when the pachyderms were hunted, the lake margins must have been more than 3 km beyond the present town of Santa Isabel Iztapan, toward the north and northeast, on the skirts of the Chiconautla and Tlahuilco hills. In spite of this, the difference in elevation between these shores and the zone of Santa Isabel Iztapan is so slight that the depth of the waters of the lake at the location of both mammoths must not have been greater than 60 to 70 cm. Near the present town of Tequisistlán and Santa Isabel Iztapan there is a slight elevation of the terrain above the general level of
the sloping plain. It is possible, therefore, that during the Pleistocene era there might have existed here a kind of peninsula or tongue of land, more or less firm, from which the hunters could operate with greater ease.

The lake which existed at the time of these hunts must have been that which de Terra (1947:20) referred to as El Risco Lake III (elevation 2240 m ), and which he considered the one associated with Tepexpan Man as well (de Terra 1949, Table I). This shore of El Risco Lake III has been totally destroyed by erosion in the region of Tepexpan, but its remnants are observed in localities nearby such as at El Risco. On the slopes of the Chiconautla and Tlahuilco hills there remain today only vestiges of the higher, and consequently more ancient shores of the Upper Pleistocene era: El Risco Lake I (2263 m ) and El Risco Lake II (2257 m ), both too elevated to have been contemporaneous with that of Tepexpan Man and the elephants of Iztapan.

Techniques of Excavation

The first fossils were found by José Cortés when deepening a drainage ditch which serves as a boundary for his farm land. This operation revealed, without harming in the least degree, part of the base of the skull and the inferior portion of the alveoli, as well as a small sector of the proximal third of both tusks. From the curve of these tusks, it was known from the beginning that the skull was inverted.

The exploration followed a minutely cautious technique, adapted to the special conditions of the terrain and taking advantage of experience acquired in excavating the first mammoth of Iztapan and other similar works of the Dirección. The procedure is fundamentally the same as that followed with a delicate human burial, giving special attention to control over the geological strata overlying the bones, and to the search for associated implements which, because of their small size, require very laborious dissection of the deposit surrounding every one of the bones.

The first phase of this work was to discover the maximum area of dispersion of the bones by means of little test trenches. It was soon seen that the greater part of the remains lay to the east* of the skull, so that it was necessary to widen considerably this side of the pit and to cut down a tree in this sector. Without yet deepening the excavation over the area which covered the bones, the four walls were made even wider for the double purpose of providing comfortable free space for working around the skeletal remains, and of locating possible additional bones which could be isolated from the principal group (as at Iztapan No. 1). In its final dimensions the pit was 7.05 m east to west by 5.30 m north to south.

The next step was to deepen the free area around the skeletal remains up to the four walls, which at all times were kept perfectly smooth and vertical, with 90 degree corners. The pit around the skeleton was deepened to a level much below the bones, so as to leave the whole mass on a bank of clay, a circumstance which permitted greater comfort during the exploration and which made possible the excavation of many little tunnels and bridges around the bones, leaving them in place on pedestals of clay (Fig. 2). These operations were executed with gardening tools, spatulas, needles, and brushes. Shovels and picks were used exclusively for cleaning the pit around the skeleton. The problem of seeping water, which began to appear in abundance around the skeleton when the excavation reached approximately 1.60 m in depth, was solved by means of a pump.

The Mammoth Remains

The skeletal remains were delimited within an area 3.60 m north to south by

*This was mistakenly referred to as “west” in the original report, page 12. — A.D.K.
4.75 m east to west. The highest bones (inverted tusks) were found at 1.40 m below the surface. This level is 20 cm higher than that of the uppermost bone of the first mammoth at Iztapan (Aveleyra and Maldonado-Koerdell 1952: 14). The remains of the second mammoth, however, were totally included within the lowest geological stratum present, which in this vicinity is a greenish muck (*limo verde*) belonging to the Becerra formation, the terminal phase of the Upper Pleistocene. The same lacustrine facies of the Becerra formation completely surrounded the skeleton of the first mammoth at Iztapan (Aveleyra and Maldonado-Koerdell 1952: 12-13), as well as the remains of Tepexpan Man when discovered by de Terra and his associates in 1947.

