

island, but it is cut through by two narrow channels, to leave South Seymour and North Seymour islands, extending for another $5\frac{1}{2}$ miles northward. The islands are both low and flat, with much of the surface easily traveled, but there are areas of broken lava rock and low boulders that make it rough. The vegetation is sparse, cactus being most conspicuous, made more sparse by the activities of the numerous goats that roam the islands, or, at least, South Seymour. South Seymour is the home of a large species of land iguana, of a reddish brown color that blends very well with the color of the lava rock where it lives.

There are strong tide rips and crosscurrents around and north of the islands. Most of the shore is rocky, but on the west shore of South Seymour there is a sand beach, probably the largest and finest in the archipelago, with the most conspicuous faunal feature, the large burrowing hermit crab, which leaves trails everywhere in the sand when the tide is out. On the shores of a small bay (which has been named Velero Bay) near the north end of the west coast of South Seymour, there is an interesting fossil-bearing stratum exposed.

Two rocky islets, Daphne Major and Daphne Minor, lie offshore to the westward, a short distance from South Seymour. They are precipitous and conspicuous. It is only with difficulty that a landing can be made on either of them. They increase the channel area in this region.

Collecting in the Seymour Island region has been confined to the west side of the islands and the adjacent waters. There are shore stations on the rocks of North Seymour, in Velero Bay, on the rocks and on the sand beach of South Seymour; inland collecting; several electric light stations; and dredging stations in shallow water, mostly in sand or in sand with rock patches, all along the west coast of both islands and in deeper water, up to 80 fathoms, in shell and rock in the channel between the Daphne Islands and South Seymour. The results from the deeper dredging have been gratifying, since several species were obtained here that did not appear in any of the other Galapagos collections.

Barrington Island, 10 miles southeast of Indefatigable Island, is a rugged island, 6 miles long, east and west, and $3\frac{1}{2}$ miles wide, with a height of 900 feet. Its shores are so precipitous that landing is difficult except at the southern end of the east coast, and even here the anchorage is poor. On the southeast shore there are shore stations on the rocks and among the coral masses, and a diving station in 2 fathoms. There are one dredging station in shallow water near by and others in deeper water, 45 to 75 fathoms, 2 miles and 6 miles north of the island.

Chatham Island, 27 miles east of Barrington, lies with its main axis 24 miles long, northeast and southwest, and is 8 miles wide, with two main peaks nearer the west end, 2,490 and 1,927 feet, with a saddleback connecting them. There are other cones of considerable height, making both ends of the island descend quite abruptly to the sea. There is a better fresh-water supply on this island than on any of the others in the archipelago, so that there is richer vegetation, particularly toward the summit of the hills. Some land is under cultivation, and there is a town, Progreso, the capital of the Galapagos, located on the saddleback between the two summits, 5 miles from the shore at Wreck Bay.

The coast is more irregular than it is on the other islands, as there are more projecting points and indenting bays, some small islands, and many outlying rocks and reefs. The most conspicuous, rocky islet, Kicker Rock, at the entrance to Stephens Bay, 2 miles off Bassa Point, looks as though it were composed of a few very large boulders. It is 486 feet high. Dalrymple Rock, 62 feet high, off Lido Point at the entrance to Wreck Bay, also stands out clearly.

Of the bays, three should be mentioned. Wreck Bay (Porto Chico) is on the north shore, near Wreck Point, the western tip of the island. Here there is a safe and well-protected anchorage, but there are so many shoals and reefs on each side of the entrance that the passage may be difficult in bad weather. It is the main port of the island, the only port of call for vessels coming to the islands from Guayaquil. This is one place in the Galapagos where one may see a wharf or pier. Lido Point stands out prominently at the northeast entrance.

From Lido Point to Bassa Point, the western limit of Stephens Bay (Puerto Grande), there is a ragged coast line. Stephens Bay offers a good anchorage, with safe approach. The entrance, from Bassa Point to Finger Point, is 5 miles across, and the depth of the bay is 2 miles. There is a farther extension of the bay to form Sappho Cove, but here the bottom is strewn with large boulders, and, in consequence, the cove is not suited for anchorage.

