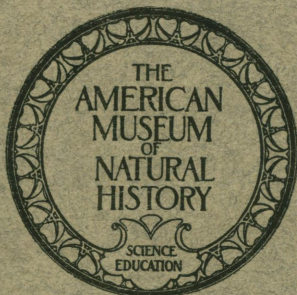


ANTHROPOLOGICAL PAPERS
OF
THE AMERICAN MUSEUM OF NATURAL HISTORY

VOLUME XXXV, PART II

EXCAVATIONS AT EL ARBOLILLO

By GEORGE C. VAILLANT



By ORDER OF THE TRUSTEES
OF
THE AMERICAN MUSEUM OF NATURAL HISTORY
NEW YORK CITY
1935

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Excavating Cut VII, Trench G.

Frontispiece

EXCAVATIONS AT **EE** ARBOLILLO
BY GEORGE C. VAILLANT

FOREWORD

An archaeological report is the result of the faithful coöperation of many people, each of whom played an essential part in its preparation. To all these collaborators the writer wishes to express his thanks: To his wife, who assisted in the field-work and in the preparation of the manuscript; to Doctor Clark Wissler and Mr. Clarence L. Hay, for their support of the project and their counsel during its execution; to the officials of the Direccion de Monumentos Prehispanicos of the Secretaria de Education Publica of the Mexican Government, for the judicious execution of their duties and for their ready coöperation in forwarding the work; to Mr. Eman L. Beck, for his generosity in arranging the survey of the occupation levels at various sites of the Early Cultures of the Valley of Mexico, and to Mr. Thomas Rowe for carrying it out; to Miss Mildred Conner who gave freely of her time and skill in the preparation of the illustrations; to Messrs. Shoichi Ichikawa and E. Grom for drawing the maps and sections; to Mr. H. B. Rice for his photographs of many of the specimens.

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INTRODUCTION

The excavation at El Arbolillo from March 16 to April 20, 1931, composed the third of the systematic analyses of Early sites in the Valley of Mexico carried out by the American Museum of Natural History. At Zacatenco, in 1928-1929, three time periods were discovered, Early, Middle, and Late Zacatenco, which involved at least two distinct cultures, and thus necessitated the abandonment of the term "Archaic" culture.¹ The following year, 1929-1930, investigations at Ticoman disclosed that Late Zacatenco, the second culture, could be divided into two major periods and a transition. Consequently, the term Late Zacatenco was abandoned for the more precise, Early, Intermediate and Late Ticoman.² During the season of 1930 the writer collected a few Early and Middle Zacatenco figurine heads from El Arbolillo, but it was not until the next winter, when he and his wife made formal excavations, that a considerable collection was amassed.

El Arbolillo was archaeologically discovered by Professor Boas in 1910, and in 1911-1912, he published some specimens from that site in his Album.³ Several years later Professor Kroeber also described the site and analyzed some of its surface pottery.⁴ The choice of El Arbolillo as a point for excavation was based on its proximity to Zacatenco and Ticoman. Therefore its subjection to the same geological and ethnological factors which affected the populations of the other two sites would be extremely probable. Moreover, the presence of Early and Middle Zacatenco material offered a means of corroborating the results obtained at Zacatenco.

¹Vaillant, 1930a.

²Vaillant, 1931.

³Boas, 1913, 178, El Arbolillo described, but not mentioned by name; Boas, 1911-1912, Pls. 54-56.

⁴Kroeber, 1925, 396.

PHYSICAL COMPOSITION OF EL ARBOLILLO

The archaeological site referred to in this paper as El Arbolillo adjoins the dairy ranch of that name, located on the northern edge of the township of Ticoman, some eight kilometers northwest of the Villa de Guadalupe, Federal District, Mexico (Fig. 5). The ground occupied by the site is part of the *ejido* (communal land) of Ticoman and is locally known as La Pastora. However, since the most conspicuous landmark near the site is the ranch of El Arbolillo, Professor Boas used that name, and as Professor Kroeber followed his example, it has seemed best to keep the term current in archaeological literature. El Arbolillo is readily accessible from Guadalupe by car or autobus, for the road to Cuauhtepac, after passing the hacienda of La Escalera and crossing the old Spanish aqueduct from Tlalnepantla to Guadalupe, cuts through a section of the refuse beds less than a kilometer north of the rocky point occupied by the archaeological site of Ticoman.

El Arbolillo is favorably situated, since it lies on the eastern shore of a former arm of Lake Texcoco, which the Cerros de Guadalupe divide from the main body of water. After the Conquest, this arm was drained and converted to farmland, but anciently there was a continuous chain of dwelling sites, ranging from Tlacopan and Azcapotzalco at the west, to Tenayuca at the north. Then, along the eastern shore, were strung El Arbolillo, Ticoman, Zacatenco, Sant' Isabel Tola, and finally Tepeyac, the modern Guadalupe. Curiously enough, between Tenayuca and Tepeyac there are no important Aztec monuments, although salt works of that period are very common. But our work has shown that for a very long time before the period of the high cultures this region was occupied by fair-sized communities.

The site of El Arbolillo must have been chosen for convenience rather than defence, since it is located within the northern curve of a half-circle of foothills which, at the north and east, merge steeply into the Cerro del Chiquihuite, and, at the south, tail off into the peninsula of Ticoman. Consequently, the site lay open to the sun and the mountain slopes protected it from the chill winds. It is probable that in early times the hills, which are now bare, were covered with timber. Thus the arroyo at the south of the site may have been a living stream, providing fresher water than the marshy shores of the lake. The fields south of the stream bed are rich and loamy and must have yielded heavy crops.

The primary rubbish deposit spread over several acres (Fig. 1). Although modern agriculture and the grading operations for the Cuau-

tepec road have added considerably to normal surface disturbance, and the washing out of an irrigation reservoir has created a deep arroyo at the north between Trenches C and I, the condition of the site was remarkably good for stratigraphical work. The gradual slopes of the present surface of the ground indicated a gently rolling subsoil, in contrast to the craggy contours of the original terrain at Zacatenco and Ticoman. Moreover, as may be seen by a glance at the contour lines of Fig. 1, the *débris* beds at El Arbolillo tended to mound up away from the slopes of the bordering hills. Thus much of the violence of erosion after occupation was counteracted, since the violent passage of surface water down the slopes of the hills during the rainy season tended to pass around rather than to cut through the depositions of human refuse.

Mr. Thomas Rowe, a civil engineer of Mexico City, staked out in twenty meter squares that part of the site we judged most profitable to analyze (Fig. 1). The altitude of each stake was calculated from the 10 meter bench-mark at Ticoman.¹ The outer polygon on the map (Fig. 1) bounds that portion of the site where the signs of human occupation were most intense. The various trenches fairly effectively sampled conditions of deposit over the entire site, since to the east, rocks began to appear and the *débris* tended to thin out.

These trenches are designated alphabetically in the order in which they were made. However, we shall describe them, in topographical sequence, from north to south (Fig. 1). As will be seen, the first group, Trenches A, C, and J, probed the shallow ground at the north of the site. Trench I explored the ground just east of the arroyo left by the abandoned irrigation reservoir. Trenches K, B, and G were designed to section the deepest part of the refuse mound; Trench D sampled the southwest corner of this accumulation. Trenches E, H, F, and L were intended to produce data on some refuse which showed evidence of a Teotihuacan occupation in the southern sector where the mound leveled out.

Following our method of presentation in previous publications, we are showing the relative positions of figurines and burials in the various trenches (Figs. 2-4, 6). These levels, computed in relation to the 10 meter bench-mark at Ticoman, are given in order to integrate the relative vertical position of the trenches. Their horizontal position is shown in Fig. 1. Reference is constantly made to the period of the various depositions. While Table 17 may be consulted for the ceramic frequencies in each cut, those of the figurines marked in the trench sections

¹Vaillant, 1931, 248, 426-427.

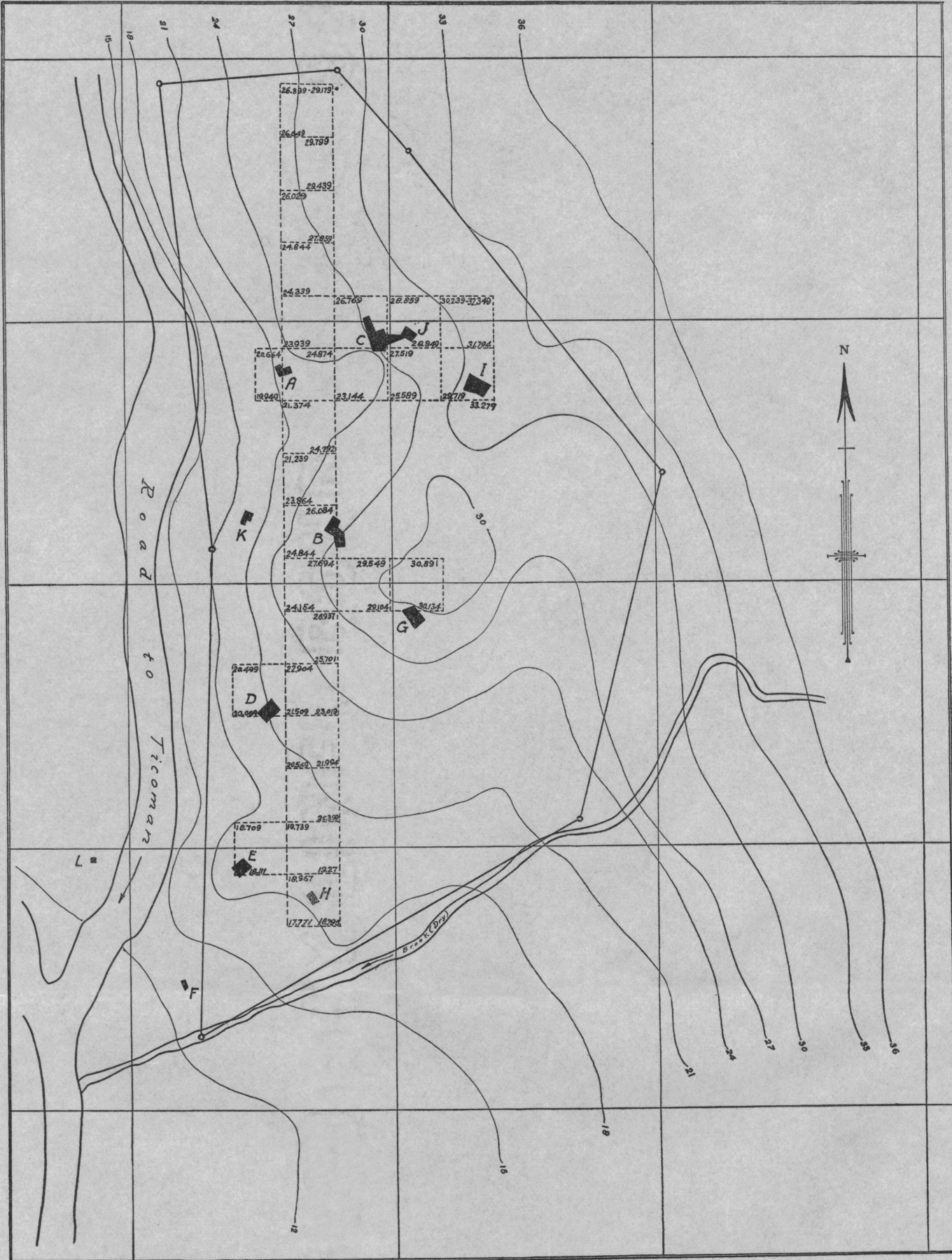


Fig. 1. Plan of El Arbolillo.

(Figs. 2-4, 6) are equally significant (Tables 8-16). The following list gives their chronological association, according to the Zacatenco classification.

Early Zacatenco: Types C1, C2, C3, D1, F early

Middle Zacatenco: Types A, B, B-C, C5, F

TRENCHES A, C, AND J

Trench A (Fig. 6, No. VII) began at the western edge of the archaeological depositions at El Arbolillo, where the Guadalupe-Cuautepec road left a vertical bank (Fig. 1). The earth was removed in three layers, revealing an upper stratum of earth disturbed partly by redepositions from the Trench C region to the east and partly by the churning incident to modern agriculture. Sherds and Type B figurine fragments

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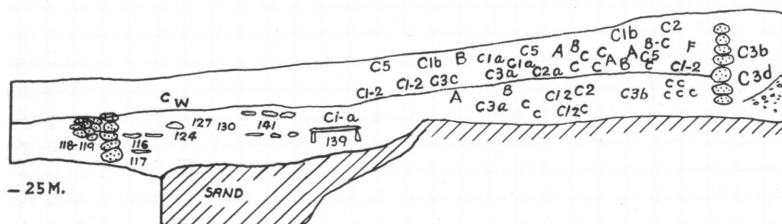


Fig. 2. Section of Trench C and J.

defined the layer as of Middle Zacatenco date. Next followed a thick layer of mixed sand and loam, almost sterile as to artifacts. This stratum in turn rested on clean yellow sand which, showing no signs of disturbance, must represent an original geological deposition. But dug into this clean sand layer was a grave containing eight individuals, men, women, and children (Fig. 7, No. 1). It was not possible to trace the living surface from which the interment was made.

Trench C (Figs. 2, 8) was opened some forty meters east of Trench A to seek the source of the material redeposited as the top layer of this trench. Trench C produced constant evidence that its shallow débris layer, seldom more than a meter and a half deep, had been disturbed. However, although the plough may have been in part responsible and erosion also had its share, the main cause of disturbance was the interment of no less than eighteen individuals (Fig. 8) at different times.

The dead were mainly laid in slab-covered graves just east of a wall extending north and south, but some were buried directly in the ground. A number of burials had been disturbed, some apparently by modern agriculture, others by erosion, and a few by the activities of burrowing animals which often utilized the soft ground around a skeleton for their nests.

As in the case of Trench A (Fig. 6, No. VII), bottom in this trench, C, was an undisturbed layer of sand, into which only one of the burials, the baby, Skeleton 140, was ever sunk. Every effort was made to date the burial layer. The *débris* lay in two strata, in the churned upper layer of which, enough Type A and B figurines were found to establish that this deposit was of Middle Zacatenco date (Fig. 2). In the north extension of the trench the lower stratum was full of graves, up to a stump of wall which extended a short distance east across the head of the trench (Fig. 8). Beyond this there were few skeletons. No figurine heads were found in the lower layer, nor did the sherd yield offer affirmative evidence as to period. The east extension of Trench C passed through the burial belt and into a *débris* layer. Here there were signs of a stratification. The disturbed upper layer contained such Middle Zacatenco elements as Type A and B figurine heads, whereas in the lower layer a single Type B head, high up, was the only exception to the usual C types of Early Zacatenco. This condition indicates that the burials lay in Early Zacatenco *débris* and therefore must have been made subsequently. Since Middle Zacatenco *débris* overlay this stratum, it would be logical to assume, on the external evidence of position, that the burials also were of this later period. On the other hand, the internal testimony of the artifacts accompanying the burials, and the character of the burials themselves, adduced a different date (pp. 178-179).

Trench J (Figs. 1, 2) was a purely exploratory trench designed to obtain further data on the northern depositions. The earth was churned and eroded, since the cut passed through the bank of the southern edge of the arroyo. When junction was effected with Trench C, the stub of a north-south wall was disclosed, with dumped gravel at its inner or eastern side; on the outer or western side a meter of churned earth covered the layer of primary deposition. The wall, which may have been the eastern border of the burial belt in Trench C, had seemingly been leveled off, at first by erosion and fill, and secondly, by the grading operations of later peoples, to promote their agriculture.

The cutting of Trenches A, C, and J revealed that the original surface of the northern portion of the site was a gently sloping beach of

clean sand. The first comers of the Early Zacatenco period threw some refuse out on this area, and, in some parts like Trench A, sank an occasional grave. Later on, this zone was utilized more intensively, for not only is there débris of subsequent periods, but also the graveyard in Trench C and the walls which apparently enclose it. The shallowness of the rubbish beds indicates that this northern region of El Arbolillo was never its chief center of population.

TRENCH I

Trench I (Figs. 1, 3) was excavated to examine the deposits just north of the washed out reservoir that, in forming an arroyo, had

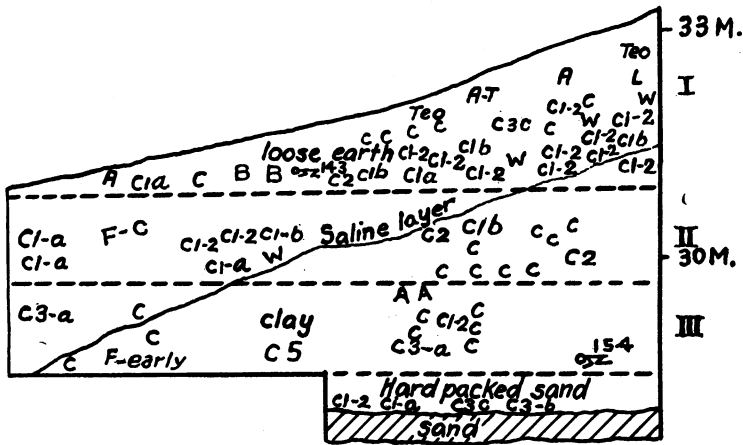


Fig. 3. Section of Trench I.

destroyed the gradual northward slope from the top of the El Arbolillo mound. The trench was cleared in three cuts (Fig. 3). The top layer was composed mainly of material redeposited by erosion and yielding many fragments of figurines, mainly Types C1 and C2. Potsherds were small in size, also indicating redeposition, for in a primary deposit the sherds would be larger. A thin sprinkling of Teotihuacan pottery also appeared. At the easternmost extremity of the cut, signs of primary deposit were found. The second peeling showed, at first, the general character of Cut I, but on moving eastward, the sherds became larger and stones, as if from a fallen wall, began to appear. The bones of a washed-out skeleton, No. 143, were found and figurine fragments were still plentiful. Running diagonally upward and eastward across the

trench, at an angle of 45 degrees, was a thin streak of saline deposit. This gave an effective basis for the conclusion that the *débris* had formed along a very steep slope. On opening Cut III, which was much narrower than the previous cuts, owing to the difficulties of throwing out the dirt, we observed the western extremity of the saline streak emerging from the floor of the cut. A heap of stones indicated the remnants of a terrace and against it were two Type A (Middle Zacatenco) figurines. Behind this ruined revetment, the soil was much more sandy, and in a loam-filled grave lay the baby, Skeleton 154 (Fig. 7, No. 3), with its mortuary furniture. Bottom in the trench was clean sand.

Lack of time prevented a continuation of the trench. We were therefore unable to ascertain whether there existed a rocky outcrop to the east and south against which *débris* in falling would have created the steep slope indicated by the refuse lenses. Moreover, the revetments founded on the loose earth of a natural drainage slope would have been most unstable. The extremely numerous Type C1 and C2 figurines suggested an Early Zacatenco dating for the refuse, but the Type A figurines in Cut III presented a serious obstacle. The sherd count (Table 17) suggested a dating at the close of the Early Zacatenco period. However, in view of the less disturbed rubbish beds to the south, the stratificatory evidence from Trench I is not in itself a crucial matter. The material, as a whole, is very significant owing to the preponderance of Types C1 and C2 (Tables 8-15).

TRENCHES K, B, G, AND D

Trenches K, B, G, and D were designed to explore the central part of the El Arbolillo accumulations (Fig. 1). Trench K (Fig. 6, No. VIII), like Trench A, was sunk at the western edge of the accumulations, where the road cut through them. Most of the depositions at this point had been removed for grading, so that sand was reached at a depth of a little over a meter of mixed *débris*. Buried in this stratum, but covered with loam, lay two female skeletons, Nos. 150 and 151, with their equipment (Fig. 7, No. 2). Although the modern road excavations had spoiled the *débris* for any period analysis, the internal evidence of the grave furniture (Fig. 19, No. 2) indicated that the burials were of the same period as those in Trench A.

Trench B (Fig. 1; Fig. 6, No. IX) was sunk near the top of the mound and its six cuts penetrated some six meters of *débris*. Dug vertically downward, a stairway had to be cut for the removal of earth in carrying baskets. Consequently, there is some mixture in the sherds

of the upper three cuts, as may be noted in Table 17, where Teotihuacan sherds are recorded from Cut V. The segregation of earth from the cutting of the stair was impossible. However, the provenience of the figurines could be accurately observed and analysis of the *débris* could be validated. The top layer produced mainly churned Middle Zacatenco rubbish with a thin sprinkling of Teotihuacan sherds. A Teotihuacan burial, Skeleton 100-101 (Fig. 7, No. 11), and a Middle Zacatenco burial, Skeleton 102 (Fig. 9, No. 1), were uncovered, the latter lying near a rock pile. Just below the floor of this cut lay the young female, Skeleton 113 (Fig. 9, No. 2).

The second cut showed a layer of rubbish heavily laminated with gray ash, tilted sharply to the northwest and cut in the center by the filled channel of a shallow arroyo. The bottom of this lens reached downward into Cut III. Middle Zacatenco and a little Teotihuacan pottery came from the fill of the arroyo, but the bulk of the figurines from the ashy layer were Early Zacatenco. Mano and metate fragments were especially common in Cuts I and II, and a jar, probably associated with Skeleton 162, came from one corner of this trench.

Beneath the ashy stratum, a belt of caked and loamy *débris* extended from the southeast corner of Cut II to the floor of Cut IV. In Cut III sherds were few, but increased gradually in number as Trench B deepened. They looked rotted, as if they had been subjected to submersion. This appearance may have been caused by an actual rise in the lake level or just as probably by the clay in the soil which prevented a rapid drainage of moisture.

Skeleton 131 (Fig. 7, No. 6) was uncovered in Cut IV, but the shaft of the grave could not be traced. The pottery fragments were large, suggesting a primary deposition. In Cuts V and VI the sherd lenses tended to level out, and although small boulders appeared, the trench had the same sandy bottom that we had met before in the northern trenches, A, C, and J.

After completing this section, we ran a spur south, Trench B, South Extension, to peel off the upper layers and hunt Middle Zacatenco and Teotihuacan burials, since we had found three, Nos. 100-101, 102, and 113, in the top cuts. We had very fair success, finding four individual graves, probably of Middle Zacatenco date, Skeletons 147, 149, 155, 156 (Fig. 9, Nos. 3-6), and a multiple Teotihuacan grave, Skeletons 157-159 (Fig. 7, No. 12) that was most richly equipped, producing about one hundred field catalogue entries (p. 172). The soil, owing to the presence of the skeletons, could not have been much disturbed in modern times,

7, No. 7), and an adult, Skeleton 144 (Fig. 9, No. 8), appeared in the upper part of the cut. The sherds were large and exhibited the peculiar water-rotted look of those in Trench B. Cut III was marked by very loose earth, an extraordinary condition in view of the weight of the soil above it. Casts of maize leaves and chunks of charcoal were frequently observed. Skeleton 148 (Fig. 7, No. 8) was found with its upper body inserted in a sort of pit or oven, and its legs in a grave lined by slabs. Another such hollow was encountered, and also a fire pit made of slabs of stone and tepetate, set in a square of some 20 centimeters, interior dimension. The sherds still retained the dried slime that made them appear to have been submerged. In the middle of the cut we found another pit about 1.20 meters in diameter, the walls of which had been smoothed and extended downward 1.50 meters. The bottom meter produced many sherds and several Type C figurines. All of the specimens had a rotted appearance, so that apparently any standing water could produce this condition, without our having to invoke the presence of a flood.

Working out from this pit, we removed Cut IV. Two burials, Skeletons 152, 153, both babies (Fig. 7, Nos. 9-10) were found at the top of the cut. The earth was pitted with holes, smaller than those described in the previous paragraph. The sherds generally were found in a strip near the floor. Figurines of the C type continued to be found.

Cuts V and VI were made as a narrow shaft, since the soft earth created great danger of a side slip. The earth in these bottom layers was more hard packed than that above. The sherds showed no evidence of the action of water, and the figurines of the C group retained the paint applied after firing. At the bottom of Cut VI, two burials, Nos. 160 and 161, were found, (Fig. 7, Nos. 4-5). The depositions ended in a layer of clean sand.

Trench D (Fig. 1; Fig. 6, No. X) was sunk at the southwest slope of the main mound, where Teotihuacan sherds on the surface gave promise of a deposit of that culture. The excavation was made in four cuts, passing through some 3.50 meters of debris tilting sharply westward, and, after dropping a meter more through sterile sand, the trench was abandoned. Two sections were made to check results, but the trench is best treated as a whole.

The top earth contained a very thin layer of Teotihuacan pottery, separated by a sterile layer of redeposited earth from the earlier deposits below. We considered this sterile layer of great importance, since it indicated a lapse of time between the Teotihuacan and the earlier occupations.

In Cut I, just below the sterile layer, two graves were found, Skeletons 123 and 129 (Fig. 9, Nos. 9-10) which, since they lay in Middle Zacatenco débris, could not have belonged to an earlier period. Further, they were so near the surface that it is quite probable that there had been considerable erosion before the deposition of the sterile layer. Cut II yielded one burial, No. 111 (Fig. 9, No. 11), figurine heads, and sherds of Middle Zacatenco type. In both these upper cuts mano and metate fragments were abundant. In Cut III the soil was hard and laminated, but the refuse continued to be Middle Zacatenco. The presence of five burials, Skeletons 114, 115, 132-134 (Fig. 9, Nos. 12-13), showed that this was a primary deposit. The bottom cut still yielded Middle Zacatenco débris. Directly below Skeletons 132-134 was another burial, No. 135 (Fig. 9, No. 14), perhaps associated with them. The bottom of the trench was undisturbed sand.

The digging in Trenches K, B, G, and D (Figs. 1, 4, 6, Nos. VIII, IX, X and Frontispiece) uncovered tremendous accumulations of débris. The refuse had accumulated against the southerly normal slope of the original surface of the ground. In Trenches K, B, and G, the Early Zacatenco occupation was most intense and, to judge from the five and six meter accumulations, of very long duration. The burials found at different depths, coupled with the general appearance of the débris lenses, prove a primary deposit.

Middle Zacatenco débris in Trenches B and G beds was relatively shallow when compared to the deep accumulations of Early Zacatenco refuse. The churned condition of the soil suggested disturbance by modern agriculture as well as erosion after abandonment. Yet the burials found in the top cuts of Trenches B and G argued that these débris beds, or at least, what remained of them, were intact. However, the excavations in Trench D (Fig. 6, No. X) disclosed a deposit equal in importance to the representation of the Middle period of Zacatenco.¹ The concentration of this débris at one point suggested that the Middle Zacatenco people at El Arbolillo abandoned the top of the mound to move nearer the water. The gummy quality of the earth in Trenches B and G also suggested a muddy dwelling place, in contrast to the clean sand further south and west.

The sherds from the Teotihuacan period were found only on the surface, indicating a sparse occupation, almost obliterated by the destructive agencies of agriculture and erosion. Yet the burial in Trench B and the possibilities of others in Trenches G and D made it necessary to hunt a bed of such refuse.

¹Vaillant, 1930a, Map IV, Fig. 1.

TRENCHES H, E, F, AND L

These four trenches were designed to explore Teotihuacan *débris* at the south of the site (Fig. 1). Trench H (Fig. 6, No. XIV) was sunk through sandy soil about 140 meters south of Trench B. The Teotihuacan sherds were scanty and appeared to have been washed down from higher up the slope. The soil, at first churned and lean in specimens, became harder a meter lower, with a higher sherd content. Two burials appeared at this level, Skeletons 136-137 (Fig. 9, Nos. 15-16). A belt of sherds and figurine bodies in the earth dated the deposit as Middle Zacatenco. Two meters from the surface we struck clean sand and, after probing this sterile layer for a meter, closed off the trench. Trench H definitely marked an edge of occupation, where the depositions were created by wash rather than direct dumping.

Trench E (Fig. 6, No. XI), which lay northwest of Trench H, reached sterile sand at a depth of four meters. The Teotihuacan layer produced 1.50 meters of *débris* full of sherds, but lacked the charcoal and animal bones of a primary deposit. It would seem that this layer had once been deeper, but erosion had carried away the soil from the original accumulation, redepositing in its place earth from higher up the slopes of the main mound. Cut III in Trench E was virtually sterile, and marked a period of abandonment such as we had observed in the top layer of Trench D. In Cut IV fragments of animal bone and Middle Zacatenco sherds appeared. In the southwest corner of the trench we uncovered an oval construction, 65 by 80 centimeters, made by lining an excavation with slabs of tepetate and erecting a superstructure of wattle and daub (see Fig. 6, No. XI). Nearby was found an olla intact (Fig. 19, No. 12). Mano and metate fragments occurred as well as large sherds, but the earth was clean and sandy. Bottom in Trench E was clean sand, like all the other cuts.

Trench F (Fig. 6, No. XII) was dug at the extreme southwest corner of the occupied zone. We struck a bed of Teotihuacan *débris*, packed with sherds, interspersed with white ash layers and chunks of burned clay. The size of the sherds and their high frequency indicated no gradual accumulation, but rather the sudden demolition which might result from pillage by an invader or from a ceremonial destruction of pottery at the beginning of a new fifty-two year cycle.

Below this layer was clean sand. Although we sank a pit for more than two meters we were unable to find any Early or Middle Zacatenco rubbish layers. Apparently we had reached the limits of occupation during those periods.

To test the limits of residence a little further, we crossed the Ticoman road to the flat fields of the former lake bottom (Fig. 1). Here we carefully examined the edges of a drainage ditch, some three meters deep, at the point marked L (Fig. 6, No. XIII), but found no signs of human occupation.

This last group of Trenches E, F, H, and L, showed evidence of Teotihuacan layers subjected to intense erosion. Below these were signs of a Middle Zacatenco occupation which, to judge from the débris, was neither intense nor long. The main settlement of this period was north of these trenches in the region of Trenches D and C. Between the Zacatenco and the Teotihuacan layers was usually a strip of clean soil, indicating that the site was abandoned between occupations.

CONCLUSIONS

The original surface of El Arbolillo was a gently sloping sand beach, perhaps slightly coated with loam. The first settlements seem to have been on this beach rather than on the surrounding hills, as the deepest débris beds, Trenches B and G, appear to have accumulated vertically, without the steep tilts in strata noted at Zacatenco, where an irregular rocky hillside was the center of occupation. The casts of maize leaves in Trench G show how a large proportion of this accumulation was formed and presumably adobe washed from *jacales* of wattle and daub also added considerably to the deposits.

The occurrence of burials at various points in the débris proves the relative immutability of the deposits. In Early Zacatenco times the central part of the site seems chiefly to have been occupied, but in Middle Zacatenco the most consecutive habitation appears to have been on the western edge of the mound, although for a while the northern part of the site was occupied. The site must have lain abandoned all through Ticoman times, since only one sherd of that culture was found. However, sprinkling the southwestern zone of El Arbolillo was evidence of a Teotihuacan occupation.

We have, at El Arbolillo, evidence of three principal periods of occupation, Early Zacatenco, Middle Zacatenco, and Teotihuacan. To use the Zacatenco terminology in connection with the sequence of material culture elements observable at El Arbolillo restricts comparison. Because of the infinite variations in the accumulation of débris, the stratigraphy of two communities will never produce exactly the same rhythms of development. Therefore, in the following pages, we have seen fit to designate the Early Zacatenco period as El Arbolillo I, the Middle

Zacatenco, as El Arbolillo II. The artifacts of the Teotihuacan period necessitate a broader treatment than is feasible at this point: such discussion will be postponed until our next report, *Teotihuacan Culture Sites in the Valley of Mexico*, in which the various ceramic time phases of this culture will be analyzed.

Although Middle Zacatenco corresponded to El Arbolillo II, and both sites produced a phase transitional from the preceding epoch, the enormously heavy deposits of El Arbolillo I refuse in Trenches I (Fig. 3), G (Fig. 4), B, and D (Fig. 6, Nos. IX and X) made it possible to distinguish several phases of development in the Early Zacatenco-El Arbolillo I figurines (p. 193). During this period there was also a change in the burial habits (pp. 172-181). Thus, we find that the Early Zacatenco period here can be divided on the basis of figurines, into Late, Intermediate, and Early El Arbolillo I, and according to burials, into Late and Early El Arbolillo I.

A complete sample of the various figurine periods was discernible in none of the El Arbolillo trenches, so that we have prepared the following table to show the distribution of these figurine phases according to the cuts in the trenches from which the stratigraphical series were derived.

TABLE 1

DISTRIBUTION OF FIGURINE PERIODS ACCORDING TO TRENCHES AND CUTS

	Trench D Cuts I-IV	Trench B Cut I, South Ext.	Trench I Cut I, upper	Trench G Cut I
El Arbolillo II				
Transitional Period	Absent	Cuts II-III	Absent	Cuts II-III and III pit
Late El Arbolillo I	Absent	Cuts IV-VI	Cut I, lower, Cut II	Absent
Intermediate El Arbolillo I	Absent	Absent	Cut III	Absent
Early El Arbolillo I	Absent	Absent	Absent	Cuts IV-VII

HYDROGRAPHICAL NOTES

As we wished to seek data on the lake levels at different periods and at various points in the Valley of Mexico, Mr. Thomas Rowe undertook a series of levels to tie in Ticoman and Zacatenco with El Arbolillo. Later, he extended the survey across the Valley to San Juanico, Copilco, and Cuicuilcō (Fig. 5). The data he obtained are quite suggestive and warrant examination.

At Zacatenco (Fig. 6, Nos. I-III) we had observed that the sherds of certain strata appeared to have been coated with dried slime as if they had lain on a beach, alternately receding and expanding with the dry and wet seasons¹. These sherds and figurines showed also a stylistic transition from Early to Middle Zacatenco. Moreover, in Trench D, the Early Zacatenco deposit, which was below this level, showed no signs of such action (Fig. 6, No. I), but the Middle Zacatenco layers above were redeposited². Therefore, it seemed possible that a rise in lake level had taken place after the close of the Early Zacatenco period, and the inhabitants, retreating to higher ground, threw their rubbish down the rocky slopes whence it was washed by seasonal rains out over the Early Zacatenco rubbish heaps. Furthermore, we theorized that if the lake had risen, groups of people might be forced to move and the fusion of a band of such migrants with the Early Zacatenco population might produce the culture changes observable in Middle Zacatenco³.

At Ticoman we established a bench-mark where the ground leveled out into the lake bed of Aztec times. This we gave an arbitrary height of 10.00 meters. Running a series of levels back to Zacatenco, we established that the layers of slimy sherds fell between 12.00 and 13.50 meters and that the bottom of the lowest deposits at Ticoman ended also at 13.50 meters (Fig. 6, Nos. IV-VI)⁴. Below that depth there were no refuse beds (Fig. 6, No. IV). Moreover, as if the Ticomanos were conscious of the fluctuations in lake level, the Early Ticoman deposits lay well up the slopes at levels of 25 meters or more.

When we examined the lake shore at El Arbolillo by means of Trenches A, B, D, E, F, H, K, and L (Fig. 6, Nos. VII-XIV) we found that bottom in all the trenches was above the 13.50 meter mark and the water level in the ditch, Trench L (Fig. 6, No. XIII) fell exactly at that point. In Trench F (Fig. 6, No. XII) our digging descended below the 12 meter mark, but there were no signs of Early Zacatenco deposits.

¹Vaillant, 1930a, 24-25, 28-30; Map IV, Section I.

²Vaillant, 1930a, 22-24.

³Vaillant, 1930a, 52-53.

⁴Vaillant, 1931, 247-250, 430-431.

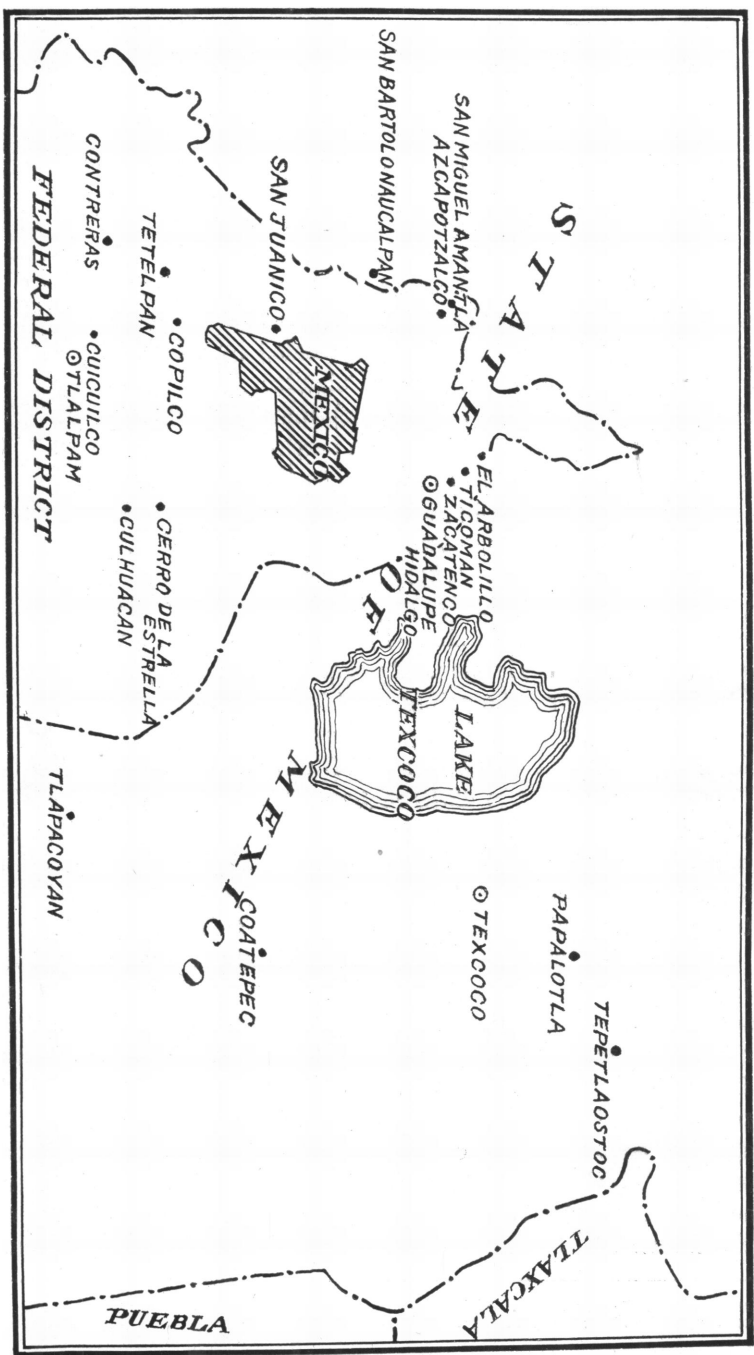


Fig. 5. Valley of Mexico, showing Relative Position of Archaeological Sites.