Although the geological deposits at the two Iztapan sites are the same, those at Mammoth Two are less clearly seen than the corresponding ones at Mammoth One. At Mammoth One there is a more gradual transition in coloration and texture of the materials from one stratum to another, which might be due to the fact that this locality is located farther into the ancient lake than the first one, and consequently was subject to more stable conditions of moisture and deposition. Both mammoths, however, lay in exactly the same geological position, completely enclosed within the green muck of the Upper Becerra formation, which lay immediately below a *marshy equivalent* of the Totolzingo formation of the early Postglacial period. In the photograph (Fig. 5b), this deposit can be clearly seen as a black band overlying the lighter-colored Becerra formation.

As for the taxonomic classification of the mammoth, the very bad preservation of the upper molars (the only ones recovered), the crowns of which are completely obliterated, does not permit identification of the species. The great robustness and curvature of the tusks suggests, however, that they may belong to an imperial mammoth, *Mammuthus* (*Archidiskodon*) *imperator* Leidy, the largest of the American
proboscideans. This suggestion is reinforced on considering that all mammoths discovered up to date in the plain of Tepepan and nearby places have been identified as imperial mammoths. In an interesting study Maldonado-Koerdell (1955) explains the very probable coexistence of two species of mammoth in the Valley of Mexico during the Upper Pleistocene, describing two molars of *Mammuthus (Paralephas) columbi* Falconer in the important prehistoric site of Tequixquiac. According to Maldonado-Koerdell the two species had different habitats within the Valley of Mexico; the Columbian mammoth lived on the surrounding elevations covered with forest, and the pastures of the lower plains near the lake.

As to the age of the second mammoth of Santa Isabel Iztapan, the large size of the bones and tusks, the pronounced smoothness of the crowns of the molars, and the complete ossification of the epiphyses of the long bones, indicate that it was an adult animal that had reached the period of maximum growth. The first mammoth of Iztapan was a young animal (Aveleyra and Maldonado-Koerdell 1952: 15-16).

The mineralization of the remains is appreciable although not extreme. The bones show a typical dark coloration which characterizes all the fossil remains which are found in this region, and which is due to the impregnation of mineral salts peculiar to the terrain.

The skeleton was incomplete, lacking some large, heavy parts: the mandible (of which there was found only a small fragment corresponding to the symphysis); both humeri; the right ulna; both radii; the left femur and the right scapula. An inventory of the ribs and vertebrae reveals, on the other hand, that the thoracic box and vertebral column were almost complete. As was said above, the skull was also recovered, with its two molars and tusks. Besides this, the pelvic girdle and a great number of additional small bones were present (Figs. 3, 4).

All the bones were found totally displaced and out of anatomical relation, with the remarkable exception of the right hand leg (see below). The scattering of these bones,
even more than in the case of the first Iztapan mammoth, must unquestionably be referred to human activity. Displacement by natural agents appears impossible to accept. The stratified deposits around the skeleton reveal only very fine sediment, uninterrupted in deposition and horizontal to the slimes of the lacustrine bottom. This type of deposit can only be the result of a slow sedimentation through several
millennia without any violent current which could have moved the bones about, even the small ones. On the other hand, disturbances due to predatory animals feeding on the carcass of the mammoth must have been at a minimum as the only carnivorous mammal of any size existing in the Valley of Mexico at that time was the dire wolf (Aenocyon) and related forms, the powerful sabre-tooth having become extinct earlier. Even admitting the intervention of canidae and other predatory animals, they could have moved only with great difficulty in water more than a half meter deep.