On the south side of the island there is a bay or, better, an open roadstead, Freshwater Bay, into which a fresh-water stream empties after a fall over a lava cliff. There is little or no shelter for boats.

On Chatham Island there are two inland stations—one on the shore of El Junco Lake, not far from Progreso, and the other $\frac{1}{2}$ mile upstream from Freshwater Bay. The shore stations, all on rock, are located at Bassa Point, in Wreck Bay, west of Wreck Bay, toward Wreck Point,

and in Freshwater Bay. The dredging stations are at the entrance of Stephens Bay, farther out than Kicker Rock, in 32-40 fathoms, sand and coralline, and in shallower water, 8-12 fathoms, at the entrance to Sappho Cove, where the large boulders on the bottom made dredging difficult. Here gorgonids are at their largest and best. There is one station, about 3 miles offshore at Freshwater Bay, in 400 fathoms, coarse sand.

In the southern crescent, Narborough Island and the southern part of Albemarle have already been discussed. As no dredging, and very little shore collecting, has been done at or near either of them, they do not come into the distribution picture. The two remaining islands, Charles and Hood, have received much attention. They show very well the greater effect of the Humboldt Current than do the islands in the other two crescents. In the swing of the Humboldt Current north and south in seasonal succession, these islands are seldom, if ever, outside the influence of the current.

Charles Island lies midway between Albemarle and Hood islands, 35 miles from each, 27 miles south of Indefatigable Island. It is about 10 miles long, east to west, and 7 miles wide. There are two rather large volcanic cones, 1,500 and 1,780 feet, toward the southern coast, both visible from the western approach to Black Beach Anchorage. The slope to the north shore is quite gradual, and there are few secondary cones. There are some springs on the island, but they do not supply enough water for irrigation, except to a limited extent. In very dry seasons, like that in 1934, they may nearly dry up. There is vegetation on much of the island, with a greater relative number of trees and shrubs, as compared with cactus, than on some of the other islands. There is suitable stock fodder; cattle, goats, pigs, and donkeys are said to be somewhat abundant on the island.

What few sand beaches there are, at Black Beach, Post Office Bay, etc., are very small. The south shore is high and abrupt, the remainder lower and more irregular, with rocky points, islets, and reefs outlying. The chief islands, none of them large, are Onslow Island, off Cormorant Point to the north, and Caldwell and Gardner islands to the southeast. The bays are rather insignificant, none of them offering much protection in a storm; but, since storms are rare, they serve as good anchorages. Black Beach Bay on the west coast, just north of Saddle Point, is a small bight, with a pocket, sand beach that is protected by the rocks enough to make a good landing place. There is much algal growth in shallow water near the rocky shore, but farther out the bottom is sandy.

Post Office Bay is on the north coast, just east of Daylight Point, the northwest point of the island. It is $1\frac{1}{4}$ miles across at the entrance and extends inshore $\frac{3}{4}$ mile. The inner part of the bay is pretty well free of obstructions, but there are shoals and reefs at both sides of the entrance.

Lying just east of the point (not named on the chart) that bounds Post Office Bay to the east is Cormorant Bay, extending $\frac{3}{4}$ mile to Cormorant Point. At the head it is divided into two by a projecting point near its center. Back of the head of the bay there is a salt-water lagoon, inhabited by a flock of flamingoes.

There has been some inland collecting, particularly at the springs near Black Beach and near the south side of the island. There are numerous shore stations on the west coast south of Saddle Point, on the rocks and in the tide pools around the point that forms the southern limit of Black Beach, on the north shore of Black Beach, at the head of Cormorant Bay, on the shore of the salt lagoon east of Cormorant Point, and on Onslow Island, where coral masses were obtained. There are several electric light stations in Black Beach Anchorage and in Post Office Bay. There are dredging stations in shallow water, 4-6 fathoms, and farther out in 35-40 fathoms, in and off Black Beach Bay, several in Post Office Bay, and one in Cormorant Bay. Northwest of Post Office Bay there are three stations, 5 miles from Daylight Point in 40-45 fathoms, 7 miles in 65-70 fathoms, and 10 miles in 250 fathoms.