If our contention were correct that the original floor of Lake Texcoco was much lower in Early Zacatenco times than now, then the El Arbolillo population of that period lived well away from the water. However, the stream bed mentioned on p. 147 might have furnished a sufficient water supply. Yet, it seems clear that the lake could not always have had its Colonial (1519-1700) level, when burials and undisturbed débris are found at Zacatenco below that surface (Fig. 6, No. I).

Having reduced the levels at Zacatenco, Ticoman, and El Arbolillo into a comparative series, it seemed advisable to connect them with the depositions at San Juanico, which were sealed by a loam deposit, and the lava-covered sites of Copilco and Cuicuilco.

Accordingly, in relation to the bench-mark of 10.00 meters at Ticoman, Mr. Rowe took a series of levels across the northern part of the Valley and through the City of Mexico to the site called San Juanico, which lies just north of Chapultepec Park and west of the Modelo Brewery on the Avenida Saavedra, within the brickyard known (in 1931) as the Ladrillera Torriello. Thence the survey line was carried back along the edge of the Park to the Avenida Insurgentes, and then south to San Angel, and the Copilco site. From there the levels were brought across the Pedregal to Tlalpam. Appendix II gives the measurements made by Mr. Rowe and the points at which they were taken.

In terms of the Ticoman bench-mark, 10.00 meters, the bottom of the débris bed at Copilco was 35.77 meters, the base of the lava 36.065 meters, and the top 42.13 meters (Fig. 6, No. XVI). At Cuicuilco (Fig. 6, No. XVII) the base of the pyramid was 46.58 meters, the bottom of the lava 49.45 meters, the top of the lava 52.19 meters, and the top of the pyramid 66.755 meters. Since our supposed lake level in the Zacatenco-Ticoman area ranged from 12.00 to 13.50 meters, obviously both Copilco and Cuicuilco were located well above such a shore line. Kroeber mentions the possibility of the ground at Copilco being swampy¹, but he by no means suggests that there was any considerable sheet of water near at hand. Furthermore, there was nothing to suggest inundation, in that the lava rested directly on the refuse at Copilco and on the slump and refuse from the Cuicuilco pyramid. The levels made by Mr. Rowe, moreover, show quite conclusively that the lake could not have reached the elevation occupied by Copilco. Moreover, the evidences of sedimentation at Cuicuilco were more probably due to the action of rain than flood waters.² The lava flow of the Pedregal and its effect on adja-

¹Kroeber, 1925, 378, footnote 5.

²Cummings, 1926, 300; Nuttall, 1926, 248.

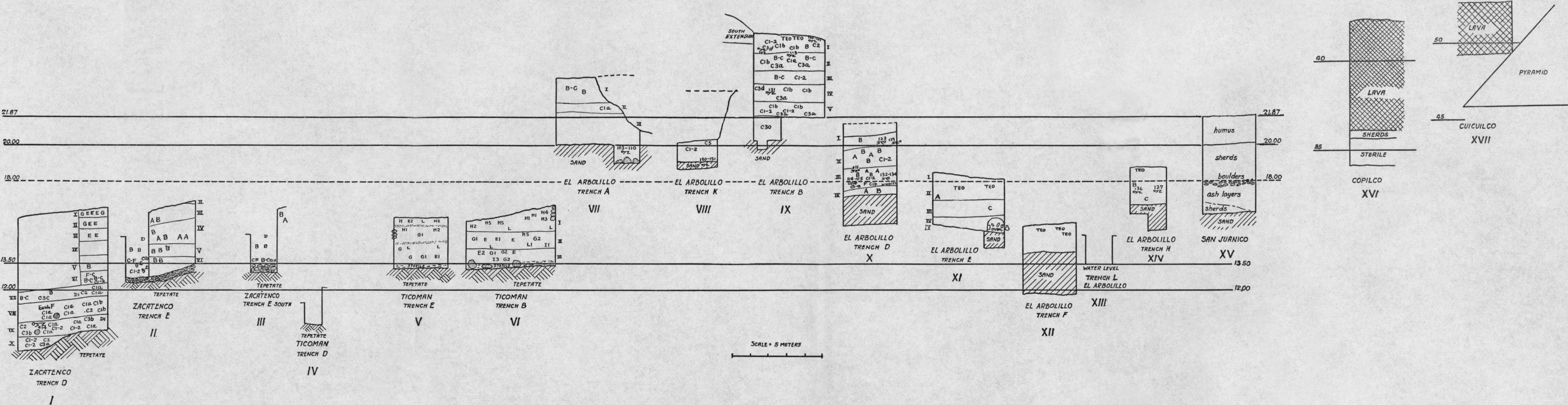


Fig. 6. Comparative Sections from Various Sites of the Early Cultures of the Valley of Mexico.

These sections are designed to show the comparative levels of various sites producing material from the Early Cultures of the Valley of Mexico. The lower lines show the "beach" levels at Zacatenco and Ticoman (Vaillant, 1931, Map V), the upper broken lines, the humus layer at San Juanico. The discussion on pp. 162-165 discloses that the flood causing sedimentary deposition at San Juanico probably did not affect the Zacatenco, El Arbolillo, and Ticoman sites.

Sections XVI and XVII are not set on the page in relation to their actual levels, in order to conserve space. The figures for each section are given in each drawing. The figurines, indicated on Sections I-III, have been designated according to the subdivision of the El Arbolillo material.

- I. Trench D, Zacatenco, looking west. Figurines subdivided according to the El Arbolillo classification (cf. Vaillant, 1930a, Map IV, Section I; Vaillant, 1931, Map V, Section I).
- II. Trench E, Zacatenco, looking west. Figurines subdivided according to the El Arbolillo classification (cf. Vaillant, 1930a, Map IV, Section I; Vaillant, 1931, Map V, Section II).
- III. Trench E, South, Zacatenco, looking west. Figurines subdivided according to the El Arbolillo classification (cf. Vaillant, 1931, Map V, Section III).
- IV. Trench D, Ticoman, looking west (cf. Vaillant, 1931, Map V, Section IV, Map VI, Section IV).
- V. Trench E, Ticoman, looking west (cf. Vaillant, 1931, Map V, Section V, Map VI, Section III).
- VI. Trench B, Ticoman, looking south (cf. Vaillant, 1931, Map V, Section VI, Map VI, Section V).
- VII. Trench A, El Arbolillo, looking south (Fig. 1).
- VIII. Trench K, El Arbolillo, looking north (Fig. 1).
- IX. Trench B, and portion of B, South Extension, El Arbolillo, looking south (Fig. 1).
- X. Trench D, El Arbolillo, looking east (Fig. 1).
- XI. Trench E, El Arbolillo, looking southeast (Fig. 1).
- XII. Trench F, El Arbolillo, looking north (Fig. 1).
- XIII. Trench L, El Arbolillo, looking north (Fig. 1).
- XIV. Trench H, El Arbolillo, part of trench only, looking east (Fig. 1).
- XV. Pit B, San Juanico, from section made in 1929 and levels in Appendix A (Fig. 5).
- XVI. Copilco, after levels in Appendix A (Fig. 5).
- XVII. Cuicuilco, after levels in Appendix A (Fig. 5).

cent populations is a problem, distinct from that of fluctuations in the lakes of Mexico and their influence on the settlements about their borders.

However, San Juanico presented a very different situation (Fig. 6, No. XV). There were beds of Early and Zacatenco *débris* sealed in by a layer of clean loamy clay, such as could only reasonably be formed by sedimentation of the soil washed into the lake from the surrounding hills. For a considerable distance around the site the ground was level, a characteristic of the land in the Valley reclaimed from the shallow waters of the lake. However, instead of the 12.00–13.50 meter level met at the Guadalupe sites here the surface of the ground was 21.87 meters to 21.67 meters, an eight meter increase in height. Then followed a sterile layer and sherds began to occur at 20.10 to 20.34 meters. These did not occur in regular lenses, but at 18.00±meters there was an irregular layer of boulders, below which were ash pockets and many sherds, extending downward to 16.25 meters. Most of the sherds and figurines are of Middle Zacatenco type.

The interpretation that springs most readily to mind is that there were two floods in the Valley. The first took place at the close of Early Zacatenco and created the "beach" shown on Fig. 6, Nos. II–III, establishing a water table more or less equivalent to that found at El Arbolillo (Fig. 6, No. XIII).

The second flood took place at the close of Middle Zacatenco, forming the deposits found at San Juanico (Fig. 6, No. XV). If one compares the levels of the San Juanico sedimentation, 20.00 to 21.87 meters, to those of the Early Period occupation of Ticoman¹ he will see that this refuse is above the 22 meter mark. Then the argument follows that at the close of the Early period the lake must have receded to the beach at the Zacatenco flood, so that in Intermediate Ticoman *débris* could accumulate at a 13 meter level². From then on the level of the lake was substantially unchanged until the drainage operations after the Spanish Conquest.

There are several great objections to this theory. If there had been a second flood one would expect to find, beneath the Intermediate deposits at Ticoman, a layer of loam, like that above the layers at San Juanico. Yet, on Fig. 6, Nos. V–VI it will be seen that the refuse rests directly on tepetate. Furthermore, at El Arbolillo none of the trenches below the San Juanico humus levels (Fig. 6, Nos. X–XIII) is sealed by the coating of sediment, which one would expect to have been left by a second flood.

¹Vaillant, 1931, Map VI, No. X.

²Vaillant, 1931, Map VI, Fig. I–II.

Thus, although the immediate results of this survey are negative, they suggest a profitable field for further research. It is obvious that the problem of lacustrine deposition is one for the geologist and without that special training and experience, analysis is superficial and ill-informed. Yet it seems advisable to sum up the bearing of geology, or more specifically hydrography, on the archaeology of the Valley of Mexico.

The Valley of Mexico has an undulating surface, according to Mr. Rowe's levels, which are given in Appendix II. The floor of the lake bed drops slowly from the Ticoman region to the Calzada Vallejo, tending to rise again in the vicinity of Chapultepec near the San Juanico site. Northwest of the Park the land drops again, but beyond the Rio Piedad it rises continuously until it forms the high ground at San Angel. Thus with such an uneven lake floor there would be, in all probability, irregular conditions of sedimentation.

Under such circumstances, the sedimentary deposits covering the San Juanico site might not represent the conditions attendant to the formation of the deposits at Azcapotzalco, which were investigated by the International School¹. Too long a time has elapsed since the International School worked in that region for us to compare their depths with our own. It would be too difficult to determine precisely the location of their trenches, which have been long since obliterated.

It is essential to distinguish the nature of the sedimentary depositions before using them as a basis for postulating changes in the lake levels. At Zacatenco we have seen (Fig. 6, No. I) how burials and refuse lay below the floor of the lake as it must have existed in early Colonial times. Corroborative evidence of this exists in an eighteenth century map of the Guadalupe region, which shows the lake shore at Zacatenco and Ticoman to be still swampy². Yet a determination of the lake limits, localized exactly enough for archaeological purposes, does not exist. From the accounts left us by the Conquistadores, we know that much of the Valley was under water,³ and important hydrographical studies have been on the general extent of lakes⁴. But to determine a point so important to archaeological hydrography as the extension of the lake over the San Juanico site we have only one doubtful bit of evidence, the early seventeenth century map of the engineer, Enrico Martinez⁵,

¹Boas, 1912a, b, c, 1913; Boas and others, 1912; Boas and Tozzer, 1915; Gamio, 1913, 1917.

²Boban, 1891, Atlas, Plate 79.

³Anonymous Conqueror, 58-62, Chapters XVII-XVIII, and map; Diaz del Castillo, vol. 2, Chapter LXXXVII, 35-39; Chapter XCII, 74-83; Cortes, vol. 1, 256-257 (Second Letter).

⁴Lobato, 1876; Orozco y Berra, 1864; Garcia Cubas, 1897; Tellez Pizarro, 1899; Oropesa, 1898; Memoria de las Obras del Desagüe del Valle de Mexico, 1902.

⁵Memoria, 1902, Appendix, map entitled "Descripción de la Comarca de Mexico i obra del Desagüe de Laguna,"

showing Chapultepec as an island in contrast to the peninsula indicated in most sites. Moreover, a far more potent cause for sedimentation than the slow settlements through a lake was the floods which have consistently inundated the Valley, as far back as trustworthy records have been kept¹. Of the effect of such inundations only one study from the archaeological viewpoint is known to the writer. That is the examination of the Convent of Acolman² made by Doctor Gamio and his associates. Here the floods of the San Juan River, in 1629 and successive years, deposited sediment to the depth of more than two meters throughout the church and its environs. Doctor Gamio made soundings in a number of other churches, where inundations had had similar effects, and reached the conclusion that a sedimentary deposit *per se* has only a local historical significance.

These Acolman data possibly explain the difference in the surface levels of San Juanico and Zacatenco (Pl. 6, Figs. I-III, XV), since the Zacatenco "beach" may have been created by one local flood and the San Juanico loam deposit may have been laid down by another at some later time. It is also evident from the Acolman study that, in the Valley of Mexico, geological formations of this character do not signify antiquity. Sedimentary depositions must be studied with the most scrupulous attention to the possibilities of recent formation and the archaeologist then can place little reliance on their being suggestive of great age. While it does appear, on the fairly secure basis of material found beneath the lake floor at that site, that the lake in Early Zacatenco times may have been smaller than now, in every case special circumstances must be considered. A crying need, now, in the study of the archaeology of the Valley of Mexico, is an examination of its hydrography and sedimentation by a competent geologist from the point of view of the reduced time count used in human history.

The volcanic flows of the Pedregal of San Angel are as little indicative of absolute chronology as are the sedimentary deposits. The estimates, given by Professor Cummings³, range from the 2000 years of Tempest Anderson of England, Karl Wittick of Germany, and N. M. Darton of the U. S. Geological survey, to the 5000 to 7000 years given by Professor Hyde of New Zealand.⁴ Professor Cummings calculates that if

¹Memoria, 1902, 37-51 records as dates for floods in the reigns of Montezuma I, 1446 ±, of Ahuizotl, 1499, of Montezuma II, 1517. Floods in Colonial and later times are described as follows: 53-84, the inundations of 1555, 1556, and 1580; 85-86, 1607; 124-125, 1627; 127-145, 1629; 210, 1707, 1714; 242-243, 1792; 244-245, 1795; 259-260, 1806; 260-263, 1819; 267, 1846; 275-276, 1856; 307-309, 1865; 362, 1878.

²Gamio, 1922a, Tomo I, Vol. I, 266-267; Tomo I, Vol. II, 368-378, 607, Fig. 186; Montes de Oca, 1928, 174-177.

³Cummings, 1926, 304.

⁴Mena and Hyde, 1921, 19; Cummings, 1933, 14.

it took at least two thousand years for the deposits to form above the Pedregal, then it would have taken sixty-five hundred years for the deposits to accumulate below the lava flow¹. Yet the archaeological material from Cuicuilco which ties in with Ticoman and Gualupita, and perhaps with Teotihuacan, suggests no such great antiquity². It would seem to the writer more advisable to estimate the period of such geological strata from the archaeology beneath them than to do the reverse, since not only are the time units of geology much greater than those necessary for archaeological reckoning, but also no method has ever been devised precisely to date volcanic activity, except by historical records of the actual event. On the other hand, Dr. Harold Colton was able to date a volcanic deposition in Arizona by means of archaeological material³, but the archaeology of the Southwestern United States rests, typologically and chronologically, on a much more secure basis than that of the Valley of Mexico.

The duration of the Zacatenco and Ticoman cultures, which to judge from the depths of the refuse heaps must have existed for a great many years, offers another field for speculation. Although nothing is more dangerous than making such estimates, for the purpose of comparison let us tabulate these depositions in terms of the rubbish heaps of Pecos, New Mexico, where from the researches of Doctor A. V. Kidder on the archaeology⁴ and of Professor A. E. Douglass on the tree rings⁵, the approximate duration of the site is known in years. Since Pecos is virtually denuded of vegetation and the ruins have been subjected to intense erosion, it is somewhat comparable to the Guadalupe sites, even though the latter are probably much more ancient.

Pecos was settled about 1250 A.D. and was not abandoned until 1838, a total occupation of approximately 600 years⁶. The deepest rubbish bed was on the eastern slope, where a steep cliff, together with the prevailing wind, made a logical place for refuse disposal⁷. This débris, at times, reached a depth of 21 feet or 6.40 meters⁸. If the sum of the depths of deepest beds in the Guadalupe sites are taken, we find a depth of 5.35 meters in Cuts III-VII, for the Early Zacatenco period in Trench G at El Arbolillo (Fig. 4). The deepest bed of Middle Zacatenco refuse is Trench E at Zacatenco⁹ which measures 4.75 meters. The sum

¹Cummings, 1933, 55.

²Vaillant, 1931, 338-341; Vaillant and Vaillant, 1934, 122-127.

³Colton, 1932.

⁴Kidder, 1924, 1932.

⁵Douglass, 1929.

⁶Kidder, 1932a, 1-4.

⁷Kidder, 1924, 16-35.

⁸Kidder, 1924, 20, Fig. 1, Pl. 9a, b.

⁹Vaillant, 1930a, Map IV, Section I.

of these depths is 10.10 meters. For the Ticoman culture, the Early bed in Trench A north of Wall F is 1.40 meters and the Intermediate-Late deposits in Trench B first excavation 2.40 meters¹, making a total of 3.80 meters for Ticoman or 13.90 for both the Zacatenco and Ticoman cultures. This 13.90 meters of maximum depths is more than twice the 6.40 meters at Pecos. On the other hand, legitimate objections may be brought to taking the maximum depths in the Valley of Mexico and comparing them to a rubbish heap which was not composed of the greatest depths for each of the eight Pecos periods². Therefore, it might be fairer to compare the Pecos heap with Trench D at Zacatenco, a heavily eroded midden in which Early, Middle, and Late Zacatenco material was found superimposed³. Here 7.50 meters of rubbish were found, 1.50 meters of which contained Late Zacatenco-Ticoman material, 2.50 meters Middle Zacatenco, and 3.00 meters Early Zacatenco. This proportion is not far removed from the 13.90 meters of combined deposits of which 3.80 meters were composed of Ticoman material, 4.75 meters of Middle Zacatenco, and 5.35 meters of Early Zacatenco. Yet the 7.50 meters of refuse at Zacatenco, despite the erosion that continued through Teotihuacan, Aztec, Colonial, and Republican times is a greater accumulation than the 6.40 meters at Pecos, which was abandoned in 1838.

There is every evidence that the Zacatenco and Ticoman cultures were of long duration, with a strong possibility that they were in excess of 600 years on the basis of the Pecos data. It is unlikely that the recent lava flow of the Pedregal, which in covering the sites of Copilco and Cuicuilco sealed in the Middle Zacatenco and Ticoman periods, will ever be dated except by archaeological methods. It is equally improbable that the lacustrine deposits can ever be dated except in the same way. Consequently, the chronology of the Early Cultures of the Valley must be determined by their integration with other culture sequences. We shall defer speculation about their age on this basis until the final section which considers conclusions on the material culture.

¹Vaillant, 1931, Map VI, Sections V, X.

²Kidder, 1924, 21-23.

³Vaillant, 1930a, Map IV, Section I.

BURIALS

The most important result of the digging at El Arbolillo was the discovery of the graves of sixty-three individuals. Not only were data gained on the burial habits of the Early and Middle Zacatenco populations, but also evidence appeared that seemed to justify a subdivision of the Early Zacatenco period burials at El Arbolillo into Late El Arbolillo I and Early El Arbolillo I. The burials were distributed as follows:—

GRAVE DATA FROM EL ARBOLILLO

Skeletons 100–101, mother and child; bad condition. Trench B, Cut I; Teotihuacan Period (Fig. 7, No. 11).

Skeleton 100, adult ♀; flexed supine, head southwest, face northwest.

Skeleton 101, baby at birth; flexed on right side, on left arm of mother; both equipped with five small jars, three clay seals, forty-two miniature vessels of unbaked clay, nine kaolin nodules; cinnabar spread on vessels and seals.

Skeleton 102, young adult ♀; fair condition; flexed prone, head northwest, face down; equipped with thin black ware bowl (like Fig. 22, No. 1) and hammerstone. Trench B, Cut I; El Arbolillo II Period (Fig. 9, No. 1).

Skeletons 103–110, group burial of eight adults and children; bad condition. Trench A, Cut III; Early El Arbolillo I Period (Fig. 7, No. 1).

Skeleton 103, adult ♂; flexed supine, head west, face up.

Skeleton 104, child; flexed on left side, head north, face down.

Skeleton 105, child; flexed on left side, head north, face up; three bone awls at left shoulder (Fig. 28, Nos. 7–9).

Skeleton 106, adult ♂; flexed supine, head north, face down; two bone ornaments at left of face (Fig. 28, No. 3).

Skeleton 107, child; flexed prone, head east, face down; inlaid, incised tripod bowl over hips (Fig. 19, No. 1).

Skeleton 108, child; flexed prone, head east, face down.

Skeleton 109, adult ♀; flexed on right side, head northwest, face southwest.

Skeleton 110, adult ♀; flexed supine, head east, face up.

Skeleton 111, young adolescent; fair condition, flexed on left side, head west, face north; fragments of flaring rim bay cajetes (like 1930a, Pl. IIIa) and mano in front of chest. Trench D, Cut III; El Arbolillo II Period (Fig. 9, No. 11).

Skeleton 112, adult ♂; disturbed and incomplete; in slab grave; jade bead associated. Trench C, South; Late El Arbolillo I Period (Fig. 8).

Skeleton 113, young adult ♀; bad condition; extended prone, head southeast, face down; russet ware B bowl bottom up (Fig. 22, No. 7) at right shoulder, two hammerstones at hip and head, red paint (hematite) at waist. Trench B, Cut II; El Arbolillo II Period (Fig. 9, No. 2).

Skeleton 114–115, possibly group burial. Trench D, Cut III; El Arbolillo II Period (Fig. 9, No. 12).

Skeleton 114, adolescent ♂; fair condition; flexed on right side, head east, face north; wrapped in mat; obsidian blade at waist; buried from Cut II.

Skeleton 115, child; bad condition; partially flexed, prone, head southeast, face down; wrapped in mat; diagonally across and over Skeleton 114.

Skeleton 116, young adult ♂; fair condition; extended supine, head north, face up; in slab-covered grave; traces of shell ornament at neck. Trench C, east of wall; Late El Arbolillo I Period (Fig. 8).

Skeleton 117, young adult ♂; fair condition; extended supine, head south, face up; in slab-covered grave; russet bottle at left shoulder (like Fig. 22, No. 14), brown ware jar between legs (Fig. 22, No. 6). Trench C, east of wall, below Skeleton 116; Late El Arbolillo I Period (Fig. 8).

Skeletons 118-119; mother and baby in birth; bad condition; slab-covered grave, bodies wrapped in mat. Trench C, west of wall; Late El Arbolillo I Period (Fig. 8).

Skeleton 118, adult ♀; extended supine, head north, face up; small russet bowl (like Fig. 21, No. 2) nested over small russet jar (like Fig. 22, No. 14) at left shoulder, white ware bowl, thin slip (Fig. 21, No. 2) over left elbow.

Skeleton 119, baby at birth (foetus?); between thighs of mother, Skeleton 118.

Skeleton 120, adolescent, legs only, disturbed and incomplete. Trench C, north of wall, below stones; El Arbolillo I Period (?) (Fig. 8).

Skeleton 121, adult; legs only, disturbed and incomplete; below stones. Trench C, north of wall; El Arbolillo I Period (?) (Fig. 8).

Skeleton 122, adult; head only; incomplete. East of Trench I, beyond mapped zone; Period ? (not drawn).

Skeleton 123, elderly adult ♂; good condition; extended prone, head north, face down. Trench D, Cut I; El Arbolillo II Period (Fig. 9, No. 9).

Skeleton 124, adult ♂; fair condition; extended supine, head south, face east, on gravel bed in slab-covered and lined tomb; rough soapstone pendant at neck; pot at left shoulder and jar at head (like Fig. 21, No. 7). Trench C east of wall; Late El Arbolillo I Period (Fig. 8).

Skeleton 125, elderly adult ♀; bad condition; flexed prone, head west, face down. Trench C, north of wall; Early El Arbolillo I Period (Fig. 8).

Skeleton 126, adult, too disturbed to discern position. Trench C, north of wall; El Arbolillo I (?) Period (Fig. 8).

Skeleton 127, elderly adult ♂; fair condition; extended supine, head north, face up; in gravel bed in slab-covered grave; black tripod bowl (Fig. 19, No. 8) nested over black ware bottle (Fig. 22, No. 13) at feet, incised black ware bowl (Fig. 19, No. 4) at left shoulder; red paint on ventral vertebrae. Trench C, east of wall, overlapping Skeleton 124, and overlapped by Skeleton 130; Late El Arbolillo I Period (Fig. 8).

Skeleton 128, adult; too disturbed to discern position; under slabs on bed of sand; equipped with effigy pot (Fig. 20), two quartz tools, an obsidian point with tang, and an obsidian scraper. Trench C, north of wall; Late El Arbolillo I (?) Period (Fig. 8).

Skeleton 129, young adult ♀; good condition, extended prone, head south, face down; slab-covered tomb; equipped with three pots (Fig. 19, No. 10, Fig. 21, No. 5, Fig. 22, No. 1) at feet; bowl (Fig. 22, No. 3) at right wrist, *neritina* beads at neck (Fig. 25, No. 6), obsidian spear point (Fig. 27, No. 5) and blades at left shoulder, dis-

integrated basket and red paint at skull. Trench D, Cut I; El Arbolillo II Period (Fig. 9, No. 10).

Skeleton 130, adult ♀; fair condition; extended prone, head southwest, face southeast; on gravel bed in slab-covered tomb; equipped with two black ware pots at left of head (Fig. 19, No. 5; Fig. 22, No. 15), appliqué brown ware bowl at right wrist (Fig. 22, No. 4). Trench C, east of wall, overlapping and disturbing Skeleton 127; Late El Arbolillo I Period (Fig. 8).

Skeleton 131, young adult ♀; bad condition; extended supine, head east, face up; mat-wrapped and covered with hematite; equipped with russet bottle (Fig. 22, No. 12) at left shoulder, russet bowl (like Fig. 21, No. 4 without pinched sides) inverted over black ware jar (Fig. 21, No. 7) at left arm, white ware bowl (Fig. 21, No. 1) at elbow, ball of hematite in lap. Trench B, Cut V; Late El Arbolillo I Period (Fig. 7, No. 6).

Skeletons 132-134, group burial of three children; wrapped in mats and reeds over grave; good condition. Trench D, Cut III; El Arbolillo II Period (Fig. 9, No. 13).

Skeleton 132, young child; partially flexed, supine; head southwest, face back and down.

Skeleton 133, child; partially flexed, prone; head northeast, face southwest.

Skeleton 134, child; partially flexed, prone; head west, face almost down.

Skeleton 135, adult ♂; good condition; extended supine, head northeast, face northwest; equipped with half an Early red-on-yellow bowl. Trench D, Cut III, beneath Skeletons 132-134 and perhaps part of that group interment; El Arbolillo II Period (Fig. 9, No. 14).

Skeleton 136, adult, undetermined sex; bad condition; extended prone, head south, face east, rock-lined grave; russet ware B bottle (Fig. 22, No. 11) at right shoulder. Trench H; El Arbolillo II Period (Fig. 9, No. 15).

Skeleton 137, adult ♂; bad condition; extended prone, head north, face east. Trench H; El Arbolillo II Period (Fig. 9, No. 16).

Skeleton 138, child, two years ±; fair condition; flexed supine, head southeast, face up; slabs over grave; large obsidian blade below head. Trench G, Cut I, El Arbolillo II Period (Fig. 9, No. 7).

Skeleton 139, adult ♂, middle age; fair condition; extended supine, head north, face up, on gravel bed in slab-lined and covered grave; equipped with worked sherd near head, russet ware bottle (Fig. 21, No. 6), black ware bowl (Fig. 22, No. 5), and olla fragments at left elbow, deer scapula rattle (Fig. 27, No. 4) at right wrist, brown ocher at left band, pottery bead at left knee (Fig. 25, No. 3). Trench C, east of wall; El Arbolillo II Period (Fig. 8).

Skeleton 140, baby under one year; bad condition; flexed prone, head west, face down, clay-lined grave; equipped with white ware olla (Fig. 22, No. 10) at head, white ware bowl (Fig. 22, No. 9) at feet, two jade earplugs under chest (Fig. 25, No. 7). Trench C, northeast of wall; Early El Arbolillo I Period (Fig. 8).

Skeleton 141, adult ♀; good condition; extended prone, head east, face north, on gravel bed in slab-covered grave; body covered with hematite; equipped with jade bead in mouth, inverted black ware bowl (Fig. 19, No. 6) at right elbow, black ware jar (like Fig. 22, No. 15) and bowl tilted on side (like Fig. 22, No. 3 but larger) at feet. Trench C, east of wall; Late El Arbolillo I Period (Fig. 8).

Skeleton 142, baby at birth; bad condition; flexed on left side, head north, face southeast. Trench G, Cut III, Late El Arbolillo I Period (Fig. 7, No. 7).

Skeleton 143, adolescent; bad condition, too disturbed to draw. Trench I, Cut I; Period doubtful (not drawn).

Skeleton 144, elderly adult ♂; fair condition; flexed on right side, head east, face down; grave roughly covered by slabs; equipped with pottery earplug (Fig. 25, No. 14), black ware jar (like Fig. 22, No. 15) with hematite and pottery bead (Fig. 25, No. 5) inside, and russet bottle (Fig. 22, No. 14) at hips. Trench G, Cut II; El Arbolillo II Period (Fig. 9, No. 8).

Skeleton 145, baby at birth; bad condition; position indeterminate; mat-lined grave. Trench C, northeast of wall; late El Arbolillo I Period (Fig. 8).

Skeleton 146, child two to three years; bad condition, head missing; flexed prone, head west; traces of hematite on body; grave roughly covered with rocks. Trench C, near Skeleton 141; Late El Arbolillo I Period (Fig. 8).

Skeleton 147, adult ♂, middle age; bad condition, disturbed, extended supine, head north, face east. Trench B, South Extension; El Arbolillo II Period (perhaps Teotihuacan ?) (Fig. 9, No. 3).

Skeleton 148, young adult ♀; fair condition; extended prone, head north, torso hanging into pit, sides of grave mudded, grave partially slab-lined and covered; grave filled with reeds, mat-wrapped body; equipped with white ware bowl (Fig. 22, No. 8) and brown jar (like Fig. 22, No. 15) at head, turquoise mosaic at chest (Fig. 25, No. 10). Trench G, Cut III; Late El Arbolillo I Period (Fig. 7, No. 8).

Skeleton 149, child about two years; bad condition; extended prone, head north, face down. Trench B, South Extension; El Arbolillo II Period (Fig. 9, No. 4).

Skeletons 150-151, group burial of two adults; in clay-filled grave in sand; stone and metate painted red at top of grave; fragments of olla, and inlaid incised black ware bowl (Fig. 19, No. 2) scattered on floor of grave. Trench K; Early El Arbolillo I Period (Fig. 7, No. 2).

Skeleton 150, adult ♀; flexed on left side, head southeast, face southwest.

Skeleton 151, elderly adult ♀; partially flexed on left side, head southeast, face southwest.

Skeleton 152, child about two years; bad condition; extended prone, head south, face west; equipped with black ware bowl (Fig. 19, No. 7) and russet ware B bowl (Fig. 21, No. 3) top down over legs; three stone balls at feet and at either thigh, mano at left hand. Trench G, Cut IV; Late El Arbolillo I Period (Fig. 7, No. 9).

Skeleton 153, baby about one year; bad condition; extended prone, head north, face down; mat-wrapped body equipped with russet ware bowl (Fig. 21, No. 4) and black ware jar (like Fig. 22, No. 15) at left leg, obsidian blade and quartz tool at right shoulder, two jade beads (Fig. 25, Nos. 8-9) at neck. Trench G, Cut IV; Late El Arbolillo I Period (Fig. 7, No. 10).

Skeleton 154, baby, one to two years; bad condition; extended prone, head west, face down; clay-filled grave in sand; equipped with brown ware olla and obsidian blade at head. Trench I, Cut III; Early El Arbolillo I Period (Fig. 7, No. 3).

Skeleton 155, young adult ♀; fair condition; flexed on left side, head north, face east; equipped with gray ware bowl (like Fig. 22, No. 1) and bead at hips. Trench B, South Extension; El Arbolillo II Period (Fig. 9, No. 5).

Skeleton 156, elderly ♂ (?), bad condition; many ribs and vertebrae missing; seated erect, face up; perhaps reburied but doubtful. Trench B, South Extension; El Arbolillo II Period (Fig. 9, No. 6).

Skeletons 157-159, group burial of three adults; badly eroded; sexes indeterminate; equipped with twenty-three pottery vessels, seven miniature vessels, two pot covers, eleven unfired miniature vessels, four fragments of quartz, four blades and one point of obsidian, two fragments of flint, two fragments of pumice, one mirror of iron pyrites, two discs of isinglass, a number of pointed slate "feathers," four shell ornaments, two Teotihuacan III unfired jointed dolls, two Type B figurines. Trench B, South Extension. Teotihuacan Period (Fig. 7, No. 12).

Skeleton 160, child; bad condition; extended prone, head south, face north; equipped with inlaid incised black ware bowl (like Fig. 19, No. 3) inverted over white ware bowl (like Fig. 21, No. 2) at head. Trench G, Cut VI, feet almost contiguous to feet of Skeleton 161; Early El Arbolillo I Period (Fig. 7, No. 4).

Skeleton 161, adult ♂, middle age; bad condition; extended supine, head north, face up; slab-covered grave. Trench G, Cut VI, feet almost contiguous to feet of Skeleton 160; Early El Arbolillo I Period (Fig. 7, No. 5).

Skeleton 162, adult; disturbed by visitors; flexed, exact position indeterminate, too disturbed to draw; equipped with black ware jar (like Fig. 22, No. 15). Trench B, Cut II; El Arbolillo II Period.

There are four chief means of dating burials: by the physical type of the skeletons, by the character of the interment, by the types of the material found within the graves, and by the stratigraphical position of the burials with regard to each other and to the deposits in which they are found. Dating and defining burials by means of the physical type of their occupants, required an anthropometric knowledge not available for this El Arbolillo material. A utilization of grave furniture was not entirely practicable, since the gradual changes from one period to another which could be traced from cut to cut through the medium of the percentage frequencies of various types of potsherds, were less visible in the individual vessels placed as mortuary offerings. As for the stratigraphical position of burials in regard to each other or to the deposits in which they lie, several difficulties obtrude. A burial which disturbs another is obviously later than the first, but is not necessarily made at a subsequent epoch. A number of examples of this type of succession were recovered at Ticoman.¹ That a primary burial must be later than the débris in which it is made is self-evident. Yet the intervals at which interments are made may be much shorter than the periods definable by changes in the material culture. In other words, because a burial is found in refuse of period A, it does not always follow that it was made during the subsequent period B, but rather during a later interval in period A than that represented by the débris.

It will be seen, then, that the identification of the El Arbolillo burials with the various time periods was far from self-evident. Yet,

¹Vaillant, 1931, 316-327.

