

Evidence of more complex social and religious organization typical of the Circum-Caribbean culture can be inferred from the presence of large burial mounds, elaborate pottery, differential treatment of the dead and similar archeological evidence.

2) It recognizes basic differences in environment that operated in the past as in the present, and which have affected the cultural adjustment. By pursuing the cultural adaptation backward in time, the archeologist is able to examine in detail the interaction between culture and environment and the stability of the cultural adjustment.

3) Since Steward's culture areas are also stages of cultural development, they make it possible to evaluate the relative speed of cultural development in the different areas. For example, in the Amazon, it is possible to determine how long ago the inhabitants advanced from a Marginal to a Tropical Forest type of culture and to compare this with the time at which a similar transition occurred in the other culture areas. This type of analysis may shed light on the direction and speed of diffusion of some of the basic inventions and discoveries.

## PRELIMINARY REPORT ON THE DISCOVERY OF ARCHAEOLOGY IN THE GALAPAGOS ISLANDS

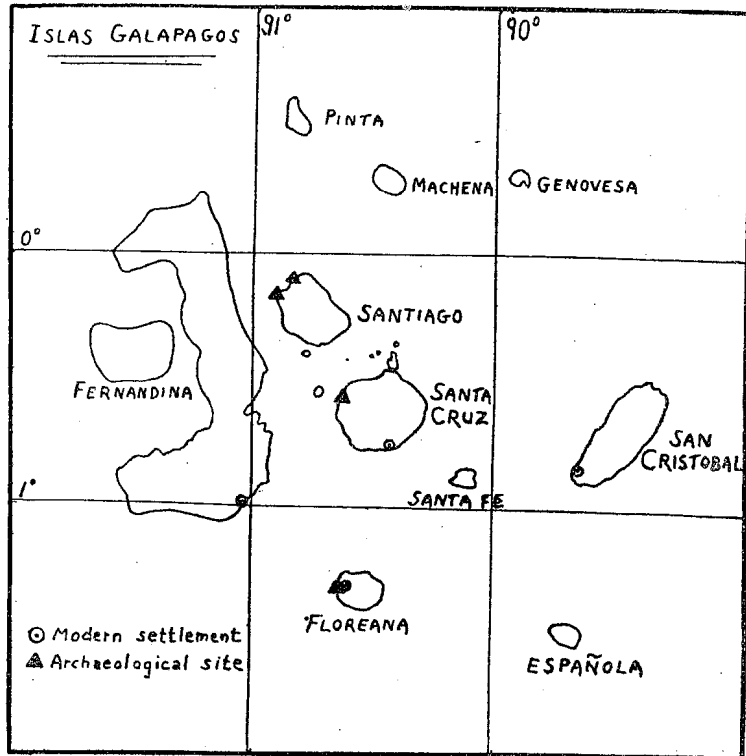
by

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The Galapagos group consists of 10 larger and a great number of smaller islands located on the equator about 600 miles (or 1000 kilometers) off the Pacific coast of Ecuador. The islands are entirely of volcanic origin, and the local topography is characterized by frozen lava flows and rugged rock formations along the coasts, partly without vegetation and partly covered by a dense growth of cactus and thorns. Some of the larger islands do have interior forests, principally of *palo santo*, but both inland and on the coast there is usually a marked absence of fresh water supply, even in the form of pools and permanent waterholes.

The first European to visit the Galapagos islands was Bishop de Berlanga in 1535. It is not without importance to recall that he was on his way on an inshore voyage from the Panama Isthmus towards the recently discovered coast of Peru, when his caravel was becalmed and carried helplessly away by the Humboldt Current. Eight days later the Spaniards sighted what today is known as the Galapagos group, where they almost perished in a futile search for water before they got away and resumed the correct course for Peru. No inhabitants were seen on the islands visited.

