

drank. A white man will drink more water in one day than his native guide will in three days, and the native will be carrying a heavy burden while the white man is riding comfortably in saddle or volan.

We also note the significant fact that where the groups are built by the side of cenotes few, if any, of these subterranean chambers are found, while they are found by the score in groups not so favored by nature. The now ruined group of Labná is an example of this latter class. Built far away from any cenote, — the nearest one so far as known being the famous Loltun,\* Cave of the Stone flowers, nearly twelve miles distant, — the inhabitants had to depend entirely upon the rainfall for their supply, so far as we now know.

Every one of the numerous hills that surround the group had its crown levelled and its steep sides cut into terraces, and every terrace examined shows traces of having had one, and sometimes two, of these reservoirs.

A wide area around the principal structures now standing is covered with mounds and terraces, and interspersed among these are subterranean reservoirs, one at least for every mound or terrace. Many are now difficult to find; some are hidden beneath the débris of the buildings that now form the mounds; others are almost obliterated by the caving in of their walls and the washings of centuries. Several are yet in shape for study, and one, which is represented by Figs. 1 and 2 from photographs and drawings made during the expedition of 1889, is so nearly intact that it could easily be restored to usefulness. Some were concealed. Their mouths were sealed by a heavy stone slab and cemented with thick stucco.

It seemed desirable that these curious structures should be investigated, and that their contents, whether detritus or material intentionally placed by man, should be preserved and studied.

This was neither an easy nor a safe undertaking. In fact, one of the narrowest escapes of my life came to me in the semi-darkness of one of these underground vaults. As one is being lowered by a rope down through the narrow well-like opening into the darkness beneath, there is always the charming uncertainty as to whether a viper's head will be thrust into one's face on the way down; whether the whir of a rattlesnake's rattle or the skurry of a nest of tarantulas or scorpions will be the first greeting on touching the chamber floor. The work was done, however, and fully sixty of these structures were subjected to investigation. Thirty-three of these yielded successful results, and the remainder were found to be either in a state of formation or else so entirely destroyed that even their original outline could not be traced.

Our method of working was as follows: First, carefully opening a sealed chultun, a lighted candle was lowered into the darkness beneath as a test for mephitic gas. A bunch of inflammable grass would have served

\* See Report on Cave of Loltun, Memoirs of the Peabody Museum, No. 2.

better, but as the charred grass would be scattered among the material accumulated upon the chamber floor and might thus cause doubt as to the authenticity of any charred material found actually in place, I deemed it best to allow no chance for doubt, and so used only sperm candles, the droppings of which could not be confounded with any other substance. A large bellows and a long flexible rubber tube formed a very effective means of replacing the mephitic layer with good, fresh, even if dusty, air. This enabled us to work with some degree of composure, although no amount of care could make the work in the close vault anything but intensely disagreeable. The least movement, the mere action of the expressed air from the tube, raised clouds of impalpable dust atoms, the accumulation of centuries. Alternate outside and inside work was the only available method by which the work could be carried on. Commencing at the extreme outer edge of the deposit upon the floor of the chamber, the excavation was carried on in diagrammed, vertical sections, each section being excavated by candle light with hand-brush and small trowel. The refuse material was then hoisted out of the chamber into the light of day, where it was passed through a large, finely-meshed sieve, and carefully scrutinized for specimens.

CHULTUN No. 1 (Plate I. Fig. 1), situated near the northeast corner of Mound 8, was the first chamber to be excavated. This chamber was closed by a large square stone placed over the mouth and firmly cemented into position by the usual cement of the ancients, — a mixture of one part slaked lime to two parts zahcab. This had then been covered over by loose rubble, over which had grown the jungle and large trees. It seems to have been originally one of the zahcab pockets before described. It is irregular in shape, fifteen feet in diameter at the base, and twelve in height to the circular opening, which is one foot six inches in diameter, with a height of three feet six inches, measuring from the termination of the orifice in the apex of the chamber roof to the surface of the terrace.

The accumulation of material on the floor was three feet deep directly under the orifice, and two feet deep near the chamber walls. This low mound-shaped accumulation was covered three inches deep with fine white dust, — the depositions and borings of myriad insect larvæ in the roof and walls of the chamber. The accumulation upon the reservoir bottom bore no evidence of stratification or gradual deposition save only in the upper six inches, which was a mixture of fine plaster particles, insect and reptile casts, mouse and iguana bones, snail shells, beetle wings, and spider cells. Directly upon the bottom of the reservoir was a large stone collar, similar to the one illustrated on Plate IX. Fig. 2. It was circular in shape and very smoothly finished. This collar had evidently been purposely broken, torn from its place, probably at the mouth of the chultun, and thrown in upon the reservoir floor. Close by it was found a circular stone, a disk that when placed over the restored collar just covered the central orifice. Thus

we get a presumably correct idea of the methods the ancients used to prevent contamination of the stored water.

Mixed ashes and earth covered the floor to a depth of an inch, and in places nearly an inch and a half. In this deposit were found potsherds of various forms and patterns, a crystal bead (Plate X. Fig. 25), a bead of lime cement (Plate X. Fig. 36), and a fragment of an obsidian knife. In the earth immediately above this ash mixture were found potsherds, bones of animals and animal teeth, human heads in terra-cotta, and a human tooth. Fragments of human bones were also found, but very much decayed. In the next two feet of material were found an animal's head of terra-cotta (Plate XI. Fig. 15), a double whistle of terra-cotta (Fig. 3), and a portion of a cutting implement of bone. Among the most interesting of the specimens found was the mouthpiece and upper portion of a whistle of terra-cotta ornamented with a human head bearing an elaborate head-dress (Plate XII. Fig. 21).

