

in the caves, is different from that of the builders of the ancient city of Copan not many miles away, unless the pottery vessels were made for special rites connected with the caves.

All the illustrations in the two memoirs are from drawings by Mr. Gordon or reproductions of his photographs. The specimens figured or specially alluded to in the report form only a small portion of the collection made by Mr. Gordon. The entire collection is arranged in the Museum, and is open to all students.

As in former years, the expense of these explorations and of the publication of these memoirs has been met by the contributions of generous patrons of American research. Mr. Charles P. Bowditch and the Honorable Stephen Salisbury have shown a special and substantial interest in the Central American explorations. To Mr. Bowditch I am personally indebted for his unceasing devotion to this research, and for his personal supervision of the many details involved in carrying it on:

F. W. PUTNAM,
Curator of the Museum.

HARVARD UNIVERSITY, CAMBRIDGE,
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RESEARCHES IN THE ULOA VALLEY.

In October, 1894, I arrived at San Pedro Sula, on my way from Puerto Cortez to Tegucigalpa in the Republic of Honduras. The rains which had fallen heavily for some weeks still continued, the streams were swollen, and the condition of the roads was discouraging, — a state of affairs that made travelling extremely difficult. It was during the delay caused by the difficulty of obtaining animals for such a journey that I first received intelligence of prehistoric remains on the Uloa. A resident of the town showed me a specimen of painted pottery which resembled specimens from Copan already familiar to me. The owner of this specimen informed me that it was brought to him from the Uloa River by an Indian who claimed to have found it on the bank of the stream where it had been washed out during a flood. The locality where it was found was given as *Playa de los Muertos*, or Shore of the Dead, — a place that would seem to have received its name from circumstances connected with the buried relics of a former population, which are found in this as well as in other localities along the course of the river. It is probable that when the name was first applied, it was common to see human bones as well as pieces of pottery unearthed by the annual floods, which tear away the banks and sometimes change the course of the river for miles. Even at the present day an occasional skull or fragment of bone is exposed by the same cause.

Before proceeding on my journey I rode from San Pedro to Playa de los Muertos, a distance of about twenty-five miles. The way lay over a level country consisting largely of deep bottom lands, very rich and covered with luxuriant vegetation. On arriving at the place I found that the river, overflowing its bounds, had partly inundated the site of the little native village situated upon its bank, driving the inhabitants from their flimsy huts of poles and thatch. It was evident that further investigations would have to be postponed till a different season.

The explorations which form the subject of this report were carried on in May and June, 1896, and from March till June, 1897. These months being in the dry season, the river was then at its lowest, and afforded the best opportunity for making the investigations.

The two rivers, Uloa and Chemilicon, draining separate mountain systems in the interior, converge as they approach the coast, and, traversing the broad plain which forms their common valley, empty into the Gulf of Honduras at points not more than eight miles apart. At one time, perhaps not very remote, when their respective volumes of water were much greater than now, the two rivers became united long before they reached the coast, and formed a broad stream whose waters were spread over a great part of the region that lies between the present water-courses. Then, when the volume of water decreased, owing to climatic changes dependent on variations of geological conditions or other causes,* the point of confluence advanced gradually towards the coast until at last the two streams reached the sea by independent courses and by different mouths. The waters of the Uloa and its tributaries, which form the larger stream, confined themselves to the east of the valley, and the Chemilicon became confined to the west. It is not probable, however, that their separate existence when once established remained constant. Subsequent variations and temporary changes in the conditions governing the amount of discharge caused their swollen currents to reunite at different periods. Even at a time so recent as to be within the memory of the present inhabitants, owing to a sudden increase in their respective volumes, the two streams became united for a short time near their mouths. In times more remote this reunion would have been much more extensive, and would have involved the flooding of a great part of the valley and the destruction of any human society that may have been developed on its productive soil. It will be well to have these considerations in view when we come to examine the actual conditions underlying the superficial aspect of this region to-day.