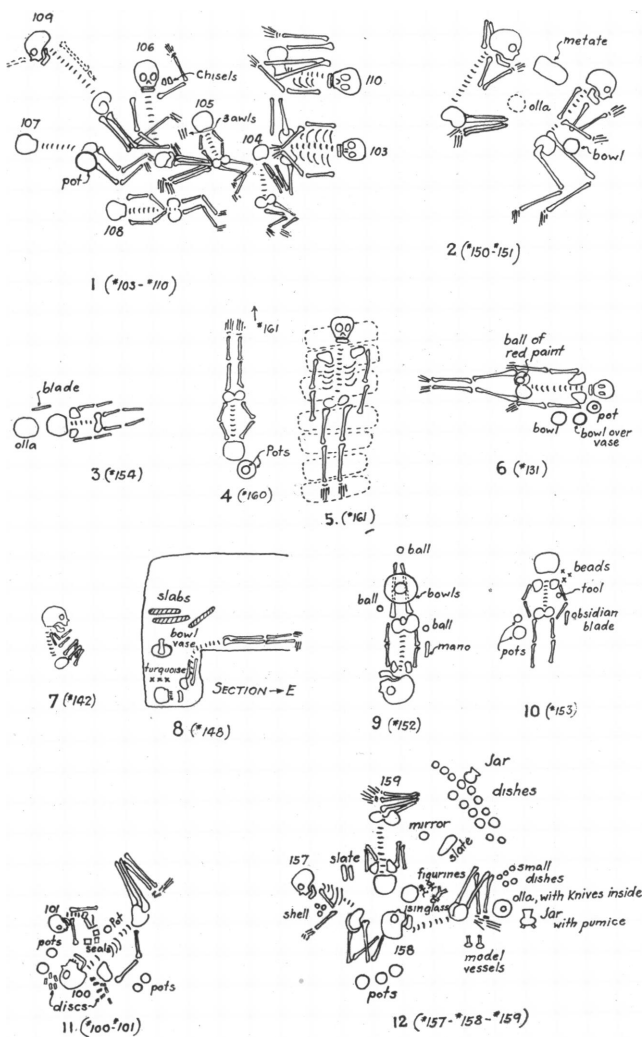


Fig. 7. Early and Late Arbolillo I and Teotihuacan Burials.
(North at top of page. No. 2 is misplaced. The heads should be southeast.)

considering the depth of the deposits, it is obvious that all the burials were not made at the same time. The most logical procedure, to achieve such an end, was to sort out the various burials on whatever basis suited the specific case.

Several burials, to judge from their mortuary furniture, belonged to the Teotihuacan period. Such were Skeletons 100-101 and 157-159 (Fig. 7, Nos. 11-12). These were buried directly in the soil in a flexed position, but as the Teotihuacan culture, owing to its complexity, cannot profitably be discussed in this paper, we shall defer comment until our work at Teotihuacan is published.

Buried in the sand and covered with loam was the group interment, Skeletons 103-110, in Trench A (Fig. 7, No. 1) and Skeletons 150-151, in Trench K (Fig. 7, No. 2). Since both these burials were made in soil of natural origin and were overlaid by depositions of refuse, they were presumably among the first made at the site. A tripod bowl of black ware, adorned by incisions inlaid with red paint (Fig. 19, Nos. 1-2) accompanied each interment. Such a bowl was also part of the equipment of the child, Skeleton 160 in Trench G, Cut VI, so that it and the adult male, Skeleton 161, buried adjacent, belong in all probability to the same period (Fig. 7, Nos. 4-5; Fig. 4). In Trench I, Cut III, a child, Skeleton 154 (Fig. 7, No. 3; Fig. 3) lay in the sand below the refuse layers and was covered with loam.

With the exception of Skeleton 161, these burials were direct interments. The occupants of the group burials, Nos. 103-110 and 150-151 were flexed. The two children, Nos. 154 and 160, were buried extended, but that was the usual practice with the very young. Skeleton 161 alone was notable as being buried extended, with slabs covering the grave.

The next step, after having segregated the Teotihuacan and the earliest burials, was to learn which were clearly associated with the Middle Zacatenco-El Arbolillo II period. The burials in Trench D would presumably qualify, since the refuse was Middle Zacatenco and the grave furniture recovered was neither Ticoman nor Teotihuacan in type. In this trench there was one multiple burial, the young adolescents, Skeletons 132-134 (Fig. 9, No. 13), and perhaps another, the adolescent and child, Nos. 114-115 (Fig. 9, No. 12). These, except for Skeleton 115, were flexed, and interred directly in the soil like the adolescent No. 111 (Fig. 9, No. 11). The child, No. 115 (Fig. 9, No. 12), was extended, with its arms spread, and like Skeleton 114, was wrapped in a mat. Skeleton 135 (Fig. 9, No. 14) beneath the group burial, Nos. 132-134, lay in an extended position, as did the old man, No. 123 (Fig. 9, No. 9)

in Trench D, Cut I. Skeleton 129, a young woman (Fig. 9, No. 10) also in the same cut, alone had a slab-covered grave and a rich mortuary equipment of four pots, beads, and a knife¹.

Five Trench D burials were flexed, one, Skeleton 115, was extended informally, and three were neatly extended. Only one burial, Skeleton 129, had a slab covering to her grave and she was distinguished by her

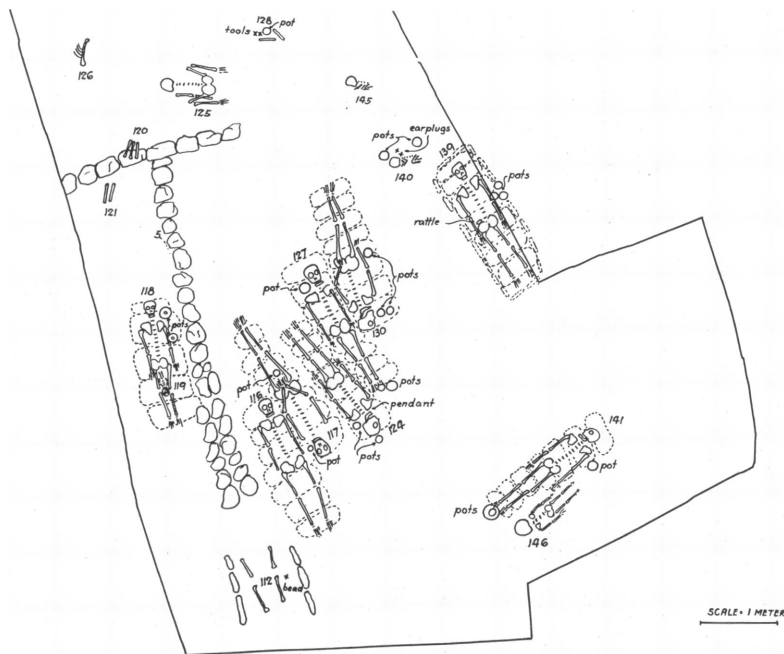


Fig. 8. Late Arbolillo I Burials, Trench C.

rich equipment. Five of the other burials had nothing, one, Skeleton 135, a bowl fragment, and another, Skeleton 111, a cajete fragment and a mano, and the last, Skeleton 114, a knife.

Such poor equipment and careless disposal of the dead was very unlike the relatively rich and formal interments in Trench C (Fig. 8). It appeared legitimate, then, to add to this El Arbolillo II group of burials, graves having the same characteristics from the upper cuts of

¹To render this exposition of the mortuary habits less prolix, it seems advisable to omit the Figure references to specimens, except where such reference has a direct bearing on the text. This information is given on pp. 168-172, and by turning back to the skeleton mentioned, the reader can find the complete reference to the mortuary material illustrated.

Trenches B, G and H, which produced Middle Zacatenco-El Arbolillo II pottery and figurines. Skeleton 102, a female in Trench B, Cut I, was flexed and had a typical thin black bowl and a hammerstone (Fig. 9, No. 1). She lay near a heap of stones. Just below that cut, another female, No. 113 (Fig. 9, No. 2) was found in an extended position, equipped with a russet bowl and a hammerstone. Also in Cut II the adult Skeleton, No. 162, was found, situated too deep in the trench wall to be excavated. Its position was flexed and it was furnished with a jar. In Trench B, South Extension, an adult male, No. 147, and a child, Skeleton 149, lay extended (Fig. 9, Nos. 3-4), both without mortuary furniture. A female, No. 155, in a flexed position, was equipped with a bowl and a shell bead (Fig. 9, No. 5). An old man, No. 156 (Fig. 9, No. 6) was buried in a seated position. This burial had been disturbed and the chest region was missing; but it did not otherwise suggest a re-burial. All of these interments were direct and none of them differs strikingly from the burials in Trench D.

In Trench G, Cut I, a baby, No. 138 (Fig. 9, No. 7) was buried in a flexed position with a slab over its head, and an obsidian blade for equipment. An old man, No. 144 (Fig. 9, No. 8), was found in the cut below in a flexed position, a few slabs roughly placed over the top of his grave. Two pots, a pottery earplug, a jade bead, and some red paint, comprised an unusually lavish offering for this El Arbolillo II group of burials, comparable, however, to that with Skeleton 129 in Trench D.

In Trench H, two extended burials were found, an adult of indeterminate sex, No. 136, and a male, No. 137 (Fig. 9, Nos. 15-16). Skeleton 136, who lay in a grave roughly lined with slabs, had as an offering, a russet bottle with white paint (Fig. 22, No. 11), closely similar to one with Skeleton 129 (Fig. 21, No. 5). The surrounding debris, though very mixed, had El Arbolillo II elements, so that, in view of ceramic connections with Skeleton 129 in Trench D, it seems legitimate to assign these burials also to El Arbolillo II.

Summing up the general characteristics of El Arbolillo II burials, we note that fourteen burials were made directly into the soil, in contrast to four where slabs were used as a cover or lining. Yet, in only one burial, No. 129, were the slabs used to line and cover the grave, thereby creating a simple tomb. In eight graves, two of which, Nos. 115 and 149, were those of children, the extended position was employed. Ten, of which five were adolescents or children, lay flexed. Eight of the burials had no mortuary offerings, and of the remainder, tools were buried with Nos. 114 and 138, a sherd with No. 135, a sherd and a tool with No. 111,

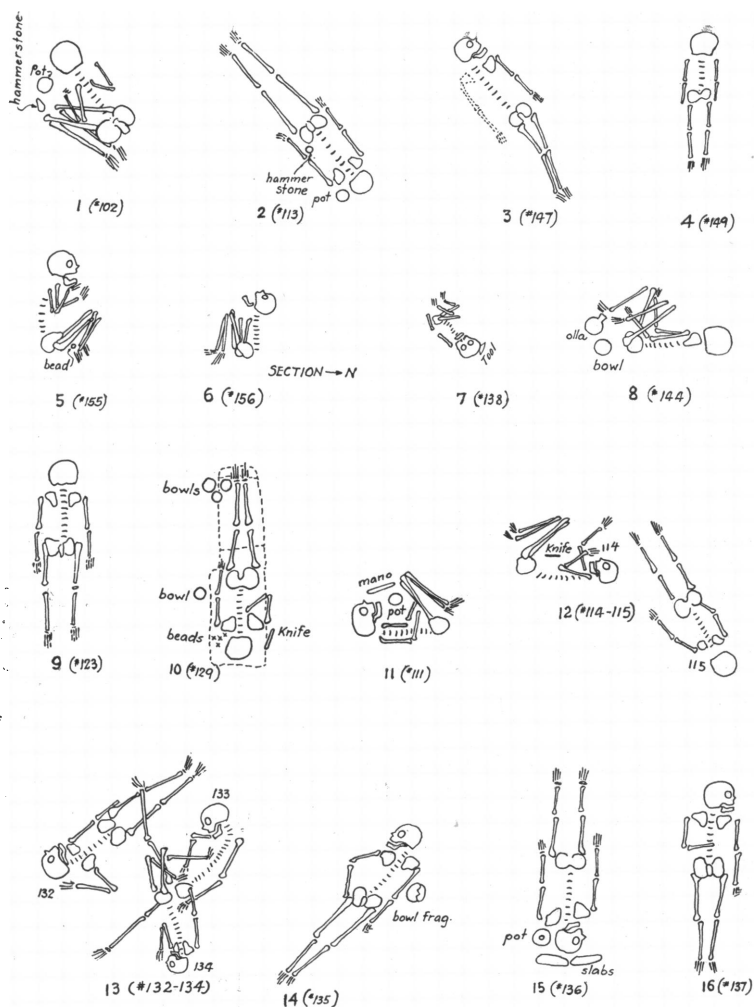


Fig. 9. El Arbolillo II Burials.
(North at top of page.)

a single pot and implements with Nos. 102, 113, and 155, a pot with No. 136, and rich equipment of pottery vessels and implements with Nos. 129 and 144.

The trend of this segregation becomes apparent when we consider a fourth group of burials, those in Trench C and in the deeper cuts of Trench G and H. In Trench C nine burials, six males (Nos. 112, 116, 117, 124, 127, 129), and three females (Nos. 130, 141, 118-119), the last with child, lay in carefully built, slab-lined and slab-covered tombs (Fig. 8). Five of these burials (Nos. 124, 127, 130, 139, 141) rested on beds of gravel. All were extended and each, with the exception of the young male (No. 116), who had a bead, produced at least two pots as mortuary offerings. The legs of another burial, No. 112 (Fig. 8), which had been disturbed, were similarly placed in a slab tomb, although only a jade bead remained of his furniture. Beside, and a little above a woman (Skeleton 141), the child (No. 146) lay extended underneath a covering of rocks, but without furniture. It had been covered with red paint, hematite, which also covered Skeletons 127 and 141 in the same trench and No. 131 in Trench B.

A few flexed burials were found. The workmen disturbed the baby (No. 145) too much to note its position, but it was a direct burial, wrapped in a mat, without furniture. Another infant, No. 140, lay flexed in a loam-filled grave in the sandy subsoil, richly equipped with two jade earplugs and a white ware vessel at its head and feet. Conceivably, this burial belongs to the earliest grave group with Skeletons 103-110, 150-151, but the shallowness of the debris, the richness of the offering, and the proximity of the slab-lined graves suggest its inclusion in the latter class. Another burial, that of an old woman, No. 125, was flexed beneath the north-south wall in Trench C. She had no furniture and was placed beneath a wall anterior to at least one (Skeleton 118-119) of the slab graves. This burial may well belong to the earliest period, particularly when her flexed position is taken into consideration. Additional data suggesting that early El Arbolillo I burials had existed were furnished by black ware tripod bowls with incised and inlaid decorations (Fig. 19, Nos. 3, 9) the fragments of which nearly completed the vessels. Such an occurrence in refuse heaps would be exceptional, unless there had been previous disturbances of burials.

In the north area of the trench, four disturbed skeletons were found, an adolescent, No. 120, and three adults, Nos. 121, 126, 128 (Fig. 8). It would be logical to assign these to Early El Arbolillo I, were it not that two of them, Nos. 126 and 128, lay near enough to the surface of the soil

to have been uprooted by ploughing, and that No. 128 yielded an effigy bottle (Fig. 20) and some quartz and obsidian tools, an offering more characteristic of the usual burials in this trench.

The Trench C burials, by their general adherence to an extended position in a slab tomb with a relatively rich mortuary equipment, indicated, in the mass, a style of interment that differed from the less formal burials noted in the Early El Arbolillo I and El Arbolillo II deposits. Yet the Trench C burials might have been considered the result of a specific cult practice in a prescribed spot, had not the deeper Trench B and G burials followed this style. Skeleton 131 in Trench B, Cut V (Fig. 7, No. 6) was extended, but was wrapped in a mat and buried direct in the soil, instead of in a slab tomb. However, the quantity and type of pots and the use of red paint, together with its position, tied this burial into the Trench C complex. In Trench G, Skeleton 148 (Fig. 7, No. 8), a female, was buried in a grave made by reconstructing a pit with slabs. Besides a turquoise mosaic and pot, this burial contained a shallow white bowl, identical with one by Skeleton 131. A flexed baby skeleton, No. 142 (Fig. 7, No. 7), without furniture, was presumably of the same period. Two other babies, Skeletons 152-153 in Cut IV (Fig. 7, Nos. 9-10), were generously endowed, the former with two pots, several stone balls, and a mano, the latter with a jade bead, quartz and obsidian tools, and two vessels. Both of them were extended.

The homogeneity of this last group of burials is striking. Out of sixteen burials, two babies, Nos. 140 and 142, were flexed. Of the five individuals buried directly in the soil, four, Nos. 140, 142, 152, 153, were babies, and only one, No. 131, an adult. A baby, No. 142, and a child, No. 146, alone were without offerings. The adult males, Nos. 116 and 112, the latter disturbed, had ornaments, but not the ceramic equipment of the rest of the group. All the rest were buried in slab tombs with considerable mortuary equipment.

In Trench I, Cut I, Skeleton 143, and at the north of the site, an adult, No. 122, were found in too disturbed a condition to be of any service in determining their period.

Reducing the grouping of skeletons to tabular form we find four periods represented and a number of undatable disturbed burials.

TEOTIHUACAN PERIOD

Direct burials, flexed position; Skeletons 100-101 (Trench B, Cut I); mother and child; Nos. 157-159 (Trench B, South), three adults, sex indeterminate; lavish equipment. (Fig. 7, Nos. 11-12).

EL ARBOLILLO II—MIDDLE ZACATENCO PERIOD

Direct burials, extended position; males: with sherd, Skeleton 135 (Trench D, Cut III); with nothing, Skeletons 123 (Trench D, Cut I), No. 137 (Trench H), No. 147 (Trench B, South); females: with bowl and tools, Skeleton 113 (Trench B, Cut II); child: with nothing, Skeleton 115 (Trench D, Cut III); baby: with nothing, Skeleton 149 (Trench B, South). (Fig. 9, Nos. 2, 3, 4, 9, 12, 14, 16).

Direct burials, flexed position; males: with tool, Skeleton 114 (Trench D, Cut III); with nothing, Skeleton 156 (Trench B, South); females: with tools and single bowls, Skeletons 102 (Trench B, Cut I), 155 (Trench B, South); indeterminate sex; with jar, Skeleton 162 (Trench B, Cut II); adolescents: with sherd and tool, Skeleton 111 (Trench D, Cut III); with nothing, Skeletons 132-134 (Trench D, Cut III). (Fig. 9, Nos. 1, 5, 6, 11, 12, 13).

Slab tombs, extended position; female: with tools, ornaments, and bowls, Skeleton 129 (Trench D, Cut I); indeterminate sex, with bowl, Skeleton 136 (Trench H). (Fig. 9, Nos. 10, 15).

Slab tombs, flexed position; males: with tools and bowl, Skeleton 144 (Trench G, Cut II); child: with tool, Skeleton 138 (Trench G, Cut I). (Fig. 9, Nos. 7-8).

LATE EL ARBOLILLO I—EARLY ZACATENCO PERIOD

Direct burials, extended position; females: with bowls and red paint, Skeleton 131 (Trench B, Cut V); babies: with tools and bowls, Skeletons 152 (Trench G, Cut III), 153 (Trench G, Cut III). (Fig. 7, Nos. 6, 9, 10).

Direct burials, flexed position; babies: with ornament and pots, Skeleton 140 (Trench C); with nothing, Skeleton 142 (Trench G, Cut III). (Fig. 7, No. 7; Fig. 8).

Slab tombs, extended position; males: with ornaments, Skeletons 112 (Trench C), 116 (Trench C); with ornaments and pots, Skeletons 124 (Trench C), 139 (Trench C); with pots and red paint, Skeleton 127 (Trench C); with pots, Skeleton 117 (Trench C); females: with bead, pots, and red paint. Skeleton 141 (Trench C); with mosaic and pots: Skeleton 148 (Trench G, Cut IV); with pots, Skeleton 118-119; mother and child (Trench C), Skeleton 130 (Trench C); child: with red paint, Skeleton 146 (Trench C)¹. (Fig. 7, No. 8; Fig. 8).

EARLY EL ARBOLILLO I PERIOD

Direct burials, extended position; child: with pots, Skeleton 160 (Trench G, Cut VI); with pot and tool, Skeleton 154 (Trench I, Cut III). (Fig. 7, Nos. 3, 4).

Direct burials, flexed position: females: with nothing, Skeleton 125 (Trench C). (Fig. 8).

Group burials, flexed position; Skeletons 103-110 (Trench A) including male with ornaments, Skeleton 106; male: with nothing. Skeleton 103; female: with nothing, Skeletons 109-110; child: with pot, Skeleton 107; child: with tools, Skeleton 105; child: with nothing, Skeletons 104, 108; two females with pot and tools, Skeletons 150-151 (Trench K). (Fig. 7, Nos. 1-2).

Slab tomb, extended position; male, with nothing, Skeleton 161: (Trench G, Cut VI). (Fig. 7, No. 5).

¹Rocks cover grave, instead of slabs.

DISTURBED BURIALS (INDETERMINATE PERIOD)

Under rocks: adolescents, Skeleton 120 (Trench C)¹. (Fig. 8).

Under slabs: adults, Skeleton 121 (Trench C)². (Fig. 8).

Direct burial: adults with pots and tools, Skeleton 128 (Trench C);² adults with nothing, Skeleton 126 (Trench C);² Skeleton 122 (east of site); adolescents, with nothing, Skeleton 143 (Trench I, Cut I); baby, with nothing, mat wrapped, Skeleton 145 (Trench C). (Fig. 8).

Having grouped the burials according to the strata in which they were found, we are in a position to proceed with various comparative tabulations. Study of the racial types is, as yet, incomplete, so we cannot study the burials from that point of view.

Let us first examine the positions from period to period.

TABLE 2
POSITION OF BURIALS ACCORDING TO PERIOD

	Early El Arbolillo I	Late El Arbolillo I	El Arbolillo II
Direct Extended	2	3	6
Direct Flexed	11	2	9
Slab Tomb Extended	1	11	2
Slab Tomb Flexed	..	..	2

Direct interment in an extended position obtained among eleven of the forty-nine burials selected as of chronological value. In the Early El Arbolillo I period the two extended burials comprised a child and a baby and in the late El Arbolillo I period, the three burials included two babies and an adult, whereas in El Arbolillo II, four adults, one child, and one baby were arranged in this fashion. In the burials of small children and babies, the position of the limbs is of little consequence. The space occupied by the head and body is so great in proportion to that occupied by the legs and arms, that an extended or contracted disposal of the limbs requires little alteration of the pit. However, when four adults lay in an extended position in El Arbolillo II, one in Late El Arbolillo I, and none in Early El Arbolillo I, there may be some significance.

When the flexed position in direct interment is considered, we find two baby burials in Late El Arbolillo I; but of the eleven cases in Early El Arbolillo I, seven were adult or adolescent and the four children were of fair size. The nine examples in El Arbolillo II were all adult or adolescent. A legitimate criticism might be made that an orderly dis-

¹Probably Early El Arbolillo I.

²Probably Late El Arbolillo I.

position of the limbs would be difficult in a group burial, so that because ten of the eleven flexed burials in Early El Arbolillo I came from two group graves (Skeletons 103-110, 150-151), judgment should be suspended. However, as may be seen in Fig. 7, No. 2, Skeletons 150-151 were buried in a large sized shaft, and thus there is some basis for believing that flexed burial was the usual mode.

A slab tomb for extended burial was found only once in Early El Arbolillo I, with Skeleton 161, deep in Trench G, Cut VI. Yet, in Late El Arbolillo II, eleven examples were found, the mother and child, Skeleton 118-119, in Trench C (Fig. 8) being counted as a single example. Only one child, Skeleton 146 (Fig. 8), was so treated, and that with a slovenly covering of rocks. Thus the slab tomb appears to be an honor chiefly accorded to adults, for the baby, Skeleton 140, had no stone grave, although two pots and two jade earplugs were lavished on it as an offering. In the El Arbolillo II period, only two burials were found. Since one, Skeleton 129 (Fig. 9, No. 10), was in the top cut of Trench D, which was filled with El Arbolillo II refuse, there can be no question of misinterpreting its period. The other, Skeleton 136, (Fig. 9, No. 15) in Trench H, lay beneath débris partly composed of El Arbolillo II refuse and the tomb was carelessly made. Adjoining Skeleton 136 was Skeleton 137, an extended direct burial, which produced a russet bottle like one with Skeleton 129 (Fig. 21, No. 5; Fig. 22, No. 11), providing yet another reason for assigning Skeleton 136 to the El Arbolillo II period.

Only two individuals were placed in slab tombs in a flexed position and both of these Skeletons, Nos. 138 and 144 (Fig. 9, Nos. 7-8), were found in Trench G, in refuse yielding El Arbolillo II material. This evidence, coupled with the rare occurrence of the extended position in tomb burials in El Arbolillo II, seems symptomatic of an abandonment of the solicitous care in disposing of the dead that characterizes Late El Arbolillo I.

To sum up, in Early El Arbolillo I direct burial in a flexed position seemed to be the rule, but in Late times the extended position, ordinarily in a slab tomb, was the usual mortuary method. In El Arbolillo II, direct burial employing both the flexed and extended positions seems to have been resumed, although a few tombs still were made.

The preparation and equipment of the grave present various points which are less susceptible to tabular treatment. There were two chief methods of preparing the grave. Direct inhumation consisted of excavating a simple shaft and laying the body, usually wrapped in a mat, presumably the *petate* used for sleeping, in a flexed or extended position.

Tomb interment involved the opening of a grave, which was then lined with slabs and floored with a bed of gravel on which the body was laid in an extended position. Then additional slabs were placed to roof the grave and the shaft was filled in. There was no orientation of the graves, as a consultation of the diagrams on Figs. 7-9 will show.

In Trench C (Fig. 8), seventeen graves were found within so small a radius that it seemed likely that, at this point, there was a formal burial ground. However, the other burials were scattered wherever soft ground afforded a convenient spot to sink a shaft. Four group burials occurred. In Trench A (Fig. 7, No. 1) two men, two women, and four children (Skeletons 103-110) occupied a common grave; in Trench D (Fig. 9, No. 13) three children or young adolescents (Skeletons 132-134) were so interred, with perhaps a fourth individual (Skeleton 135) in association with them (Fig. 9, No. 14); in Trench B, South Extension, (Fig. 7, No. 12) three adults (Skeletons 157-159) were buried together with a rich hoard of mortuary furniture of the Teotihuacan period; in Trench K (Fig. 7, No. 2) two women (Skeletons 150-151) shared another common grave. There is perhaps a fifth example in Trench D, Cut III where adolescent and child (Skeletons 114 and 115) were buried very close together (Fig. 9, No. 12). In two burials mothers were buried with their children. In Trench B (Fig. 7, No. 11) a mother (Skeletons 100-101) of the Teotihuacan period lay with her child in her left arm and in Trench C (Fig. 8) a mother (Skeletons 118-119) died at childbirth, to judge from the position of the infant which lay between her thighs.

There were several noteworthy dispositions of the body that varied somewhat from the normal methods. Skeleton 131, a young female in Trench B, Cut V (Fig. 7, No. 6), in addition to the complement of pottery, was impregnated with red ocher. Possibly her sleeping mat had been lined with this pigment, for her bones were absolutely undisturbed and there was no indication, in consequence, that the paint had been applied after dissolution of the flesh. Red paint was streaked on the ventral aspect of the vertebrae of the old man (Skeleton 127) in Trench C (Fig. 8). In the same trench Skeleton 141, a female (Fig. 8) was also painted red, and faint traces of this color tinted the bones of a child, Skeleton 146 (Fig. 8), in the same trench. None of these three burials showed signs of having been tampered with after the original interment. Chunks of pigment accompanied the burials of Skeleton 113, Trench B (Fig. 9, No. 2), Skeleton 129, Trench D (Fig. 9, No. 10), Skeleton 139, Trench C (Fig. 8), and Skeleton 144, Trench G (Fig. 9, No. 8). These two old men (Skeletons 139 and 144) also had some of their mortuary

equipment smeared with ocher, as did the Teotihuacan woman (Skeletons 100-101, Fig. 7, No. 11) in Trench B and the early El Arbolillo I females (Skeletons 150-151; Fig. 7, No. 2) in Trench K. This use of red paint has been also observed at Ticoman, Gualupita, and to the south in Oaxaca and the Maya country, as well as at many other points in North America.¹

The most curious burial was that of the female, Skeleton 148, in Trench G (Fig. 7, No. 8). A shallow trough walled by slabs held her legs and lower torso, while the upper torso and head dangled downward in one of the numerous small pits that honeycombed that trench. The body was wrapped in a mat, covered with reeds, and the pit was roofed with slabs. But equally solicitous care was observable in the Trench C burials (Fig. 8), Skeleton 131, in Trench B (Fig. 7, No. 6), Skeleton 129, in Trench D (Fig. 9, No. 10), and Skeleton 144 in Trench G (Fig. 9, No. 8). Only one skeleton was found seated erect, No. 156, in Trench B, (Fig. 9, No. 6).

The disposal of objects seems to have been regulated by the space within the grave. Thus pottery vessels were usually found at the angle between the head and the shoulders, or along the lower legs where the width of the body tapers sharply.

Two series of graves are available for comparison with the El Arbolillo burials, those found by Gamio at Copilco contemporaneous with the El Arbolillo II and the Zacatenco series of Late El Arbolillo I and El Arbolillo II date. Since the Ticoman burials are later, no purpose is served by considering them in this connection.

At Zacatenco, fourteen burials with traceable positions were recovered². Of these, five, Skeletons 3, 4, 13, 14, 12³ were extended, and the remainder flexed. One of the extended burials, No. 12, was a baby interred in Middle Period débris; of the other four, an adult, an adolescent, and a child lay in the Early Period deposits of Trench D. Another adult in the same trench was semi-extended⁴. It would seem, perhaps, that this contrast between more or less extended burials in the Early Period, and flexed interments during the Middle Period, expresses the same difference in burial habits that we have just considered between Late El Arbolillo I and El Arbolillo II. At the Middle Zacatenco site,

¹Ticoman, Skeleton 15, Vaillant, 1931, 400-401, 422-423; Gualupita, Skeletons 2, 9, 11, Vaillant and Vaillant, 1934, 112; Xoxo, Oaxaca, Saville, 1899, 354, 361; Holmul, Guatemala, Merwin and Vaillant, 1932, 30, 34; Copan, Honduras, Gordon, 1896, 21, 24, 27; Cayo District, British Honduras, Thompson, 1931, 273-274; Chibuaahua, Hrdlicka, 1901, 703; North America, Moorehead, 1922; Willoughby, 1898; Hrdlicka, 1901, 714-725; 1905.

²Vaillant, 1930a, 188-189.

³Vaillant, 1930a, 189, Figs. 1-4, 7.

⁴Vaillant, 1930a, 189, Fig. 2.

Copilco, the burials were either semi-flexed or extended, a condition not unlike the El Arbolillo II burials¹.

During the excavations at Zacatenco several slab structures were uncovered², but at the time we did not know what they were³. That they could be tombs never dawned on us, for finely laminated mud deposits seemed to indicate that they never had been occupied. Yet, such an identification would seem probable after our discovery of such structures containing burials at El Arbolillo.

Mortuary offerings are indicative of the respect for the dead, and in a sense, of communal wealth, since in a poor community, the people could not afford to destroy utensils needed in the struggle for existence. Table 3 analyzes the offerings according to period and age groups. Unfortunately, we do not know whether the individuals listed as without objects had offerings of a perishable nature which had disappeared.

TABLE 3
MORTUARY FURNITURE ACCORDING TO PERIOD AND AGE GROUPS

	Early El Arbolillo I		Late El Arbolillo I		El Arbolillo II	
	With offerings	Without offerings	With offerings	Without offerings	With offerings	Without offerings
Adults	3	5	11	..	9	3
Adolescents	..	..	..	..	1	3
Children and Babies	3	3	3	2	1	2

The period of most generous offerings is Late El Arbolillo I, whereas the poorest is Early El Arbolillo I. However, in Early El Arbolillo I, as we have said, ten of the individuals were in two group graves, and each of these graves produced an offering, with Skeletons 103-110, a bowl (Fig. 19, No. 1) and bone tools (Fig. 28, Nos. 3, 7-9) and with Nos. 150-151, a bowl (Fig. 19, No. 2), an olla, and a metate. If such furniture appears incommensurate with the importance of the burials, the fact remains, nonetheless, that only two burials, Skeletons 125 and 161, had no equipment. It will be noted that in all burials adults tend to receive greater attention than the young.

But to appreciate the relative wealth of the Late El Arbolillo I period, we have compiled another table based on the quantity of objects found within graves.

¹Gamio, 1926-1927, 25.

²Vaillant, 1930a, 186, Figs. 1-2.

³Vaillant, 1930a, 27-28, 51-52.

TABLE 4
TYPE OF MORTUARY OFFERING ACCORDING TO PERIOD

	Early El Arbolillo I	Late El Arbolillo I	El Arbolillo II
Implements	1 ¹	2 ²	2
Pot	1 ¹	..	2
Implements and Pot	1	..	4
Two Pots	1	2	..
Implements and Two Pots	1 ³	6	1
More than Two Pots	..	3	..
Implements and more than Two Pots	..	1	1
Nothing	8	2	8

It will be seen from Table 4 how the offerings were consistently of greater quantity in Late El Arbolillo I than they were in either the preceding or the subsequent period. Ornaments like beads or earplugs were found with seven burials (Nos. 112, 116, 124, 140, 141, 148, 153) of Late El Arbolillo I to three (Nos. 155, 129, 144) in El Arbolillo II. Tools, like knives, hammerstones, and the like, were more common in the later period, there being five burials in El Arbolillo II (Nos. 113, 129, 111, 114, 138) to three in Late El Arbolillo I (Nos. 139, 152, 143), and three in Early El Arbolillo I (Nos. 105, 154, 150-151) so accompanied.

The general custom of depositing objects with the dead was very much more common at El Arbolillo than at Zacatenco, where only one, No. 17 of the Middle Period, had an offering. This was an obsidian blade, which corresponded to the tools commonly deposited in El Arbolillo II. At Copilco, also corresponding to El Arbolillo II, all the three graves preserved by the Mexican Government have a two to four pot mortuary equipment⁴. The burials at Gualupita, which presumably equate with El Arbolillo II and the succeeding periods of Ticoman, usually had their complement of funeral furniture⁵. The most obvious answer, if not perhaps the correct one, to this lack of correspondence between sites in regard to burial equipment is that local economic conditions, rather than a cultural religious practice, governed the quantity and quality of objects deposited with the dead.

The gross distribution of offerings, according to age, has been touched on in Table 3, but it is well to give a more detailed analysis of the type of funeral furniture.

¹With individual skeletons of group burial, Nos. 103-110.

²Ornaments.

³With group burial, Nos. 150-151.

⁴Observations made by the writer.

⁵Vaillant and Vaillant, 1934, 111-116.

TABLE 5
MORTUARY OFFERINGS ACCORDING TO AGE GROUP AND TYPE

	Adult Male	Adult Female	Indeter- minate Adult	Adoles- cent	Child	Baby
Implements	3	..	..	..	2	..
Pot	2	..	2	..	..	..
Implements and Pot	..	3	1	1	..	1
Two Pots	1	1	..	..	1	..
Implements and Two Pots	3	3	..	..	..	3
More than Three Pots	1	1	..	..	..	..
Implements and more than Two Pots	..	2	..	..	..	..
Nothing	6	3	3	2	11	2

According to Table 5, women received the largest offerings, and babies too received considerable gifts. In fact the two jade earplugs, found with the baby, Skeleton 140 (Fig. 8; Fig. 25, No. 7), were the best find of the season. Men fared less well, but children, curiously enough, were buried with scant respect.

Vital statistics, unless made by a qualified physical anthropologist, cannot be taken as conclusive, nor do the small number of individuals involved warrant the assumption that we have a really fair sample.

TABLE 6
COMPARATIVE DEATH RATE AT EARLY CULTURE SITES

	El Arbolillo		Zacatenco		Ticoman	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
Old ♂	4	6.9	1	5.2	6	9.8
Old ♀	2	3.4	..	....	6	9.8
Old Indeterminate	..	....	1	5.2	3	4.9
Middle Age ♂	8	13.8	5	26.3	10	16.4
Middle Age ♀	6	10.3	1	5.2	9	14.8
Middle Age Indeterminate	6	10.3	4	21.1	9	14.8
Young ♂	4	6.9	..	....	5	8.2
Young ♀	6	10.3	1	5.2	2	3.3
Young Indeterminate— Adolescent	3	5.2	1	5.2	2	3.3
Children	11	18.9	2	10.5	6	9.8
Babies—to two years	8	13.8	3	15.7	3	4.9
Total	58	99.8	19	99.6	61	100

However, according to the rough sexing and aging made in the field, Table 6 is presented, comparing the death rate of the El Arbolillo I-II population with those of Zacatenco and Ticoman.

The chief points observable in this table are the high rate of infant mortality in El Arbolillo and Zacatenco as opposed to Ticoman, and the high percentage of death among young adults and adolescents at El Arbolillo in comparison to the other two sites. At Ticoman it would seem that more people attained old age than in the earlier cultures. A glance at Table 7 will show that there are no striking differences in mortality rates between periods at El Arbolillo.

TABLE 7
COMPARATIVE DEATH RATE AT EL ARBOLILLO ACCORDING TO PERIOD

	Early El Arbolillo I		Late El Arbolillo I		El Arbolillo II Indeterminate	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
Old ♂	..	....	1	5.9	3	14.3
Old ♀	2	14.3	..	....	..	....
Middle Age ♂	3	21.4	3	17.6	2	9.5
Middle Age ♀	3	21.4	3	17.6	..	....
Middle Age Indeterminate	..	....	..	....	2	9.5
Young ♂	..	....	2	11.8	2	9.5
Young ♀	..	....	2	11.8	4	19.0
Young Indeterminate—						
Adolescent	..	....	..	....	1	4.8
Children	5	35.7	1	5.9	5	23.8
Babies	1	7.1	5	29.4	2	9.5
Total	14	99.9	17	100.0	21	99.9

According to Table 7, infant and child mortality tends to decrease, but death among young adults, particularly women, increases. However, the scattering percentages of middle-aged and elderly people show that the numbers involved are really too small for successful analysis.