At the end of the same century other Spanish ships attempted to visit de Berlanga's remote group, but the currents were so strong and unpredictable that some report-



ed the group to have disappeared while others held that the islands drifted about in the ocean. They were accordingly referred to as the Enchanted Islands, or *Las Islas Encantadas*, and were forgotten by the Spaniards until the latter part of the 17th century, when British buccaneers rediscovered the group and went ashore as the first Europeans to make use of the local ports, about 1670 to 1680. Their object was to use the isolated islands as a base for their raids on the Spanish treasure ships that sailed along the South American coast with cargo bound for Europe. About 1800 British whalers began to visit the Galapagos on their way to and from the Antarctic, bringing ashore livestock and food supply. It was not until later in the same century that the first colonists moved out from Ecuador and formed settlements on some of the islands, four of which are still maintained today, together with the remains of an American airbase on Seymour.

This brief historic background is important for the appreciation of the Galapagos archaeology.

As is well known, it has hitherto been a generally held belief that there is no archaeology in the Galapagos islands. This assertion has been universal in the general literature on the group, and has spread from there to the technical publications on South American archaeology merely due to the lack of contrary evidence, as there had been, until last year, no archaeological survey of the group. The discussions pro and contra pre-Spanish visits from South America to the Galapagos islands have therefore so far been maintained on a purely theoretical level.

It was Markham, the prominent Inca historian, who first suggested in 1907 that Peruvian aborigines under Inca Tupac Yupanqui might have visited the Galapagos group on a premeditated voyage by balsa-rafts. He founded his view on the old Peruvian account of Inca Tupac Yupanqui's voyage at sea, independantly recorded by Sarmiento de Gamboa in 1572 and by Cabello de Balboa in two different reports of 1576 and 1586. As well is known, the essence of this Inca account is that Inca Tupac in the harbour of Tumbes in North Peru met some

native merchants with balsa-rafts who spoke of their own visits to inhabited islands in the remote ocean. The Inca assembled his troops in a given number of Ecuadorian ports where he caused a great quantity of balsa-rafts to be built, on board which he sailed into the ocean with half his force, to return after almost a year with a report of two islands he had visited from which he brought along certain prisoners, treasures and curios to be exhibited in Cuzco. The legendary islands, Avachumbi and Ninachumbi, were tentatively identified by Markham as the Galapagos group, or two of the islands in that group, a theory which has been widely quoted, although rejected by many authorities including Lothrop (1932), Means (1942) and Hornell (1946), all of whom pointed out that prisoners and treasures could not have come from the uninhabited Galapagos group, which, they said, was in any case beyond the range of the water absorbent Inca balsa-rafts.

We have shown today that the latter objection was based on wrong information, as a balsa raft can travel ten times the distance to the Galapagos group, yet we must admit that the theory of Incas hauling treasures from the Galapagos islands still today must rest on a foundation of mere speculation.

The next argument in favour of pre-Spanish visits to the Galapagos was brought up by a group of prominent botanists, and seems to rest on a considerably firmer footing. In 1947 Hutchinson, Silow and Stephens managed to reduce the endemic cotton of the Galapagos islands to a mere variety of the 26-chromosomed *Gossypium barbadense*, which again was a culture product raised and domesticated by the aboriginal civilizations on the north coast of Peru, and had never been a wild species. The fact that this important product of the Early Chimu high culture had been transplanted to the Galapagos before European arrival has a direct bearing on anthropology, since, as pointed out by the same botanists and later emphasized by Sauer, Carter and others, the plant under consideration was not one that could be dispersed by birds or ocean

currents, but only by human craft and care, and in an early pre-Columbian period, yet necessarily after the raise of the Early Chimu culture.

The present speaker was informed of this remarkable ethno-botanical evidence as well as the rumoured discovery of a stone head in Floreana when he organized and led an archaeological expedition to the Galapagos group in 1953. Expedition archaeologists were Dr. E. K. Reed of the U. S. National Park Services, and A. Skjölsvold of the Archaeology Department, Oslo University.

The expedition visited the islands of San Cristobal, Santa Cruz, Floreana, Santa Fe, Santiago and Isabella besides some of the smaller islands; and the survey was purposely restricted to such areas as would seem accessible and inhabitable for primitive settlers dependent on watercraft. The survey was accordingly greatly simplified by the geography of the islands, for the rugged and often precipitous lava coasts offered very few beaches suitable for the landing of primitive craft, and the existing beaches did only exceptionally lead up to level ground allowing primitive habitation. Since by far the major areas were found unfit or at least unfavourable for aboriginal occupation, it was possible to concentrate the attention on a few less extensive locations.