The whole valley is covered with an almost unbroken forest, and there is not to be found above the surface more than very insignificant vestiges of a former population; nor is there in its whole extent a town or a village

* The changes here indicated are apparent from the conformation of the valley and the continuous deep river deposits from the east of the Uloa to the west of the Chemilicon. The interior of the country furnishes abundant evidence of similar changes uniform in character with the drying-up process, which according to numerous observations has been going on over the land surface of the earth through later geological and historical time. This evidence of a diminution in the amount of water standing and running in the interior of Central America, although not so marked as in many parts of the world, is nevertheless ample. The much broken Cordilleras are in many places intersected by deep cañons which could have been formed only by running streams of considerable volume, and which now contain water only for a short time and irregularly during the period of greatest precipitation. More striking are the signs of dried lakes. The wide depression known as the plain of Comayagua was at one time occupied by a lake whose boundaries are marked by ancient terraces and shorelines, and whose outlet was the Humuya, a branch of the Uloa. That there has been a perceptible change in the amount of flowing water in recent times would seem to be indicated by the presence in different localities of ancient village sites, marked by ruined houses and other structures of stone, upon the borders of what are now dried watercourses or channels containing water during a short part of the year only. Since there is at present no convenient water-supply for these long-abandoned communities, it is only reasonable to suppose that at the time when the sites were chosen the amount of precipitation was greater than it is now.

or a single hut that does not stand upon the buried relics of what must have been a very extensive and flourishing community. One can scarcely dig a drain or excavate a fox's hole without coming upon some relic of former industry. At San Pedro, along the whole line of the railroad that runs for fifty miles through the valley, or wherever excavations have been made for any purpose, the experience has been the same. It is not possible to excavate the whole valley, but where the rivers have cut their channels through the old alluvial beds, and particularly in the terraces of the Uloa, we have an opportunity of observing the conditions that have been described. In the lesser channel of the Chemilicon the same conditions pertain, but to a less extent.

Embarking at La Pimienta and passing down the Uloa in a canoe, the chief details that at first impress themselves on the spectator are as follows.

The course of the river is rather crooked, and at each turn the bank opposing the direction of the current and receiving all its energy, is undergoing constant encroachments, which in flood times are considerable. Consequently this bank takes the form of a vertical cutting, presenting a cross section of unconsolidated strata of sand and clay about thirty feet in height and lined on top with dense masses of manaca palms and other trees.

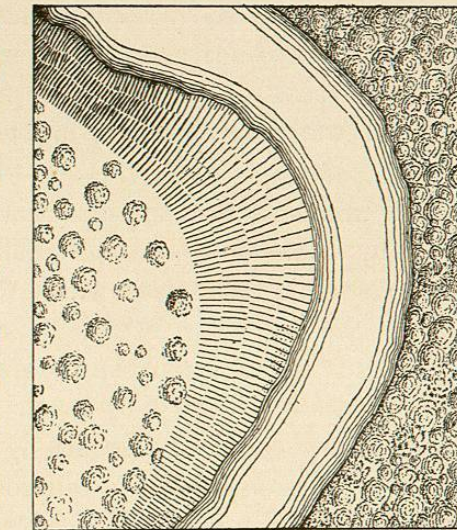


FIG. 1.—TYPICAL FORM OF RIVER BED.

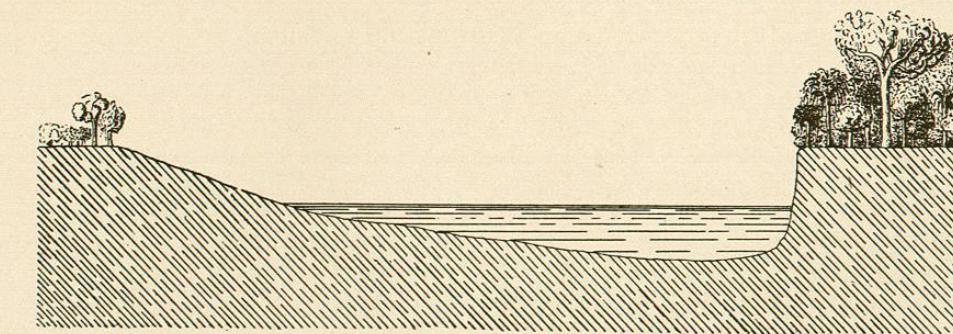


FIG. 2.—TYPICAL SECTION OF RIVER BED.