ARCHAEOLOGICAL COMPOSITION OF EL ARBOLILLO

The appraisal of the archaeology of an area through its ceramics is nothing new. In the Southwestern United States this method has been employed with conspicuous success¹. However, in Central America this approach is relatively new and untried, despite Strebel's superb initiation of the method², and the later pioneer studies of Boas³, Gamio⁴, Hay, and Lothrop⁵. At present, Mr. E. Noguera⁶ has made valuable contributions to this historical method at various key sites in Central Mexico.

However, in using pottery as an approach to history, a different methodology is employed than were ceramics to be studied as a special cultural manifestation. Instead of trying to establish the steps by which the potter's art evolved, emphasis is laid on the differentiation between the pottery styles of various peoples and various times. This method has worked with conspicuous success among the relatively primitive cultures of North America and indicates profitable application to the history of the civilizations of Central America. Yet the possibility must be faced, that in this latter region the results of ceramic research may produce an appearance of greater tribal and historical complexity than actually existed. However, until the ceramic history of different localities like the Valley of Mexico and Yucatan, has been worked out and compared with the evolution of architecture, stonework, and other aspects of material culture, as well as with the records and traditions of the various tribal groups, no decision should be made rejecting this usually significant archaeological approach.

The Early Cultures of the Valley of Mexico lend themselves very well to ceramic analysis. Pottery is their most striking product, since architecture is rudimentary, stone carving virtually absent, and no trace of the people remains in the historical traditions available to the student. Moreover, the ceramic art falls into two divisions, figurines and pottery vessels, each susceptible of close classification and capable of use as a control for the historical analysis of the other.

The figurine classification established by Mr. C. L. Hay in 1918 and elaborated by the writer in subsequent papers, is based on the grouping of specimens by means of variations in their morphology, with special emphasis on ethnographical and chronological considerations. Such details as clay, surface finish, proportion of limbs and body elements,

¹Kidder, 1924, 1931, 1932; Roberts, F. H. H., 1929, 1930, 1931, 1932.

²Strebel, 1885-1889, 1899, 1894.

³Boas, 1911-1912, 1912a, b.

⁴Gamio, 1913, 1920, 1921.

⁵Lothrop, 1926, 1927.

⁶Noguera, 1930a, b, 1932; *Antecedentes y Relaciones de la Cultura Teotihuacan (El Mexico Antiguo*, vol. 3, pp. 2-95, Mexico, 1935).

methods of depicting features and ornaments are all analyzed, not as individual characteristics, but in respect to the group as a whole. Thus specimens are divided into classes, not by a single criterion like the technique of forming an eye or a turban, but by means of the mutual resemblance of groups of figurines on the basis of the sum total of all their parts, plus their position in time and space.

Under this system a group of figurines, restricted to a single site and a single period, would therefore present a greater variation in its constituent specimens, than would a group which could be subdivided into chronological divisions or regional styles. In this latter circumstance differences in the minutiae of detail would receive greater emphasis than the gross resemblance of the plastic technique as a whole. Thus the C group of figurines which is widely distributed in time and space must be divided into a quantity of sub-types to distinguish these aspects¹, whereas the B group which is confined to the Middle Zacatenco-Copilco culture phase exhibits no comparable range in local or chronological variations² and does not require such subdivision. However, in some cases subdivisions were made when it seemed probable that future research would show this chronological and regional differentiation, as in the case of the Ticoman styles first observed as Late Zacatenco³.

In general the letters of the alphabet indicate the broad divisions of figurines according to technique and time. The numerals following indicate subdivisions on the basis of regional styles or a cross-cutting of a major group by time periods. Letters in small case following such numerals are the result of the discovery of time or regional variations in a type previously classified.

The Hay-Vaillant classification is not intended as final, but it seems the most logical means of codifying the fruits of a series of excavations. Site nomenclature is of no use when the merest fraction of early culture sites in the Valley of Mexico has been explored. Chronological terminology is merely confusing, when each season brings new or more accurate determinations. The bewildering succession of letters and numerals is not a final end, but a method of preserving data of potential historical worth, until sufficient information is amassed for secure recognition of the inter-play of culture in Mexico. Then a simpler system can be confidently adopted, with a nomenclature indicative of tribe and period.

Pottery is arranged into wares on the basis of body paste and slip. Subsidiary divisions are formed because of variations in the slip color or

¹Vaillant, 1930a, 98-113.

²Vaillant, 1930a, 122-125.

³Vaillant, 1930a, 130-141; 1931, 344-367.

TABLE 8
PERCENTAGE TABLE OF EL ARBOLILLO FIGURINES

Figurine Types	Trench D, Cuts I-IV				Trench B, Cuts I-III				Trench G, Cut I				Trench B, Cuts II-III				Trench G, Cuts II-III 3 feet				Trench I, Cut I				Trench I, Cut II				Trench B, Cuts IV-VI				Trench I, Cut III				Trench G, Cuts IV-VI				Total
	No.	Type	%	Cut %	No.	Type	%	Cut %	No.	Type	%	Cut %	No.	Type	%	Cut %	No.	Type	%	Cut %	No.	Type	%	Cut %	No.	Type	%	Cut %	No.	Type	%	Cut %	No.	Type	%	Cut %					
A	5	50		25					1	10		16.6								2	20		8.7								2	20		18.2				10			
B	8	50		40	5	31.3		29.4	1	6.3		16.6								2	12.5		8.7													16					
F	2	50		10	1	25		5.9	1	25		16.6																								4					
F-C																																					3				
B-C					1	14.3		5.9	2	28.5		3.3	3	42.8		37.5	2	66.6		9.1	1	14.3		4.5													7				
C1a									1	7.7		16.6	1	7.7		12.5	4	30.8		18.2	3	23.1		13.0	3	23.1		30				1	7.7		9.1			13			
C1b	1	6.3		5	2	12.5		11.8					1	6.3		12.5	3	18.7		13.6	3	18.7		13.0	2	12.5		20	4	25		36.4					16				
C3c																	2	50		9.1								1	25		9.1	1	25.0		9.1			4			
C3d					3	50		17.6													2	33.3		8.7					1	16.6		9.1					6				
C2					1	14.3		5.9												2	28.5		8.7	2	28.5		20				1	14.3		9.1	1	14.3		9.1	7		
C1-2	4	13.8		20	2	6.9		11.8					1	3.4		12.5	4	13.8		18.2	9	31.0		39.1	2	6.9		20	2	6.9		18.2			4	13.8		36.4	29		
C3a					1	8.3		5.9					2	16.6		25.0	1	8.3		4.5								3	25.0		27.3	2	16.6		18.2	3	25.0		27.3	12	
C3b																	2	40		9.1								1	20		9.1	2	40		18.2			5			
D																	3	100		13.6																	3				
Early F					1	50		5.9																							1	50		9.1				2			
C5																													1	50		9.1 ¹	1	25		9.1 ²			2		
Total	20				17				6				8				22				23				10				11					11				11	139		

¹Doubtful, see pp. 199, 214, Fig. 11, No. 6.

²Intrusive see pp. 155, 199, Fig. 11, No. 8.

decorative technique. Form is also utilized, but, since the most abundant material occurs in fragmentary form, rendering shapes of vessels difficult to distinguish, composition and decorative technique must necessarily be given greater weight as criteria.

The student is confronted with as confusing an array of ceramic types and sub-types as in the classification of the clay plastic. But here again, the record is incomplete, and at the risk of listing tedious minutiae, actual and potential data of historical importance must be conserved.

Implements and ornaments of pottery, bone, and stone have received a less rigorous analysis, partly because utilitarian considerations have presented less opportunity than in pottery and figurines, for the expression of individuality in decoration and form. Yet, where possible, the ethnographical and chronological implications have been sketched.

In the preceding section on the Physical Composition of El Arbolillo mention has been made of a Teotihuacan deposit. Consideration of the constituent elements of this occupation will be deferred until the next paper in this series, *Teotihuacan Culture Sites in the Valley of Mexico*. So complex a set of factors is involved, that it is better to devote a whole paper to the intricacies of this important culture phase.

Since the objects of clay, stone, and bone recovered at El Arbolillo are directly associable with those found at Zacatenco, they do not need the exhaustive descriptive analysis which new material merits. However, some comment will be made and any variation from the Zacatenco norms will receive close scrutiny.

FIGURINES

The figurines from the Early Cultures of the Valley of Mexico have the dynamic quality of an evolving art and are therefore very difficult to classify chronologically. Were one to classify them on a purely cultural basis, distinguishing them as Aztec, Teotihuacan, Ticoman, or Zacatenco, the problem would be relatively simple, in comparison to trying to recognize the various time stages within the broad culture groups.

The deep deposits of Early and Middle Zacatenco material at El Arbolillo apparently presented a wonderful opportunity to resolve the clay plastic into such stages. Unfortunately, the determination of such periods was vastly complicated by the nature of the refuse. The inhabitants of El Arbolillo had dumped their débris in different places at various times, so that the establishment of a stratigraphy depended

TABLE 9
DISTRIBUTION OF FIGURINES ACCORDING TO GROUPING OF TRENCH CUTS

Figure Types	Trench D, Cuts I-IV	Trench B, Cuts I-III	Trench G, Cut I	Trench B, Cuts II-III	Trench G, Cuts II-III	Trench I, Cut I	Trench I, Cut II	Trench B, Cuts IV-VI	Trench I, Cut III	Trench G, Cuts IV-VI	Maximum Grouping Per Cent
A	5	0	1	0	0	2	0	0	2	0	80
B	8	5	1	0	0	2	0	0	0	0	
F	2	1	1	0	0	0	0	0	0	0	
F-C	0	0	0	0	2	0	1	0	0	0	80
B-C	0	1	2	3	1	0	0	0	0	0	
C1a	0	0	1	1	4	3	3	0	1	0	
C1b	1	2	0	1	3	3	2	4	0	0	77
C3c	0	0	0	0	2	0	0	1	1	0	
C3d	0	3	0	0	0	2	0	1	0	0	
C2	0	1	0	0	0	2	2	0	1	1	
C1-2	4	2	0	1	4	9	2	2	1	4	77
C3a	0	1	0	2	1	0	0	3	2	3	65
C3b	0	0	0	0	2	0	0	0	1	2	
D	0	0	0	0	3	0	0	0	0	0	
Early F	0	1	0	0	0	0	0	0	1	0	
C5	0	0	0	0	0	0	0	0	1 ¹	1 ²	

¹Doubtful specimen, prototype or C3a (?), see Fig. 11, No. 6, p. 214.
²Intrusive (?), pp. 156, 200, see Fig. 11, No. 8.

on the correlation of the various layers in the several trenches. The constant use of the rubbish as a burial place contributed to further confusion.

From the Zacatenco excavations we already knew the Middle Zacatenco Types A, B, F, the transitional Type B-C, and the Early Zacatenco Types C1-3 and D1.¹ However, the depth of the Early Zacatenco refuse beds at El Arbolillo suggested that the period could be subdivided. Accordingly, we segregated all the material composed of Middle Zacatenco elements and concentrated on the residue. It then seemed wise to reexamine the figurines from the Early Zacatenco Period with a view to reclassification and the establishment of a greater number of sub-types. On this basis it was found that Type C1 could be subdivided into C1a and C1b. A number of heads previously grouped more or less arbitrarily as C1 or C2 were combined as C1-2. C2 remained intact, being still composed of the fundamental type specimens. It also appeared advisable to subdivide C3 into C3a, a new expression of the type, C3b, the class as originally defined at Zacatenco, and C3c and d, two other variations from the central group.

Having subdivided the groups, we then noted the numerical frequency, according to the various cuts, with a view to combining some of them. If Cuts I-IV of Trench D were all of the same period, then the same situation would probably occur in other trenches. We were then able to form the accompanying tables, which indicate the maximum frequencies of the styles.

The small number of figurines produced by the trenches and the variety of the sub-types suggested that the various figurine groups evolved, not from one main type into another, but through gradations in the original types. We therefore prepared Table 9 which shows the clustering of the various sub-types in different trenches and levels.

The Middle Zacatenco-El Arbolillo II and the Transition styles are chiefly found in Trench D, and the upper cuts of Trenches B and G. Similarly the intermediate cuts of Trench G and lower ones of Trench B produce a predominance of Types C1a and b and C3c and d. The high frequencies of Types C1-2 and C2, so common to Zacatenco, were confined to Trench I, but the new style, C3a, was most common in the bottom cuts of Trench G. It seemed logical to assume, since we had a repetition of the main Zacatenco types, save in Type C3a, that the bottom cuts of Trench G must represent a period anterior to the Zacatenco

¹The use of Arabic numerals seems more intelligible than the Roman notation used in previous papers.

TABLE 10
CORRELATION OF ASSOCIATION OF FIGURINE GROUPS WITH PERIODS

Figurine Types	Trench D, Cuts I-IV	Trench B, Cuts I-III	Trench C, Cut I	Trench B, Cuts II-III	Trench G, Cut II	Trench I, Cut I	Trench I, Cut II	Trench B, Cuts IV-VI	Trench I, Cut III	Trench G, Cuts IV-VI	Total
ABF	(4.5) 15	(3.6) 6	(1.4) 3	(1.8) 0	(4.3) 0	(5.2) 4	(2.3) 0	(2.5) 0	(2.0) 0	(2.3) 0	30
FCBC	(1.5) 0	(1.2) 1	(.5) 2	(.6) 3	(1.4) 3	(1.7) 0	(.8) 1	(.8) 0	(.7) 0	(.8) 0	10
C1ab-C3d	(5.9) 1	(4.7) 5	(1.8) 1	(2.4) 2	(5.6) 9	(6.8) 8	(3.0) 5	(3.2) 6	(2.7) 2	(3.0) 0	39
C2-C1-2	(5.5) 4	(4.4) 3	(1.6) 0	(2.2) 1	(5.2) 4	(6.3) 11	(2.7) 4	(3.0) 2	(2.5) 2	(2.7) 5	36
C3a-b	(2.6) 0	(2.1) 1	(.8) 0	(1.0) 2	(2.4) 3	(3.0) 0	(1.3) 0	(1.4) 3	(1.2) 3	(1.3) 5	17
C = + .61	20	16	6	8	19	23	10	11	9	10	132

occupation. On the basis of this clustering, there can be discerned five groups, arranged according to period as follows:—

El Arbolillo II, Types A, B, F (Fig. 10)

Transitional or Early El Arbolillo II, Types B-C, F-C (Fig. 12)

Late El Arbolillo I, Types C1b, C1a, C3c, C3d (Fig. 13)

Middle El Arbolillo I, Types C1-2, C2 (Fig. 15)

Early El Arbolillo I, Types C3a, C3b (Fig. 17)

The preceding correlation table (Table 10) with the high coefficient, $+ .61$, indicates that this segregation is valid and has not been founded on a purely arbitrary basis. We may now pass to a description and evaluation of the various types, according to the chronological position we have suggested.

EL ARBOLILLO II TYPES

Types A, B, F, C5. Table 11 shows the occurrence of Types A, B, and F which are the time-bearing figurine styles of the Middle Zacatenco-El Arbolillo II period. Types B and F derive very definitely from the C tradition of the preceding period, but Type A is more reminiscent of southern techniques. Type C5 probably belongs to this horizon, but has not been included in the graph, owing to circumstances explained under the type description (p. 200).

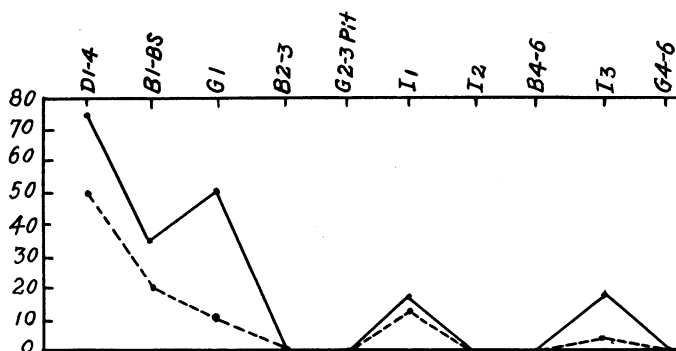


Table 11. Graph of Frequency of Types A, B, F, according to Class and Cut Total.

Type A (Fig. 10, No. 1) might be called the "classical" type of Early Culture figurine, having been published in the early accounts of the Copilco digging and having been the first type defined by Mr. C. L. Hay. It is readily distinguished by the heavy body, broad, fat face, and simple turban. The torso is sometimes made up of two elements, a hollowed breast and a stomach. The eye is formed by two ploughing



Fig. 10. El Arbolillo II Figurines, Types A, B, F.

1. Type A, H. 8 cm., Trench D, Cut III (30.0-8863)
2. Type B, large, H. 8.1 cm., Trench B, South (30.0-9235)
3. Type B, two heads, H. 9.6 cm., Trench D, Cut III (30.0-8899)
4. Type F, two heads, H. 6.8 cm., Trench G, Cut I (30.0-8955)

strokes separated by a perforation; the nose is filleted. The mouth is usually made by two fillets countersunk into a rectangular groove. The figurines are sometimes covered with a white paint, used almost like a slip, with additional details picked out in red.

Evolutionary steps demonstrating the origin or later developments of Type A are as yet unknown. Lavachery suggests a Type D origin¹, but as Type A is very rare in Morelos, where the D group is strongest², this theory seems untenable. However, there is a strong possibility that Type A originated outside the Valley at some undetermined locality³, and, of all the styles in the Valley, it has the closest affiliation to those of Salvador⁴.

With the exception of two heads in Trench I, Cut III and one in the Teotihuacan débris of Trench E, all of which are probably intrusive, Type A occurs in the typically Middle Zacatenco-El Arbolillo II débris of Trench D, and the top cuts of Trenches G and I. It is a time-bearer for the Middle Zacatenco-Copilco culture. The quantity of Type A heads is smaller at El Arbolillo than at Zacatenco possibly due to a shorter and less populous occupation at the former site.

References:

- Boas, 1911-1912, Pl. 43, Fig. 22; Pl. 44, Figs. 2, 14, 16, 17; Pl. 45, Fig. 6; Pl. 56, Fig. 7.
 Seler, 1915, Pl. XXI, Fig. 1, Third Row, No. 3; Fig. 2, Second Row, No. 6, Third Row, No. 5, Fourth Row, No. 4.
 Beyer, 1917, Pl. II, Fig. 1.
 Gamio, 1920, Fig. 8; 1922, Pl. IIIb.
 Mena and Hyde, 1922, 38.
 Vaillant, 1929, 540; 1930a, 44-45, 73, 120-121, 138-139, Top Row Nos. 1-2, 144-145, Top Row No. 3, 150-151; 1931, 214, 368-369, Bottom Row No. 2.
 Lavachery, 1932, Figs. 2-5.
 Noguera, 1932, Pl. V, Figs. 7-9.
 Vaillant and Vaillant, 1934, 47, No. 10, 49, No. 10.

Type B (Fig. 10, Nos. 2-3), together with Types A and F, is a time-bearer for the Middle Zacatenco-El Arbolillo II period. Body, head, and legs are made as separate elements and combined into a flat whole, having a wide range in size. Anatomical proportions are only vaguely observed and the heads are usually large in relation to the body. The eye is made by means of two broad ploughs and the nose and mouth fillets are small in comparison with the facial area. Headdress treatment is

¹Lavachery, 1932, 103-105; 1933, 67-69.

²Vaillant and Vaillant, 1934, 58-60.

³Vaillant, 1930a, 144-145.

⁴Vaillant, 1930a, 150-151.

simple and conventional. The posture is usually erect, but seated forms are known. In the latter case the head is apt to rest directly on the legs, without an intervening torso. A few two-headed forms are known (Fig. 10, No. 3) and the mother and child motif also occurs¹.

The origin of the style is quite definitely in the Type C group of figurines, as is shown by the transition group, B-C (Fig. 11, No. 4; Fig. 12, Nos. 1-2). It also connects with Type F in such technical details as the eye (Fig. 10, No. 4; Fig. 11, No. 2) and at Zacatenco a Type B figurine was found with a Type F headdress².

At El Arbolillo, Type B was found consistently in the Middle Zacatenco deposits, in Trenches D and C, and the upper cuts of Trenches B and G, confirming thereby its value as a time-bearer.

References:

Hamy, 1897, Part I, 19.

Boas, 1911-1912, Pl. 43, Fig. 1; Pl. 45, Figs. 1-2.

Mena, 1918, Fig. 6.

Gamio, 1920, Fig. 8.

Mena and Hyde, 1922, Plate facing 39.

Kroeber, 1925, Pl. 20B.

Vaillant, 1929, 538; 1930a, 45, 74, 124-127; 1931, 214, 368-369, Bottom Row No. 1.

The crude Type F (Fig. 10, No. 4; Fig. 11, No. 2), occurs in association with Types A and B and is therefore a Middle Zacatenco-El Arbolillo II diagnostic. The body and legs are crudely made; the head defines the type. Ploughed eyes, low foreheads, with crude or absent headdresses, and muzzle-like noses and mouths are too frequently combined to be considered degenerate examples of other styles. Erect and seated postures are shown and some specimens like Fig. 10, No. 4 have two heads. A bearded Type F from the Weitlaner Collection is shown in Fig. 11, No. 2. An Early form of Type F is represented in Fig. 11, No. 1. Here filleted eyes give a reliable diagnostic for distinguishing this Early Zacatenco form from the Middle Period examples.

Type F quite definitely has its origin in the C group as the transitional types attest (Fig. 12, Nos. 3-4) and some of the technical processes, like the ploughed eye, show affinities with Type B. Probably both Types B and F are conventionalizations of the laborious, if crude, technical expressions in the C group of Early Zacatenco and El Arbolillo I.

References:

Boas, 1911-1912, Pl. 44, Fig. 23; Pl. 45, Fig. 18.

Mena and Hyde, 1922, to face 39, Bottom Row No. 6.

¹cf. Vaillant, 1930a, 126, Third Row No. 1.

²Vaillant, 1930a, 125; Top Row No. 9.

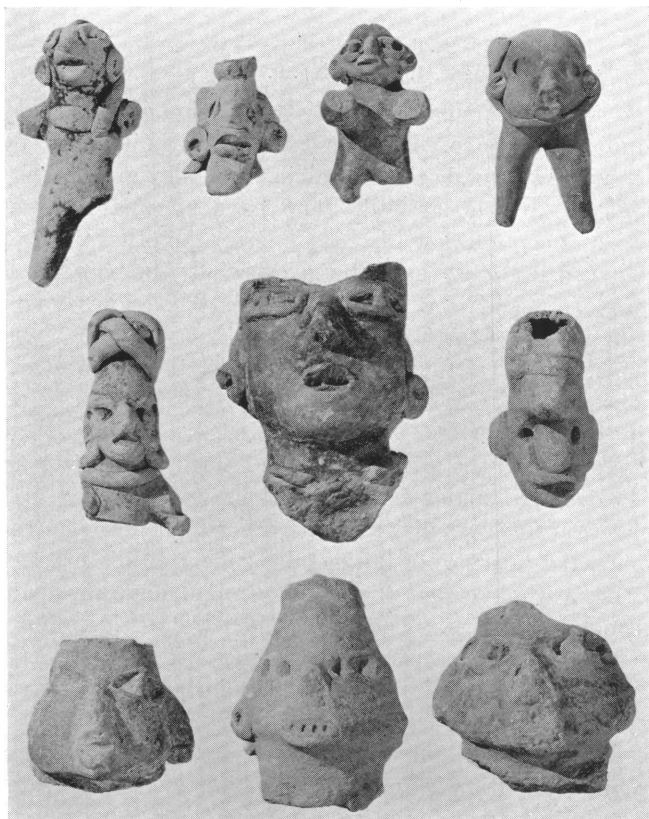


Fig. 11. Odd Type Figurines¹.

1. Figurine, Type F early, H. 8.3 cm., Trench I, Cut III (30.0-9426)
2. Figurine, Type F with beard, Tetelpan, Weitlaner Collection
3. Whistle, Type C3a, Trench B, Cut II (30.0-8674)
4. Figurine, Type B-C, no trunk, Trench G, Cut I (30.0-8954)
5. Figurine, Type C1b, variant, Trench B, Cut IV (30.0-8714)
6. Figurine, Type C5 (?), atypical, Trench I, Cut III (30.0-9423)
7. Effigy whistle, Type C1a, Trench I, Cut II (30.0-9386)
8. Figurine, Type C5, Trench G, Cut IV (30.0-9173)
9. Figurine, Type C5 (?), variant, Trench C, Upper Cut (30.0-8765)
10. Figurine, Type C5, Trench K (30.0-9486)

¹The scale for photographed specimens is given by No. 1 of each plate.

Vaillant, 1929, 539; 1930a, 46, 74, 128-129; 1931, 215, 368-369, Bottom Row No. 5.

Lavachery, 1932, Figs. 6-7.

Vaillant and Vaillant, 1934, 47, No. 9.

Type C5 (Fig. 11, Nos. 6, 8-10) is a variation of the C group which is not found at Zacatenco. It is present at the Middle Zacatenco site of Copilco, as well as several other points in the Valley and in Morelos, and it occurs at El Arbolillo as well. The diagnostic feature is a "sheep-faced" appearance, to follow Mr. Hay's term. In other words, the head is extremely prognathous, the features, especially the nose, are large, the turban simple, and the brow low and conical. The bodies have the three dimensional quality of the C type, but with the stiffness of Type B.

Six specimens were found at El Arbolillo; the earliest, an atypical example, possibly of C3, in Trench I, Cut III (Fig. 11, No. 6), and another in Trench G, Cut IV (Fig. 11, No. 8), as opposed to three in Trench C, and one in the mixed débris of Trench K. The typical specimen which occurred under early conditions was battered, in contrast to the relatively fresh condition of the other figurines from those cuts. Furthermore, the presence of burials also suggested disturbance, not to speak of the possibility that the figurine might have dropped in from above during the digging. Therefore, when we consider that the vast majority of specimens occurred in trenches yielding El Arbolillo II material and that Type C5 is plentiful at Copilco, a Middle-Zacatenco-El Arbolillo II dating seems legitimate.

The origin of Type C5 may well be in C1a, but its chronological and ethnographical definition is among the feeblest of the excavated Valley types. Type C was not found at Zacatenco, but it was abundant at Copilco, San Juanico, and relatively so in Morelos¹. It would seem to be a survival of the C plastic which persisted at some sites into Middle Zacatenco times, while the main stream of the genus was either absorbed by conventionalization into Type B or by degeneration into Type F. Some comparative material exists in the literature.

References:

- Boas, 1911-1912, Pl. 56, No. 1.
- Plancarte, 1911, 8, Bottom Row No. 1; 9, Top Row No. 6.
- Gamio, 1920, Fig. 8, left, Nos. 8, 10.
- Mena and Hyde, 1922, to face 38, Left Panel, Nos. 8, 10; Right Panel No. 5.
- Hay, 1923, 262, Nos. 2-3.
- Vaillant, 1930a, 108-109, Top Row Nos. 5-6, Middle Row Nos. 4-6, Bottom Row; 1931, 368-369, Bottom Row Nos. 3-4.
- Vaillant and Vaillant, 1934, 47, No. 11.

¹Vaillant, 1930a, 108; Vaillant and Vaillant, 1934, 41, 44, 59-60; Plancarte, 1911, 8-9.

TRANSITIONAL TYPES, EL ARBOLILLO I-II

Types B-C, F-C. The following table shows the occurrence of Types B-C and F-C which mark the final stages of the transition of the important C genus into the Middle Zacatenco-El Arbolillo Types B and F. Their numerical occurrence is small, but their chronological position corresponds to their technological situation, wherein the filleting on of features, so characteristic of the C types, is given up for a greater use of incision.

Type B-C (Fig. 12, Nos. 1-2) marks the transition between the C group figurines of Early Zacatenco-El Arbolillo I and the B group of Middle Zacatenco-El Arbolillo II. As is to be expected in a transitional group, considerable variation exists. The bodies of the figurines are usually female, with essential anatomical details in the C manner. The

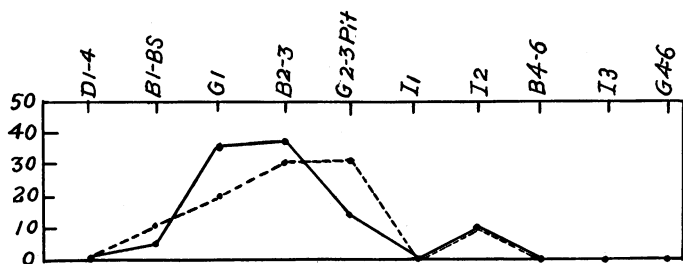


Table 12. Graph of Frequency of Types B-C and F-C according to Class and Cut Total.

heads, somewhat larger than in anatomical proportion, begin to be flattened like those of Type B (Fig. 10, Nos. 2-3). Eyes are usually made by ploughing with some edged instrument and the other features are formed by applied bits of clay, greatly reduced from the exuberant filleting so characteristic of the C group. Headdresses tend to be simple. A curious variation is displayed by Fig. 11, No. 4 where the torso is omitted, leaving the legs attached to the head. Several specimens were painted after firing.

This transitional style is found just below El Arbolillo II in upper El Arbolillo I débris, confirming its typological and chronological position at Zacatenco¹ as midway between its Early and its Middle phases. It appears to have been derived from Type C1b (Fig. 13, Nos. 4-5; Fig. 15, Nos. 10-12), the eye fillets of which have been abandoned and

¹Vaillant. 1930a, 46, 108-109.



Fig. 12. Transition Period Figurines.

1. Type B-C, H. 5.8 cm., Trench G, Cut III (30.0-9109)
2. Type B-C, H. 8.0 cm., Trench B, South (30.0-9236)
3. Type F-C, H. 3.0 cm., Trench G, Cut II (30.0-9049)
4. Type F-C, H. 3.1 cm., Trench G, Cut III (30.0-9111)

the headdress simplified. This style is widely distributed throughout the Valley.

References:

- Boas, 1911-1912, Pl. 43, Figs. 5, 16.
 Mena and Hyde, 1922, to face 39, Top Row No. 4; Bottom Row No. 4.
 Kroeber, 1925, Pl. 20, Fig. B.
 Vaillant, 1930a, 46, 74, 108-109, Top Row Nos. 1-3, Middle Row Nos. 1-3; 1931, 214.

The F-C sub-group (Fig. 12, Nos. 3-4) is set up for the first time at El Arbolillo. In contrast to Type B-C, this style has the low rounded head and flattened muzzle of the F group, but a certain clarity in defining individual features suggests the C family. Noseplugs are also a diagnostic of this type.

Occurring in the upper part of Trenches G and I, the chronological position of Type F-C is transitional from the Early to the Middle Zacatenco period. Technically, it seems to have its origin in Type C1b (see especially Fig. 13, No. 5). A technical variation of no intrinsic significance, Type F-C, is rarely found, only one or two examples occurring at Zacatenco. Yet, coupled with Type B-C, it marks the shift from a plastic technique based almost entirely on filleting, to one where incision is important in delineating features.

Reference:

- Vaillant, 1930a, 99, Bottom Row No. 7, 128-129, Top Row No. 7.

LATE EL ARBOLILLO I TYPES

Types C1a, C1b, C3c, C3d. The heavy deposits at El Arbolillo permitted the subdivision of the figurines into three chronological groups; Late, Intermediate, and Early El Arbolillo I. These divisions hardly represent anything so fixed as a *period*, but are rather phases in the continuous evolution of plastic art. A glance at Tables 8-9 on pp. 191, 192, and the following graph will show the distributional reasons for grouping these four sub-types, C1a, C1b, C3c, and C3d, whereas the illustrations (Figs. 13, 14, 15) will show the typological basis.

In the figurines of the Early and Intermediate periods (pp. 208-214, Figs. 16, 17) a tendency to incorporate the fillets into the face mass may be noted, but in these late El Arbolillo I specimens the fillets, except in Type C1a, are merely applied to the face without any attempt to smooth them into unity with its basal structure (Fig. 13). Thus in the El Arbolillo II types, A, B, F, the substitution of incision for applied fillets of clay seems to be an obvious technical evolution.

Type C1a (Fig. 11, No. 7; Fig. 13, Nos. 1-3; Fig. 15, Nos. 7-9) comprises the group originally defined as Type C1¹. It is one of the most characteristic and numerous elements of the Early Zacatenco period. Its clay is usually well-smoothed and of a reddish tone. Type C1a is defined by an anatomically proportionate female torso, short arms, long legs, elongated head, prognathous face, filleted features, the mouth element obscuring the chin, and a simple turban with incised details. Painting in black and red is common after firing. Although usually erect, the seated posture is known.

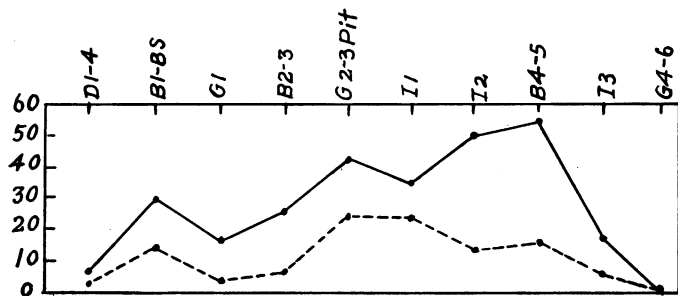


Table 13. Graph of Frequency of Types C1a and b and C3c and d according to Class and Cut Total.

Type C1a is more common (Tables 8-9) to Trench I and the upper cuts of Trenches B and G, whereas Types C2 and C1-2 tend to be proportionately more numerous in their lower cuts. Yet, so close is the affiliation between Type C1a and Types C2 and C1-2 (Fig. 15), that were it not for their different stratigraphical positions it would seem that these two groups should be handled as one. But in view of this chronological position, Type C1a appears to have degenerated from the blundering care with which Type C2 and C1-2 were fashioned. The common occurrence of Type C1a in all cuts of the Early period at Zacatenco indicates that this site was occupied later than the original El Arbolillo settlement.

Fig. 13. Late El Arbolillo I Figurines (On opposite page)

1. Type C1a, H. 10 cm., Trench D, Cut VII, [Zacatenco], (30.0-6872)
2. Type C1a, H. 7.1 cm., Trench D, Cut VIII, [Zacatenco], (30.0-6965)
3. Type C1a, H. 8.6 cm., Trench D, Cut VII, [Zacatenco], (30.0-6870)
4. Type C1b, H. 4.4 cm., Trench G, Cut III, pit (30.0-9159?)
5. Type C1b, H. 5.5 cm., Trench B, Cut V (30.0-8726)
6. Type C3c, H. 5.5 cm., Trench G, Cut II (30.0-9048)
7. Type C3c, H. 6.4 cm., Trench B, Cut VI (30.0-8752)
8. Type C3d, H. 6.3 cm., Trench B, Cut I (30.0-8635)
9. Type C3d, complete no torso, H. 4.1 cm., Trench B, Cut IV (30.0-8715)

¹Vaillant, 1930a, 34-36.



Fig. 13. Late El Arbolillo I Figurines.

Abundant illustrative material exists in the literature.

References:

Boas, 1911-1912, Pl. 43, Figs. 1, 7, 20; Pl. 44, Figs. 4, 10, 11; Pl. 53, Fig. 20; Pl. 56, Figs. 2, 5.

Seler, 1915, Pl. XXI, various examples.

Mena and Hyde, 1922, to face 39, Top Row No. 1.

Vaillant, 1929, 536; 1930a, 34-35, 72-73; 99, Top Row Nos. 2-4, 6-7, Middle Row Nos. 1-2; 100, Top Row Nos. 1, 4-5, Bottom Row Nos. 2-5.

Lavachery, 1932, Figs. 2-4.

Noguera, 1932, Pl. V, Fig. 4, Top Row, Nos. 3-4.

Type C1b (Fig. 11, No. 5; Fig. 13, Nos. 4-5; Fig. 15, Nos. 10-12) was not recognized at Zacatenco originally nor was it common enough in the general collections available at the time to warrant its consideration as a sub-group. The coarse clay is a grayish color and the surface is rougher than in Type C1a. Large fillets of clay boldly indicate the features and ornaments. There is little attempt to smooth the fillets back to the face planes, as in the case of Type C1a. Nose-plugs are commonly shown and headdress treatment is elaborate. Posture is usually erect and anatomical proportions are roughly observed, even to the point of modeling the torso. Sex, when detectable, is usually feminine, and in Fig. 16, No. 10, the legs of a child whose body is lost, may be seen filleted to the left side of the figure. Face and body painting in black, red, and white is applied after firing (Fig. 13, No. 5).

The occurrence of Type C1b in Trench B, Cut 1 (2), Trench I, Cut I (3), Trench D, Cut III (1), and the pit in Trench G, Cut III (3) suggests an El Arbolillo II or Late El Arbolillo I date. Consequently, the specimens from Trench B, Cuts IV (1) and V (2) indicate that those strata are of the Late El Arbolillo I period. Re-classification shows Type C1b to be rare at Zacatenco, but relatively common at San Juanico. A comparison of Fig. 15, Nos. 10-12, with Fig. 14, Nos. 7-12 shows that there is a connection with Types C3c-d. In comparing Fig. 15, No. 10 with Fig. 12, Nos. 1-2 one sees the possibility of later transition into Types B-C and B.

References:

Boas, 1911-1912, Pl. 43, Figs. 4, 9; Pl. 54, Fig. 25.

