

it from being compressed and hardened; and the water brought to the caves for use would have to be taken from the stream and raised with difficulty to a height of several hundred feet; consequently it would be used carefully and with little waste, and hence there would not be so much dampness attending the domestic life of the people as there usually is under ordinary conditions.

The presence of the mortuary chamber with so many bones, as well as the burial in the outer chamber of Cave 3, would seem to indicate a constant occupation or even seclusion. But we know, from the writings of the early Spanish priests, that among the Maya tribes of Central America there was an extensive cave cult, devoted to the worship of a cave god, and the rites and ceremonies were performed in caverns. They are probably identical with the so-called Nagualists whose holy places and sacred objects, says Brinton,* were in caves and deep rock-recesses and not in artificial structures. Moreover, according to the same author, they disposed of the bodies of the priests of their cult in the same caverns where they held their sacred mysteries.†

As to the age of these relics and the period to which they belong, there is little to give us any information, or to determine the relative place in history of the people they represent. Whether they preceded those who built Copan, came after or were contemporaneous with them, we have no data whatever for determining. The condition of the bones and of the wooden object, though not indicating of necessity any very great antiquity, proves they are of no very recent date, while the accumulation of a deposit from the decomposition of the rocks without the aid of moisture or vegetation, the formation of a stalagmite upon a bed of ashes and the subsequent deposition of a layer of dust argue a considerable antiquity. If we are to suppose these people were distinct from the builders of Copan, then where are they to be traced? where else are their remains to be found? May it not be (to hazard a guess) that these cave relics belong, after all, to the same period as Copan itself and are remains of the Copan people, or the devotees of some old cult among them whose temples were the caves and whose vessels used in the ritual were of a design and character exclusively their own.

As for the natives now living in the country, they neither knew of the existence of the caves nor exhibited any interest when they were made known to them, except in the fear that they displayed when asked to enter, which can be accounted for as the natural attitude of an ignorant and super-

* Daniel G. Brinton, *Nagualism*. Phila. 1894. Sec. 24.

† *Ibid.*
The same author states (*Myths of the New World*, New York, 1868), on the authority of Gumilla, that the Caribs preserved the bones of their dead hung upon the walls and doorways of their dwellings, like family armor and insignia; and the learned doctor adds, with an unconscious humor akin to that of the enthusiastic preacher who prayed the Lord to remember the people of uninhabited lands, that "when the quantity of these heirlooms became burdensome, they were removed to some inaccessible cavern and stowed away with reverential care" (page 256).
The Caribs, however, were a coast people, and are not known to have penetrated into the interior.

stitious people — with whom the devil is not only the ever-active enemy of mankind, but is responsible for everything not readily comprehensible to their minds — towards places of such a doubtful character as dark underground caverns.

CONTENTS OF CAVE POTTERY.

THE jar (Plate I, b.) from Cave 3 contained cremated bones of some small animal (too fragmentary to be identified), also a few charred fragments which are probably remains of an infant.

The jar (Plate I, c.) contained bones of a number of small rodents of different species. These bones are very old, but whether or not they underwent partial cremation is doubtful, for while some of the bones seem to show traces of fire, it is by no means certain that they do.

The jar (Plate I, d.) contained a few cremated fragments of the bones of a child, and a great number of bones of small rodents like those in the above-mentioned vessel. These latter retain what appear to be traces of fire, and I am inclined to regard them as having been subjected to partial cremation.

These bones of animals found in the pottery vessels from the cave indicate surely a custom which belonged to the people, of placing in the urns which were put with the dead the remains (cremated or otherwise) of certain species of small animals (generally rodents, if not always). The presence of the partially cremated remains of a child in one of the jars, and what appears to be the same thing in another, suggests that they are cinerary urns in which the cremated remains of children were placed, together with those of the animals above mentioned. It is possible, however, that the human remains may have fallen in, as the jars when found were among a great quantity of calcined human bones, while the animal bones, which in any case are too numerous to have come there accidentally, were found only inside the jars; and the signs of cremation, which in some cases are unmistakable, show that the animals to which they belonged were not intruders at a time subsequent to the burials.

NOTE ON THE FORMATION OF STALAGMITE.

The stalagmite formation found in Cave 3, chamber 2, over the remains of a fire and containing fragments of burnt bones embedded in its under side, furnishes no accurate measure of age, although it may imply a considerable lapse of time.

Stalagmitic growth is irregular, and depends upon a variety of conditions such as the amount of rainfall and the quantity of carbonic acid gas in the air. These conditions are variable, the amount of rainfall varying with locality, and the quantity of carbonic dioxide in the atmosphere depending upon the quantity of vegetation on the surface. The raindrops, taking up carbonic acid in their passage through the air or

in percolating through the surface soil, acquire thus the power of dissolving limestone through which they pass, and the carbonate of lime thus taken up is deposited in the interior as stalactites and stalagmites when the water evaporates. Thus the rate of growth depends also upon the amount of evaporation, for if the dripping water were allowed to run away or to become absorbed by the floor of the cave, it would carry most of its charge of lime with it. Therefore in a cave where the conditions are damp and the temperature low, the rate of growth would be slow, while in a cave containing less moisture and with a temperature relatively high the growth of calcareous deposits would be correspondingly rapid.

The conditions as regards temperature and humidity in Cave 3 at Copan are such as would favor rapid growth; while the amount of annual rainfall and the quantity of carbonic acid in the air are probably favorable to the same end.