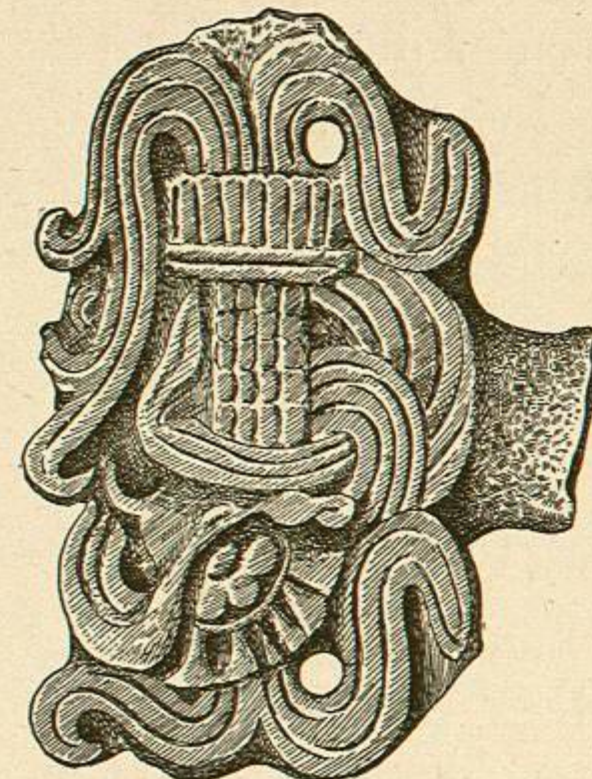


FIG. 3.—DOUBLE WHISTLE OF TERRA-COTTA, CHULTUN 1. †

CHULTUN No. 2 (Plate I. Fig. 2), situated at the southern intersection of Mounds 3 and 4, was carefully sealed in the same manner as No. 1. The mound-shaped accumulation was of the same general character as previously described. The first foot of material seemed to have been carefully placed, and the rest thrown in carelessly. In the first foot above the actual floor were found potsherds, sea-shell pendants, beads of shell and lime cement, and human teeth and bones much decayed. In the remaining superimposed deposit were found potsherds, terra-cotta heads, human and animal, fragments of knives of obsidian and flint, a smooth ball of stone, bone beads, a pin or lip-plug of shell, the engraved shell disk shown in Fig. 4, and fragments of terra-cotta musical instruments. A whistle modelled in the form of a monkey (Plate XIII. Fig. 1, a), a finely polished washer-shaped object made from iron pyrites, the upper portion of a large whistle ornamented with a human head (Plate XII. Fig. 19), and the terra-cotta heads illustrated on Plate XI. Fig. 17, and Plate XII. Figs. 1, 2, and 8, were also taken from this reservoir.



FIG. 4.—ENGRAVED SHELL DISK, CHULTUN 2. †

On the northern wall the figure of a duck in high relief was moulded in the plastic stucco (Plate I. Fig. 2). On the walls of chultunes numbered 5, 9, 15, 27 are other similar figures of various animals.

CHULTUN No. 3 (Plate I. Fig. 3) is situated fifty feet south of the one just described. This was also sealed, but less carefully. The stone had become

loosened by falling material and large roots had grown up within. There was the usual mound-shaped deposit about four feet high. The specimens found are as follows: A few potsherds, many fragments of objects in terra-cotta, including whistles (one of which is illustrated on Plate XIII. Fig. 1, f), cylindrical pieces with perforation through one end, a fragment of a circular stamp, several small terra-cotta balls, finely formed terra-cotta beads painted black, beads of shell (including those shown on Plate X. Figs. 9 and 11), beads of lime cement (Plate X. Figs. 30, 37, 46), stucco ornaments (Plate X. Figs. 48-50), and a portion of an engraved bone ring. Several heads in terra-cotta were found, three of which had been used as the upper portions of musical instruments (Plate XII. Figs. 17, 18, 20). Two other heads are illustrated (Plate XII. Fig. 9, and Plate XI. Fig. 19), a double whistle representing two monkeys (Plate XIII. Fig. 1, b), a number of shells of *Oliva* with the apex of each ground away for the passage of a cord, worked shells of several species, obsidian knives, a thick leaf-shaped implement of chalcedony (Fig. 5), and a broken instrument used in preparing agave fibre (similar to the one represented in Fig. 7).



FIG. 5.—CHIPPED IMPLEMENT OF CHALCEDONY, CHULTUN 3. †

Three small clay vessels (Plate XIII. Fig. 2, a, b, c) were also found, — one at one foot six inches in the deposit above the floor, and the other two six inches higher up in the mass. They were perfect except that the largest one had its bottom perforated, as is often the case with vessels found in the ancient graves of Yucatan. The position in which they were found leads to the belief that they were once placed upright in the reservoir, and that the succeeding down rush of material, as it was thrown in, pushed them onto their sides. Below and around them were found the above-mentioned specimens, which were not arranged in any order, but seemed to have been thrown in at the same time as was the earth material. The soft character of this earth, a dark red loam, prevented the destruction of all, except the most delicate objects, and formed a yielding cushion around the small clay vessels.



FIG. 6.—FLINT KNIFE FROM CHULTUN 4. †

CHULTUN No. 4 (Plate I. Fig. 4) is situated two hundred and ninety feet southwest of "Old Edifice Group." The deposit was of the usual form and dimensions. The excavation yielded potsherds, an ornament of shell (Plate X. Fig. 17), human teeth, and the inner por-