Between Charles, Indefatigable, and Albemarle islands there is a wide open space in which there have been but few soundings and much fewer bottom indications. This makes dredging here a matter of groping in the dark. To make matters worse, there are strong currents, varying so much in direction and force that the dredge may be carried as many as three different directions in sinking from the surface to the bottom in the deeper portions of this area. There may be quiet periods with little current, but the currents have not been studied; so it is impossible to know when the quiet periods are likely to come. In spite of the difficulties, some stations have been established in this area, most of them between Charles and Indefatigable but one between Charles and Albemarle, in depths ranging from 60 to 200 fathoms. In some of them the material obtained was not very extensive, but there was always something of great interest from the distribution standpoint.

Hood Island, the most southerly of the islands of the archipelago, is elliptical in shape, the long axis, 8 miles, running east and west, and 5 miles wide. It has no high volcanic cones, the highest being 640 feet. The

slope to the north and northeast is gradual. There is more vegetation on it than on some of the others. Most of the shore is rocky, but there is a long, sandy beach facing Gardner Bay.

There is only one outlying island of any size, Gardner Island, lying $\frac{3}{4}$ mile east of the northeastern portion of Hood Island. There is deep enough water in the channel for large vessels to pass through, but off the northern entrance, in Gardner Bay, Magicienne Rock is but 14 feet below the surface, and right in the channel is a small island, Osborn Island. The water is very shallow between Osborn and Hood, but is deeper between Osborn and Gardner. Gardner Island itself is steep and rocky on its western side, but the descent to the beach to the northeast is low. Gardner Bay, the only significant bay off Hood Island, lies between Hood and Gardner islands.

The Gardner Bay region has a rich fauna, possibly as rich as any explored in the Galapagos, and, in consequence, much collecting has been done here. There are shore stations on Gardner Island, on Osborn Island, and on the main island at the head of Gardner Bay and at the northwest entrance to the bay. There are diving stations off the Hood Island shore and electric light stations at the anchorage in Gardner Bay. There are dredging stations in many parts of the bay from shallow water, 2-4 fathoms at the head to 30-50 fathoms at the entrance, and farther out in 50-100 and 140-160 fathoms, mostly in sand but some rock. There is one station 8 miles southeast of the island in 300 fathoms, sand and rock.

Little has been said concerning the distribution of such species as the galápagos, the sea lion, the marine iguana, and various sea and land birds among the islands; but these have been written up at length in so many reports that it does not seem necessary to go into detail concerning them here. Observations have been made on them and these have been recorded. In general, though, these do not come within the range of marine biology.

The Galapagos Archipelago has been, and is, of very great interest. Even the preliminary exploration of the marine fauna and flora has proved to be much worth while. As the material collected is being examined, a more definite basis for further work is being established.

PLATE 105

- Fig. 220 Hancock Expedition members landed at Wenman Island, Galapagos, by means of the rocky shelf shown in the foreground, and made their way precariously up the almost perpendicular basaltic lava cliffs to the flattened summit of the headland. The island is the nesting site of fork-tailed gulls, man-o'-war birds, and boobies. (Photograph by H. W. Manter.)
- Fig. 221 The precipitous sides of Wenman Island, Galapagos, suggest that it is the remnant of a volcanic crater. The landing was effected inside the flat-topped headland shown at the center of the picture. Dredging operations were conducted at a depth of 100 to 150 fathoms near by. Chart 100, p. 417.

PLATE 106

- Fig. 222 Marchena or Bindloe Island, Galapagos, showing lava flows which seem so fresh that they might have cooled but yesterday. They have blotted out every vestige of plant life, except perhaps on the distant summits, which appeared to have escaped burial in this manner.
- Fig. 223 On the black lava sand at Marchena or Bindloe Island was discovered the signal of distress erected by shipwrecked mariners of the sloop *Dinamita*. Their desiccated bodies had been found ten days previously by Portuguese fishermen. Chart 99, p. 417.