Seler, 1915, Pl. XXI, Fig. 1, Second Row No. 1.

Vaillant, 1930a, 99, Top Row No. 1, Bottom Row Nos. 2, 8; 102, Middle Row Nos. 3-4, Bottom Row No. 4.

Type C3c (Fig. 13, Nos. 6-7; Fig. 14, Nos. 7-9), the third division of the amorphous C3 group, includes a handful of specimens emanating from the later strata of El Arbolillo I. Their paste is the color of cream-



Fig. 14. Comparison of Figurine Sub-Types C3a, b, c, d.

1. Type C3a, H. 5.3 cm., Trench I, Cut III (30.0-9420)
2. Type C3a, Trench I, Cut III (30.0-9422)
3. Type C3a, Trench G, Cut IV (30.0-9053)
4. Type C3b, Trench G, Cut V (30.0-9205)
5. Type C3b, Trench J (30.0-9460)
6. Type C3b, Trench I, Cut III (30.0-9421)
7. Type C3c, Trench G, Cut III (30.0-9114)
8. Type C3c, Trench I, Cut III (30.0-9424)
9. Type C3c, Trench B, [Zacatenco], (30.0-6999)
10. Type C3d, Trench B, Cut I (30.0-8646)
11. Type C3d, Trench I, Cut I (30.0-9329)
12. Type C3d, Trench B, South (30.0-9239)

infused coffee. The contours of the head have the quadrate shape characteristic of the general C3 group. Features are indicated by clay fillets, relatively small in relation to the face plane, but without much effort to untie the applied elements to the head mass. A variant with massive fillets and gross execution belongs to the C3c group, more than to any other, and is shown on Fig. 13, No. 6, and a similar head found in Early Zacatenco also seems assignable to this class (Fig. 14, No. 9). Type C3c is very rare in the published collection and occurs chiefly in El Arbolillo.

Reference:

Vaillant, 1930a, 105, Bottom Row No. 5.

Type C3d (Fig. 13, Nos. 8-9; Fig. 14, Nos. 10-12) constitutes a minor class of figurines made of grayish clay. This color, together with the larger size of the facial fillets, distinguishes them from those designated as Type C3c. The broad faces, however, unite them in the large C3 group and distinguish them specifically from the C1b subgroup. Some of these C3d examples are hollow, and may have been used as vessels or rattles (Fig. 14, No. 12) like similar specimens found at Tlapacoya, Zacatenco, and Gualupita, listed in the references below.

References:

Boas, 1911-1912, Pl. 43, No. 4.

Vaillant, 1930a, 104-105, Middle Row No. 4; 35; 105, Top Row No. 1, Bottom Row No. 4.

Vaillant and Vaillant, 1934, 39, Nos. 12-13.

Types C3c-d have the same relation to the general C3 group that Type C1b has to the C1, C1-2, C2 groups. The emphasis is shifted from the amalgamation of the facial fillets with the head mass to the use of these applied bits of clay as supplementary units.

INTERMEDIATE EL ARBOLILLO I TYPES

Types C2 and C1-2. In the original Zacatenco classification, Type C was divided into three groups: C1, figurines with a medium degree of execution; C2, figurines carefully fashioned; and C3, figurines grossly and poorly made. It was thought that should the figurines of the Early Zacatenco period receive further chronological division, it would be along these lines. However, at El Arbolillo where the deposits were deep enough to render such classificatory refinement practicable, the division fell across, rather than parallel to the lines of morphological classification sketched above (Figs. 14, 15).

Overlapping the Late and Early El Arbolillo I types were the Intermediate styles, C2 and C1-2, as may be seen in Table 14 and the distri-



Fig. 15. Comparison of Figurine Sub-Types C1-2, C2, C1a, and C1b.

1. Type C1-2, H. 6 cm., Trench G, Cut V (30.0-9203)
2. Type C1-2, Trench I, Cut I (30.0-9321)
3. Type C1-2, Trench G, Cut VI (30.0-9217)
4. Type C2, Trench I, Cut II (30.0-9374)
5. Type C2, Trench D, Cut IX [Zacatenco] (30.0-6950)
6. Type C2, Trench I, Cut I (30.0-9324)
7. Type C1a, Trench G, Cut III (30.0-9112)
8. Type C1a, Trench I, Cut III (30.0-9419)
9. Type C1a, Trench B, Cut II (30.0-8672)
10. Type C1b, Trench B, Cut I (30.0-8632)
11. Type C1b, Trench I, Cut I (30.0-9313)
12. Type C1b, Trench G, Cut III, pit (30.0-9160)

bution charts (Tables 8-9) on pp. 191, 192. Type C2 is the standard form as defined¹. Type C1-2 comprises those figurines which fall on the border line between the Zacatenco Type C1 (the present C1a) and C2.

Type C2 (Fig. 15, Nos. 4-6; Fig. 16, Nos. 4-6) was originally distinguished from C1a, not on the basis of the bodies, which are alike, but on the contrast between the naturalistic facial angle, careful and proportionate filleting of features, modeling of the chin, and frequently elaborate formation of the turban, as opposed to the bird-like prognathism of Type C1a. However, to judge from conditions at El Arbolillo, it appears that this distinction is really based on the comparative sculp-

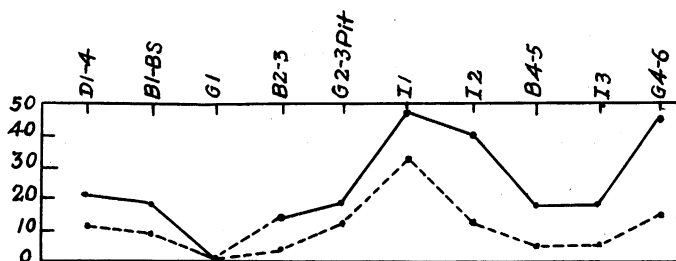


Table 14. Graph of Frequency of Types C2 and C1-2 according to Class and Cut Total.

tural excellence of specimens. Reducing Type C2 to its true classificatory core, we find the few examples at El Arbolillo confined to Trench I and the bottom cuts of Trench G, with "floating" specimens occurring in later levels. The type figurines for C2 are fairly common in the literature.

References:

- Boas, 1911-1912, Pl. 43, Figs. 15, 17; Pl. 44, Fig. 1; Pl. 45, Fig. 10.
- Seler, 1915, Pl. XXI, Fig. 1, Third Row No. 5, etc.
- Vaillant, 1930a, 35, 72-73, 102-103, Top Row Nos. 1, 5-7; 105, Top Row No. 3; 1931, 368-369, Top Row No. 2.
- Noguera, 1932, Pl. V, Fig. 5.
- Lavachery, 1932, Figs. 2-4.

Many of the Type C1-2 specimens (Fig. 15, Nos. 1-3; Fig. 16, Nos. 1-3) were formerly included under Type C2, but it was impracticable to distinguish the minute gradations separating the naturalistic Type C2 from the prognathic Type C1a. When the El Arbolillo heads were subdivided, distinctive examples of C1a and C2 were set apart and

¹Vaillant, 1930a, 35, 102-103.



Fig. 16. Intermediate El Arbolillo I Figurines.

1. Type C1-2, H. 5.6 cm., Trench I, Cut I (30.-0-9326)
2. Type C1-2, H. 4.5 cm., Trench B, Cut V (30.0-8729)
3. Type C1-2, H. 3.1 cm., Trench D, Cut IX, [Zacatenco], (30.0-6944)
4. Type C2, H. 9.6 cm., Trench C, Upper Cut (30.0-8794)
5. Type C2, H. 6.3 cm., Trench D, Cut VIII, [Zacatenco], (30.0-6907)
6. Type C2, H. 6.4 cm., Trench D, Cut IX [Zacatenco] (30.0-6951)

the resultant doubtful pieces were studied in regard to their chronological distribution (Table 9). It was found that their concentration not only extended further into the lower cuts, than did Type C1a, but also harmonized closely with the Type C2 distribution. Therefore this rough group, C1-2, was set up.

The best verbal description of Type C1-2 is to define it as including specimens which could be assigned either to C1a or C2, since they bear traits of both (Fig. 15). Type C1-2 specimens lack, however, the bird-like look of C1a, and they have neither the size nor the sure facial modeling of C2. In forming the eyes, the fillets are smoothed back into the face plane into which the incisions penetrate. Other details of head-dress and features are rough approximations to naturalism, without the conventional effects of C1a. Body painting after firing is common.

References:

Vaillant, 1930a, 99, Middle Row No. 4, Bottom Row No. 6; 101, Top Row Nos. 2-3, Bottom Row No. 1; 102, Top Row No. 4; 106, Middle Row No. 6.

EARLY EL ARBOLILLO I TYPES

Types C3a and C3b. Types C3a and C3b according to Tables 8-9 (pp. 191, 192), are concentrated in the lowest cuts at El Arbolillo. They are another example of the cross-cutting of the original C sub-types by chronological factors. The original Type C3¹ was created as a catch-

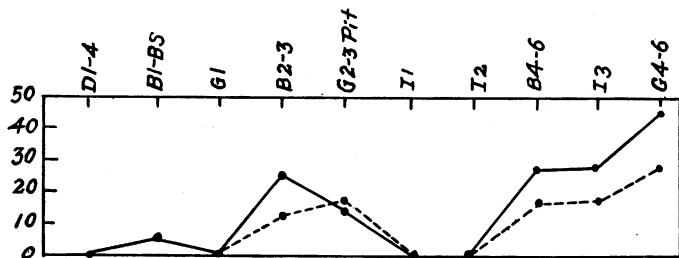


Table 15. Graph of Frequency of Types C3a and b according to Class and Cut Total.

all to include Zacatenco C group specimens which did not fall into the more obviously classifiable C1 and C2 divisions. We have noted as C3c and C3d, the later examples in the preceding section on Late El Arbolillo I styles (pp. 206-208). The occurrence of earlier examples of C3a, a new subdivision, and C3b, the original basis for C3 figurines, is shown in Table 15.

¹Vaillant, 1930a, 35, 104-105.

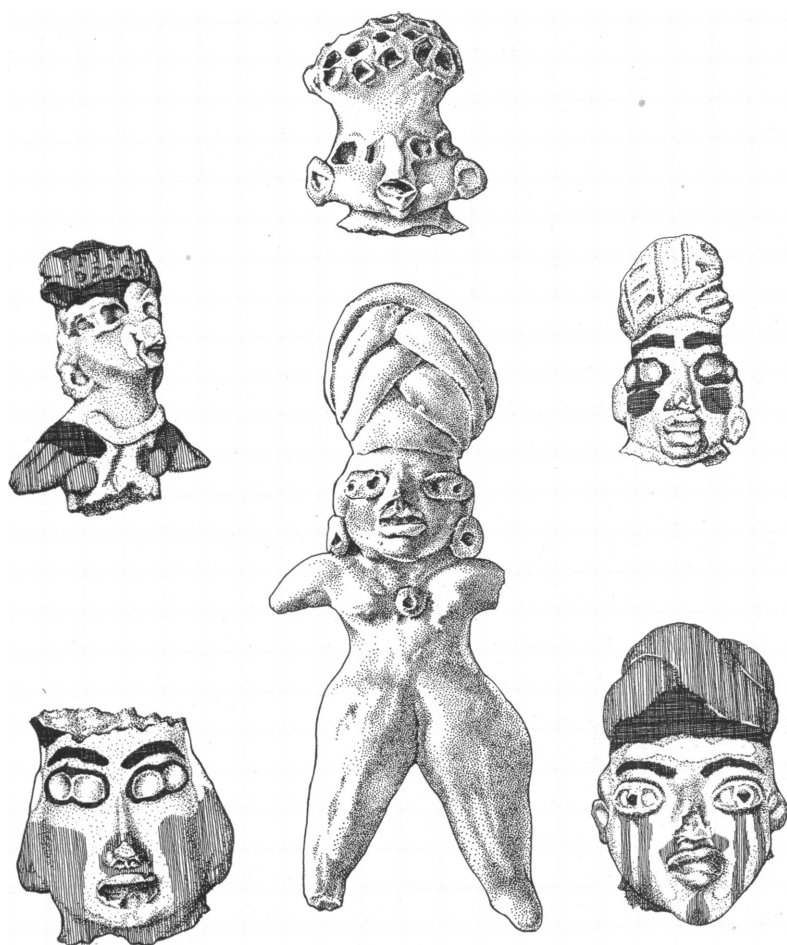


Fig. 17. Early El Arbolillo I Figurines.

1. Type C3b, Trench D, Cut IX, [Zacatenco] (30.0-6949)
2. Type C3b, Trench G, Cut III, pit (30.0-9162)
3. Type C3a, Trench B, Cut IV (30.0-8712)
4. Type C3a, Trench B, Cut V (30.1-8730)
5. Type C3a, Trench G, Cut VI (30.0-9218)
6. Type C3a, Trench G, Cut VI (30.0-9219)

Type C3a (Fig. 11, No. 3; Fig. 14, Nos. 1-3; Fig. 17, Nos. 3-6) was formed to include figurines with chunky ill-formed bodies made from a clay burning brick-red, in distinction to the fawn color of Type C1a. The features were filleted, except for the nose which was modeled, and the turbans were made of thick bands of clay. Painting after firing is very characteristic both as pure adornment and to emphasize anatomical details, like eyebrows, eyeballs, or lips. Black, white, and red pigments are used.

Chronologically, this style has considerable significance, since two specimens come from Trench G, Cut VI, two from the bottom of Trench I, and three from the bottom of Trench B. The remaining four specimens were excavated from the upper cuts of Trenches B and G. Perhaps these examples persisted from earlier times, but more probably they mingled with the later *débris*, as a result of grave digging. The only specimen of C3a ever recovered at Zacatenco (30.0-6987) came from the deepest cut there, and no examples are illustrated in the literature. A single specimen was found at Valle de Bravo in the State of Mexico. This rarity may indicate age. The figurine illustrated on Fig. 11, No. 6, which we suggested as perhaps a prototype of C5, (p. 200) may well be a variant of C3a, especially in view of its position in Trench I, Cut III.

Type C3b (Fig. 14, Nos. 4-6; Fig. 17, Nos. 1-2) comprises the original C3 group as first defined¹. It is characterized by the grossly careless method of constructing the features and the somewhat square proportions for the head. The style of headdress is usually simpler than the elaborate turbans adorning the pear-shaped heads of Types C1a and C2. The formation of the features and body follows the same technical methods employed in those groups. The fawn-colored body paste also connects this class with Types C1-2 and C1a. This style is much commoner at Zacatenco than at El Arbolillo, and examples have been recovered from various other points in the Valley. Of the four specimens found at El Arbolillo, two occur in the earlier cuts and the other two in the Late El Arbolillo I *débris* of Trench G, perhaps because of the graves dug from that level into earlier deposits. It would seem on technological grounds that Type C3b would be the logical predecessor of the C1-2 and C2 developments (Fig. 16).

References:

Boas, 1911-1912, Pl. 44, No. 3.

Vaillant, 1930a, 99, Top Row No. 5; 102, Top Row No. 2; 105, Middle Row Nos. 2, 3, 6.

¹Vaillant, 1930a, 35, 104, 105.

VARIOUS EL ARBOLILLO I TYPES

Odd Styles, Types Early F and D1. Two types, early F and D, cannot be fitted to a particular phase of El Arbolillo I. Only two early F specimens (Fig. 11, No. 1) were found, one at the bottom of Trench I and the other mixed in the débris of Trench B, South Extension. The specimens encountered at Zacatenco¹ were found in débris of the Early period there, which is equatable with Late and Intermediate El Arbolillo I. Therefore, some such dating would seem just. On technological grounds it is possible to see how the crude and distorted early F style could have been influenced by the C types and, by way of the transitional style, F-C, transformed into Type F. However, it is just as possible that these minor styles represent various experiments resulting in the same end, the creation of Types B and F.

References:

Boas, 1911-1912.

Vaillant, 1930a, 128-129, Top Row Nos. 1-3; 1931, 368-369, Top Row No. 1.

Lavachery, 1932, Figs. 6-7.

Type D1² is one of the best known types from Early horizons in the Valley of Mexico, owing to its peculiar charm from the point of view of European aesthetic. It is distinguished by the careful delineation of the features, whereby the modeling technique of applying separate fillets of clay to form the features is supplemented by carving to bring out anatomical details. The body follows closely the canons of proportion of the C group, but frequently there occurs a distinctive and peculiar swelling of the thighs.

It was found associated with the Early period at Zacatenco and, although occurring with less frequency than the standard subdivisions of the C groups, it was thought to be a reliable period diagnostic, even if perhaps of foreign origin, as its wide distribution indicated. However, after the excavations at Gualupita³, the D group was found to be one of the major Morelos figurine styles and, so, its presence in the Valley was most probably due to trade or imitation.

In contrast to the examples at Zacatenco, only one head and three body fragments were found at El Arbolillo, all in Trench G, Cut III, just below the Middle Zacatenco-El Arbolillo II layer. Checking this position with the Zacatenco specimens, a similar situation was found in Cut VII of Trench D, at the top of the main Early period deposit, and in the lowest layers of Trenches E and E North Extension, which yielded

¹Vaillant, 1930a, 128-129.

²Vaillant, 1930a, 114-119.

³Vaillant and Vaillant, 1934, 27-33.

principally Middle Zacatenco material. Type D1 is seemingly a product of upper Early Zacatenco times, which would correspond to Late El Arbolillo I.

Why a preference for Type D1 should have been shown at Zacatenco and no such thing at El Arbolillo, is one of those inexplicable problems which so constantly beset the archaeologist.

Much illustrative material may be found in the literature.

References:

- Boas, 1911-1912, Pl. 43, Nos. 19, 21, 23; Pl. 44, No. 18; Pl. 45, No. 9; Pl. 53, Nos. 7, 27.
 Plancarte, 1911, 8, Second Row Nos. 1-2; 9, Bottom Row.
 Seler, 1915, Figs. 40-43, Pl. 21, No. 1, Second Row Nos. 3-4; Pl. 21, No. 2, First Row No. 2, Third Row No. 6.
 Hay, 1923, 261.
 Tozzer, 1927, to face 212.
 Spinden, 1928, Fig. 13, Nos. 4-5.
 Vaillant, 1930a, 34-35, 61, 73-74, 114-119, 144-145, Top Row No. 4, Bottom Row Nos. 1-2; 153, Top Row Nos. 8-9, 212.
 Lavachery, 1932, Figs. 1-3; 1933, 64-67.
 Vaillant and Vaillant, 1934, 27-33, 58, 117-119.

A number of clay figures occurred that are not classifiable according to standard typology of the figurines. These are chiefly representations of animals, like dogs, and to judge from the varied technique of presentation seem not to have been governed by any rigid custom. Their occurrence is chiefly in the upper layers of the site, in El Arbolillo II and late El Arbolillo refuse. At Zacatenco, the majority of such specimens came from the Middle Period deposits. Although much less numerous than human figurines, they are illustrated in the more exhaustive publications on the Early Cultures. Effigy whistles, usually in the form of birds, will be considered under Clay Implements.

A number of strange little figures were found that seem to have been representations of babies, since they appear to have been broken off something and on a few of the figurines there are vestiges of just such objects (Fig. 15, No. 10). Like the animals, such specimens are rare, but a few have been published.

References:

- Boas, 1911-1912, Pl. 56, No. 19.
 Vaillant, 1930a, animals, 110, Bottom Row Nos. 1-3, baby (?), 153, Top Row No. 1.

TABLE 16

DISTRIBUTION OF FIGURINES AT VARIOUS SITES AND PERIODS

Figure Types	Early Zacatenco ¹	Early Arbolillo I ²	Intermediate Arbolillo I ³	Late Arbolillo I ⁴	Transitional Zacatenco ⁵	Transitional Arbolillo ⁶	Middle Zacatenco ⁷	Arbolillo II ⁸	Copilco ⁹	Late Zacatenco ¹⁰	Early Ticoman ¹¹	Intermediate Ticoman ¹²	Late Ticoman ¹³	Cuicuilco ¹⁴	Tlapacoya-Coatepec ¹⁵	Tetelpan ¹⁶	Azacapotzalco ¹⁷	San Juanico ¹⁸	Gualupita I ¹⁹	Gualupita II ²⁰	Morelos ²¹	Puebla ²²
A	×	×	×	×	×	×	×	..	×	..
B	×	×	×	×	×	×	×	×	..	×	..
B-C	×	×	×	×	×	×	×	..	×	..
B-F	×	×	×	×	×	×	×	..	×	..
C1a	×	×	×	×	×	×	×	×
C1b	×	×	×	×	×	×	×	×
C1-2	×	..	×	×	×	×	×	×	×
C2	×	×	×	×	×	×	×	×	×
C3a	..	×	×	×	×	×	×	×
C3b	×	×	×	×	×	×	×	×	×	×
C3c	×	×	×	×	×	×	×
C3d	×	×	×	×	×	×	×
C4	×	×	×	×	×	×	×	×
C5	×	×	×	×	×	×	×	×
C6	×	×	×	×	×	×
C7	×	×	×	×	×	×
C8	×	×	×	×	×	×
C8	×	×	×	×	×	×
C9	×	×	×	×	×	×
D1	×	×	×	×	×	×	×	×
D2	×	×	×	×	×	×	×
D3	×	×	×	×	×	×	×
E1	×	×	×	×	×	×	×	×
E2	×	×	×	×	×	×	×	×
E3	×	×	×	×	×	×	×	×
E4	×	×	×	×	×	×	×	×
Early F	×	×	×	×	×	×	×	×	×
F	×	..	×	×	×	×	×	×	×	×
G1	×	..	×	×	..	×	..	×	×	×	×	×	×	×
G2	×	..	×	×	..	×	..	×	×	×	×	×	×	×
H1	×	×	..	×	×	×	×	×	×	×	×	×
H2	×	×	..	×	×	×	×	×	×	×	×	×
H3	×	×	..	×	×	×	×	×	×	×	×	×
H4a	×	×	..	×	×	×	×	×	×	×	×	×
H4b	×	×	..	×	×	×	×	×	×	×	×	×
H4c	×	×	..	×	×	×	×	×	×	×	×	×
H4d	×	×	..	×	×	×	×	×	×	×	×	×
H5	×	×	..	×	×	×	×	×	×	×	×	×
I1	×	×	..	×	×	×	×	×	×	×	×	×
I2	×	×	..	×	×	×	×	×	×	×	×	×
I3	×	×	×	×	×	×	×	×	×	×	×	×
J	×	×	..	×	×	×	×	×	×	×	×	×
K1	×	×	..	×	×	×	×	×	×	×	×	×
K2	×	×	..	×	×	×	×	×	×	×	×	×
L	×	×	..	×	×	×	×	×	×	×	×	×
M	×	×	..	×	×	×	×	×	×	×	×	×
N	×	×	..	×	×	×	×	×	×	×	×	×
O	×	×	..	×	×	×	×	×	×	×	×	×

¹Vaillant, 1930a, 34-36, 72-73; Boas, 1911-1912, Pls. 43-46 (general Zacatenco).²This paper, 212-214; Boas, 1911-1912, Pls. 51-53 (general El Arbolillo).³This paper, 208-212.⁴This paper, 203-208, 215-216.⁵Vaillant, 1930a, 45-46, 75.⁶This paper, 201-203.⁷Vaillant, 1930a, 44-47, 74-75.⁸This paper, 195-200.⁹Beyer, 1917; Mena, 1918; Gamio, 1920; Hyde and Mena, 1922; Diaz Lozano, 1925a, b; Kroeber, 1925; Vaillant 1930a, 15, 53, 124, 307.¹⁰Vaillant, 1930a, 59-63, 76-77.¹¹Vaillant, 1931, 253-255, 330; Boas, 1911-1912, Pls. 54, 56 (general Ticoman).¹²Vaillant, 1931, 255-261, 264-266, 330-331.¹³Vaillant, 1931, 261-264, 331-332.¹⁴Cummings, 1923a, b, c; 1926; 1933; Vaillant, 1930a, 53, 66, 67, 71, 112, 132, 136, 140; 1931, 263, 265, 331, 338, 348, 360, 363, 367; Vaillant and Vaillant, 1934, 36, 40, 119-120, 125.¹⁵Vaillant, 1930a, 99, 103, 104, 107, 111, 112, 115, 116, 119, 120, 123, 124, 131, 132, 135, 136, 139, 140, 152, 156.¹⁶Vaillant, 1930a, 99, 104, 108, 111, 112, 116, 120, 123, 124, 131, 132, 135, 136, 139, 140, 152, 156.¹⁷Seler, 1915, 445-455, Pls. 20-21; Gamio, 1909, 1913; Vaillant, 1930, 99, 108, 111, 112, 115, 119, 120, 128, 132, 135, 136, 139, 140; arrangement of types by C. L. Hay, in the Peabody Museum of Harvard University.¹⁸Vaillant, 1930a, 99, 103, 108, 111, 120, 124, 128, 139, 156.¹⁹Vaillant and Vaillant, 1934, 27-37.²⁰Vaillant and Vaillant, 1934, 38-57.²¹Plancarte, 1911, 5-12; Vaillant, 1930a, 116, 119, 136; Vaillant and Vaillant, 1934, 24-27, 58-62, 117-120, 124-127; Seler, 1915, 446, Figs. 40-43.²²Seler, 1915, 446, Pl. 22; Vaillant, 1930a, 28, 54, 99, 107, 111, 112, 116, 120, 132, 140, 144, 152; 1931, 363; Plancarte, 1911, 7, 28, 40-41, 119-120; Vaillant and Vaillant, 1934, 24-62.

CONCLUSIONS

This detailed scrutiny of El Arbolillo figurines shows the changes and shifts that may take place within a single culture trait, without affecting the culture complex as a whole. The deep deposits at El Arbolillo magnify, as it were, the Early Zacatenco period, so that it is possible to discern the evolutionary stages of the plastic within that epoch. The major groups of Early Zacatenco figurines remain unchanged, but to express the early and late forms of those types, subdivision is necessary. Associable with the earliest phase of El Arbolillo I, we find Types C3a and b (Fig. 17) and Type C1-2 (Fig. 16). In the intermediate phase Types C1-2 and C2 (Fig. 16) predominate; but at the close of the period those forms are transformed into Type C1a and b (Figs. 13, 15) and the C3 group is transformed into the styles C3c and d (Figs. 13, 14).

Types C1a and b and C3c and d become simplified in the Transitional (El Arbolillo I-II) period into Types B-C and F-C (Fig. 12) and in the El Arbolillo II-Middle Zacatenco period, the evolution culminates in Types B and F (Fig. 10). At this time Type A (Fig. 10) is made which, as yet, has shown no transitional links with the C group as it exists in the Valley. The distribution of Type D seems to render it unsuitable for a Type A prototype, as suggested by Lavachery¹, since in Morelos and Puebla, where Type D has its maximal development, Type A is rare in the extreme². Nonetheless, the hypothesis previously advanced by the writer that the Middle Zacatenco culture stage is the fruit of an ethnic fusion becomes less tenable, in view of the definite evolution of Types B and F from the Early Zacatenco-El Arbolillo I C group. On the other hand, Type A, since it does not seem to have evolved in the Valley must have been absorbed from elsewhere.

The combination of the great diversity in the figurine types with the thick depositions at El Arbolillo certainly indicates the lapse of considerable time. Diversity in itself is not so significant, since in Intermediate Ticoman, which gives every semblance of a short period, there was an extraordinarily varied typology including Types E4, G1-2, I1-2, L, M, and perhaps J³.

The recurrence of types, even minute sub-types, at various sites seems to indicate that this stylistic diversity does not arise from individu-

¹Lavachery, 1932, 102-103; 1933, 64-67.

²Vaillant and Vaillant, 1934, 27-33.

³Lest the personal equation be thought to operate unduly in this connection, compare this section on figurines with those in Vaillant, 1931 (Ticoman), Vaillant, 1930a (Zacatenco), and Vaillant and Vaillant, 1934 (Gualupita), and the correlation Table 10 (p. 194) of this paper.

alism in the technique. On the other hand, local styles appear in bewildering numbers. The preceding table lists the types as now defined, chronologically and regionally, but the list is obviously incomplete.¹ Some areas, like the State of Puebla, are represented by a scant number of specimens, and others, like the Azcapotzalco district, by a large quantity, without chronological segregation. Yet the restriction of certain types to specific regions and time periods is very evident.

The general use of the figurine is a widespread characteristic of the peoples of the Valley of Mexico. In the early cultures like the Zacatenco-Copilco and the Ticoman-Cuicuilco, these little objects stand out, since they appear to receive a major emphasis as a cultural expression. The development of the civilizations with formalized theologies, ceremonial architecture, stone sculpture, and the like, caused the figurine trait to dwindle in relative importance, to which the use of the mould, by allowing mass production, also contributed. Yet even then the figurine retains its value as a chronological and ethnographical determinant.

The two aspects of figurine study should not be confused. In these papers we have taken advantage of variation in techniques to define diverse expressions of time and tribe. The study of the figurine cult as a culture trait would cover a vastly wider ground, and could not be confined to the chronological and geographical restrictions imposed by this research on the early cultures of the Valley of Mexico.

POTTERY

Data on the pottery of El Arbolillo are obtained from two sources, the sherds in the refuse and the vessels buried with the dead. The fragments could be reduced to frequency tables and compared with the Zacatenco sequences, but before the El Arbolillo excavations, mortuary vessels had not been recovered in sufficient quantity to present a comparative corpus.

The comparison of El Arbolillo and Zacatenco sherd frequencies could not be made, stratum for stratum, because the El Arbolillo refuse did not represent a completely consecutive dumping in a single trench, as did Trench D at Zacatenco (Fig. 6, No. I). First, it was necessary to reduce the cuts of the El Arbolillo trenches to their proper chronological order, but, when such an arrangement was made, an important difference in the material from the two sites was discernible. At Zacatenco, long trenches were run through relatively undisturbed strata. At El

¹The constantly growing collection of Mr. Robert Weitlaner of Tacubaya, D. F., is the ideal source for such a list. Unfortunately, it was impracticable to include his most recent data in Table 16.

Arbolillo, on the other hand, most of the fragments were recovered from large pits which were sunk vertically into the débris mound and yielded smaller quantities of sherds. Moreover, these pits produced anywhere from two to nine burials. Therefore, besides the normal factors of redeposition and erosion affecting the refuse, and consequently, the sherd percentages, there were three additional forces operating against a proper ceramic reflection of the time. First, the presence of anywhere from two to nine burials in the principal trenches tended to mix up the chronological order of strata. Second, the restricted size of cuts, which produced relatively small quantities of sherds, would make it possible for the fragments from a single shattered vessel to distort the normal range of type frequencies, a condition which is less likely to occur in a long cut like Trench D at Zacatenco. Third, in deep trenches like those at El Arbolillo, there is always the possibility of fragments dropping from higher cuts in the trench. In Trench G, El Arbolillo II specimens like C5 figurine fragments and a red-on-white sherd, all badly battered, were found among the well-preserved early El Arbolillo I sherds and figurines from the bottom cuts of the trench.

Yet, all in all, the remarkable correspondence in the ceramic tables of El Arbolillo and Zacatenco proves the utility of this method, even under such different conditions of application as at these two sites.

Early and Middle Zacatenco wares are described and illustrated in Vaillant, 1930a, and a summary is given in Vaillant, 1931, 211-215. Since the pottery of El Arbolillo I and II corresponds to that of Early and Middle Zacatenco, the following comment has been reduced to the description of variations from the Zacatenco norms and the vessels recovered from the graves.

BAY WARE

Bay ware, the commonest kind of pottery at El Arbolillo and Zacatenco, ranges from 78 to 96 per cent of the totals from the various cuts and is made of heavy coarsely kneaded clay, with a sandy temper which includes many crystalline particles. It is slipped with a wash made from a finer treatment of the same clay. The usual color from which the ware derives its name is best expressed by that reddish-brown shade of horses called "bay." The most common forms are ollas (large jars for the storage of food or water), cajetes¹ (big bowls with wide mouths), and bowls for the service of food.

Ollas are of slight value in chronological determination, but at Zacatenco an attempt to classify the vessels on the basis of their neck

¹The term "cajete" is used according to its meaning in the Southwestern United States.

form resulted in two divisions: "vague" necks and "simple" necks. "Vague" necks showed a gradual constriction from the shoulders of the olla to the lip¹. "Simple" necks made a more abrupt curve at the neck, which was shorter than in the preceding class². Although necks of both classes were found in Early and Middle Zacatenco, "vague" necks were more common to the Early period and "simple" necks to the Middle³. At El Arbolillo we observed the same tendency (Table 17), but we were not able to distinguish a working difference between Early and Late El Arbolillo I. A third form of olla neck, absent from Zaca-

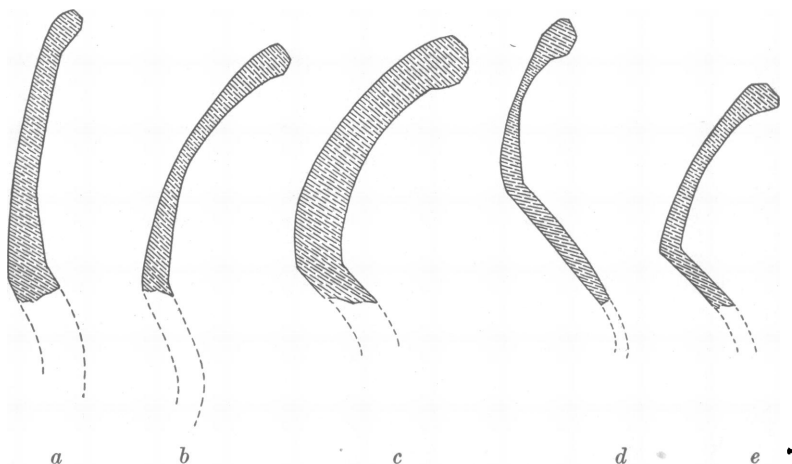


Fig. 18. "Funnel" Necks, El Arbolillo I.

- a. "Funnel" neck, bay ware olla, H. 7.6 cm., Trench G, Cut V (30.1-142)
- b. "Funnel" neck, bay ware olla, H. 11.5 cm., Trench B, Cut VI (30.1-355)
- c. "Funnel" neck, bay ware olla, H. 7.4 cm., Trench G, Cut VI (30.1-156)
- d. "Funnel" neck, bay ware olla, H. 13.6 cm., Trench G, Cut VI (30.1-157)
- e. "Funnel" neck, bay ware olla, H. 12.2 cm., Trench B, Cut VI (30.1-356)

tenco, was also noted at El Arbolillo. This was the "funnel" neck, which, composed as a separate element, rose abruptly from the body (Fig. 18). In the lowest cuts of Trenches G and B, the neck was quite long, but tended to shrink in size through Late El Arbolillo I and El Arbolillo II. As a pure form, without taking into consideration the size factor, it was slightly more common in El Arbolillo I than El Arbolillo II (Table 17).

A dun-colored type of olla occurs in Early and Late El Arbolillo I (Table 17). It is not associated, however, with one particular neck

¹Vaillant, 1930a, 81, t-d'.

²Vaillant, 1930a, 86, l, k-p, v-w.

³Vaillant, 1930a, Table II.