The local conditions were, on the other hand, highly unfavourable for the preservation of prehistoric remains, partly due to the scarcity or often total absence of surface soil in the inhabitable coastal areas, and partly due to the rapid erosion of the soft volcanic tuff. Thus the narrow coastal plateaux were gradually undermined and carried away by the unsheltered ocean, and the great sandbeaches and dunes were regularly changed after high seas or tidal waves. In a few apparent instances important beaches and the bottom of entire valleys had been covered by lava flows, some of which could be dated to post-European time.

Yet the expedition discovered the remains of four ancient occupation sites in the Galapagos group, revealed

through the occurrence of potsherds and flints. The working conditions were much the same as in certain desert areas of New Mexico, with a thin layer of windblown sand covering or partly covering non-perishable material without possibilities for stratigraphy or for the preservation of organic matter. It may here be stated that the stone-head in the interior hills of Floreana island, as described and illustrated in a recent issue of *American Antiquity*, had been executed in the soft and perishable local tuff by a German settler and had no bearing on archaeology. All sites discovered by the expedition were on the coast, near a favourable landing beach, and with some access to permanent or at least seasonal water-holes further inland.

The principal site was found in James Bay on the northwest coast of the large and uninhabited Santiago or James Island. Here broken pottery and flints were found on the cliffs and plateaux above the beach covering a stretch of 400 meters, which again was cut into three distinct sections by two canyons running inland from the beach. Two of these sections were in themselves naturally divided by minor ridges and depressions into separate sub-sites, of which six were identified in all. The average elevation of these plateaux above the sea was from 30 to 40 feet, which was made up by a steep cliff falling abruptly down to the beach and the sea, and ascents had to be made through the two canyons. There was a marked erosion of the loose rock which consisted of volcanic tuff, and potsherds, apparently *in situ*, were recovered right out to the rim of the cliff, suggesting without doubt that more archaeology had been lost to the sea together with part of the level ground.

A few minutes walk inland from these sites a permanent water-hole was found at the base of an extinct volcano, and after rain creeks with running water could be spotted from the distance down the side of the 1300 feet high volcano. Further inland rich salt deposits were accessible in a crater lake. Piles of large broken water-jars of European make as well as fragments of porcelain

and blown glass showed that the local water supply had also attracted the buccaneers and whalers to call at James Bay in the 17th and 18th centuries, and a couple of miles nearer to the salt crater were seen the sparse vestiges of two unsuccessful 19th and 20th century attempts by Ecuadorians to utilize the salt deposits for export.

The limitation of the natural conditions were such that the early British visitors in two cases had camped at the early Indian sites, yet their ceramic remains, consisting of large wheeled water-jars and porcelain, were easily separated from the ware of their early South American predecessors.

Another site was discovered in a smaller bay a few miles further east on the same island. Here the hills and mountains fell right into the sea except in the inner bay where a sand-beach was separated from the raising hill by a narrow plateau of loose volcanic ashes. Here erosion was in marked progress, the loose front of the plateau was steadily moving down to the sea-level in a steep grade like a huge sand-pile. Fragments of aboriginal ware were found in the downwards moving slope as well as in the sterile sand of the remaining part of the terrace.

Archaeology was also found on the level ground above Whale Bay on the uninhabited west coast of Santa Cruz island, and, finally, above Black Beach on Floreana island. The latter site had recently been selected as homestead also by a European colonist, and fragments of aboriginal ware were found on and right beneath the surface of the sterile sand right around his houses.

In all, a little more than 2000 artifacts, principally potsherds, were uncovered by the expedition. However, the expedition survey was by no means exhaustive although possibly the best locations were visited. Some islands, even among the larger ones, were not visited, and other only partly examined.

As will be seen from the material made available, a significant aspect of the Galapagos archaeology is that it is not homogenous, it represents more than one period and

possibly more than one culture area in continental South American archaeology. Quite apart from the apparent segregation in regards to cultural affiliations and origins, the pottery fragments recovered in the islands may be divided into three main groups according to the purpose of the vessels they represent, namely water-jars, cooking-vessels and ornamental or decorative vases.