PLATE 107

- Fig. 224 Tide pools at Darwin Bay, Tower Island, Galapagos. The mud flats at the right were inhabited by fiddler crabs, while frigate birds nested on the rocks to both right and left. The lava is fractured into rectangular blocks. (Photograph by W. L. Schmitt.) Chart 98, p. 416.
- Fig. 225 Marine collectors at work on a rocky beach at Darwin Bay, Tower Island, Galapagos. The headland marking the northern limit of the entrance to Darwin Bay is shown in the distance, and between it and the shore are two rocky reefs which prevent the ship's launch from coming farther inshore. (Photograph by W. L. Schmitt.)

PLATE 108

- Fig. 226 The landing place at Darwin Bay, Tower Island, consisting of an arching beach and a small lagoon behind which rise the basaltic walls of the rim of a volcanic crater.
- Fig. 227 The *Velero III* anchored in 27 fathoms in Darwin Bay, scarcely 150 yards from shore. The bay represents the cone of a mile-wide crater, a portion of which has weathered away, admitting the sea.

PLATE 109

- Fig. 228 Lava shores of Narborough Island, Galapagos, showing mangrove thickets in the distance. (Photograph by Wm. R. Taylor.) Chart 101, p. 418.
- Fig. 229 The island of Narborough, located across a narrow channel from Tagus Cove. It is shield volcano 4,000 feet high and without the irregularities of shape which characterize the other islands. Volcanic activity has been observed at Narborough as recently as 1927.

PLATE 110

- Fig. 230 Crater Lake, Albemarle Island, Galapagos. Tagus Cove may be seen to the left, at a considerably lower level. (Photograph by H. W. Manter.)

- Fig. 231 Two miles south of Tagus Cove, Albemarle Island, lies what is probably the largest crater lake in the archipelago. Although a mile or more in length, it does not appear on any chart and must be located anew by each expedition by means of directions handed down by preceding expeditions.

PLATE 111

- Fig. 232 Lava beach north of Tagus Cove, Galapagos. A grove of mangrove trees indicates a lagoon on the right. One of the five large volcanoes of Albemarle Island rises majestically in the distance.
- Fig. 233 Tagus Cove, Albemarle Island, the most protected anchorage in the islands, but unfortunately too small to hold many vessels at one time. Visiting ships have left their names whitewashed against the dark lava rocks. Tagus Cove is the home of the Galapagos penguin and the flightless cormorant. Chart 102, p. 418.

PLATE 112

- Fig. 234 The area around Christopher Point, Albemarle Island, is perhaps the most desolate in the entire Galapagos. Here many small spatter cones may be explored within a mile radius, provided one is fortunate in arriving in one of those rare periods in which a landing can be made. (Photograph by Wm. R. Taylor.)
- Fig. 235 One of the most massive single formations in the Galapagos archipelago is this perpendicular headland at Cape Berkeley, Albemarle Island. It is composed of volcanic ash and shows landslides resulting from the undercutting. A fairly safe anchorage for the tuna fleet is found close in at its base. (Photograph by H. W. Manter.)

PLATE 113

- Fig. 236 Members of the 1938 Hancock Expedition explore a huge crack in the misshapen mass of *pahoe hoe* lava at Cartago Bay, on the east side of Albemarle Island. Mangrove trees form an almost impenetrable barrier between the sand beach and the lava rock.
- Fig. 237 The *Velero III* anchored in Tagus Cove, Albemarle Island. The successive beds of volcanic ash of which the island is composed are nowhere seen better than along the south rim of the cove.

PLATE 114

- Fig. 238 Academy Bay, Indefatigable Island, showing houses in the middle distance which were occupied prior to 1938 by a Danish-American family named Rader. A garrison of Ecuadorian soldiers was stationed at the fort, which is known locally as Puerto Ayora. Chart 106, p. 420.
- Fig. 239 The large rock shingle at Barrington Island, Galapagos, was a profitable collecting ground for early Hancock Expeditions. The cactus-studded interior of the island is the home of land iguanas, hawks, and doves. Chart 106, p. 420. (Photograph by W. L. Schmitt.)