In summary, it appears definite that the position of the skeletal parts when found was practically the same as that in which they were left by the hunters after cutting up their prey. This leads to a very important conclusion: Given the geology of a site such as that of the mammoths of Santa Isabel Iztapan, the position of skeletal parts alone is evidence of human intervention in its dismemberment; the hydraulic factors rule out other explanations.

The story of discoveries related to the geological antiquity of man in America has demonstrated that there exist four fundamental types of association between extinct fauna and implements of human origin:

1. Alluvial deposits in which artifacts and fossils have been transported a certain distance from their original place by a force of water, completely destroying the anatomical relation of the skeletal remains, and where isolated bones of different animals may be mixed in. These associations are usually discovered in the eroded exposures of stream, lake, or aeolian deposits. A typical example is the famous fossil site of Tequixquiac, located just to the north of the Valley of Mexico.

2. Ancient watering places and other strategic sites at which animals gathered periodically, and where prehistoric man achieved collective hunting (the "butchering grounds" or "kill sites" of North American archaeologists). In these cases there are found masses of fossil bones, many of them broken, in complete disorder and pertaining to dozens of killed mammals. The represented species are usually diverse, and the associated artifacts relatively abundant. Examples of this type of association are some of the more famous sites of primitive man in America such as Lindenmeier, Colorado; Plainview, Texas; Folsom, New Mexico.

3. Caves to which hunters brought parts of slain animals to be further butchered and consumed. Complete disorder and fragmentary representation of different species are also characteristic. Examples are Sandia and Burnet caves, New Mexico.

4. Sites in which a single animal was killed and in which, thanks to special geological conditions, the absence of later disturbance has permitted preservation of the remains just as they were abandoned by the hunters. The advantages provided by this last type of association over the three preceding ones are obvious, since they can illustrate the hunting customs of prehistoric man in such aspects as the selection of vulnerable points at which to wound the animal, the parts especially selected for food, the techniques of butchering, and so on.

The discoveries at Santa Isabel Iztapan are magnificent examples of this last type of association. The system of exploration used permitted us to keep a detailed record of the exact position of each bone in relation to the others, deriving observations of great interest.

The cranium of the second mammoth, disarticulated and inverted, has special importance. Because of its great weight, this position cannot be attributed to any

*The original report lists three types of association: (1), (2), and (4). I have added (3) with the consent of the author. — A.D.K.
other factor besides that of human activity. The reason for turning the skull upside down could well have been the extraction of the brain which must have been a favorite delicacy for primitive man. The apparently intentional destruction of the skull base around the occipital foramen seems to confirm this assumption. The skull of one of the mammoths excavated by Arellano (1946b, Figs. 1, 4) in the plain of Tepexpan was found in an analogous position.

The vertebral column and the thoracic box of the mammoth were the parts most minutely dismembered. All the ribs and vertebrae were found dispersed without the least anatomical relationship (Fig. 4). Surely the "loins" and "ribs" of the mammoth were among the parts preferred for food. The limbs were also disarticulated, but in this case many parts were taken away and more widely dispersed. This is especially true of the forelegs, of which only the left ulna was found. The corresponding hind limb was represented by the tibia only. The hind leg, on the other hand, constitutes a remarkable exception from the rest of the skeleton, as it not only was found complete, but also in complete articulation. The proximal end of this limb (head of the femur) rested very near the cotyloid cavity of the corresponding ilium. In the photograph (Fig. 5a), the way in which this articulated leg lay underneath the inverted skull can be appreciated. Its articulation was probably due to the fact that the leg could not be reached during the task of butchering. The foot of this leg was sunk deeply into the mud, immobilizing the animal; this foot was the lowermost point of the skeleton.

The position of the pelvic girdle and the articulated hind leg provides, besides, the only data suggestive of the probable direction which the animal followed im-

Figure 5. a. View of inverted tusks over articulated right hind leg; the tibia and foot bones at lower left were sunk deeply into the Becerra muck, probably indicating how the mammoth was mired and killed. b. Stratigraphic profile of deposits overlying the mammoth remains (see Fig. 9 for explanation).
mediately before being trapped in the marsh, toward the east, perhaps trying to reach
firm land at the east edge of the lake.

