

These experiments show that the relative efficiency of the different parts of the spectrum of a carbon arc light for the production of heliotropic curvatures in the animal *Eudendrium* and in the seedlings of the plant *Avena* is practically identical.

¹ Blaauw, *Rec. des Trav. botaniques Néerlandais*, 5, 209 (1909).

² Loeb and Ewald, *Zentralbl. f. Physiol.*, 27, 1165 (1914).

ARCHAEOLOGY OF BARBADOS

By J. Walter Fewkes

BUREAU OF AMERICAN ETHNOLOGY, SMITHSONIAN INSTITUTION

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Our knowledge of the extent, character, and relationship of the prehistoric population of Barbados is very indefinite. It is not known whether the island was inhabited when discovered by the Portuguese in 1505, but there is every reason to believe it was, for a few aborigines still remained when it was colonized by the English over a century later. The existence of a native population is shown by Lignon's map published in 1657, thirty-one years after the English landed at Holetown, on which we find legends referring to Indian settlements. Several writers assert that while a limited number of Caribs were found by the first English colonists, these should be regarded as transient visitors from neighboring islands, rather than permanent occupants.

Archaeological evidences of a considerable prehistoric population in Barbados before the advent of Europeans are somewhat more definite than historical. These have already been presented by Greville T. Chester, and other archaeologists who have described many shell celts collected on Barbados. They have also brought to the attention of students numerous village sites that show evidences of a long continued occupation.

In a brief reconnaissance* made on Barbados by me in 1902, an examination was made of the archaeological evidence and data gathered bearing on the age and nature of the culture it revealed. An attempt is here made to determine the relation of this material to that found on the other West Indies. I am convinced from this examination that Barbados had a large local population in prehistoric times,

*These studies were made under the auspices of the Heye Museum of New York and the Bureau of American Ethnology of the Smithsonian Institution; a more complete account, amply illustrated, will be published later by the Bureau.

and that its culture, with certain significant differences, resembled in general that on the other West Indies.

The presence of an aboriginal population in Barbados is indicated by the numerous prehistoric objects collected in caves, natural and artificial, mounds, middens, and other village sites. The number of prehistoric implements found in these localities on Barbados, is so large that there can be no doubt that the island once had a great aboriginal population. These objects were made of shell, and were formerly so abundant that, according to several informants, they were ground up and used for road beds. Even now a considerable number can be secured from the natives at a few pennies apiece, for the asking.

There are several well-marked types of shell implements, so characteristic that there is no doubt they are of local manufacture. Stone celts are very rare for the reason that suitable material for their manufacture does not exist in any place on the island. The few that occur were evidently brought to Barbados from over the sea. This abundance of shell implements and relative paucity of those made of stone has an important bearing on whether the aborigines were transient visitors or permanent inhabitants. They must have been locally made by the latter, for shell implements are rare on the nearest islands where stone implements are very abundant.

Evidences that the aborigines of Barbados formerly inhabited natural caves are many. On the roofs of these caves there still remain marks of smoke indicating former fires, while in their floors, especially near the entrance, numerous artifacts have been excavated. Joseph Forte found over a hundred implements in one cavern, 350 feet above the level of the sea. Although the material out of which they were made is different, the forms of these objects show that the culture of the cave dwellers resembled that of cave people found elsewhere in the West Indies, although much more varied.

While there is nothing in the natural caves and their artificial contents which shows that the aboriginal culture of Barbados was exceptional, the claim that artificial caves exist is important; for if it can be successfully proved that the aborigines made these caves, Barbados is the only West Indian island where artificial cave dwellings were made. The existence of this kind of cave from its unique character is naturally doubted by many, and while some writers deny their artificial origin, or ascribe them to Europeans, others take the opposite view. The examinations made by me lead me with some hesitation to adopt the latter conclusion.

Three groups of artificial caves, supposed to have been the work of historic aborigines, were seen by me on my visit to Barbados. One of these, and the most problematical, has been known for several centuries from its site as Indian Castle; the others are pit-like excavations near Bridgetown on the right bank of Indian River, and at Freshwater Bay.

The so-called Indian Castle is situated northeast of Speightown, on the Pleasant Hill Estate, about three miles due east of Six Mens Bay. As one leaves the town above mentioned the road rises gradually to a hill and passes the 'Castle,' revealing the entrance to the cave on the right-hand side in the cliff above the road. The cave opens through the *archway with a key-stone* on which is cut a rude figure in relief. Both entrances and arch have smooth perpendicular walls with well made angles in each corner, the whole chamber cut out of the solid rock. The subterranean room has lateral recesses in its walls and smaller mural niches. An opening in the right-hand wall communicates with a well, also excavated in rock, but open above to the sky.