PLATE 115

- Fig. 240 Conway Bay, Indefatigable Island, showing stretches of coral sand separated by rocky promontories representing ancient lava flows. Such beaches are the homes of the ghost crab *Ocyrode*. Chart 107, p. 420.
- Fig. 241 Conway Bay, Indefatigable Island, Galapagos, showing Eden and Guy Faulkes islands in the distance. The reef in the foreground was a collecting station of the marine zoologists. Chart 107, p. 420.

PLATE 116

- Fig. 242 Interior of a crater at Daphne Major Island, Galapagos. The floor of the crater is of sand and is occupied by families of nesting blue-footed boobies.
- Fig. 243 Inlet at Academy Bay, Indefatigable Island, Galapagos, showing perpendicular lava cliffs and the two principal cactus types, *Opuntia* and *Pachycereus*. Chart 108, p. 421. (Photograph by Wm. R. Taylor.)

PLATE 117

- Fig. 244 South Seymour Island, which extends northward from Indefatigable Island, separated from it by a narrow channel. Its flora is similar to that of the parent island, dominant forms being the bursera tree and *Opuntia* cactus.
- Fig. 245 The veldt-like interior of South Seymour Island, Galapagos, showing bursera trees growing among lava boulders. (Photograph by C. McLean Fraser.)

PLATE 118

- Fig. 246 A view from South Seymour Island showing the many cones of Indefatigable Island. The beach in the foreground is marked with the tracks of the green sea turtle and the holes dug by the female turtle for egg-laying purposes. Chart 106, p. 420.
- Fig. 247 North Seymour Island showing land iguanas from South Seymour Island being landed in a transplantation experiment, there being no land iguanas previously on North Seymour. A nameless island, composed largely of sand, may be seen in the right background. It lies in the narrow channel separating North and South Seymour islands. Chart 106, p. 420.

PLATE 119

- Fig. 248 Agaves, or Century plants, line the red clay road which leads from Wreck Bay, Chatham Island, to Progreso, three miles to the interior. Here the plants appear to grow wild, but at higher elevations they form neat hedgerows separating the plantations. Chart 113, p. 423.
- Fig. 249 Village of Progreso, situated at an elevation of over 1,000 feet in the interior of Chatham Island, Galapagos. The houses are built of cane imported from the mainland, and many of them are elevated from the ground in the manner of houses of the Santa Elena Peninsula. The population of Progreso is said to be around 300. Chart 113, p. 423.

PLATE 120

- Fig. 250 The few buildings located at Wreck Bay, Chatham Island, consist of headquarters for the governor and his military aides, and a lighthouse. They are built of bamboo, or "Guayaquil cane," the same type of construction found in the maritime provinces of Ecuador. Chart 113, p. 423.
- Fig. 251 Wreck Bay, Chatham Island, the principal port of the Galapagos and home of the military governor. A treacherous reef at the harbor entrance obliges vessels the size of *Velero III* to anchor outside, while small sailing vessels may anchor near the wharf.

PLATE 121

- Fig. 252 Post Office Bay, Charles Island, a favorite collecting ground for *Velero III* scientists. Within a short radius may be found sandy beach, rocky shore, brackish lagoon, and a sizable cave in which were trapped many of the now extinct Charles Island tortoise. Chart 111, p. 422.
- Fig. 253 Captain Allan Hancock standing beside the barrel post office at Post Office Bay, Charles Island, perhaps the best-known single feature in the Galapagos Islands. This old barrel, or one like it, has been in continuous use since the days of Gloucester whalers, 150 years or more ago.