Proof of human intervention in the cutting up of the second mammoth at Iztapan,
besides the position of the bones, is provided by the marks and scratches found over
many of the bones. Some of these scratches could be attributed to the gnawing of
predatory animals, after the carcass was abandoned by man. Nevertheless, there are
other marks and cuts which must have been made with scrapers and knives to dis-
member the carcass. In several European Pleistocene localities, by means of statistical
studies based on hundreds of bones found in open sites, shelters, or caves with the
deposits of primitive man, it has been possible to prove the constant presence of
certain kinds of marks and cuts at certain key points where the main muscles and
ligaments were attached to the bones, and which had to be cut to achieve an effective
dismemberment of the animal. A remarkable study of this kind is that accomplished at
the Mousterian site of La Quina (Charente), France (Martin 1910). At some localities
in the United States similar investigations have been attempted recently (White 1952,

In the case of the second mammoth at Iztapan these marks were found on a large
number of the epiphyses or articular facets of the long bones, especially on the head
of the only femur, around the fossa of insertion of the so-called "round ligament." These
marks have been described by Martin quite often in cases of coxofemoral
disarticulation (Martin 1910, Pl. 50, 9, 10, 11). There are very frequently also, in cases
of intentional skull disarticulation, cuts and transverse grooves over the ridges of the
lateral processes of the first cervical vertebra (atlas) of mammals (Martin 1910, Pl. 47,
3, 4, 5). Such marks are clearly observed on the Iztapan mammoth atlas.

Another remarkable object found in the exploration is the rib fragment illustrated
in Figure 6. Martin illustrated several cases of incisions on ribs, made, according to
him, during the process of defleshing (Martin 1910, Pls. 40-3). However, this
fragment of the Iztapan mammoth shows such a quantity of scratches and deep cuts
that it is inadmissible that these were simply the result of defleshing a bone. In Figure
6 the front view of this rib shows a series of cuts regular in size and depth, arranged
symmetrically on both sides of the ridge. These marks must have an explanation not
yet discovered.

**Associated Artifacts**

During the course of the excavation three implements of chipped stone (Fig. 7)
were found in irrefutable association with the mammoth remains. Two of them (Nos. 1
and 3) were discovered and photographed in situ. The third artifact (No. 2) was found
underneath an aggregate of ribs and vertebrae toward the center of the skeletal
remains, while this zone was being explored by means of small tunnels excavated
under the bones; therefore, it was not possible to observe its exact location. The
position of these implements with respect to the skeleton is recorded in Figure 4.

**Artifact 1.** This is a lanceolate atlatl (dart) point without shoulders, base slightly
concave, and very symmetrically shaped. The edges converge gradually toward the tip
and the base from the middle, which is the widest part. Its maximum dimensions are:
length 80.2 mm, width 27.4 mm, thickness 8.5 mm. This artifact is skillfully
fashioned on both faces from a flake which retains some of the original fracture planes
in the middle part of the lower third. It shows pressure flaking, very fine and applied
over all the basal edges, as on most of the early types of projectile points of the Pleis-
tocene and early post-Pleistocene of North America. The tip appears to be somewhat
weathered. The material is of igneous origin, probably dacite, of fine texture and dark

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Figure 6. Section of mammoth rib bearing numerous deep cuts made with stone knife.

Figure 7. Three stone artifacts found in association with second mammoth. Positions are shown in Fig. 4. Dimensions and descriptions are given in the text.
red color; it is foreign to the Valley of Mexico but abundant in more northern regions, especially the states of Guanajuato and San Luis Potosi. This specimen was found near an isolated rib at the northeastern extreme of the skeletal remains (Fig. 8).