The stalagmite under consideration had acquired a thickness of six inches, and with its corresponding stalactite was the only evidences of the entrance of water at any time. Its growth had long been stopped. It had partly decomposed, and had become covered with about an inch of dust from the decomposition of the walls of the cave.

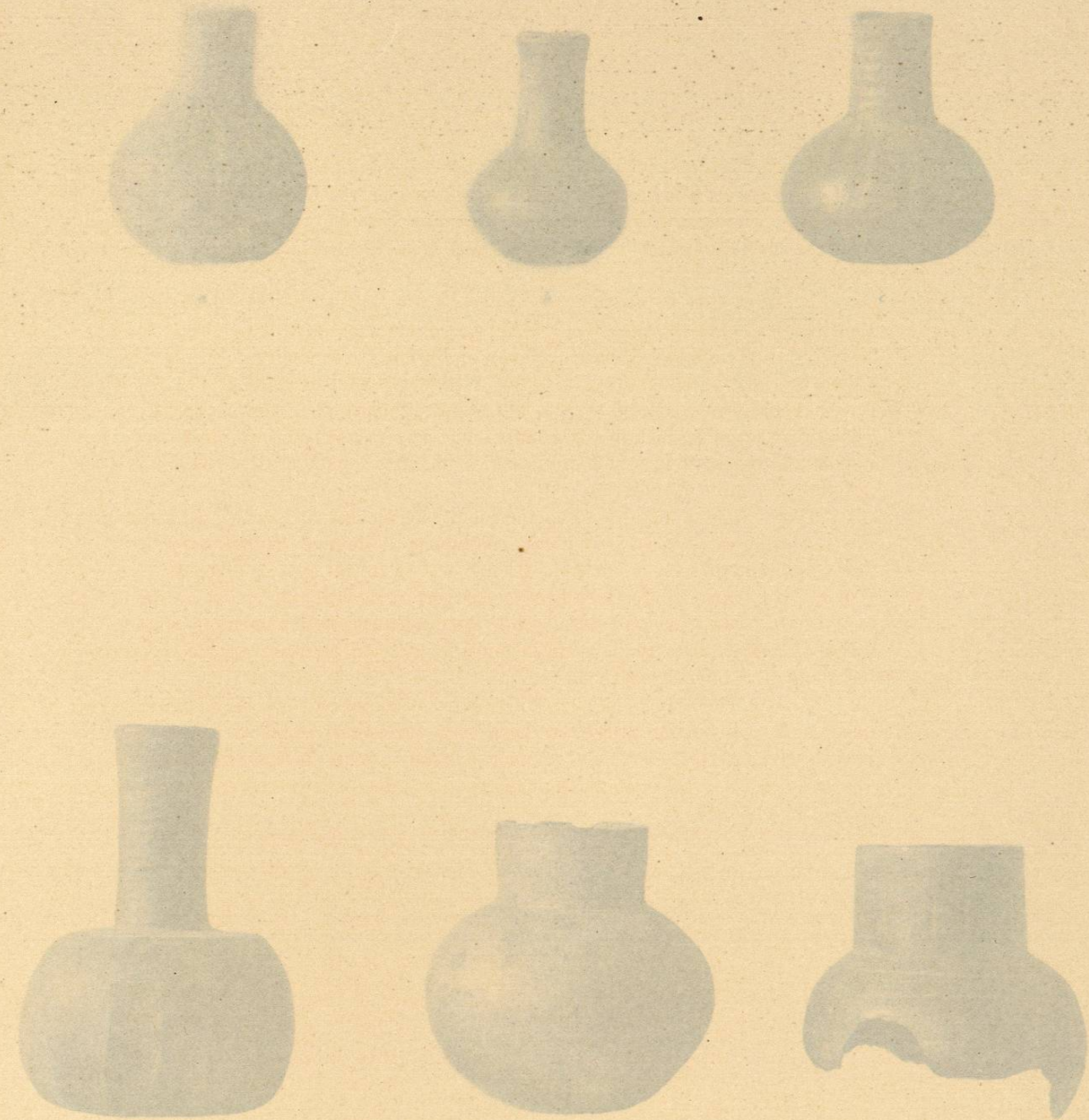
It is not easy to make an estimate of the time that it took for these various phenomena to take place, data on the subject of stalagmitic formation being scarce.

When Kent's Cavern near Torquay in Devonshire was opened in 1825, inscriptions bearing the dates 1604, 1615, and 1688 were found upon the walls; the oldest of these dates was covered with a thin stalagmitic accretion showing an increase of one-twentieth of an inch in two hundred and fifty years.* If such an instance were taken as a standard, it would give a period of thirty thousand years to the formation of the stalagmite in question.

This of course would not do; the conditions which would determine the growth in the two cases are very different. Although the annual rainfall is probably not very different, and the amount of carbonic acid in the air may be taken as the same, the average temperature, which is a very important determining factor, is very different in Devonshire and Honduras, while the conditions pertaining in the interior of Kent's Cavern, where there is much moisture and low temperature, are the reverse of those pertaining to Cave 3.

In the Cave of Ingleborough, where rapid evaporation is caused by air currents, a stalagmite on which observations have been made since 1839, has been growing at a rate of about three-tenths of an inch annually. It is evident, therefore, that the presence of a few inches of stalagmite is of little value in determining lapse of time.

* Transactions of the Edinburgh Geological Society, 1886-87.



POTTERY FROM CAVERNS OF COPAN.