TABLE 17																							
PERCENTAGES OF FREQUENCIES OF POTTERY TYPES																							
Trench and Cut	D1	D2a	D2b	D3a	D3b	D4	B1	G1	B2	B3	G2	G3	G3 pit	I1	I2	B4	B5	B6	I3	G4	G5	G6	G7
Total Sherds from Cut	809	742	1093	262	396	448	1048	699	290	193	740	544	144	252	694	320	803	166	823	274	220	230	61
Total of rim and decorated sherds on which percentages are based	241	229	409	96	165	262	436	373	124	74	383	224	40	143	344	112	251	56	348	75	63	64	28
STORAGE WARES																							
Bay ware ollas																							
Simple neck	2.1	7.9	.7	....	9.7	8.0	5.7	5.1	11.3	4.1	3.1	.4	2.5	....	....	....	1.6	....	....	4.0	....	....	....
Vague neck	9.1	14.0	12.0	10.4	18.2	16.4	9.2	9.1	8.1	17.6	12.0	19.6	22.5	18.2	13.7	20.5	14.7	42.6	15.2	20.0	20.6	21.9	14.3
Funnel neck	14.5	15.7	16.9	32.3	21.2	14.9	13.1	18.8	6.5	13.5	20.9	25.0	35.0	20.3	18.6	17.9	19.5	31.5	11.8	25.3	15.8	20.3	17.9
Handles	....	....	....	....	....	.8	1.1	....	....	....	.5	.9	....	.7	.3	....	....	1.9	....	1.3	1.6	....	....
Bay ware cajetes	13.3	4.8	4.9	4.1	4.8	1.9	7.1	10.7	5.6	....	19.8	6.3	....	2.8	4.9	3.6	2.0	....	4.0	3.2	4.7	10.7	7.1
Thick lip	4.1	7.0	1.5	....	1.8	4.6	7.1	5.4	4.0	16.2	4.4	5.4	....	9.1	7.8	6.2	2.4	....	6.9	13.3	9.5	4.7	10.2
Flare lip	11.2	6.1	9.8	7.3	8.5	6.8	6.4	7.2	3.2	6.8	8.1	5.8	25.0	9.1	9.0	9.8	13.1	9.3	12.4	8.0	19.0	15.6	7.1
Flat lip	3.7	3.9	2.0	5.2	1.8	3.1	4.6	3.8	4.0	2.7	.8	1.8	....	3.5	3.2	.9	2.0	....	3.4	....	....	6.3	3.6
Reinforced lip	1.2	6.1	1.7	3.1	7.9	3.1	3.2	2.4	4.8	2.7	2.8	4.5	2.5	4.9	4.7	4.5	15.5	5.6	4.9	2.7	3.2	....	10.7
Dun ollas	....	....	....	....	....	....	....	....	....	4.0	1.3	....	....	1.4	3.5	1.8	....	....	4.3	....	9.5	....	....
SERVICE WARES																							
Bay ware bowls																							
Simple silhouette	2.1	4.4	5.4	4.2	1.8	.8	3.7	.3	1.6	5.4	.5	2.7	....	1.4	.6	3.6	4.0 ¹	1.9	2.6	4.0	....	4.7	3.6
Incurved rim	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.8	....	....	5.3	....	....	....
Incised rim	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Filleted decorations	....	.4	....	....	....	....	.2	....	....	....	.3	1.3	....	.7	....	1.8	....	....	....	....	....	....	....
Dun ware bowls	....	....	2.4	....	....	....	.9	....	....	....	....	....	....	....	.8	1.8	.8	....	....	....	....	....	....
Russet ware																							
Bottles A	3.7	....	3.2	4.2	3.0	6.5	3.7	5.6	6.5	9.5	3.4	7.6	....	4.2	2.6	8.0	....	....	2.9	4.0	....	....	7.1
Bottles B	1.2	1.3	.7	....	.6	.4	1.1	1.3	.8	....	....	.4	....	.7	.3	....	....	....	.9	....	....	....	7.1
Bowls	2.5	4.8	1.7	1.0	2.4	1.5	1.6	.8	....	2.7	2.9	.4	....	2.1	3.2	.9	3.6	....	2.6	....	....	....	....
White-on-red ware bowls	....	2.6	.2	....	....	3.4	5.0	1.1	....	4.1	5.0	4.0	....	....	....	.9	.4	....	.3	2.7	....	1.6	....
Black wares																							
Thin black bowls	8.7	10.9	4.9	5.2	....	4.6	4.4	5.6	14.5	8.1	3.4	....	....	2.8	1.2	....	....	....	.6	....	....	....	....
Thick black bowls	....	2.6	12.2	13.5	5.5	5.0	8.0	6.7	8.9	1.4	5.7	7.6	10.0	9.1	9.3	9.8	8.8	5.6	10.6	5.3	17.5	14.1	....
Incised thick black bowls	6.6	....	.2	....	2.4	3.4	....	....	....	....	.5	2.2	2.5	....	7.8	3.6	1.6	....	3.7	....	....	1.6	....
Bottles	....	....	....	....	....	....	3.0	2.4	....	....	4.1	....	....	....	.8	....	....	....	....	....	....	....	3.6
White wares																							
White bowls	1.2	3.1	.7	....	1.2	1.5	.9	1.1	.8	....	.8	1.3	....	....	.8	1.8	6.8	1.9	6.3	....	....	1.6	....
Red-on-white bowls	1.2	3.1	2.2	5.2	3.6	2.3	5.7	1.3	....	....	.3	2.7	....	....	2.9	.9	.8	1.9	1.7	....	....	....	3.6
Granular white ware	....	....	....	....	.6	.8	.2	....	.8	....	....	....	....	....	.9	....	.4	....	.3	....	....	....	....
Blue white bowls	....	1.3	.2	....	....	.4	.2	....	1.6	....	....	....	....	....	....	....	....	.9	....	....	....	....	....
Yellow white (A) bowls	.8	....	2.0	....	....	1.9	.2	.5	6.5	....	....	....	....	....	.6	.9	....	1.9	1.4	....	....	....	....
Hard yellow bottles	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3.1	....
Early red-on-yellow bowls	2.1	....	2.2	4.2	.6	1.5	1.6	1.1	2.4	....	....	....	....	2.8	2.6	....	....	....	.3	....	....	....	....
Red-on-brown ware	....	....	....	....	1.8	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Orange lacquer	....	....	....	....	....	....	.2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Fine orange	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Teotihuacan	10.4	....	12.2	....	2.4	6.5	1.8	9.9	8.0	1.4	....	....	....	6.3	....	.9	1.2	....	....	....	....	....	....

¹Straight wall.

form and may have arisen from factors pertaining to the firing of the vessel.

Handles are of sporadic occurrence throughout all periods (Table 17). Usually they are attached to the neck and have their upper portion marked like a hand¹. They are very rarely attached to the body, or made in double form (Fig. 22, No. 6).

The dynamic condition of the olla neck evolution precludes fixed period typology. Yet, in El Arbolillo II, there is evident a gradual tendency to reduce the elongated necks of El Arbolillo I to short curved forms.

Cajetes or large size bowls are as characteristic of El Arbolillo I and II, as they are of Early and Middle Zacatenco. A division on the basis of rim forms is not particularly significant chronologically. Reinforced rims, defined by a restricted mouth, encircled by an added band of clay, occur in all periods² (Table 17). Thickened rims may be slightly more common in the bottom cuts of Trench G, than at any other point³ (Table 17). Flare rim cajetes, tend to mass more heavily in El Arbolillo I, but this numerical preponderance has no true diagnostic utility⁴ (Table 17). Flat rim cajetes, which at Zacatenco showed a tendency to increase at the close of the Middle Period, are more consistent in their appearance during El Arbolillo II⁵ (Table 17).

The slow changes that affect a people in the course of time are even less reflected by the cajetes found at El Arbolillo than the ollas. These forms were made too constantly and for too humble a purpose to receive that individual decorative touch which, by creating styles, lightens the task of the archaeologist.

Bay ware bowls have the same lack of chronological definition found in the ollas and cajetes. A less rugged composition than that used for the heavier vessels was used for these globular, hemispherical, or amygdaloid bowls. A sporadic occurrence of dun ware probably marks misfortunes in the firing of either bay or black ware vessels. The silhouette varies with the shape; a simple silhouette for the hemispherical bowls and a pronounced inward curve for the globular or amygdaloid receptacles, the mouths of which are necessarily reduced⁶. Whereas the globular form at El Arbolillo appears confined to El Arbolillo I, this same shape, with the addition of filleted ornament, appears in late Arbolillo I and El Arbolillo II (Fig. 22, No. 4; Table 17)⁷.

¹Vaillant, 1930a, 81 e.

²Vaillant, 1930a, Table II, 81 n, 85 z.

³Vaillant, 1930a, Table II, 81 p-q, 85 b'.

⁴Vaillant, 1930a, Table II, 81 k-m, s; 83 a'.

⁵Vaillant, 1930a, Table II, 81 r, 85 x-y, a'.

⁶Vaillant, 1930a, 81 o.

⁷Vaillant, 1930a, Table II, 81 a.

Bay ware seems to have been sparingly used as mortuary furniture. A cajete fragment was buried with an El Arbolillo II interment (Skeleton 111) and another was found in the late El Arbolillo I period (Burial 141). An amygdaloid bowl with fillets was part of the equipment of Skeleton 130 of the same period (Fig. 22, No. 4). A small olla or bottle was buried with the Early El Arbolillo I baby (No. 154).

In view of the intermediate position of bay ware bowls, which make a transition to the pastes composing black ware and russet, little can be hoped for their chronological utility. However, the use of filleting seems to have its greatest development in Late El Arbolillo I and El Arbolillo II.

RUSSET WARE

Russet ware is a compact coarse clay made usually into bottles (ollas with reduced necks and mouths) and bowls. A hard slip made of a finer variety of the base clay is applied, highly burnished, resulting in a very characteristic red shade with brown tones, resembling the color of a russet apple. This group has been designated as russet ware A¹.

Russet ware B is similar, but possesses the additional feature of white paint applied either as a solid mass about the neck or to give the effect of alternating fields of white and red. Sometimes the white paint is used as a secondary slip. The El Arbolillo digging shows russet wares A and B to occur more commonly in late El Arbolillo I and El Arbolillo II, than in the preceding period, but the Zacatenco excavations show a much less clear demarcation of occurrence² (Table 17).

Bowls of this ware are quite common and have a similar distribution (Table 17)³. At Zacatenco the bowls have so deep a red, that they were classified as polished red, early style, but further research at El Arbolillo shows them to be variations of russet.

Abundant examples of russet ware accompanied the burials, in contrast to the rare occurrence of bay ware. Russet ware was in intimate daily use, and not confined to storage vessels, so that it would thus be more suitable to place with the dead than bay ware vessels. Possibly the element of size might have had some influence in dictating the choice of vessels. Bottles of russet ware A were found in a cache in Trench E, Cut IV (Fig. 19, No. 12) and with such late El Arbolillo I burials as Skeletons 117, 118-119, 131, 144 (Fig. 22, Nos. 12, 14). Another with handles was also part of the furniture of Skeleton 117 (Fig. 22, No. 6).

¹Vaillant, 1930a, 85 h, j, w.

²Vaillant, 1930a, Table II.

³Vaillant, 1930a, Table II, 86 n.

A variation of russet ware, which was adorned with a red band set with three panels made by two superimposed arcs also in red, was found with Skeleton 139 (Fig. 21, No. 6). Russet ware B bottles accompanied the El Arbolillo II burials, Skeletons 129 and 136 (Fig. 21, No. 5; Fig. 22, No. 11). In both of these the white paint was used as a secondary slip and one bottle had additional decorations in black. A vessel similar to this was bought at San Juanico.

An ovate bowl with pinched-in sides was part of the equipment of the late El Arbolillo I burial, No. 153 (Fig. 21, No. 4). Skeleton 131 of the same period produced a simple silhouette bowl in the same style. A bowl with white paint along the lip in the russet ware B style was found with the late El Arbolillo I burial, No. 152 (Fig. 21, No. 3), and a bowl completely slipped in white with red paint accompanying Skeleton 113 of El Arbolillo II date may be a variant of this style (Fig. 22, No. 7).

Thus, the chronological associations of mortuary furniture tally very closely with the sherd frequencies of russet ware in giving a major occurrence in late El Arbolillo I and El Arbolillo II. The illustrated specimens show the variability within a group, in a way that the classification for frequencies never can.

BLACK WARE

Black ware is a refinement of the base ware, bay, in which a black shade is achieved by baking the vessels in a smoky fire. At times the color is almost jet black, while a number of vessels merge off into brown. Black ware is chiefly used for jars and bowls. Ollas occur sporadically (Table 17) and may, however, be accidental, due to an excess of carbonization from a smoky fire on a bay ware form.

This ware is best considered in two divisions, the mass of vessels found as sherds in the rubbish heaps and the specific bowls accompanying burials. In all periods, a considerable quantity of heavy black bowls was made, following the general shape of bay ware cajetes, but of smaller size (Table 17)¹. Incised bowls are found with fair consistency, the steadiest distribution falling in late El Arbolillo I, the greater quantities in El Arbolillo II (Table 17)². Both grooved and incised vessels are grouped in this class³. Almost impossible to express in a statistical summary is the gradual change from the deeply incised individual designs of El Arbolillo I to the continuous pattern, etched after firing, in El Arbolillo II. Occasionally, this etching technique is used for individual designs in El Arbolillo I.

¹Vaillant, 1930a, Table II, 81 f-j.

²Vaillant, 1930a, Table II.

³Vaillant, 1930a, 80, b-d.



Fig. 19. Burial Bowls, chiefly Black Ware.

The course of this evolution becomes more apparent in thin black ware, where the composition of the clay shows refinement in the thinness of the vessel walls. The sloping walls of thick black ware are straightened to a more nearly vertical position. A lustrous burnish is applied and etched patterns create further embellishment.¹ Occasionally ovate vessel shapes² are used, and, rarely a tripod support.³ Another form is the shallow bowl with a handle, supported on an annular base⁴. Gadrooned jars once doubtfully associated with Middle Zacatenco are now definitely to be connected with that period, after finding this form in El Arbolillo II deposits in Trench G, Cut II⁵. Furthermore, examination of the frequency tables shows thin black ware originating in late El Arbolillo I, but having its fullest development in Middle Zacatenco-El Arbolillo II (Table 17)⁶.

Individual bowls found with burials, show a variation of shape and surface that is not demonstrable in the gross sherd classification. Distinctive to El Arbolillo are the thick black ware jars which occurred with Skeletons 124, 130, 131, 141, 142, 144, 148, 153, 162 (Fig. 21, No. 7; Fig. 22, No. 15). Simple vessels of thick black ware were found with Skeleton 139 (Fig. 22, No. 5). One of the most interesting types comprises tripod bowls of black ware, each with three panel designs incised probably after firing, but certainly after sun drying (Fig. 19, Nos. 1-3). Red paint is rubbed into the etched lines. The decorative technique is interesting, having been found at such different places and times as

Fig. 19. Burial Bowls, chiefly Black Ware. (On opposite page.)

1. Tripod bowl, incised and red inlaid black ware, H. 11 cm., Skeleton 107, Trench A (Field No. 169)⁴
2. Tripod bowl, incised and red inlaid black ware, H. 11.6 cm., Skeleton 151, Trench K (30.0-9633)
3. Tripod bowl, incised and red inlaid blackware, H. 6.7 cm., Trench C, general digging near Skeleton 112 (30.0-9768)
4. Bowl, incised thick black ware, general digging, G.D. 15.3 cm., Skeleton 127, Trench C (Field No. 473)⁷
5. Bowl, incised thick black ware, general digging, G.D. 23 cm., Skeleton 130, Trench C (30.0-9655)
6. Bowl, grooved black ware, H. 8.3 cm., Skeleton 141, Trench C (Field No. 1008)⁷
7. Bowl, grooved black ware, H. 9.7 cm., Skeleton 152, Trench G, Cut IV (30.0-9678)
8. Tripod bowl, grooved black ware, H. 11.1 cm., Skeleton 127, Trench C (30.0-9641)
9. Tripod bowl, incised and red inlaid black ware, H. 10.7 cm., Trench C, general digging, near Skeleton 112 (30.0-9769)
10. Vase, grooved black ware, H. 18.1 cm., Skeleton 129, Trench D, Cut I (30.0-9654)
11. Tripod jar, grooved black ware, H. 24.5 cm., Trench G, Cut II (30.1-5097)
12. Bottle, russet ware, H. 30.3 cm., in cache, Trench E, Cut IV (Field No. 630)⁷

¹Vaillant, 1930a, 86, c-d, h-l, o-p.

²loc. cit., e-g.

³loc. cit., q.

⁴loc. cit., m.

⁵Vaillant, 1930a, 85 b.

⁶Vaillant, 1930a, Table II.

⁷In the National Museum, Mexico, D. F.

Holmul III¹, Chalchihuites², Teotihuacan³, Tula⁴, Eastern Queretaro⁵, etc. Bowls of this type were found with Skeletons 107, 151, and 160, which we judged to be the earliest interments at El Arbolillo (p. 174).

The form of the legs of these vessels is closest to those on some bowls from Ozumba, State of Mexico.⁶

A variation of this type of incision was found in a restorable tripod bowl from Trench C (Fig. 19, No. 9). Another tripod bowl belonged to the late El Arbolillo I group of burials and was decorated by horizontal grooves (Fig. 19, No. 8). A magnificent vessel, beautifully burnished and elaborately grooved came from the El Arbolillo II refuse in Trench G, Cut II. This had three stubby feet (Fig. 19, No. 11).

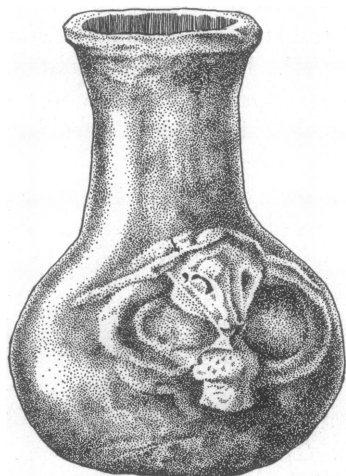


Fig. 20. Black Ware Bottle in Museo Nacional, H. 11.8 cm., Skeleton 128, Trench C (Field No. 433).

Grooving and incision among the burial bowls were not confined to tripod vessels. They followed the same associations noted for the pottery fragments found in the débris. Deeply scored incisions marked the floors of bowls found with the late El Arbolillo I burials, Skeletons 127 and 130 (Fig. 19, Nos. 4-5), in Trench C. Grooves adorned the vessel found with Skeleton 141 of Late El Arbolillo I and the jar with the El Arbolillo II, Burial 129 (Fig. 19, Nos. 6, 10). Ridges ornamented the wall of the bowl found with the Late El Arbolillo I burial, No. 152 (Fig. 19, No. 7), which was almost identical to a bowl fragment found at Zacatenco⁷.

Two rare forms, in black ware, were a bottle found with Skeleton 127 (Fig. 22, No. 13) and the effigy bottle found with the disturbed burial, No. 128 (Fig. 20). The latter represents a rodent eating some substance held in both hands, and is the only vessel of this type recovered to date from definitely Early Culture horizons. It recalls the effigy pots from the Ozumba region, another link to which was afforded by the legs

¹Merwin and Vaillant, 1932, 66, Pl. 22.

²Gamio, 1910, Pls. 6-7; Marquina, 1928, 44.

³Seler, 1915, Fig. 165.

⁴Collections of the American Museum of Natural History.

⁵Collections of the American Museum of Natural History.

⁶Collections of the American Museum of Natural History.

⁷Vaillant, 1930a, 81, Fig. b.

on the tripod bowls. Another bottle shown in Fig. 22, No. 2 was purchased and may have come from Ticoman, since it resembles closely a vessel from that site¹.

Thin black ware bowls with straight walls occurred with Skeletons 102, 129, and 155 (Fig. 22, Nos. 1, 3). The El Arbolillo II period of the burials coincided with the chronological determination suggested by the form.

To sum up: Black ware is an extremely important indicator of time at El Arbolillo. The etched patterns with red paint rubbed in seem to be associated with the early part of El Arbolillo I (Fig. 19, Nos. 1-3). These styles tend to give way to grooving and to deeply incised patterns in the latter part of the period (Fig. 19, Nos. 4-9). In El Arbolillo II the pottery is more finely made and there is a greater range of shape (Fig. 19, Nos. 10-11). Etched designs are also adopted, disposed in a continuous band instead of the panel utilized in the early El Arbolillo I period.²

WHITE WARES

White ware, although not particularly numerous, plays an important part among the service wares of El Arbolillo. It shows its maximal frequencies in El Arbolillo I, corresponding to the situation at Zacatenco (Table 17)³. At El Arbolillo white wares fall into two sub-groups, one distinguished by a heavy white slip with a bay ware variant as a base clay (Fig. 22, No. 9)⁴, the other recognizable by a thin wash covering either a shallow simple silhouette, terminating in a thickened rim (Fig. 21, No. 1; Fig. 22, No. 8) or a composite silhouette bowl (Fig. 21, No. 2). Low solid conical tripods were found in association with thick-slipped vessels with everted lips⁵. But many vessels of this lip form rested directly on the ground as did deep bowls of simple silhouette (Fig. 22, Nos. 8-9). Ollas were rare (Fig. 22, No. 10).

Incision is the common method of decoration. The thick-slipped vessels received a few simple parallel lines cut through to the base clay after sun drying. The thin-slipped variety had more complicated patterns on the bottom of the interior, usually decorative, but in one case (Fig. 21, No. 1) suggested use as a chile-grater. El Arbolillo II produced a few sherds from shallow vessels having arched handles and resting on annular supports. Similar forms were found in white ware at Copilco and in black ware at Zacatenco⁶.

¹Vaillant, 1931, 389 q.

²Gamio, 1922, Fig. 10; Vaillant, 1930a, 86, c-q.

³Vaillant, 1930a, Table II.

⁴Vaillant, 1930a, 82b, e-f, 80 f.

⁵Vaillant, 1930a, 82, e-f, 89, a-b.

⁶Vaillant, 1930b, Fig. 2 j; Vaillant, 1930a, 86 m.



Fig. 21. Burial Bowls.

1. Bowl, white ware, "grater" (?), general digging, G.D. 21.1 cm., Skeleton 131, Trench B, Cut V (30.0-9658)
2. Bowl, brown ware, white slip disintegrated (?), H. 7.5 cm., Skeleton 118-119, Trench C (30.0-9639)
3. Bowl, russet ware B, H. 5.8 cm., Skeleton 152, Trench G, Cut IV (30.0-9679)
4. Bowl, russet ware, pinched sides, H. 6.1 cm., Skeleton 153, Trench G, Cut IV (30.0-9686)
5. Bottle, russet ware, white slip with black decoration, H. 13.7 cm., Skeleton 129, Trench D, Cut I (30.0-9653)
6. Bottle, red-on-brown ware, two concentric arcs repeated thrice, variant of russet (?), H. 15.8 cm., Skeleton 139, Trench C (30.0-9660)
7. Jar, black ware, H. 15.5 cm., Skeleton 131, Trench B, Cut V (30.0-9656)

White ware was relatively well represented among the burial bowls. A thick white ware olla and bowl accompanied the baby, Skeleton 140 (Fig. 22, Nos. 9-10). Two simple silhouette bowls with the thin white slip were found, one with Skeleton 131, the other with No. 148, both of the late El Arbolillo I period (Fig. 21, No. 1; Fig. 22, No. 8). The composite silhouette type was represented by two examples with Skeletons 118-119 and another with Skeleton 160 (Fig. 21, No. 2).

Red-on-white ware, in general, consists of the application of thick red paint to the thick-slipped variety of white. The deep simple silhouette bowl and the shallower bowl with everted rim and an occasional tripod support are the main types at El Arbolillo as at Zacatenco (Table 17)¹. This style tends to concentrate in the El Arbolillo II-Middle Zacatenco period. In Early Zacatenco and Early El Arbolillo I, the red is used more as a simple band, but in Late El Arbolillo I, El Arbolillo II, and Middle Zacatenco, the paint is used either to form designs or else, richly burnished, is the background for incised patterns. In quantity, red-on-white is a fair diagnostic for Middle Zacatenco-El Arbolillo II.

Granular white ware is composed of a thin granular clay, sometimes unslipped, more often coated with a wash of dull white or yellow, and with inchoate maroon designs². Made chiefly in bottle form it appears in small quantities, usually in El Arbolillo II, a condition which corresponds to the more numerous frequencies at Zacatenco (Table 17)³.

Blue-white ware, has the hardest slip of any of the El Arbolillo-Zacatenco wares with the possible exception of yellow-white ware A. It is made into simple silhouette bowls, bowls with handles on an annular base, and the peculiar shape shown from Zacatenco⁴. Its occurrence was sporadic and tended to be confined to El Arbolillo II (Table 17)⁵.

Yellow-white ware A, involves a hard base clay and an extremely hard slip made into simple silhouette bowls with slightly restricted mouths.⁶ This ware was confined principally to the El Arbolillo II deposits even as its chief occurrence at Zacatenco was in Middle Period strata (Table 17)⁷. A fragment from a deep jar of curious shape was found in Trench B, Cut VI, and differed from the norm, not only in stratigraphical position, but also in shape. Presumably this vessel was a trade piece and some sherds in Trench G, Cut VI represent the same

¹Vaillant, 1930a, 82 a, d, 89 a-e, g-n.

²Vaillant, 1930a, 82 p, 91 e.

³Vaillant, 1930a, Table II.

⁴Vaillant, 1930a, 90g.

⁵Vaillant, 1930a, Table II.

⁶Vaillant, 1930a, 90 i-j.

⁷Vaillant, 1930a, Table II.



Fig. 22. Burial Bowls in Museo Nacional.

ware. Yellow-white ware B, a variant of the previous class, involving bowls with vertical walls made from a hard slip and a soft laminated base clay, was not found at El Arbolillo, although it was a time-bearer for Middle Zacatenco (Table 17)¹.

WHITE-ON-RED WARE

White-on-red ware is composed of a base clay made from a variant of bay ware. Forms include bowls with flaring mouths or with spherical shape and restricted mouths. The former have a red secondary slip on the inside of the wall, the latter on the exterior. The white design is painted on this red field. Bottles constitute a rare shape in this ware². The frequency charts showed a great variance between Zacatenco and El Arbolillo (Table 17)³. At Zacatenco, white-on-red ware was associated with the Early Period and disappeared toward the close of the Middle. At El Arbolillo we find a scattering occurrence through all strata, with the peak frequency appearing in the bottom cut of Trench D and the upper cuts of Trenches B and G. Three explanations offer themselves: that the ware was continued in use longer than at Zacatenco; that the time phase corresponding to Early Zacatenco has at El Arbolillo become mixed with Late El Arbolillo I, so that its rarity in Early El Arbolillo I and commonness in late El Arbolillo I is not statistically observable; that the early El Arbolillo sherd frequencies are based on quantities of sherds too small to sample all the styles accurately. The fact that the percentages at El Arbolillo adhere so closely to those at Zacatenco, makes the second explanation seem the most likely to the writer.

Fig. 22. Burial Bowls in Museo Nacional. (On opposite page.)

1. Bowl, thin black ware, H. 4.3 cm., Skeleton 129, Trench D, Cut I (Field No. 444)
2. Vase, black ware, H. 11 cm., purchase, north of site (Field No. 62)
3. Bowl, gray ware, H. 4.3 cm., Skeleton 129, Trench D, Cut I (Field No. 474)
4. Bowl, filleted brown ware, H. 7 cm., Skeleton 130, Trench C (Field No. 481)
5. Bowl, thick black ware, H. 7.5 cm., Skeleton 139, Trench C (Field No. 926)
6. Small olla with handles, russet ware, H. 6.8 cm., Skeleton 117, Trench C (Field No. 284)
7. Bowl, yellowish white-on-red, firing variant of russet ware B (?), H. 4.5 cm., Skeleton 113, Trench B, Cut II (Field No. 224)
8. Bowl, white ware, incised floor, thin slip, H. 7.5 cm., Skeleton 148, Trench G, Cut III (Field No. 1311)
9. Bowl, white ware, H. 6.5 cm., Skeleton 140, Trench C (Field No. 930)
10. Olla, white ware, H. 13.5 cm., Skeleton 140, Trench C (Field No. 929)
11. Bottle, russet ware B, H. 15 cm., Skeleton 136, Trench H (Field No. 858)
12. Bottle, russet ware, H. 10 cm., Skeleton 131, Trench B, Cut V (Field No. 545)
13. Bottle, black ware, H. 15.5 cm., Skeleton 127, Trench C (Field No. 438)
14. Bottle, russet ware, H. 13 cm., Skeleton 144, Trench G, Cut III (Field No. 1075)
15. Jar, black ware, H. 14 cm., Skeleton 130, Trench C (Field No. 447)

¹Vaillant, 1930a, Table II, 90 h, k-m.

²Vaillant, 1930a, 82 g-o.

³Vaillant, 1930a, Table II.

EARLY RED-ON-YELLOW WARE

Early red-on-yellow ware is composed of a soft yellow-dun clay, occasionally burnished to a harder surface consistency. Shapes are usually a simple silhouette with a slightly conical bottom, sometimes resting on a low ring base. Decoration is usually confined to a single band of red paint around the inside of the mouth¹. At Zacatenco and El Arbolillo this ware is confined fairly closely to the Middle Zacatenco-El Arbolillo II horizon (Table 17)². Minor morphological variations at El Arbolillo are strong tendencies to drop the ring base and polish the surface. A half bowl of this character was the only furniture with the El Arbolillo II skeleton, No. 135. Thus this type of pottery makes a sound diagnostic for the period.

Two trade wares, fine orange and orange-black lacquer, occurred in small but constant percentages in Middle period cuts at Zacatenco³. A very few sherds were found at El Arbolillo, one of black lacquer occurring in Trench B, Cut I, closely similar to that shown in Vaillant, 1930a, 90 d. Another sherd of orange lacquer came from Trench C, which was also the source of two or three fine orange sherds. Since much El Arbolillo II material was produced by Trench C, the use of these wares as a chronological diagnostic is by no means invalidated.

CONCLUSIONS

The subtle stages of development observable in the El Arbolillo figurines were not expressed by the pottery as a whole. In other words there was little further refinement of the Zacatenco classification. El Arbolillo I, like Early Zacatenco, is characterized by vague neck ollas, thick black ware, white-on-red bowls, and white ware. El Arbolillo II, like Middle Zacatenco, is readily diagnosed ceramically by simple neck ollas, thin black, red-on-white, yellow-white, and Early red-on-yellow wares. The chronological differences were expressed less by a presence and absence of wares, than by preponderating forms at various periods.

In black ware, the dominating service pottery, indications existed of a subtle developmental series that coincides with the figurine evolution. Associated with the earliest burials were tripod bowls of black ware having incised patterns filled in with red paint (Fig. 19, Nos. 1-3). More common to the Intermediate El Arbolillo I stage was the use of deeply incised designs (Fig. 19, Nos. 4-5). Toward the close of the period in Late El Arbolillo I, there was a development of channeled vessels, particularly to be seen in the bowls with burials (Fig. 19, Nos.

¹Vaillant, 1930a, 86 a-b.²Vaillant, 1930a, Table II.³Vaillant, 1930a, Table II, 43, 58, 90 a-d.

6-11). In El Arbolillo II, however, incision after firing became the principal decoration of thin black ware, which replaces the thicker vessels of earlier date (cf. Vaillant, 1930a, 86).

From the point of view of the technical handling of ceramic frequencies, the comparison between Zacatenco and El Arbolillo was quite instructive. The "funnel" type of olla neck, so common at El Arbolillo, was unknown at Zacatenco. Granular white ware, a very common Zacatenco class, was scarce and sporadic at the neighboring El Arbolillo site. Incised thick black ware, a common El Arbolillo trait, was virtually absent at Zacatenco, but the reliable Early Zacatenco diagnostic white-on-red was associable with late El Arbolillo I rather than the equivalent intermediate period. On the whole, however, the two series compared remarkably well.

Perhaps the most interesting feature of the ceramic studies at El Arbolillo was the recovery of a quantity of vessels, either complete or readily restorable. A technical problem was created, involving the difference in the ceramic picture of a culture, when based upon complete specimens instead of fragments. In this case a much smaller group of wares was represented, and black ware was predominant. Bay ware was seldom used for mortuary furniture, despite its 90 per cent occurrence in the sherd totals. Russet and white wares were fairly common, however, but a sherd of Early red-on-yellow was the only representative of this important class.

A number of interesting forms were recovered, including a very common shape, the jar (Fig. 21, No. 7; Fig. 22, No. 15) which we were unable to recognize in the sherd collections. Also significant was the effigy bottle, with Skeleton 128 (Fig. 20), which was a new shape and conception so far as our previous studies were concerned. Yet the presence of tripod bowls, on what seemed to be the earliest horizon, must have considerable importance in showing the antiquity of this characteristic Central American shape. Associated with this trait was also found the use of inlaying incised designs with red paint.

The El Arbolillo pottery, like the stone industry, showed an uninspired competence that must have taken centuries to develop. The ceramics of the Early Cultures occupy a limbo between the brilliantly variegated products of the High Civilizations and the crude clay vessels of the low cultures. The pottery of El Arbolillo might be said to have reached a technical plateau and progress was along the surface, rather than ascending to new heights of invention and technique. Under such conditions, there is no opportunity for chronological stages exactly to be defined by changes in method of manufacture or in mode of decoration.

IMPLEMENTS OF CLAY

A number of fragments of miniature vessels were recovered, some of which were made, through the addition of fillets of clay, into crude semblances of bird shapes or human faces (Table 18). These, usually russet or black ware, and similar vessels were known at Zacatenco¹. Occasionally, the handle of one of these vessels was made to represent a human arm, quite similar to the treatment of one type of Ticoman miniature vessel². Two fragments of small human effigy pots (p. 208, Fig. 14, Nos. 10, 12) had facial proportions and technical features that permitted their inclusion in the figurine group, C3. A rattle falling into this category has previously been figured³.

Musical instruments of clay comprised rattles and whistles. The rattles were made of thin shafts of clay expanded into a hollow, crudely spherical container with perforations⁴. At Zacatenco, these objects are most closely associated with the Middle Period⁵, but at El Arbolillo they are spread through all periods (Table 18). The rattles from the El Arbolillo I deposits have the hard consistency of the clay from which figurines are made. The later ones are, in the main, of a coarser heavier construction.

A broken object of the same general shape as the rattles, but with a hollow shank and burnished exterior, suggested a pipe or "cloud-blower." Lack of evidence of burning inside the object made it conceivable that we were dealing with a whistle.

Whistles are a relatively common class of object at El Arbolillo. The usual form is that in which a mouthpiece conducts the breath to an orifice in a hollow resonator (Fig. 11, No. 7). Much more rarely the sound is made by blowing directly into a hole in the resonator. One example, bought at El Arbolillo, has two mouthpieces and two resonators. Usually human or animal heads and limbs are engrafted to the whistle proper (Fig. 11, No. 3), a trait noted not only for Early and Middle Zacatenco, but also for Ticoman. Heads broken from whistles are also common in the débris.

There is abundant illustrative material:—

Vaillant, 1930a, 138, Top Row Nos. 4-7; 154, Top Row Nos. 1-5; 157, Top Row Nos. 2-4, 8-9; 158, Top Row No. 4.

Vaillant, 1931, 366, Top Row No. 1; 371, Top Row No. 2; 394, Top Row Nos. 1-3; 401, Top Row Nos. 3-4.

Boas, 1911-1912, Pl. 53, No. 17; Pl. 56, No. 18.

Vaillant and Vaillant, 1934, 99, Nos. 7-12.

¹Vaillant, 1930a, 157, Top Row Nos. 5-6; Vaillant, 1931, 382 q, Nos. 10-11.

²Vaillant, 1931, 370, Top Row No. 4.

³Vaillant, 1930a, 105, Second Row No. 5.

⁴Vaillant, 1930a, 154, Middle Row No. 1.

⁵*Op. cit.*, Table I.

TABLE 18
DISTRIBUTION OF UTENSILS OF POTTERY, STONE, BONE, AND SHELL

	Trench D, Cut IV	Trench B, Cuts I-III	Trench G, Cut I	Trench B, Cuts II-III	Trench G, Cuts II-III, 3 pit	Trench I, Cut I	Trench I, Cut II	Trench B, Cuts IV-VI	Trench I, Cut III	Trench G, Cuts IV-VII
Pottery Objects										
Animal Figures	..	..	1	..	3	4	..	..	..	..
Whistles	1	..	..	1	..	..	1	2	..	..
Discs	1	..	3	2	3	..	1	2	1	1
Earplugs	1	1	2	..	5	..	2	..	..	1
Beads	..	1	..	..	..	..	..	..	..	..
Spindle whorls	..	..	..	1	..	..	..	..	..	..
Gorget	1	..	..	..	1	..	1	1	..	..
Rattles	..	1	..	..	1	2	1	1	3	1
Ladles	1	3	3	..	2	2	1	3	..	..
Slipped balls	2	5	..	1	2	..	..	1	..	2
Unslipped balls	..	..	..	..	..	..	..	..	..	1
Unfired balls	..	1	..	..	3	..	..	..	..	..
Stone Objects										
Lava metates	Not Recorded									
Lava manos	3	4	..	1	..	..	..	1	..	..
Lava and pumice balls	2	2	1	1	6	..	..	1	..	..
Limestone balls	..	..	..	..	..	..	..	..	..	..
Trachyte balls	..	1	..	..	..	..	..	..	..	..
Hard stone tools	3	1	1	..	3	..	..	..	..	..
Quartz tools	..	..	..	..	2	..	..	1	..	..
Quartz fragments	2	7	5	5	14	9	2	2	8	7
Flint	..	..	..	..	1	2	1	..	..	..
Obsidian points, laurel leaf	2	1	..	..	1	..	..	3	1	1
Obsidian points, solid tang	3	2	..	..	1	..	..	..	..	..
Obsidian points, flake tang	1	..	..	..	1	..	..	..	..	..
Obsidian points, flake	..	5	1	..	..	..	..	1	..	1
Obsidian tools	11	17	9	1	8	3	5	..	1	7
Obsidian blades	33	27	39	8	23	1	4	4	6	2
Obsidian flakes	13	13	11	6	8	5	5	5	5	6
Bone, Antler, and Shell Objects										
Bone tools	4	3	2	1	8	2	3	..	..	3
Antler tools	1	1	..	..	1	2	2	..	..	..
Shell	..	..	..	..	1	..	1	..	..	..

At Zacatenco¹, whistles were much more common to the Middle Period than to the Late. At El Arbolillo (Table 18), two whistles were found in early El Arbolillo I beds, three in late El Arbolillo I and El

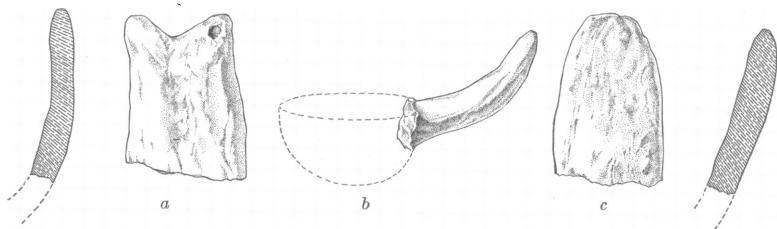


Fig. 23. Ladles.