From the point of view of typology this point is of great importance since it is identified with the recently recognized Angostura type found widely in the Great Plains of the United States. The presence of such points in certain fossil localities of considerable antiquity was pointed out several years ago, but without assigning them a distinctive name (Krieger 1947, Pl. 1A, C). Even earlier, an example was discovered in Texas in apparent association with mammoth remains (Sellards 1940, Pl. 1, 4). In eastern Wyoming very similar points appeared with bones of fossil bison (Anonymous 1943; Wormington 1949: 65). However, the Angostura type was not recognized formally until the excavations of Hughes in the Long site above Angostura Dam in South Dakota (Hughes 1949), where they were found in deposits belonging to the early Postglacial period and initially described as “Long points.” This deposit was later dated at 7073 ± 300 years ago by the radiocarbon method (Libby 1955: 126). Similar points have been described from the Agate Basin in Wyoming (Roberts 1951), and from Bexar and Blanco counties in south-central Texas (Orchard and Campbell 1954).

All archaeological data now available tend to place the Angostura type in a second lithic level in the Great Plains, which also includes the Plainview, Scottsbluff, Eden, and probably other types (Krieger 1950: 120 and Fig. 8; Suhm, Krieger, and Jelks 1954: 402). Although this period corresponds to the early Postglacial it is very probable that its beginnings were contemporary with the last Pleistocene glaciers. It succeeds the first lithic level, called by Sellards (1952: 17) the horizon of the “Llano Man” of which the Clovis fluted projectile point type is characteristic and which is well within the Pleistocene (Krieger 1950, Fig. 8).

The association of an Angostura point with the second Iztapan mammoth is a firm indication of the presence in Mexico of this second lithic horizon of the paleo-Indian cultures in North America. The Plainview point found in Tamaulipas (Arguedas and

Figure 8. Artifact 1, a projectile point of Angostura type, in situ.
Aveleyra 1953); and the projectile point related to the Scottsbluff type found with the first mammoth at Iztapan (Aveleyra and Maldonado-Koerndell 1952, Figs. 8, 9; 1953, Fig. 105, 1), seem to confirm this.

The association of Scottsbluff and Angostura points with the Iztapan mammoths points to a serious problem. When found in the Great Plains with extinct mammals they are invariably associated with fossil bison, a species which may have survived in that region several thousand years longer than the mammoth. The only exception to this rule is at the Buckner ranch, near the Texas coastal plain, where a peculiar mixture of different types of points was apparently associated with remains of several extinct species, including mammoth (Sellards 1940, Pl. 1, 4, 5, 7, 8). These may now be identified as an Angostura, a Scottsbluff, a Folsom, and the basal fragment of a Clovis point (Suhrm, Krieger, and Jelks 1954: 120-1). Aside from this unique case the projectile points discovered with mammoths in the United States have usually been the fluted Clovis, corresponding to the first lithic level already mentioned (Figgins 1931, 1933; Cotter 1937; Bryan and Ray 1938; Sellards 1938; Haury 1953).

Such a situation in central Mexico can be explained in two ways: either the Scottsbluff and Angostura points are more ancient and perhaps originated in Mexico, or the mammoth survived in central Mexico after its extinction in most of the United States. Probably the second alternative is the true one.

Artifact 2. The second artifact was found under a complex of ribs and vertebrae toward the center of the remains. It is a projectile point, leaf shaped, made of brown flint of excellent quality. This material is also foreign to the Valley of Mexico. The specimen lacks the distal extremity, which could not be found in the excavation. Originally, the projectile must have been of a laurel-leaf contour, pointed at both ends. The possibility that the missing end was the original base of the projectile must be discarded in view of the general contour of the body and the considerable thickness of the fractured cross section, which does not show a gradual thinning to facilitate hafting. The chipping is bifacial, with scars of irregular flakes over both sides and fine pressure flaking along the edges. A remarkable feature is the intentional serration observed on both edges except on the proximal third; this detail confirms that the true base of the projectile is the lower part as shown in the photographs. The dimensions are: maximum length 61.3 mm, maximum width 24.4 mm, maximum thickness 8.1 mm.