The opposite bank, which occupies the inside of the curve and is consequently receiving additional depositions from the river, takes the form of a sloping beach of sand and gravel, often attended with drifting sand and dunes. This is the typical condition, and serves to indicate the process that is going on (Figs. 1 and 2). These vertical banks, where the old alluvial

strata are freshly exposed and well in view, present the continuous spectacle of broken pottery and fragments of bone from the surface of the water up to within a few feet of the top. In places these objects are very numerous for stretches of several hundred feet, then diminishing gradually and sometimes almost disappearing for miles. They are most numerous in streaks or strata at various levels, with intervals of several feet between in which they are scarcely noticeable or entirely absent, as appears to be the case sometimes. In order to gain further knowledge of the situation, it was necessary to select the localities that promised the best results, and excavate. Since the details of the work, the methods employed, and the conditions involved remained the same throughout, it will be well to give only a summary of the work, and such incidents connected with it as may be of interest or importance, before proceeding to bring together the results in their proper relations.

The inhabitants of this region are different in many respects from the natives of the mountainous districts in the interior. Their ethnological antecedents would be difficult to trace, but I am convinced that there is an infusion of Carib blood which in its later constitution involves a strong Negro element. The physical resemblance to the modern Carib of the coast is in some individuals very noticeable, and in many respects the disposition of these people resembles that of the Carib; their exclusiveness and aversion to dealings with strangers are marked Carib traits. Since the latter are averse to mixing with people of different blood from their own and have a strong attachment to the salt water, the present instance of departure from deep-rooted customs must have been brought about by refugees or outcasts. For the rest, the racial antecedents of the people who are met with in the village communities on the banks of the Uloa River are derived from the Xicaque Indian and the Spaniard.

From La Pimienta to the mouth of the river there are twenty or thirty of these villages varying in size from half a dozen to fifty or sixty huts, often completely hidden among the trees and rarely attended with any clearing or cultivated fields. The inhabitants follow the usual occupation of doing nothing. There is abundance of fish in the river, and the forest is full of game, but they seldom take the trouble of procuring either, preferring to subsist on green plantains alone. In respect of industry they certainly do not take after their Carib progenitors.

The village of Santana is situated in a bend of the river where it makes a large loop, affording long stretches of high vertical banks, and therefore offering a suitable field for excavation, since by passing under the banks in a canoe the most likely spots could readily be chosen. Here the three most important excavations were made.

After a clearing had been made on the margin of the bank at the point selected, an arbitrary stratum four or five feet in depth was removed

over an area extending one hundred feet along the edge of the bank and an equal distance in the other direction. Then a second stratum of the same depth was removed, and so on down to the level of the water. In the first of these strata there were few objects. In an excavation at Playa de los Muertos the objects appeared to continue in increasing numbers, from their first appearance down to the level of the water; but it must be said that the conditions here were not so favorable for observation, as it rained almost continually while the work was in progress, and the sides of the excavation were constantly falling in. We will therefore proceed to a consideration of Excavations 2, 3, and 4.

In No. 2 the objects occurred in three principal layers, each about two feet thick. The first occurred at a depth of eight feet, the next at a depth of fifteen feet, the third at a depth of twenty-five feet. These layers were not clearly defined, however, and the intervals also contained objects, though in much smaller numbers. These objects did not differ in general character in the different layers, either in this excavation or in the others. They grew less numerous towards the bounds of the excavation, as indicated on the face of the bank, and almost disappeared in every direction; but not entirely, for no matter how far the excavation was carried something would be found at intervals. It will be understood that the site of each excavation and its dimensions were determined by indications on the face of the bank.

In No. 3 there were again three principal layers, at depths of twelve, twenty, and twenty-five feet. The last was in this case by far the most extensive of the three.

In No. 4 the objects occurred in four principal layers, at depths of six, twelve, eighteen, and twenty-six feet. In the case of the first of these layers the greater part of the objects occurred in a thickness of one and one-half feet. In the second they occurred principally in a range of three feet. The third was about the same as the first, and the fourth smaller.

In general there was an interval between the different layers in which scarcely any relics occurred, and it is also to be noted that the lower limit of each layer was better defined than the upper; that is to say, in going downwards the objects increased in numbers more gradually and ended more abruptly; but in no case could you say where the layer began or ended. It is impossible to say how far the relics continue below the bed of the river, but that they continue below the surface of lowest water is evident. In all cases the objects, which consisted chiefly of fragments of pottery, were distributed through, and so intimately associated with, the strata of sand and clay in which they were embedded that they had every appearance of having been laid down simultaneously with these strata. The stratifications were fairly well defined, and though somewhat uneven were continuous and horizontal.