- a. Ladle handle, section and top view, L. 6.5 cm., Trench G, Cut I (30.0-8973)
 b. Reconstructed ladle, L. 10 cm., Trench D, Cut III (30.0-8867)
 c. Ladle handle, top view and section, L. 6.6 cm., Trench I, Cut I (30.0-9350)

Arbolillo II deposits, and the remaining five in mixed débris. One can interpret the El Arbolillo occurrence in terms of Zacatenco, but the converse would lead only to confusion.

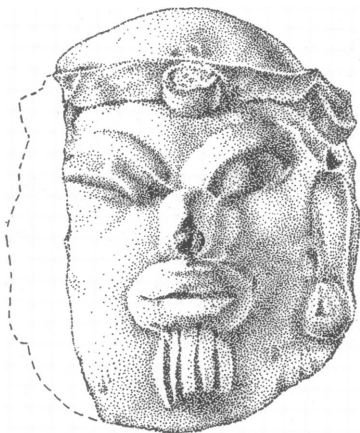


Fig. 24. Pottery Gorget or Cover, G.D. 8.5 cm., San Juanico (30.1-5209).

Ladles or spoons are found in fragmentary form (Fig. 23). Since it is almost impossible to distinguish the fragments of their bowls from ordinary rim sherds, the handles alone afford identifiable material. While at Zacatenco this utensil is confined to the Middle Period, at El Arbolillo we recovered several from El Arbolillo I, with the preponderance emanating from El Arbolillo II (Table 18)².

Convex clay discs with filleted human features may have served as pot-covers³. On the other hand, perforations in the outer rim of some specimens suggest that this kind may have been used as gorgets⁴. Such objects are known from Zacatenco and a fine

bearded example comes from San Juanico (Fig. 24). Three were found in Trench G, Cut II, Trench D, Cut II, and Trench F, Cut I, of El

¹Vaillant, 1930a, Table I.

²Vaillant, 1930a, Table I; Vaillant and Vaillant, 1934, 97, Fig. j, k.

³Vaillant, 1930a, 157, Bottom Row Nos. 6-8.

⁴*Loc. cit.*, Bottom Row Nos. 1-3.

Arbolillo II date, while the fourth and fifth lay in Trench I, Cut II and Trench B, Cut V of intermediate and late El Arbolillo I period. From the distribution of these discs¹ at Zacatenco, it seemed logical to infer a Middle Period dating, as is also suggested by their occurrence in El Arbolillo II (Table 18).¹

Balls are also made of clay, in both slipped and unslipped varieties, but their purpose is problematical. They are no different in shape or size from those found in Early and Middle Zacatenco². They are more common in El Arbolillo II than El Arbolillo I; in the earlier period the slipped type is never found (Table 18). This condition agrees with the manner of their occurrence at Zacatenco³.

The use of the spindle whorl in the Early Cultures is, on archaeological grounds, a doubtful trait. At Zacatenco two perforated sherds and a perforated stone disc were found, suggesting such a use⁴. At El Arbolillo a single worked sherd, with a hole in the center and very like those found at Zacatenco, came from Trench B, Cut II.

Worked sherds, usually ground down to a crudely circular form, are as common at El Arbolillo as at Zacatenco⁵. There are rather more of these specimens from Late El Arbolillo I and El Arbolillo II deposits, than from the Early El Arbolillo I level, but at Zacatenco the frequency is about equal for the two periods (Table 18)⁶. Most of the specimens were circular and from the contour of the sherds from which they were made had a convex and a concave side. The readiest explanation for these seemingly useless artifacts was that they were used in games. Kidder⁷ gives a full discussion of these worked sherds and concludes they may have been made purely idly with no intention of function. Some oblong specimens could conceivably have been used as smoothing tools in the manufacture of pottery and one or two odd shapes may have been shaped entirely through whim.

ORNAMENTS OF CLAY

Pottery discs with perforations (Fig. 25), which might have been used as gorgets have been considered above (p. 236-237). Clay was also used to make other kinds of ornament, like earplugs and beads.

Earplugs in El Arbolillo I and II, as in Early and Middle Zacatenco, are exclusively of the cylindrical variety (Fig. 25, Nos. 11-14)⁸.

¹Vaillant, 1930a, Table I.

²Vaillant, 1930a, 157, Middle Row; Vaillant and Vaillant, 1934, 99, No. 2.

³Vaillant, 1930a, Table II.

⁴Vaillant, 1930a, 154, Top Row No. 5, Middle Row No. 7, Bottom Row No. 5.

⁵Vaillant, 1930a, 154, Middle Row Nos. 3-6, Bottom Row Nos. 1-4.

⁶Vaillant, 1930a, Table I.

⁷Kidder, 1932, 154-155.

⁸Vaillant, 1930a, 158, Bottom Row Nos. 1, 3; 161, Top Row Nos. 3, 4.

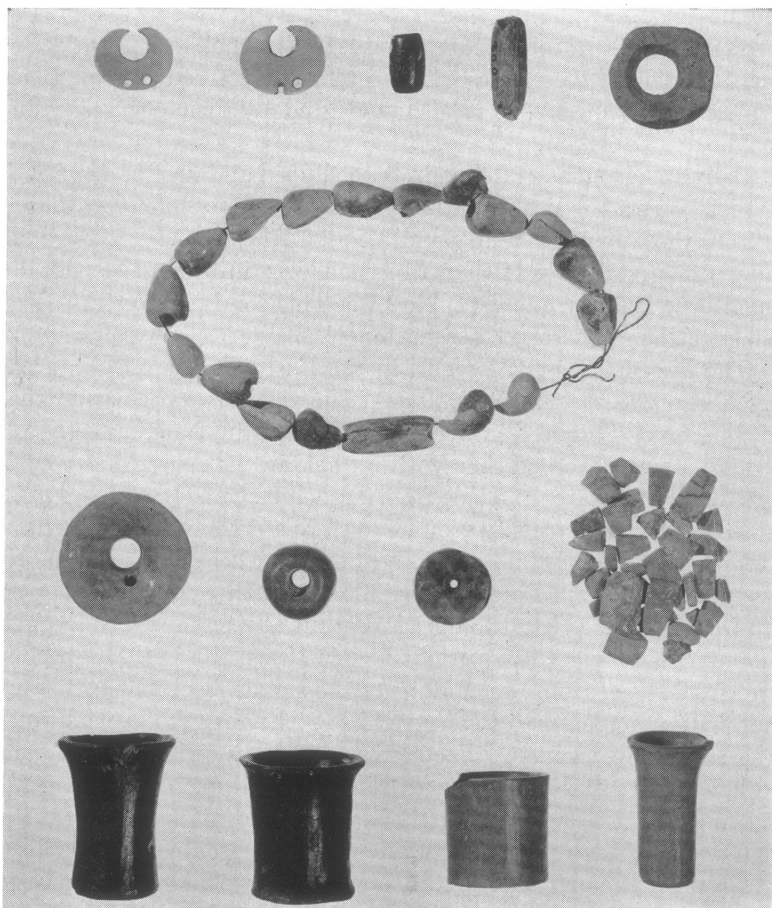


Fig. 25. Ornaments: Pottery, Stone, and Shell.

1. Bead, shell, G.D. 1.4 cm., Trench C, East Extension, lower cut (30.0-8838)
2. Bead, shell, Trench C, East Extension, lower cut (30.0-8839)
3. Bead, pottery, Skeleton 139, Trench C, East Extension (30.0-9662)
4. Bead, pottery, Trench G, Cut II (30.0-9061)
5. Bead, perforated sherd, Skeleton 144, Trench G, Cut III (30.0-9671)
6. Necklace, shell, *Veritina*, Skeleton 129, Trench D, Cut Ib (30.0-9652)
7. Earplug, jade, Skeleton 140, Trench C (30.0-9663)
8. Bead, jade, Skeleton 153, Trench G, Cut IV (30.0-9691)
9. Bead, jade, Skeleton 153, Trench G, Cut IV (30.0-9690)
10. Fragments of mosaic, turquoise, Skeleton 148, Trench G, Cut III (30.0-9677)
11. Earplug, pottery, black slip, purchased at San Juanico (30.0-8491)
12. Earplug, pottery, black slip, Trench B, South Extension (30.0-9259)
13. Earplug, pottery, burnished fawn slip, Trench G, Cut I (30.0-8966)
14. Earplug, pottery, burnished fawn slip, Skeleton 144, Trench G, Cut III (30.0-9670)

At Zacatenco, this type of ornamentation was confined to the Middle Period, whereas at El Arbolillo its principal occurrence falls in Late El Arbolillo I and El Arbolillo II. The earplugs at Zacatenco, like most of those at El Arbolillo were of thin black ware. The highly burnished fawn-colored type (Fig. 25, Nos. 13-14) is confined to El Arbolillo. Fig. 25, No. 14 was the only pottery earplug associated with a burial, that of the late El Arbolillo I elderly male, No. 142.

Pottery beads are very rare (Fig. 25, Nos. 3-5). Two barrel-shaped specimens were found, one in black clay, the other brown (Fig. 25, Nos. 3-4). The remaining four examples were made from common potsherds, ground into roughly circular form and then perforated (Fig. 25, No. 5). Some kind of drilling method akin to pre-Columbian stone-boring must have been employed, for the holes have the typical hourglass shape of such methods of perforation. No beads of either variety were found at Zacatenco although formally shaped beads were recovered at Ticoman.¹ All but one of the perforated sherds and the black barrel-shaped bead (Fig. 25, No. 3) came from El Arbolillo II deposits (Table 18). The black bead (Fig. 25, No. 3) and the perforated sherd (Fig. 25, No. 5) were found, respectively, with the late El Arbolillo I burials (Nos. 139 and 144). A pair of pottery pendants, imitating the teeth of a coyote, were found in Trench G (Fig. 28, No. 6) and will be discussed further in the section on bone and shell ornament (p. 249). It would seem logical to infer, therefore, that the development of beads belonged to the later phases of El Arbolillo culture. The scarcity and the informal character of the perforated sherds, on the other hand, would render this cultural development unimportant.

STONE

TOOLS

The working of stone at Zacatenco and at El Arbolillo might well be characterized as adequate but undistinguished.

Obsidian was the principal substance employed (Table 18), since its hardness and sharpness rendered it especially suitable for cutting and piercing tools. Arrowheads² and a few scrapers of the "snub-nosed" variety³ were worked all over. Knife-like tools⁴ were created from larger fragments which were only slightly retouched, since the sharp edges left by the fracture needed little further attention to give a cutting

¹Vaillant, 1931, 402, Top Row Nos. 1-5.

²Vaillant, 1930a, 162.

³*Op. cit.*, 166, Bottom Row Nos. 1-4.

⁴*Op. cit.*, 166.

edge. Another very characteristic implement was the blade¹, made by pressing off a long flake from a conical core² which would be serviceable as a razor or scalpel.

The form of arrowheads varies according to period. Points with tangs³ are never found below the El Arbolillo II and late El Arbolillo I deposits, even as at Zacatenco these forms were associated with Middle Period débris. The "laurel-leaf" form⁴ occurs in both periods at the two sites (Table 18)⁵. It is conceivable, however, that such forms might have been kept in use in the later period, even though they might have been actually made earlier. Larger knife-like forms show no chronological significance (Fig. 27, No. 5)⁶. Crude forms, created by retouching flakes and spalls, are common to all periods at El Arbolillo and Zacatenco. "Snub-nosed" scrapers were confined chiefly to the Middle Zacatenco-El Arbolillo II period⁷, but the knife-like tools showed no equivalent affiliation with chronological periods, either in quantity or in quality. As may be seen in Table 19, there is little or no similarity between Zacatenco⁸ and El Arbolillo (Table 18) in the proportions of their tools, blades, and fragments at various periods.

TABLE 19
PROPORTION OF OBSIDIAN TOOLS, BLADES, AND FRAGMENTS

	Tools		Blades		Fragments		Total
	No.	Per Cent	No.	Per Cent	No.	Per Cent	
El Arbolillo II	41	26.6	75	48.8	38	24.6	154
Middle Zacatenco	27	15.4	73	41.7	75	42.8	175
Late El Arbolillo I	11	17.7	28	45.1	23	37.1	62
Early Zacatenco	5	9.7	15	29.5	31	60.7	51
Early El Arbolillo I	11	27.5	17	42.5	12	30.0	40

Furthermore, the casual use of fragments, the sharp edges of which would make them perfectly serviceable cutting tools without further elaboration, makes it difficult to distinguish a discarded flake from a slightly retouched piece which would perhaps be classifiable as a knife. Thus the method of sorting specimens may be very variable.

Mr. Robert Weitlaner has suggested that certain determinations might be made on the basis of the colors of obsidian. We have therefore set up a series of tables indicative of the relationship between kinds of

¹*Op. cit.*, 165.

²Holmes, 1919, 323-324.

³*Op. cit.*, 162, Top Row.

⁴Vaillant, 1930a, 162, Second Row Nos. 4-7, Bottom Row Nos. 1-2.

⁵*Op. cit.*, Table I.

⁶*Op. cit.*, 162, Bottom Row, Nos. 1-2.

⁷*Op. cit.*, 166, Bottom Row Nos. 1-4; Vaillant, 1931, 417, Fourth Row Nos. 1-3.

⁸Vaillant, 1930a, Table I.

obsidian and types of tools, periods, and sites, within the scope of the Early Cultures.

We were able to distinguish three colors: a white variety with black streaks, a transparent gray or white, and a greenish kind with golden lights. A tabulation of these varieties according to specimens derived from the standard stratigraphical cuts at El Arbolillo follows:—

TABLE 20
PROPORTIONS OF TYPES OF OBSIDIAN IN RELATION TO THEIR USE

	Tools		Points		Fragments		Blades		Total
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	
Streaked	23	13.7	14	8.1	64	38.3	66	39.5	167
White-Gray	7	13.7	10	19.6	7	13.7	27	52.9	51
Golden-Green	7	18.4	2	5.2	2	5.2	27	71.0	38

From this table it will be seen that the streaked obsidian was the commonest variety, and, to judge from the great quantity of fragments, also had the least value. On this basis the most valuable would be golden-green, since only 5.2 per cent was found in fragmentary form, the remainder being utilized as tools, points, or blades. However, as mentioned above, we do not know how far sloth operated as a deterrent to the manufacture of shaped tools, since a simple fragment has an excellent cutting edge. A comparison of the two sets of leather worker's tools found at Ticoman illustrates this point very well¹.

Table 21 shows the proportions of types of obsidian at different epochs. On this basis, streaked obsidian is the most common in all periods, but golden-green seems to have been used with increasing frequency as time progressed. As a time indicator within a site, obsidian means little, but it may produce evidence of trade contacts with various quarries which might have indirect chronological significance. Table 22 gives a comparison of the material from which blades were made at El Arbolillo, Ticoman, and Gualupita and illustrates this quarry contact neatly.

Glancing again at Table 21 it will be seen that there is no correlation between the type of implement and the kind of obsidian used, except on the basis of quantity, that is, the commoner the color, the more tools were made of it. As for quality, the finer implements are made of green-gold obsidian, which, apparently harder than the other varieties, could be subjected to a more precise chipping.

¹Vaillant, 1931, 417-418.

TABLE 21

PROPORTIONS OF TYPES OF OBSIDIAN IN RELATION TO THEIR USE AT VARIOUS PERIODS

	Tools			Snub-nose Scrapers			Points			Fragments			Blades			Total		
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
El Arbolillo II																		
Streaked	9	28.1	2	40	11	42.3	33	45.2	42	35.0	97	63						
White-Gray	6	18.7	1	20	5	19.2	3	4.1	14	11.6	29	18						
Golden-Green	4	12.5	1	20	2	17.7	2	2.7	19	15.8	28	18						
Total																	154	
Late El Arbolillo I																		
Streaked	7	12.9	..	..	..	..	22	30.1	10	8.3	39	63						
White-Gray	..	..	..	..	4	15.3	1	1.3	10	8.3	15	24						
Golden-Green	..	..	..	..	..	..	..	..	8	6.6	8	12						
Total																	62	
Early El Arbolillo I																		
Streaked	4	12.5	1	20	3	11.5	9	12.3	14	11.6	31	77.5						
White-Gray	..	..	..	..	1	3.6	3	4.1	3	2.5	7	17.5						
Golden-Green	2	6.2	..	..	..	..	..	..	..	..	2	5.0						
Total	32		5	26	26		73		120		40							

TABLE 22
PROPORTIONS OF TYPES OF OBSIDIAN AT VARIOUS SITES

	Streaked		White-Gray		Golden-Green		Black		Total No.
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	
El Arbolillo	66	55.0	27	22.5	27	22.5	..	....	120
Ticomán	18	19.3	59	63.4	6	6.4	10	10.8	93
Gualupita	..	....	22	47.8	24	52.1	..	....	46

Quartz was little utilized for the manufacture of tools, although quite a quantity of fragments appeared in the digging (Table 18). The usual form of implement was a kind of crude scraper. The majority of specimens were taken from Trench F, which was so heavily impregnated with Teotihuacan ceramic elements that the quartz tools probably belong to that horizon rather than El Arbolillo I-II.

The quantity of quartz fragments has certain chronological implications. In El Arbolillo II quartz fragments are 13 per cent of the quartz and obsidian total, whereas quartz fragments have a proportion of 27 per cent in late El Arbolillo I, and 29.8 per cent in Early El Arbolillo I. These results do not correspond with the Middle and Early Zacatenco proportions of 20.8 per cent and 20.7 per cent, respectively, but at Gualupita the first period shows 42.3 per cent quartz in contrast to 25 per cent in the second¹, indicative of a gradual decrease in the use of this mineral, as time elapsed.

Such calculations can be made "ad nauseam," but a greater measure of consistency than that shown so far is required to reduce the casual practices of aborigines to the stern confines of statistical probability.

A few fragments of flint were found. Use of this material is extremely rare, a kind of awl at Zacatenco² and a projectile point from Gualupita I³ being the other principal occurrences in worked form.

Stone balls were as common at El Arbolillo as at Zacatenco (Table 18)⁴. In all probability they were used as bolas stones⁵. Balls were made most commonly from lava and pumice, but trachyte and limestone were also used (Table 18).

At El Arbolillo a number of balls were recovered, five from Period II and eight from Late El Arbolillo I. At Zacatenco, only one ball came from Early débris, the majority occurring in Middle Period refuse⁶.

¹Vaillant and Vaillant, 1934, Table 3.

²Vaillant, 1930a, 169, Top Row No. 3.

³Vaillant and Vaillant, 1934, 107, No. 2.

⁴Vaillant, 1930a, Table I, 169; Vaillant, 1931, 413.

⁵Vaillant, 1930a, 48.

⁶Vaillant, 1930a, Table I.

Therefore, it seems logical to associate these objects with Middle Zacatenco-El Arbolillo II. At El Arbolillo one ball was of trachyte and one of marble or fine limestone, whereas several examples of each of these varieties were found at Zacatenco. Two caches of limestone balls at Ticoman¹ suggest that missiles of this material were far more common to the Late Zacatenco-Early Ticoman horizon than to preceding periods. We cannot adduce any such reasoning to account for the disparity in the occurrence of trachyte balls at El Arbolillo and Zacatenco.

Other hard stone tools were worked by pecking and polishing and comprise celts of jade and serpentine (Table 18)². This class of object, is associated with the El Arbolillo II and Late El Arbolillo I periods confirmed by and confirming the data obtained at Zacatenco. The forms and materials of these celts suggest a southern origin, perhaps in Guerrero, a hypothesis which is further strengthened by the jade ornaments. Manos and metates do not differ from the standard Zacatenco types (Table 18)³.

ORNAMENTS

Five jade ornaments (Fig. 25, Nos. 7-9; Fig. 26, No. 2) found at El Arbolillo add substantially to our knowledge and confirm the data obtained at Zacatenco and Gualupita on the early appearance of this stone in the Valley of Mexico. The "jaguar-tooth" pendant (Fig. 27, No. 2) purchased at the site suggested a Oaxaca-Guerrero origin, as did a similar object found at Zacatenco in Middle Period débris⁴. Two beads, one spherical and the other discoidal (Fig. 25, Nos. 8-9) were part of the funeral furniture of Skeleton 153, a baby of late El Arbolillo I date in Trench G, Cut IV. A beautiful pair of earplugs (Fig. 25, No. 7) was found with Skeleton 140, a baby, whose interment may have preceded the Late El Arbolillo I burial complex in Trench C. The pair were identical, having cylindrical shanks and everted mouths, with perforations at the point of junction of the two elements. A fragment of a similar piece came from Late débris at Zacatenco⁵. Besides this group of seven jade ornaments from the Early-Middle Zacatenco horizon, attention should be called to the occurrence at Ticoman of a jade bead⁶ and several celts⁷. Added to these jade objects are several from

¹Vaillant, 1931, 305.

²Vaillant, 1930a, 49, 168-169.

³Vaillant, 1930a, 170-173.

⁴Vaillant, 1930a, 158, Second Row No. 2.

⁵Vaillant, 1930a, 158, Top Row No. 2.

⁶Vaillant, 1931, 306, 402, Top Row No. 11.

⁷*Op. cit.*, 410, Second Row No. 3, Bottom Row Nos. 3-4.

Gualupita¹, chiefly beads, except for a ball like a divining stone. Thus the corpus of jade objects from the Early Cultures is increasing, and suggesting further implications of trade with peoples to the south, perhaps more highly developed than those of Central Mexico.

Two soapstone ornaments were obtained at El Arbolillo, a circular pendant acquired by purchase (Fig. 27, No. 1) and an irregular pendant found with Skeleton 124 in Trench C, an adult male of late El Arbolillo I date. Soapstone ornaments are not uncommon in the Early Cultures, a cylindrical bead having occurred in Middle Zacatenco refuse² and others with Skeleton 6 at Gualupita.³

An irregular pendant of weathered slate came from the back dirt of Trench D, El Arbolillo II. Use of this material is not recorded at Zacatenco or Ticoman, but two crude pendants were found at Gualupita.⁴

Turquoise (Fig. 25, No. 10) was found for the first time with Early Cultures material. A number of small quadrilateral fragments occurred with the mortuary furniture of Skeleton 148, a young female of Late El Arbolillo I date in Trench G. The smoothness of one side and the discoloration of the other, in every piece, suggest that these fragments were part of a mosaic, the back of which had disintegrated. To the best of our knowledge, this is the earliest occurrence of this distinctive Central American art.⁵

For the first time among Early Cultures two pyrites were represented by a tiny fragment found near the baby, Skeleton 140, which, we have seen, was already noteworthy for producing the pair of jade ear-plugs (Fig. 25, No. 7). We have no way of knowing whether this fragment was an intentional part of the grave furniture, but it is perhaps significant that a large nodule was purchased at the site.

"Lucky" stones of quartz, opal, and the like, appeared fairly frequently in the refuse. These pebbles may have been actually part of a medicine kit or they may equally well have been brought in by the idle whims of children or adults. Similar specimens were found at Zacatenco and Ticoman.⁶

A fragment of an obsidian bead chipped into ring shape came from Trench E. Such objects are unknown from the Zacatenco-Copilco horizon, but do occur in later cultures like San Juan Teotihuacan, so that the specimen is best assignable to that horizon.

¹Vaillant and Vaillant, 1934, 32, Nos. 4, 6; 104, Nos. 4, 5, 10.

²Vaillant, 1930a, 161, Bottom Row No. 5.

³Vaillant and Vaillant, 1934, 32, No. 5; 104, No. 3.

⁴Vaillant and Vaillant, 1934, 104, Nos. 1-2.

⁵Saville, 1922; Gamio, 1910; Mason, 1929.

⁶Vaillant, 1930a, 161, Top Row Nos. 1-2; Vaillant, 1931, 401, Top Row Nos. 1-2, 7.

HORN AND BONE

Work in horn and bone has the same general range as at Zacatenco¹. Bone, usually the cannon bone of the deer, was principally used for awls (Fig. 28, Nos. 7-9)², but perforated bodkins occurred very rarely³. Antlers were used as picks⁴, pounders⁵, graining tools⁶, or awls⁷.

Two implements, not recorded from Zacatenco, were recovered at El Arbolillo. One of these was a gouge-shaped graining tool (Fig. 26) made, in the illustrated example, from a human femur, and in another, from the tibia of a deer. The other new implement was a notched rattle made from a deer scapula. A complete specimen (Fig. 27, No. 4) painted red was found with Skeleton 139, a late El Arbolillo I male, in Trench C. This piece is interesting in that it shows the interior hollowed out and perforations along the distal edge, as if for the suspension of some

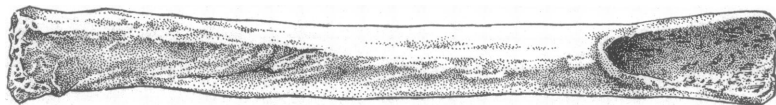


Fig. 26. End Scraper made of Human Femur, L. 29.6 cm., Trench C, North (30.0-8780).

adornment like feathers. It is now in the Museo Nacional in Mexico. Fragmentary specimens (Fig. 28, Nos. 10-11) were recovered from various levels at the site. This class of object, unless well preserved, is apt to be overlooked among the animal bones which are so plentiful in refuse beds. It is perhaps for this reason that such instruments are so rarely reported in the literature, in comparison with the fairly common observation of notched human long bones⁸. Notched deer scapulae, to judge from the literature, seem to be confined chiefly to the Huichol⁹, and the Pueblo Indian inhabitants of Kechipauan¹⁰ and Pecos¹¹, but the distribution must be in reality very much greater.¹²

¹ Vaillant, 1930a, 174-177.

² Vaillant, 1930a, 177, Top Row Nos. 1-3; Bottom Row 4-7.

³ *Op. cit.*, 1930a, 177, Top Row Nos. 1-2.

⁴ *Op. cit.*, 1930a, 174, Bottom Row Nos. 3-6.

⁵ *Op. cit.*, Bottom Row No. 2.

⁶ *Op. cit.*, Top Row Nos. 4-5.

⁷ *Op. cit.*, Top Row Nos. 8-11.

⁸ Seler, 1904, 672-694; Lumholtz and Hrdlicka, 1898, 65, Pls. VI-VIII; Palezuelos y Romero, 1933, 212; Henning, 1913; Hamy, 1897, Pl. XVII, Figs. 51, 52; Batres, 1906, Figs. 24-25; Beyer, 1917; Starr, 1899, 1904; Capitan, 1910; Castañeda and Mendoza, 1933, 560-567, Pls. 25, 89-92.

⁹ Lumholtz, 1902, II, 155.

¹⁰ Hodge, 1920, 137-140.

¹¹ Kidder, 1932, 252-256.

¹² Linné, 1934b, 204-207, gives a comprehensive study of the notched bone rattle and includes a number of citations lacking in Footnote 8.

Bone ornament was rare in the Zacatenco-El Arbolillo culture. Cylindrical bird bone beads (Fig. 28, Nos. 1-2) occurred sporadically in the general digging. None was found at Zacatenco, but the cylindrical type was relatively common at Ticoman¹. The perishability of such specimens makes them hard to find, and their barren simplicity renders them useless for stylistic determinations.

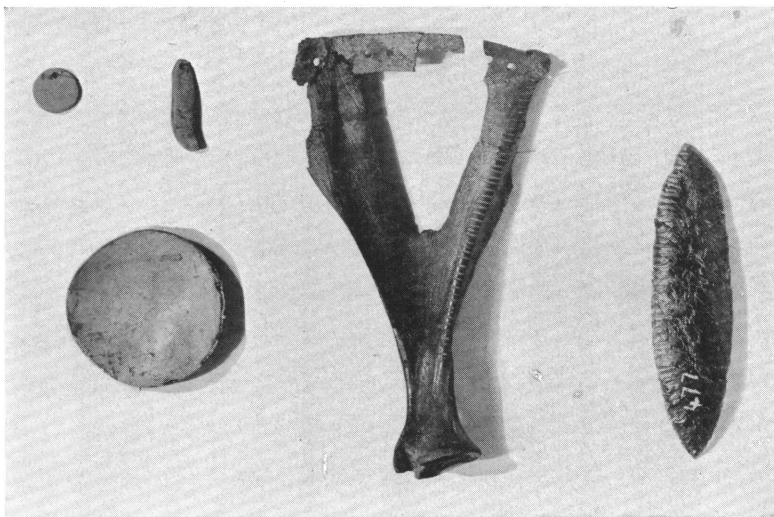


Fig. 27. Ornaments and Implements² in Museo Nacional.

1. (Upper) Pendant, green soapstone (?), purchased at El Arbolillo. (Field No. 1330).
2. (Upper) Pendant, jade, in form of jaguar tooth, purchased at El Arbolillo (Field No. 1222).
3. (Lower) Disc, shell, *Meleagrina margaritifera* (?), purchased at El Arbolillo (Field No. 89).
4. Rattle, deer scapula, L. 23 cm., (approximately) Skeleton 139, Trench C, East Extension (Field No. 928).
5. Spear point, obsidian, Skeleton 129, Trench D, Cut Ib (Field No. 477).

Two curious objects shaped like spatulas (Fig. 28, No. 3), one of which was turned over to the Mexican Government, came from the group burial, Nos. 103-110, in Trench A. One side was flat, the other rounded. The fact that each of them had a transverse groove across its rounded side suggests that they might have been pendants, for it is difficult to conceive of how so small an object could have been used as a tool.

The canine teeth of dogs or coyotes (Fig. 28, Nos. 4-5) were dug up at various points in the general digging. Only one example was perforated at the root, for use as a pendant, but probably the rest of the

¹Vaillant, 1931, 402, Bottom Row Nos. 3-4; 421, Middle Panel No. 5.

²The scale is given by No. 4.

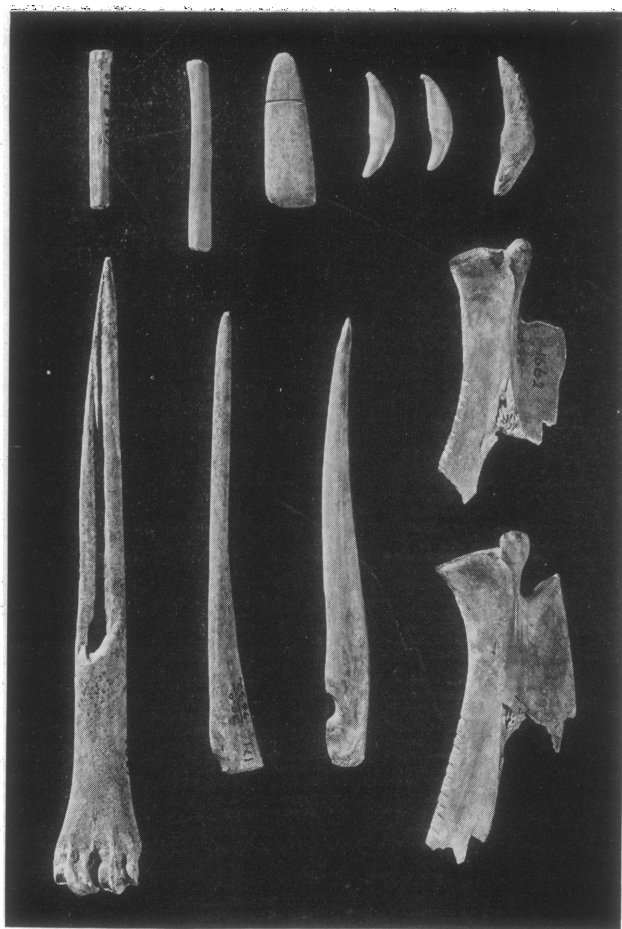


Fig. 28. Bone Ornaments and Implements.

1. Bead, bird bone, H. 5.1 cm., Trench J (30.0-9478).
2. Bead, bird bone, Trench I, Cut I (30.0-9352).
3. Pendant or spatula, deer bone, Skeleton 106, Trench A (30.0-9634).
4. Tooth, dog or coyote, Trench D, Cut IIIa (30.0-8869).
5. Tooth, dog or coyote, Trench B, Cut V (30.0-8741).
6. Pendant, pottery, in form of dog or coyote tooth, Trench G, Cut III (30.0-9129).
7. Awl, deer bone, Skeleton 105, Trench A (30.0-9631).
8. Bodkin, deer bone, Skeleton 105, Trench A (30.0-9632).
9. Bodkin, deer bone, Skeleton 105, Trench A (30.0-9633).
10. (Upper) Rattle, deer scapula, Trench G, Cut IV (30.0-9183).
11. (Lower) Rattle, deer scapula, Trench B, South Extension (30.0-9264).

canine teeth were attached without the boring of a hole. An entire necklace of perforated coyote teeth¹ was found at Ticoman, but no such adornments were found at Zacatenco.

A pair of imitation canine teeth made of baked clay (Fig. 28, No. 6), one of which went to the Mexican Government, was found in Trench G, Cut III. The part corresponding to the exposed or enameled portion was painted white and two perforations ran through the root from front to back, indicating that these pendants were designed for use with a double-string necklace.

It is curious to observe, so early in the history of the Valley of Mexico, the presence of imitation teeth as ornaments, for besides these clay specimens we have one of jade imitating a tiger canine (?) purchased at El Arbolillo (Fig. 27, No. 2) and another of the same material from Zacatenco². Imitation teeth are usually associated with much higher cultures and the distribution is relatively wide³.

SHELL

Shell was commonly used for ornament at El Arbolillo (Table 18). It was used both by perforating natural forms (Fig. 25, No. 6) and by shaping the raw product into pendants, disc and cylindrical beads, and sequins (Fig. 25, Nos. 1-2). *Neritina* was the most usual natural form, a string of twenty beads (Fig. 25, No. 6) occurring with the El Arbolillo II burial, Skeleton 129, a young woman⁴. A snail shell bead, likewise perforated, appeared in Trench I, Cut II.

The two semilunar oyster shell sequins (Fig. 25, Nos. 1-2), along with a third specimen turned over to the Museo Nacional, were all found in Trench C. They are doubtless made from the shell of the *Quadula* freshwater mussel, as was a notched shell, only slightly worked, from Trench G, Cut II. A concave disc (Fig. 27, No. 3) was bought at the site and seems to have been made of the same substance. This variety is only found in rivers, showing it to be foreign to the Valley. A cylindrical bead with Skeleton 141, an adult male, in Trench C and another of the same genus which was part of the necklace with Skeleton 129 (Fig. 25, Fig. 6) are worked examples of the Cassis or cameo shell of the West Indies.

¹Vaillant, 1931, 421, Middle Panel No. 1.

²Vaillant, 1930a, 158, Bottom Row No. 2.

³Holmul, Peten, Guatemala, Merwin and Vaillant, 91, Pl. 33 f, human tooth in jade; Uloa Valley, Gordon, 1898a, Fig. 23, human tooth in clay; Teotihuacan, Dosal, 1925, 218-219; Pauer, 1925, 220-222. Ojitlan, Oaxaca, Noguera, 1933, 45 and plates, human teeth, gold; Monte Alban, Oaxaca, Caso, 1932, 504, jaguar molars, gold; Oaxaca, Mexico, many jade specimens in the collections of the American Museum of Natural History and elsewhere.

⁴Vaillant, 1930a, 158, Top Row No. 3.

Pendants have not been recovered as yet from Early or Middle Zacatenco, but they are fairly common from the Ticoman horizon¹.

The trade possibilities of shell are interesting in that associated with the Early-Middle Zacatenco and the coeval El Arbolillo I-II horizon, are found the fresh water mussel, *Neritina*, the Cassis or Cameo shell, and the land snail. At Ticoman occur *Dentalium*, *Neritina reclinata*, *Arca ponderosa*, *Arca pexata*, *Oliva reticularis*, *Meleagrina margaritifera*, and the snails, *Oleocina coronata* and *Limnaea columella*, and as might be expected, the Ticoman varieties are worked in a more imaginative way². Thus the Zacatenco-El Arbolillo shells are associated more closely with the West Coast while the Ticoman varieties tend to come from the Gulf of Mexico.

TEXTILES

Owing to the perishable nature of such material few fragments of weaving have ever been found in sites of Early Culture date. No cloth was found at El Arbolillo, but attention should be called to the discovery of a small fragment in the skull of Skeleton 4 at Zacatenco³ and a bit of feather cloth at Ticoman⁴. Moreover, the turbans shown on many figurines indicate a common use of weaving. The impression of a twilled basket painted red was at the head of Skeleton 129, of El Arbolillo II date, and Doctor A. V. Kidder informed the writer that he saw a bit of coiled basketry in a case at Copilco. Impressions of twilled mats were relatively common, occurring in the graves of Skeletons 114, 115, 118-119, 131, 132-134, 143, 148, 153.

¹Vaillant, 1931, 402, 421.

²Vaillant, 1931, 402, 421.

³Vaillant, 1930a, 38.

⁴Vaillant, 1931, 315-316.

CONCLUSIONS

The creation of a chronology based on changes in material culture can be made an orderly and simple process, when such a synthesis is based on existing data. Yet, when such a time sequence depends on the excavation of fresh material year by year, there must necessarily be constant readjustment, and, in consequence, change in definitive factors. The analysis of the sites in the Guadalupe District of the Valley of Mexico affords a typical illustration.

Zacatenco produced three culture stages, based on the variations in pottery styles and figurine shapes: Early, Middle, and Late Zacatenco. At Ticoman, Late Zacatenco material was found under such conditions that it could be divided into three time phases: Early, Intermediate, and Late Ticoman. It seemed best to utilize the name of the type site for distinguishing these periods. Later on, work in Morelos, at the Gualupita site, disclosed three periods: Gualupita I, contemporaneous with Early and Middle Zacatenco; Gualupita II, material influenced by and contemporaneous with the three Ticoman periods; and Gualupita III, a post-Teotihuacan epoch, extending into Aztec times.