There are no reports to date of the discovery of such double-pointed laurel-leaf projectiles associated with extinct fauna in any site in America.* The form is elementary enough and is found in abundance in diverse cultures of the European continent, in very different chronological horizons. The similarity of this point to the famous "laurel leaves" of the Middle Solutrean of Western Europe is remarkable. This relationship is valid strictly from the typological point of view, without implying a direct contact between the paleo-Indian culture and the Upper Pleistocene of Europe. The possibility of extension of the Old World Paleolithic into America is not entirely remote and, at any rate, it must not be discarded a priori. The Solutrean, for instance, has very important foci in eastern Europe and its expansion or influence toward the Asiatic East is possible. The Solutrean shape seems to show in the Sandia type points, the most anciently known so far in America, and is indication enough that infiltrations

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*This statement is true for association with extinct fauna. However, in Suhrm, Krieger, and Jelks 1954, p. 440 and Pl. 99, we described and illustrated the bipointed Lerma type first recognized by R. S. MacNeish in southern Tamaulipas. Its distribution was given as western, coastal, and southern Texas in addition to Tamaulipas, and its age estimated as "several thousand years before the Christian era." — A. D. K.
from the Upper Paleolithic of Eurasia into the New World possibly occurred. * Needless to say, this digression does not pretend to prove a Solutrean affiliation for the second point found with the Iztapan mammoth.

Artifact 3. The third artifact was found in situ approximately underneath the right supraorbital ridge of the inverted skull of the mammoth. In this case the artifact is a biface knife, fashioned from impure flint (chert) of very light color with whitish bands. The shaping was done by percussion completely over both faces, with scars of wide irregular flakes, conditioned perhaps by the poor quality of the material. There is secondary retouching by pressure on some small sectors of the edges. The broken edge coincides with an increase in thickness of the artifact near the middle, and as the breakage is very ancient, it might have happened during the original shaping process. It is probable that the knife originally was of laurel-leaf form with both ends pointed. In its present state the artifact measures 67.2 mm in length, 34.9 mm in maximum width, and 9.3 mm in thickness.

It is evident that this object could never have been destined to be a projectile point, considering its general size, thickness, and irregularity of flaking. Typologically, it is a simple knife which, even after breakage, could still have been used effectively for cutting up the mammoth. The place in which it was found, underneath the skull and near the atlas, could indicate that it was one of the implements used in the complicated task of disarticulating the cranium of the animal. The presence of scrapers, knives, and other cutting implements was also abundantly proved in the exploration of Iztapan Mammoth 1.

**Summary**

The little "industry" of Santa Isabel Iztapan, found with the two mammoths in identical stratigraphic position, scarcely 400 m apart, provides no less than ten artifacts. Of these, three are projectile points, each of a distinctly different type (Scottsbluff, Angostura, and "laurel-leaf"). This mixture of types in association with isolated remains of extinct animals is almost unique in North America. The great majority of such finds have demonstrated strict uniformity in associated points, as in the recent discovery at Naco, Arizona, of a mammoth with eight Clovis points (Haury 1953). The only exception known to me besides that of Iztapan is the Buckner site in Texas already mentioned.

The typology of the more ancient lithic industries of Central Mexico is still extremely confused and full of all those unknowns typical of the regions in which prehistoric investigation is barely being started.

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*The idea that Sando points can be derived from the Upper Paleolithic of the Old World has already been noted by Bosch Gimpera (1948: 6-8), who relates them with the Gravettian "notched points" which also persisted in the Swiderian stage in Poland. The Gravettian and Swiderian points, however, are unifacial and very distinct from the bifacial Sando point, which are much more nearly parallel to the "notched points" of the Upper Solutrean. — A.D.K.*