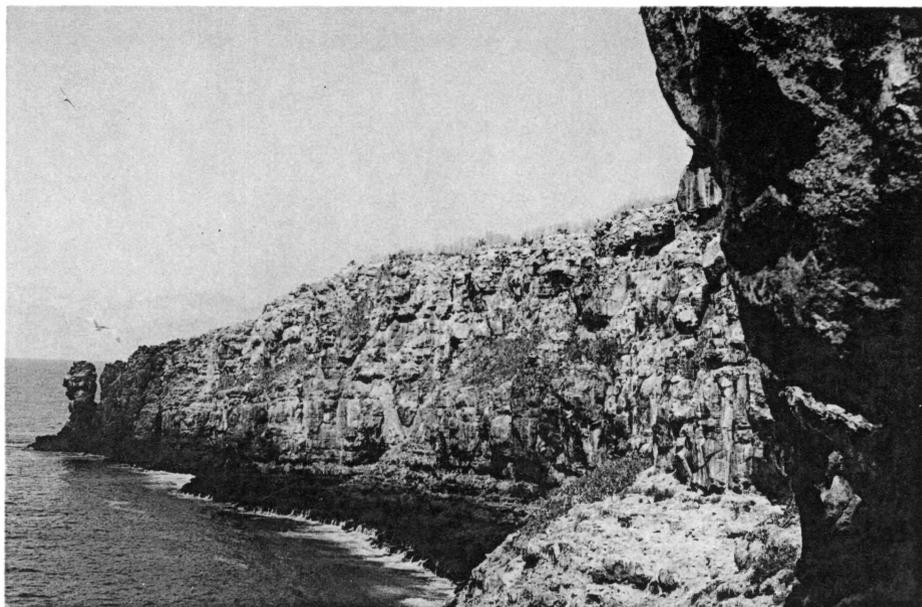


Fig. 220 Wenman Island, Galapagos, landing



Fig. 221 Wenman Island, Galapagos

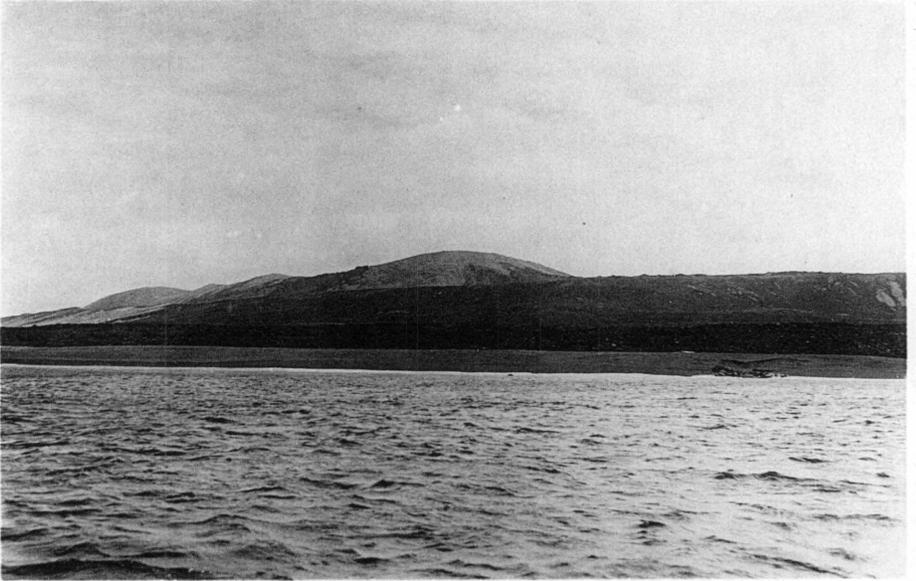


Fig. 222 Marchena Island, Galapagos

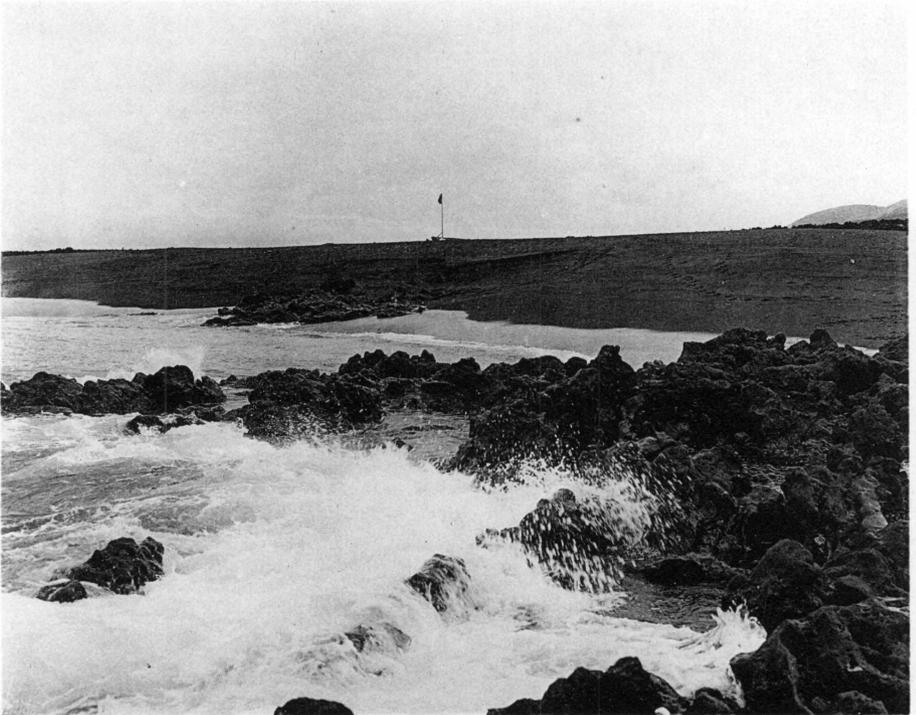