When El Arbolillo was excavated, three periods could be immediately discerned: El Arbolillo I, identical to Early Zacatenco; El Arbolillo II, the same as Middle Zacatenco; El Arbolillo III, relating to some phases of the Teotihuacan culture, discussion of which will be postponed for a future publication. However, further analysis of the material showed that El Arbolillo I could be subdivided chronologically. El Arbolillo is the first, perhaps the only place, where deposits exist deep enough to trace the evolution of Early Zacatenco culture. It seems therefore preferable to designate these developmental phases in terms of the type site, El Arbolillo, until the culture problem can be envisaged in terms of general material rather than in terms of individual localities.

El Arbolillo II produced the same traits as Middle Zacatenco, including such diagnostic features as:—

Figurine types, A, B, F, B-C, and probably C5

Pottery, with major representations of ollas with simple necks, russet, thin black, red-on-white, yellow-white, blue-white, granular white, early red-on-yellow wares

Pottery objects like whistles, cylindrical earplugs, rattles, and slipped clay balls
Stone tools, like obsidian arrowpoints with tangs, sling stones, and other implements, the general technical level of which was higher than in El Arbolillo I

El Arbolillo I was also equivalent to Early Zacatenco in possessing such characteristics as:—

Figurines, C1, C2, C3, D1, and early F

Pottery, with major representations of vague olla necks, simple silhouette bowls, white, white-on-red and thick black wares

Pottery tools, relatively infrequent, but like those in El Arbolillo II—Middle Zacatenco

Stone tools, like leaf shaped points, and rare occurrences of stone balls

Thus, had we been content merely to substantiate the findings at Zacatenco, we should have concurred in our previous belief that there were two cultures, or rather an original culture, Early Zacatenco, to which were engrafted elements of another, the fusion resulting in the stage called Middle Zacatenco. However, examination of the material indicated that although there were elements of a fusion, the true picture was the gradual evolution of a single culture, which moved at different rates in the various branches of its expression. The refuse beds at El Arbolillo, which were much deeper than the Early and Middle deposits at Zacatenco, made it possible to detect distinctions finer than the two divisions previously defined.

Predominant as time indicators were the figurines (pp. 191-218) which it became necessary to subdivide further in order to emphasize their evolutionary stages (Tables 8-9). In the earliest cuts of El Arbolillo I the predominating types were C3a and b, C2, and C1-2 (Figs. 16, 17). Gradually Types C3a and b diminished in quantity, while C2 and C1-2 (Fig. 16) reached their peak. Then Types C2 and C1-2 began to be replaced by Types C1a and b, and C3c and d (Fig. 13). From Type C1b, the transitional Types F-C and B-C (Fig. 12) were developed, and, in time, were transformed into the El Arbolillo II styles B and F (Fig. 10). It was at this time that Type A was added to those figurine styles evolved from the earlier period.

Reexamining the Zacatenco material from this point of view, the highest percentage of Type C3, the early El Arbolillo indicator, was found in the earliest cut, DX, but not in the quantity encountered at El Arbolillo. Examples of the transitional Types B-C were found in Trench E South at Zacatenco and in Trench D, Cuts VI and VII. There was not, however, the great corpus of material from these periods encountered at El Arbolillo, so that the Zacatenco figurines could not be reclassified in strictly El Arbolillo terms. Type D1, moreover, a relatively common style at Zacatenco, was extremely rare at El Arbolillo. Thus, the Zacatenco figurine data which could be summarized:

1. Early Zacatenco, Types C1, C2, C3, D1
Transitional Phase: Type B-C
2. Middle Zacatenco, Type A, B, F, D2 (?)

were transformed into

1. El Arbolillo I early: Types C1-2, 2, 3a, 3b, early F (?)
Intermediate: Types C1-2, 2
Late: Types C1a, 1b, 3c, 3d, D1 (?)
Transitional: Types B-C, F-C
2. El Arbolillo II: Types A, B, F, C5 (?)

In pottery (pp. 218-233) these five time phases exemplified by the figurine categories do not appear statistically. There is instead a slow development of wares, in which it is possible to discern the two groups of wares, mentioned above, which characterized Early and Middle Zacatenco. However, on strictly morphological grounds, there does seem to be evidence of a more subtle evolution in black ware. The earliest burials, in Trenches A and G, were equipped with tripod black ware bowls, the incisions of which were inlaid with red ocher (Fig. 19, Nos. 1-3). In the Early and Intermediate El Arbolillo I cuts and in some of the Trench C burials, deep incisions, sometimes made before slipping, replaced this class of ornament (Fig. 19, Nos. 4-5). At the close of the period, grooves and corrugations often embellished the vessels (Fig. 19, Nos. 6-9). In El Arbolillo II, a consecutive pattern, incised after firing,¹ was the usual decoration, except for some sporadic instances of grooving and channeling (Fig. 19, Nos. 10-11). Save for these shifts in decorative technique there was no definable correlation between the evolution of the clay plastic and ceramic development.

The burials at El Arbolillo, exclusive of the Teotihuacan interments, fall into three periods (pp. 168-188). One was definitely associable with El Arbolillo II, the second fitted into the latter part of El Arbolillo I, and the third with the earlier part of the same period. In the El Arbolillo II burials, the positions of the dead were variable and there was a rare use of slab tombs. In the Late El Arbolillo I groups the great majority of the burials were extended in slab tombs, but in Early El Arbolillo I the flexed position seemed to predominate.

The weakness of the ceramics, as a means for dating, was brought out very strongly by the burials, since their chronological position had to be determined by type of interment and by stratigraphical position. Seldom was there a vessel forming part of the mortuary equipment that could unqualifiedly be assigned to a specific period.

¹Vaillant, 1930a, 86.

The mortuary customs revealed nothing positive. The presence of slab-lined graves, which, when compared to Monte Alban burials seem developed¹, is counterbalanced by similar graves among the primitive peoples of Lower California². The painting of skeletons at El Arbolillo suggests nothing more significant than another example of this widespread, but irregularly distributed, custom³. More positive was the absence of figurines in graves of the Zacatenco culture, in contrast to the practice of including them in the mortuary equipment of other parts of Mexico⁴.

However, our examination of the corpus of material showed that Early and Middle Zacatenco were not two cultures, but chronological aspects of one. The analysis of deep transitional deposits at El Arbolillo indicated a gradual transformation from El Arbolillo I to II instead of an abrupt break, as our Zacatenco digging suggested.

This evolution was so gradual in plastic and ceramic types that the time markers are blurred. Whatever lines are drawn must be largely arbitrary, until there are discovered a series of sites, each of which is of short occupation. Then the disturbing factors, like burials and erosion which cause a mixture of débris, would be less strong, and the presence and absence of diagnostic traits would more readily be detected.

The other aspects of the El Arbolillo finds, save for confirming the presence of jade, added little or nothing to the data acquired at Zacatenco. Yet, the net results gave some positive information toward the adjustment of this culture to the scale of absolute time. The combined discoveries at Zacatenco and El Arbolillo present an exhaustive view of the imperishable elements of the Zacatenco-Copilco culture. The stratigraphical studies indicate a culture that changed rather than improved in the long period of time implied by the deep refuse heaps.

The geological proofs of great antiquity (pp. 160-167), which center on the age of the Pedregal lava flow, seem to be disproved by the connections of the Ticoman-Cuicuilco and Gualupita II cultures with that of the "Toltec" of Teotihuacan which the historical accounts tend to place between the fifth and tenth centuries⁵. In the Southwestern United States a volcanic eruption was dated by archaeological method, at about the eighth century⁶ so that lava *per se* need not imply great age. Furthermore, the sedimentary deposits over various sites producing Zacatenco-Copilco remains do not, necessarily, signify antiquity, in

¹Rubin de Borbolla, 1933, Figs. 1-9.

²Diguet, 1899, 1905.

³Hrdlicka, 1905.

⁴Vaillant and Vaillant, 1934, 112.

⁵Vaillant and Vaillant, 1934, 117-127.

⁶Colton, 1932.

view of the local and general floods which have constantly occurred in the Valley of Mexico.

Equally insecure are the qualitative proofs of the antiquity of the Zacatenco-Copilco culture, centering on the comparison of such material with the elements composing high civilizations like the Aztec. Appendix I gives a check list of the objects found at Zacatenco and El Arbolillo and at the Pueblo IV site of Pecos, New Mexico, which was occupied from around the beginning of the thirteenth century until long after the Spanish occupation of the Southwest. According to this table there is no enormous difference in the general run of implements, and it is in architecture mainly where the Pueblos exercise a superiority over the Zacatencanos.

In the Southwest we have a full record of the steps leading up to the Pecos development from the most primitive stage yet discovered, Basket Maker II, the work of a people who were semi-agricultural, but had as yet not invented pottery¹. Now this Basket Maker II culture is extremely important, since it implies the dissemination of agriculture before the invention of pottery. We have also, thanks to the research of Professor Douglass, an exact chronology based on tree rings, which not only fixes the Pecos culture in relatively exact terms, but also stretches back to the earlier stages of Pueblo development². At the present time the periods of Southwestern history are fixed as follows:—

Chronology of the Southwest

Pueblo V	1700—to the present day
Pueblo IVb	1540–1700
Pueblo IVa	1350–1540
Pueblo IIIb	1200–1350
Pueblo IIIa	950–1200
Pueblo II	700 ? (784)–950
Pueblo I	200?–700?
Basket Maker III	?–200 A.D.
Basket Maker II	1500–B.C.?
Basket Maker I	undiscovered

From this table it will be seen that a long time elapsed from the Basket Maker Period to Pueblo III or IV. Thus, it is not too far-fetched to assume that a correspondingly long time passed before the Zacatenco culture was evolved, which, we have seen, on a qualitative basis is the most nearly comparable of all the Valley cultures to the higher Southwestern ones. It would therefore seem legitimate to assume

¹Kidder, 1924; Roberts, 1932, 2–25; 1931, 2–15; 1930, 2–12; 1929, 2–9.

²Douglass, 1929; Roberts, 1932, 23–25.

that extreme age cannot be assigned to the Zacatenco culture on the grounds of "primitiveness" any more than it can on geological grounds. The next method of approach to the dating of the Zacatenco culture is through the chronology of the Valley of Mexico. According to Joyce¹ the chief events fall as follows:—

1520	Aztec Conquest
1325	Foundation of Tenochtitlan
1225	Nopaltzin and the Chichimec Acolhua
1187	Alcolhuatzin and Tepanec
1160	Aztecs leave Aztlan
1120	Xolotl founds Tenayuca
1064	Destruction of Tollan
752	Mixcoamazatzin founds Tollan

While the different annals give varying dates for the foundation of Tollan, most of the authorities place this beginning of the Toltec "Empire" at a point between 600–800 A.D.² To use this date as an anchor for the chronology of the Early cultures of the Valley involves two assumptions, which, although probable, are not yet proved completely. The first is based on the identification of the culture of San Juan Teotihuacan as the work of the Toltecs.³ The second rests on the interpretation of the field data which suggest a partial contemporaneity between the Teotihuacan and the Ticoman cultures⁴.

The generic terms, Toltec and Chichimec, are very confusing, and, if they are to be used should be employed with a locative⁵. Being the names of peoples who presumably had a culture history as varied as the multiplicity of their tribal units, these terms are too confused to use as cultural designations. But to seek the makers of the Teotihuacan culture and their date, the traditional history of the Valley of Mexico must to some degree be taken into consideration.

The identification of Aztec material remains has been achieved at least for the latter period of their history. The recognition of other groups of ceramics associable with areas occupied by various other tribes has also progressed to a point demonstrating the need of specific research. Now some of these ceramic families are found either beneath or unassociated with Aztec remains, so that there is a strong basis for considering them to be made by predecessors of the Aztec⁶. At Teoti-

¹Joyce, 1920, Appendix III.

²Beuchat, 1912, 258–261; Orozco y Berra, 1880, vol. 3, 21–40; Bancroft, 1883, vol. 5, 237–288; Lehman, 1922, 1923.

³Ceballos Novelo in Gamio, 1922a, Tomo I, vol. I, 63–93.

⁴Vaillant and Vaillant, 1934, 120.

⁵Bancroft, 1883, vol. 5, 156–399; Ceballos Novelo in Gamio, 1922a, Tomo I, vol. I, 63–93, 301–310.

⁶Vaillant and Vaillant, 1934, 121–125; Noguera, 1932.

huacan, remains of the culture associated with the Pyramids lay beneath remains of the Mazapan culture tentatively to be identified with the Acolhua¹. Such a situation lends great credence to the statements of Sahagun² and Ixtlilxochitl³ that the Chichimec-Acolhua lived in the Valley before the Aztec and that previous to them the particular section of the Valley was held by the Toltec who built Teotihuacan.

According to Joyce's synthesis of the dates in the history of Mexico based on the Annals of Quauhtitlan, we have a date falling in the neighborhood of 750 A.D.⁴ for the founding of Teotihuacan, or taking Sahagun's estimate, around 600⁵. Thus, the approximate beginning of the Teotihuacan culture would fall somewhere after the first half of the first millennium after Christ.

If the identification of historic peoples with excavated cultures has progressed correctly thus far, then the close of the Ticoman period must also have taken place at about the same time. We have commented before on the evidences of partial contemporaneity between the Teotihuacan and the Ticoman cultures, as produced at Ticoman, Gualupita, and Jalapasco⁶. Following out this hypothesis, the lava flow of the Pedregal becomes of insignificant age, since Cuicuilco and Ticoman are contemporaneous. Also, on technical grounds, there is no good ground for assuming a great hiatus between the Ticoman and Teotihuacan cultures.⁷

Proceeding further with this attempt to place the early cultures of the Valley in terms of years, we are confronted with the problem of their duration. To establish this, we have the most unsubstantial data, —the rate at which rubbish heaps accumulate. On pp. 166–167 we compared the rate of accumulation of the Pecos rubbish heaps with those at El Arbolillo, Gualupita, and Ticoman. While the habits of life of the makers of the Valley cultures and of Pecos people were probably roughly similar, yet the factors of erosion and the thousand and one other differences in the formation of the heaps militate violently against any firm reliance being placed on those conclusions. Nonetheless, for what it is worth, let us give the maximum depths for the various Valley periods, computing their age according to the Pecos ratio between the 6.40 meters maximum depth and the five hundred years of occupation.

¹Linné, 1934, 9–18, 1934b, 21, 75–86, 215.

²Sahagun, 1829, vol. 3, 141, 144.

³Ixtlilxochitl, vol. I, 17–21, 75–103; vol. II, 21–45, 61–71.

⁴Joyce, 1920, 11–12, 365, Appendix III.

⁵Sahagun, 1829, vol. I, XVI, vol. 2, 280 (confused statement).

⁶Vaillant, 1931, 255, 307–309, 338; Vaillant and Vaillant, 1934, 120.

⁷Noguera, E., *Antecedentes y Relaciones de la Cultura Teotihuacana (El Mexico Antiguo, vol. 3, pp. 3–95, Mexico, 1935).*

	Trench	Depth	Years according to Pecos Ratio
Late Ticoman	B, upper	2.40	187.2
Intermediate Ticoman	B, lower		
Early Ticoman	E	1.40	109.2
Middle Zacatenco	E	4.75	370.5
El Arbolillo I	G, Cuts III-VII	5.35	417.3
		13.90	1084.2

The resultant 13.90 meters would, according to the Pecos ratio, signify more than a thousand years of occupancy. Perhaps a juster ratio would be the Zacatenco accumulation of combined Ticoman and Zacatenco refuse which produced a 7.50 meter depth, or 583 years, according to the Pecos ratio. This does not seem excessive when we consider the probable erosion during the Teotihuacan, Aztec, Colonial, and Republican periods, which amounted to, at least, twelve hundred years of elapsed time, compared with the scant century of complete abandonment at Pecos.

Thus, subtracting either sum from the 650-750 A.D. date for the theoretical founding of Tollan, no vast antiquity is established for the beginning of the Early cultures of the Valley. An interesting counter-check on such a dating of 250 B.C.-500 A.D., for the Zacatenco-Ticoman development is the qualitatively comparable pre-Maya material found beneath the floors at Uaxactun in the Peten district in Guatemala¹. This material may be confidently assumed to antedate the stelae there, which are the earliest dated monuments in the Maya area, Stela 9 reading 8.14.10.13.15 or 68 A.D., according to the Spinden correlation, 328 A.D. according to the Thompson-Martinez system². Either date would throw the sub-floor Uaxactun material within the conjectural span of the early Valley of Mexico cultures.

Such attempts at dating the Zacatenco-Ticoman cultures are not to be considered categorically except for the indications that the two cultures existed for a relatively long time, Zacatenco probably much longer than Ticoman. Also, on qualitative grounds, as well as on the basis of the extremely impressionistic chronology for the Valley of Mexico, these developments are neither primitive nor extremely ancient, but are relatively advanced in comparison to North American cultures, for example. However, a tentative placement in terms of exact time, like this, will lead

¹Vaillant, 1928, 1930b; Ricketson, 1933.

²Spinden, 1924; Thompson, 1927.

to further adjustments which may finally bring Central American aboriginal history into its proper focus.

TABLE 23

CONJECTURAL SEQUENCE OF CULTURES IN THE VALLEY OF MEXICO ACCORDING TO THE DATA OF 1934

1520	Spanish Conquest		
1502-1520	Moctezuma II		Aztec IV
1486-1502	Ahuizotl		
1482-1486	Tizoc	Tenayuca III	Aztec III
1469-1482	Axayacatl		
1440-1469	Moctezuma I		
1427-1440	Itzcoatl		
1417-1427	Chimalpopoca		
1396-1417	Huitzilhuhtl	Tenayuca II- Coyotlatelco II	Aztec II
1376-1396	Acamapitzin		
1325	Tenochtitlan founded, rule of Quinatzin		Aztec I
1260	Rule of Tlotzin		
1225	Rule of Nopaltzin		
1175	Xolotl		Mazapan
1160	Departure from Aztlan	Tenayuca I	
			Coyotlatelco- Teotihuacan IV
1064	Destruction of Tollan (Teotihuacan)		
994	Huemac		Teotihuacan III
895	Quetzalcoatl dies	Gualupita II- Cuicuilco- Intermediate and Late Ticoman	Teotihuacan II
752	Foundation of Tollan	Early Ticoman	Teotihuacan I
600		Middle Zacatenco	
600-400	El Arbolillo II	Transitional Period	Copilco
400-0	Late El Arbolillo I		Gualupita I
	Intermediate El Arbolillo I	Early Zacatenco	
	Early El Arbolillo I		

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APPENDIX I

COMPARATIVE TABLE OF ARTIFACTS

FOUND AT PUEBLO AND EARLY VALLEY OF MEXICO CULTURES

	Pecos	Zacatenco	Ticomán
POTTERY			
Vessel wares	8 ¹	10 ²	13 ³
Human figurines	x	x++*	x+++
Human figurine types	4 ⁴	6 ⁵	8 ⁶
Animal figurines	x	x	x
Bird figurines	x	x	x
Miniature vessels	x	x	x
Whistles	x—†	x	x
Rattles	x—	x	x
Cornucopic objects	x	—	—
Bells	x	x	x
Beads	x	x	x
Pendants	x	x	x
Biconical objects	x	—	—
"Jack Stones"	x	—	—
Earplugs	—(x-?)	x	x+
Spindle whorls	x—	x—	—
Pot supports	x	—	—
Worked sherds	x	x	x
Tubular pipes	x	—	—
Elaborate pipes	x	—	—
Elbow pipes	x	—	—
Flutes	x	—	x—
STONE			
Projectile points without stems			
leaf shape	x	x	x—
triangular	x	—	—
Projectile points with stems			
tapering stem	x	x	x
Expanding stem wider than shoulder (a)	x	—	x—
(b)	x	x	x
Expanding stem narrower than shoulder	x	—	x

*+ signifies extreme emphasis on this trait.

†—signifies sporadic examples.

¹For Pecos these wares are according to Kidder, 1931, 11, and verbal information, polychrome and two-color glaze biscuit, black-on-white, black cooking, and three post-Conquest wares, dull-paint polychrome, polished red, polished black. On p. 11 Kidder (1931) gives "eighteen principal wares; ten of these are decorated and eight are undecorated." Chronological distinctions are used, so that glaze wares are divided into six categories, and biscuit ware into two. For the purposes of this tabulation, we have thought it better to list the wares according to composition.

²Vaillant, 1930a, Table II, the chief wares excluding chronological divisions are: bay, russet, white, granular white, blue-white, yellow-white a-b, white-on-red, black, early red-on-yellow, orange "lacquer."

³Vaillant, 1931, Table II, the chief wares excluding chronological divisions are: bay, red-on-yellow incised, red-on-yellow stick polished, lake-on-yellow, polychrome, polished red-on-white, polished red, white-on-polished red, black-brown, white, granular white, dun, black interior white.

⁴Kidder, 1932, 112-125.

⁵Major Types A, B, B-C, C, D, F; Minor Types 17.

*Major Types E, G, H, I, J, L, M, N; Minor Types 18.

APPENDIX I (*Continued*)

	Pecos	Zacatenco	Ticoman
Drills	×	×	×—
Knives	×	×	×
Pendants	×	×	×
Crescent-shaped objects	×	×	—
Scrapers	×	×	×
Blades	—	×++	×++
Axes, grooved	×	—	—
Axes, ungrooved	×	×	×
Mauls	×	—	×—
Pounders	×	—	—
Club heads	×	—	—
Notched pebbles	×	—	—
Rectangular objects	×	—	—
Hammerstones	×	×	×
Pot polishers	×	×	×
Floor polisher	×	—	—
Stone balls	×	×	×
Metates	×	×	×
Manos	×	×	×
Rubbing stones	×	×	×
Paint grinding stones	×	—	—
Griddles	×	—	?
Pot covers	×	—	?
Tablets	×	—	—
Arrow straighteners	×	—	—
Arrow smoothers	×	—	—
"Files"	×	—	—
Pipes	×	—	—
Images, anthropomorphic	×	—	×—
Images, zoomorphic	×	—	—
Medicine cylinders	×	—	—
Lightning stones	×	—	—
Phyllite objects	×	—	—
Painted slabs	×	—	—
Perforated slabs	×	—	—
Beads	×	×—	×—
Earplugs	—	×	—
Pendants	×	×	×
Mosaics	×	×	—
Unworked stone	×	×	×
ARCHITECTURE			
Communal house	×	—	—
Pyramid	—	—	× ¹
Slab tomb	—	×	—

¹Pyramids at Cuicuilco and Santa Maria Zacatepec and San Jose Sicaltepec in Puebla, Vaillant, 1931, 312, also at Tlaltenango, Morelos, Vaillant and Vaillant, 1934, 12, where there are more than three pyramids mentioned in the text.

APPENDIX I (*Continued*)

	Pecos	Zacatenco	Ticomán
BONE			
Awls	×	×	×
Spatulas	×	×	×
Needles	×	×	×
Four-sided tools	×	—	—
Matting tools	×	×	×
Flakers	×	×	×
Polishers	×	×	×
Rubbing tools	×	?	?
Scrapers	×	×	×
Side-scrapers	×	—	—
Musical instruments			
Flageolets	×	—	—
Whistles	×	—	—
Rasp sounders	×	×	—
Tubular beads	×	×	×
Tubes	×	×	×
Pendants	×	×	×
Teeth and claws	×	×	×
Turtle shell	×	×	×
ANTLER			
Shaft rubbers	×	×	×
Shaft handles	×	—	—
Tine implements	×	×	×
Flakers	×	×	×
Arrowheads	×	—	—
Awls	×	×	×
Ornaments	×	—	—
Matting tools	×—	×	×
SHELL			
Unworked	×	×	×
Beads	×	×	×
Pendants	×	×	×
Tinklers	×	×	×
WOOD¹			
Planting stick	×	—	—
Arrows	×	—	—
Bells	×	—	—
Weaving comb	×	—	—
Ceremonial objects	×	—	—
Feather box	×	—	—
Notched rasp sticks	×	—	—
TEXTILES¹			
Coiled baskets	×	× ²	—

¹Note that these are perishable objects.²Verbal information from Dr. A. V. Kidder who saw such a fragment in the show case at Copilco, D. F.

APPENDIX I (*Continued*)

	Pecos	Zacatenco	Ticomán
Twilled baskets	×	—	—
Twilled matting	×	×	×
Feather cloth	×	—	×?
Cotton cloth	×	×?	—
Piled fabric	×	—	—
String and yard	×	—	—
FOOD			
Maize	×	×	—
Squash	×	—	—
Peaches	×	—	—
MISCELLANEOUS PERISHABLE MATERIAL ¹			
Buffalo robes	×	—	—
Moccasins	×	—	—
Gourd rattles	×	—	—

¹Note that these are perishable objects.

APPENDIX II

SURVEYOR'S NOTES FURNISHED BY MR. THOMAS ROWE ON THE LEVELING OPERATIONS UNDERTAKEN IN THE SEASON OF 1931 AT EL ARBOLILLO

Ticomán to Ladrillera Torriello

B. M.		H. I.			
10.000	2.850	12.850			Bench-mark stone at Ticomán
			1.750	11.100	First turn to Aqueduct of Ticomán level of land
11.100	3.150	14.250			Turning point
			1.165	13.085	First turn along south bank of Río Remedios level of land
13.085	2.420	15.505			Turning point
			1.240	14.265	Level of land along south bank of Río Remedios
14.265	1.210	15.575			Turning point
			1.620	13.955	Level of land along south bank of Río Remedios
13.955	1.480	15.435			Turning point
			1.300	14.135	Level of land along south bank of Río Remedios
14.135	2.003	16.138			Turning point
			1.280	14.858	Level of land along south bank of Río Remedios
14.858	1.680	16.538			Turning point
			0.910	15.628	Level of land along south bank of Río Remedios
15.628	0.415	16.043			Turning point
			3.498	12.545	Level of land at Calzada Vallejo and bridge Guadalupe on Río Remedios
12.545	0.100	12.645			Turning point
			2.200	10.445	Level of land along Calzada Vallejo
10.455	0.712	11.157			Turning point
			1.462	9.695	Level of land along Calzada Vallejo
9.695	1.307	11.002			Turning point
			0.760	10.242	Level of land along Calzada Vallejo
10.242	0.115	10.357			Turning point
			0.525	9.832	Level of land along Calzada Vallejo
9.832	0.330	10.162			Turning point
			2.453	7.709	Level of land along Calzada Vallejo
7.709	1.635	9.344			Turning point

APPENDIX II (*Continued*)

			1.737	7.607	Level of land along Calzada Vallejo
7.607	1.531	9.138			Turning point
			0.140	8.998	Level of land along Calzada Vallejo
8.998	0.037	9.035			Turning point
			1.305	7.730	Level of land along Calzada Vallejo
7.730	1.790	9.520			Turning point
			1.966	7.554	Level of land along Calzada Vallejo
7.554	1.222	8.776			Turning point
			1.207	7.569	Level of land along Calzada Vallejo
7.569	1.161	8.730			Turning point
			1.408	7.322	Level of land along Calzada Vallejo
7.322	1.661	8.983			Turning point
			1.467	7.516	Level of land along Calzada Vallejo
7.516	1.467	8.983			Turning point
			1.482	7.501	Level of land along Calzada Vallejo
7.501	1.474	8.975			Turning point
			0.160	8.815	North side of Bridge on Calzada Vallejo and Rio Consulado level of land 7 kilometers from Ticoman
8.815	2.220	11.035			Turning point (April 13th, 1931)
			1.360	9.675	On north bank towards Tacuba along Rio Consulado level of land
9.675	1.375	11.050			Turning point
			1.165	9.885	Level of land along Rio Consulado
9.885	1.860	11.745			Turning point
			1.408	10.337	Level of land along Rio Consulado
10.337	1.811	12.148			Turning point
			1.626	10.522	Level of land along Rio Consulado
10.522	1.796	12.318			Turning point
			1.152	11.166	Level of land along Rio Consulado
11.166	1.452	12.618			Turning point
			0.878	11.740	Level of land along Rio Consulado

APPENDIX II (Continued)

11.740	1.240	12.980			Turning point
			1.461	11.519	Level of land along Rio Consulado
11.519	1.444	12.963			Turning point
			1.607	11.356	Level of land along Rio Consulado
11.356	1.593	12.949			Turning point
			2.303	10.646	Level of land along Rio Consulado
10.646	3.134	13.780			Turning point
			1.528	12.252	Level of land along Rio Consulado
12.252	1.762	14.014			Turning point
			1.317	12.697	Level of land along Rio Consulado
12.697	1.450	14.147			Turning point
			2.987	11.160	Level of land on Calle Moral a Tacuba estaca 11.16
11.160	2.033	13.193			Turning point
			0.566	12.627	Level of land along Calle Moral
12.627	1.395	14.022			Turning point
			2.621	11.401	Level of land across a field to corner of Fundacion Donde School on Sexta Avenida
11.401	3.275	14.676			Turning point
			0.576	14.100	On Boulevard Miguel Manuel Cervantes Saavedra level of land
14.100	3.320	17.420			Turning point
			0.592	16.828	Level of land on Boulevard Miguel Manuel Cervantes Saavedra
16.828	3.270	20.098			Turning point
			0.255	19.843	Level of land on Boulevard Miguel Manuel Cervantes Saavedra
19.843	2.834	22.677			Turning point
			3.365	19.312	Level of land on Boulevard Miguel Manuel Cervantes Saavedra
19.312	0.740	20.052			Turning point
			0.852	19.200	Level of land on Boulevard Miguel Manuel Cervantes Saavedra
19.200	2.181	21.381			Turning point
			0.454	20.927	Level of land on Cervantes Miguel Manuel Boulevard Saavedra

APPENDIX II (*Continued*)

20.927	1.698	22.625			Turning point
			0.012	22.613	Bridge of railroad Cuernavaca and Ladrillera Rivera (Torriello)
22.613	0.610	23.223			Turning point
			1.546	21.677	Level of land at Ladrillera Rivera (Torriello)
21.677	2.160	23.837			Turning point
			1.960	21.877	Level of land at Ladrillera Rivera (Torriello) Estaca
			3.735	20.102	Level of Tepalcates on line of occupation. Estaca
			3.490	20.347	Level of Tepalcates on line of occupation
			3.680	20.157	Level of Tepalcates on line of occupation
			7.580	16.257	Level of bottom of pit in the Ladrillera Rivera (Torriello) Approximately 13½ kilometers from Ticoman
					Mexico, D. F., Abril 14 de 1931 Thos. E. Rowe (Surveyor)
	<i>Leveling from Bench Mark 11.160 on Calle Moral to San Angel</i>				
11.160	2.986	14.146			Bench mark Estaca 11.160
			0.890	13.256	Level of land along Calzada Veronica
13.256	1.303	14.559			Turning point
			2.117	12.442	Level of land along Calzada Veronica
12.442	1.397	13.839			Turning point
			1.636	12.203	Level of land along Calzada Veronica
12.203	1.448	13.651			Turning point
			2.630	11.021	Level of land along Calzada Veronica
11.021	0.418	11.439			Turning point
			2.305	9.134	Gloreta Paseo Reforma y Av. Sonora level of land
9.134	0.552	9.686			Turning point
			1.930	7.756	Level of land along Av. Sonora
7.756	1.156	8.912			Turning point
			1.647	7.265	Level of land along Av. Sonora
7.265	1.132	8.397			Turning point
			1.272	7.125	American School (level of land)
7.125	1.517	8.642			Turning point
			1.503	7.139	Along Calzada Insurgentes level of land

APPENDIX II (Continued)

7.139	1.648	8.787			Turning point
			1.151	7.636	Level of land along Calzada Insurgentes. Indelible pencil mark
7.636	1.819	9.455			Turning point
			0.254	9.201	Along Calzada Insurgentes (Estaca) level of land
9.201	3.560	12.761			Turning point
			0.038	12.723	Puente Rio Piedad land of level
12.723	2.401	15.124			Turning point
			3.603	11.521	Along Calzada Insurgentes Prado level of land
11.521	0.310	11.831			Turning point
			1.967	9.864	Level of land along Calzada Insurgentes
9.864	2.140	12.004			Turning point
			0.344	11.660	Level of land along Calzada Insurgentes
11.660	2.155	13.815			Turning point
			0.229	13.586	Level of land along Calzada Insurgentes
13.586	3.822	17.408			Turning point
			0.248	17.160	Level of land along Calzada Insurgentes
17.160	2.829	19.989			Turning point
			0.633	19.356	Level of land along Calzada Insurgentes
19.356	2.178	21.534			Turning point
			1.795	19.739	Level of land along Calzada Insurgentes
19.739	2.623	22.362			Turning point
			0.693	21.669	Level of land along Calzada Insurgentes
21.669	2.750	24.419			Turning point
			0.273	24.146	Level of land along Calzada Insurgentes
24.146	3.588	27.734			Turning point
			0.060	27.674	Level of land along Calzada Insurgentes
27.674	1.430	29.104			Turning point
			1.230	27.874	Level of land along Calzada Insurgentes
27.874	3.778	31.652			Turning point
			0.231	31.421	Level of land along Calzada Insurgentes
31.421	3.426	34.847			Turning point
			0.746	34.101	Level of land along Calzada Insurgentes

APPENDIX II (*Continued*)

34.101	1.324	35.425			Turning point
			3.213	32.212	Level of land along Calzada Insurgentes
32.212	1.370	33.582			Turning point
			0.330	33.252	Level of land along Calzada Insurgentes
33.252	0.784	34.036			Turning point
			0.747	33.289	La Bombilla San Angel
33.289	2.021	35.310			Turning point
			0.327	34.983	Level of land along Streets of San Angel towards quarry
34.983	3.071	38.054			Turning point
			0.600	37.454	Level of land along streets of San Angel towards quarry
37.454	3.222	40.676			Turning point
			2.660	38.016	Level of land along streets of San Angel towards quarry
38.016	1.780	39.796			Turning point
			2.416	37.380	Level of land along streets of San Angel towards quarry
37.380	1.631	39.011			Turning point
			1.451	37.560	Level of land along streets of San Angel towards quarry
37.560	0.950	38.510			Turning point
			2.740	35.770	Level of Tepalcates at San Angel on line of occupation
			2.690	35.820	Level of Tepalcates at San Angel on line of occupation
			2.445	36.065	Level of lava (bottom)
				42.139	5.97 is top of lava measured with plumb-bob
			1.329	37.181	Bench-mark for Tlalpam (Estaca)

Note: Top of lava is 5.97 above elevation 36.065, 42.139, measured vertically, measured with plumb-bob.

Mexico, Abril, 1930

Thos. F. Rowe

Leveling from Bench Mark to Tlalpam to Pyramid at Tlalpam across the Mountains of San Angel

42.139	3.845	45.984			Bench-mark to Tlalpam
			0.020	45.964	Across the Mountains of San Angel
45.964	2.575	48.539			Turning point
			4.845	43.694	Across the Mountains of San Angel
43.694	0.180	43.874			Turning point
			3.941	39.933	Across the Mountains of San Angel
39.933	0.925	40.858			Turning point
			5.355	35.503	Across the Mountains of San Angel
35.503	4.451	39.954			Turning point
			2.120	37.834	Estaca en Arroyo

APPENDIX II (*Continued*)

37.834	3.450	41.284			Turning point
			1.910	39.374	Across the Mountains of San Angel
39.374	3.210	42.584			Turning point
			0.915	42.389	Across the Mountains of San Angel
42.389	2.334	44.723			Turning point
			0.300	44.423	Across the Mountains of San Angel
44.423	4.644	49.067			Turning point
			0.025	49.042	Across the Mountains of San Angel
49.042	4.795	53.837			Turning point
			0.060	53.777	Across the Mountains of San Angel
53.777	3.850	57.627			Turning point
			0.072	57.555	Across the Mountains of San Angel
57.555	4.972	62.527			Turning point
			0.120	62.407	Across the Mountains of San Angel
62.407	5.425	67.832			Turning point
			0.150	67.682	Across the Mountains of San Angel
67.682	4.972	72.654			Turning point
			0.170	72.484	Across the Mountains of San Angel
72.484	3.950	76.434			Turning point
			0.395	76.039	Across the Mountains of San Angel
76.039	3.065	79.104			Turning point
			0.104	78.964	Across the Mountains of San Angel
78.964	3.945	82.909			Turning point
			0.929	81.980	Across the Mountains of San Angel
81.980	2.054	84.034			Turning point
			2.000	82.034	Across the Mountains of San Angel
82.034	0.662	82.696			Turning point
			2.813	79.883	Across the Mountains of San Angel
79.883	0.850	80.733			Turning point
			3.890	76.843	Across the Mountains of San Angel
76.843	0.555	77.398			Turning point
			4.918	72.480	Across the Mountains of San Angel
72.480	0.535	73.015			Turning point
			4.761	68.254	Across the Mountains of San Angel
68.254	0.070	68.324			Turning point
			0.380	67.944	Loose earth on top of Pyramid
67.944	0.378	68.322			Turning point
			1.567	66.755	True top of Pyramid
				52.190	Top of lava. Measured with transit
				49.450	Bottom of lava. Measured with transit
				48.390	Line of Tepalcate. Measured with transit
				46.580	Bottom of Pyramid. Measured with transit

Mexico, D. F., Abril 30 de 1931
Thos. F. Rowe.