The plain water-jars, of which several were represented in all our sites, were of considerable size as may be judged from the curve of the many rim and body pieces. The diameter of the mouth of the jar could be almost 30 cm. which still is narrow in relation to that of the bulbous body of the vessel which curved out immediately below the flaring rim. The thick, coarse-grained and light brown-coloured material as well as the size and shape of some of these water-jars concurred with a type well known on the South American mainland, frequently used also as funeral urns in Peru and Ecuador.

The second group of the sherds, representing the cooking-vessels, were also of a type known from the Andean area. The cooking-vessels were characterized by the thinness of their material and the traces of fire left on their outer sides. Fragments with handles show that the handle was vertically placed and projected from the rim itself or from a point immediately below it in the particular manner that distinguishes the cooking-vessels of Andean tribes from those of the aborigines in most other sections of South America. Like the water-jars the cooking-vessels too were frequently without any slip cover. The colour varied from almost black to grey, reddish-brown and mustard colour, dependent on differences as well in the clay as in the firing temperature.

The final class, the sherds representing ornamental or decorative pottery, were also of a style and execution that in many cases permitted an identification with a limited culture area on the mainland coast. For instance the fine, black, reduced-fired Chimu ware with its typical pressed relief design could only be associated geographi-

cally with the north coast of Peru. Remains of pots from this notably maritime pre-Inca culture was found on four distinct plateaux including both extremities of the James Bay site, the latter pots being separated by a distance of 400 meters and by two steep canyons. The sherds from one of these vases were recovered from the extreme edge of the cliff, some pieces within a couple of inches from the rim of the vertically falling eroded wall.

A hundred yards further east fragments of an unpainted mustard-coloured pot with a conventionalized "eye" ornament in appliqué were excavated from the soil covering a crack in the coastal cliff; here too obviously the remainder of the pot had been lost to the sea although several pieces were recovered along the crack.

Equally typical in style and material was the Chimu frog found on a terrace in the cliff above another beach about 200 yards still further east. On a little plateau above, that possessed a very favourable location, fragments, probably representing much of the remaining portion of the pot, was found apparently *in situ*. The frog had formed an appliqué in typical Chimu style on a hard, reduced-fired decorative pot. Together with a number of black body sherds two other Chimu frogs were excavated from the thin local coat of soil, both badly mutilated. One of these frogs was applied to a broken section of a handle that presumably had been superimposed on the spherical body of the vase as so commonly seen in Chimu art of this particular type.

Among our finds was a 5 cm. terracotta whistle with a light brown slip cover and a single ventil. Although partly mutilated the whistle still functioned when the air channel was cleared for soil.

A few artifacts excavated at some slight depth in a depression on the plateau where there was some accumulation of humus, included a perforated stone disk measuring 6 cm. in diameter and carved from a chalky stone that had necessarily been imported to the Galapagos islands which are purely volcanic.

Among the many types of early ceramics were a considerable number of sherds, most of them small sherd fragments, belonging to a vase of unusual shape with a remarkably glossy red paint covering the outer side, and in some cases both sides. A large and irregularly shaped vase of comparable make is preserved in the American Museum of Natural History, but unfortunately with no records except that it comes from Ecuador.

An individual sherd of hard dark-brown ware slipped on one side and with indistinct traces possibly of black design was also found; and likewise a quantity of body sherds belonging to a polychrome vase on which a horizontal black line separated one red-painted section from another part of the pot which was of more brownish-red colour.

Two very small body sherds of a light-brown ware with incision marks running in parallel lines on the surface were recovered, one in each of two independent sites separated by canyons.

A number of flints were also excavated, they were flint scrapers with retouch as well as small chips. It is here again important to bear in mind that the Galapagos group is of purely volcanic origin where flint does not naturally occur, and it is probably safe to say that the most important aspect of the latter artifacts is to demonstrate by their mere existence that seafarers reached the Galapagos islands while still dependant on stone-age tools with which they actually were equipped when they set out on the voyage from their base on the South American mainland.