Fig. 223 Marchena Island, Galapagos



Fig. 224 Darwin Bay, Tower Island, Galapagos



Fig. 225 Darwin Bay, Tower Island, Galapagos

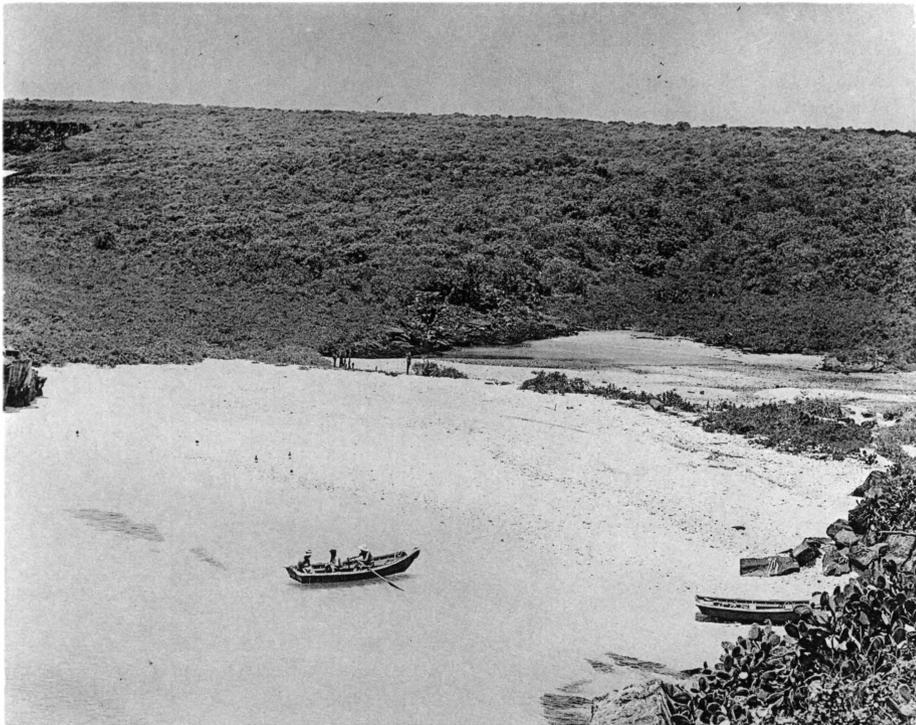


Fig. 226 Darwin Bay, Tower Island, landing place, Galapagos

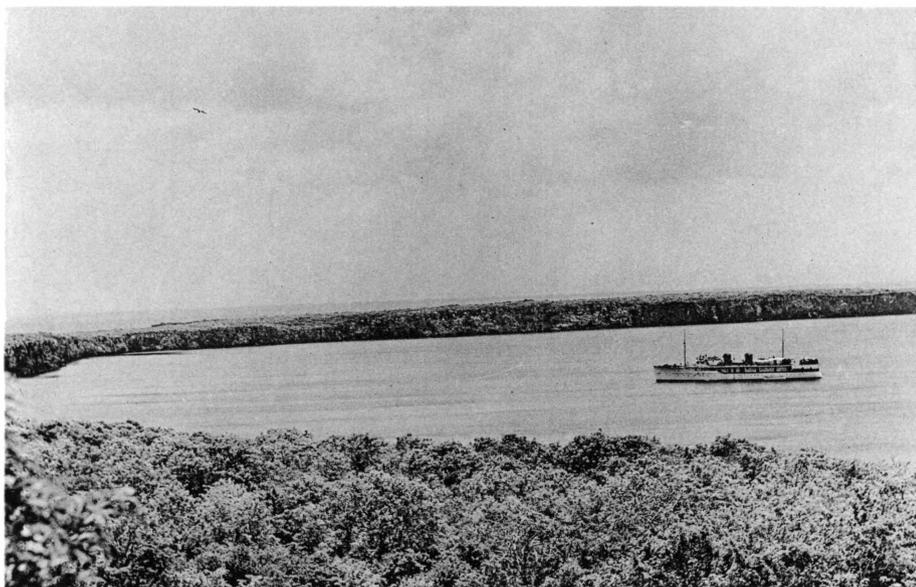