The whole appearance of this excavation, especially the conical apex of the second chamber, led me at my first visit to regard it a lime-kiln made by Europeans, but it greatly differs from one of these pits in several particulars. This cave has been known for many years. The Reverend Griffith Hughes speaks of this place in 1750, or about 125 years after the island was colonized, as follows: "A very commodious one [cave] in the side of a neighboring hill called to this day Indian Castle and almost in a direct line from Six Mens Bay," "Among several broken fragments of idols said to be dug up in this place," continues the Reverend Hughes, "I saw the head of one which alone weighed 60 pds. weight." An adjacent pond, he writes, "since the memory of oldest inhabitants has been called Indian Pond." We have in fact circumstantial evidence that the cave is aboriginal, and yet not ample data to prove that the cave was excavated by Indians in prehistoric times.

There is, however, more trustworthy evidence that the other excavated chambers in the Barbados ascribed to prehistoric man were made by the aborigines. Unlike the Indian Castle cave and natural caves above mentioned, the 'Indian excavations' are dug into the surface rock like pit dwellings. They lie near undoubted Indian middens or sites of aboriginal settlements which tells in favor of their aboriginal character. Like the Castle cave they also are ascribed by some authors to early colonists, but the majority call them Indian excavations and Carib graves. It is instructive to note that abundant evidences of

aboriginal occupation occur in their immediate vicinity, and there appears no good reason to question the theory that their local name, Indian excavations, correctly ascribes them to Indians.

Mounds or middens of considerable size, indicating aboriginal settlement, occur at many points on Barbados, especially the lee shore. The majority are situated on the plains skirting the coast, but many are found inland, especially where the soil invites the agriculturalist. Among these may be mentioned: (1) Near St. Luke's Chapel; (2) Indian River; (3) Freshwater Bay; (4) Codeington Estate Springs; (5) Maxwells; (6) New South Point Lighthouse; (7) Three Houses; (8) Marl Hill; (9) Speightown; (10) Holetown, and many other places. On account of long cultivation of the fields the size and appearance of many aboriginal sites have been more or less obscured, although their former existence can still be discovered.

A few undescribed specimens of aboriginal pottery found in these places are valuable in determining the culture of those who inhabited these localities. One of the most perfect of these having a graceful form like the well known Arawak "monkey vase," was found by Mr. Taylor at Indiantown near Bridgetown. This object can hardly be distinguished from Arawak pottery found in Grenada and St. Kitts. Another large flat fragment of pottery, from the same locality has the form of a griddle, resembling those on which the Arawaks bake their cassava cakes. A clay idol resembling one found in Porto Rico is suggestive of similar forms of idolatry in the two islands.

The general characters of aboriginal life in Barbados as revealed by these and many other archaeological remains, show that the culture was somewhat different from that of Porto Rico, the neighboring Lesser Antilles, or the coast of South America, but that the prehistoric people belonged to the same Carib-Arawak stock that inhabited these localities in prehistoric times. The number and variety of the artifacts show that the prehistoric population of Barbados was large and implies that it had diminished to such an extent that when England began to colonize the island, only a few survivors remained. These prehistoric inhabitants of the Barbados were practically cave dwellers and although they had not reached the stage of culture characteristic of Porto Rico and Hayti, they were probably the only Antilleans who made artificial caverns for habitations or other purposes, and carried the manufacture of shell implements to the highest degree of perfection. Their culture was not the most advanced among the Antilleans, but it was characteristic, showing in a marked manner the influence of their geographical environment. Although there are minor differences in artifacts, indi-

cating well marked sub-areas—of which Barbados is one—in the different West Indies there is a certain unity which stamps them as belonging to one great culture area—the Carib-Arawak—extending through the islands from the heart of South America to Florida. This resemblance extending along the east coast of Central America to the Maya area, with which it has close affinities, and along the north coast of South America to the mouth of the Amazon, is practically identical with the Arawak.

CULTURE OF THE NORTH AMERICAN INDIANS OCCUPYING THE CARIBOU AREA AND ITS RELATION TO OTHER TYPES OF CULTURE

By Clark Wissler

AMERICAN MUSEUM OF NATURAL HISTORY, NEW YORK

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The anthropology of North America has now reached a stage in its development where larger and broader problems can be successfully pursued. In the past, for want of data and tried methods, investigations were of necessity confined to tribal units and it was not until a considerable number of these units had been studied that any positive conclusions could be formed as to the continent as a whole. The following brief statement is a mere summary of investigations bearing upon the origin and significance of the observed distribution of certain culture traits in the northern half of the continent. The method is to study in detail the collections in museums and to correlate the results with the field-data of anthropologists and the observations of travelers.

A brief general discussion of the problem may be found in the review of the 'Material Culture of the North American Indians' in the *American Anthropologist*, vol. 16, no. 2, and in special studies, as 'The Influence of the Horse in the Development of Plains Culture,' *American Anthropologist*, vol. 16, no. 1, and the 'Material Culture of the Black-foot,' *Anthropological Papers*, American Museum of Natural History, vol. 5, part 1. These, however, are but preliminary to the more exhaustive treatment of the problems now under investigation.

1. *Caribou Culture Defined.* The material cultures of the Indian tribes occupying the interior of Canada present striking similarities. Their chief food was animal, the flesh of the caribou. Excepting the Pacific drainage and the prairie section, the entire area of Canada, including the interior of Alaska and the Arctic islands of the north, constituted the range of the caribou. Their range and that of the