It is still too early to draw far-reaching conclusions with regards to the past of the Galapagos islands; much more evidence would be required to get anything near a clear picture of what has happened before the advent of the Europeans. But some conclusions may be drawn on the basis of available facts which it would be equally careless to ignore. It would seem evident that neither de Berlanga who sailed from Spain, nor the late 17th cen-

tury buccaneers or some possibly unrecorded European visitors would export early Indian artifacts to scatter them about on the cliffs in various islands on the Galapagos. Ample remains are left in various parts of the group to show that South American aborigines have called at the islands equipped with such belongings as water-jars, cooking-vessels, ornamented vases, sound instruments, and flint tools before the Europeans interferred on the islands. That cotton seeds were also brought along and planted is strongly argued by botanical evidence, and it is perhaps significant to note that most of the ceramic ware uncovered by our expedition had been manufactured by Chimu and Mochica Indians and was accordingly imported to the islands from the very culture-area in which the said cultivated species of cotton had its early home.

It may be suggested that the archaeology supports Markham's theory of a visit by Inca Tupac Yupanqui's marine expedition and that the material found simply was from their pre-Spanish call. Without ignoring the apparent possibility that the Galapagos might have been visited by the Inca fleet, we shall find however, that such speculations do not the least simplify the problem. Most of the Galapagos ceramic is of pre-Inca origin. We shall also recall that the account of the Inca voyage relates specifically that inhabited islands were known to merchants of North Peru, and subsequently visited by the Inca himself who brought some of the unidentified islanders back to the mainland coast. We should therefore still have to account for a population that preceeded the Inca visit, and we are not nearer to the solution.

Available archaeology can do no more than to demonstrate that aborigines from the South American mainland one thousand miles away had visited different sections of the Galapagos group in pre-European and even pre-Inca time, bringing with them artifacts representing different epochs on the mainland coast. The local geographical conditions are such as to suggest the likelihood of casual discovery or temporary camps and seasonal

visits rather than permanent establishments, but this is no conclusive argument. The surrounding waters abound in marine life owing to the vivid plankton activity caused by the local meeting of the cold Humboldt and the warm Panama currents, and the islands were the home of innumerable giant turtles and edible iguanas, but the rocky and arid land itself had little to offer primitive agriculturists apart from the apparent possibilities for the cultivation of cotton which would grow willingly in the waterless coastal slopes. No evidence was found by our expedition to warrant the belief that the islands were ever permanently settled until by the European colonists of last century. This admittedly negative evidence, however, is not conclusive, as the erosion as well as volcanic activity had caused quite apparent disturbances as mentioned earlier. Thus, in James Bay, where the site was found near the western extremity of the bay, the wide valley was covered right down to the beach by a gigantic fresh lava flow covering many square miles of territory, and breaking through the older tuff right underneath the archeological site. Two pieces of thick, coarse pottery probably belonging to water-jars were found frozen into the fresh black lava beneath the site, and thus evinced of serious volcanic activity in post-human times. The in dependable water-supplies and threat of volcanic eruptions might have driven potential or actual aboriginal settlers away from the Galapagos in search of safer habitation.

Aboriginal fishermen from the Chimu or the Puna-Manabi area, who frequented the northern bend of the Humboldt Current and the southern bend of the Panama Current in seagoing balsa-rafts would, like de Berlanga and a great many subsequent voyagers readily end up in Galapagos waters. The fact that available evidence indicates repeated visits at different periods rather than a homogenous settlement in the Galapagos islands prompted the present speaker to resume his research on the aboriginal craft of northwestern South America and, since it has a direct bearing on the present problem, I may add

to my reports before the last meeting of the Americanist Congress that I have during recent experiments at Playas in Ecuador rediscovered the lost Peruvian and Ecuadorean art of center-board navigation. With a correct usage of the centerboards, or Guaras, such as are historically and archaeologically known from Peru and Ecuador, the large aboriginal balsa raft can sail and tack into the wind just like a regular sailing vessel, and it is abundantly clear that the range to and from the Galapagos islands was fully within the capacity of the aboriginal cultures on the northwest coast of South America.