Fig. 227 Darwin Bay, Tower Island, Galapagos

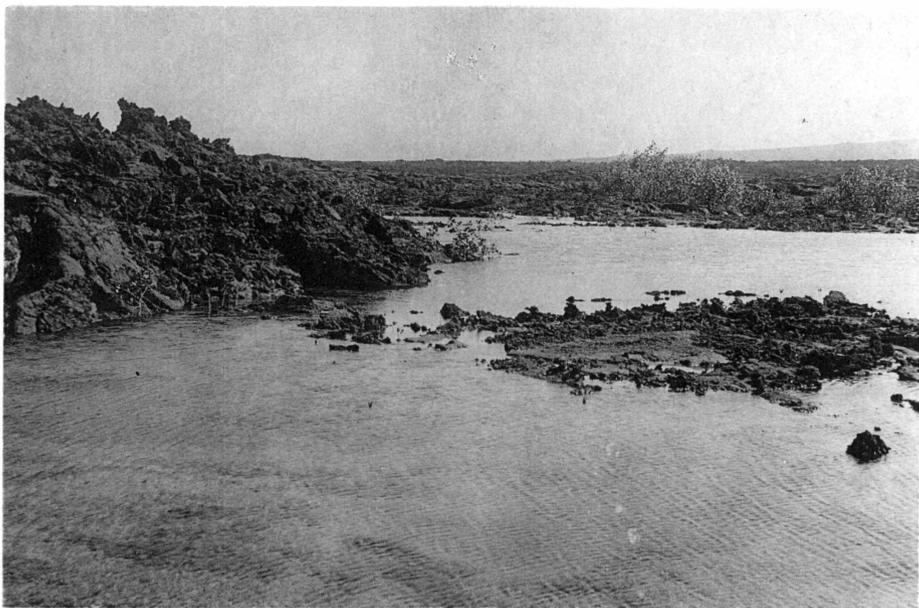


Fig. 228 Narborough Island, Galapagos, near Mangrove Point



Fig. 229 Narborough Island, Galapagos, seen from Tagus Cove



Fig. 230 Tagus Cove and Crater Lake, Albemarle Island

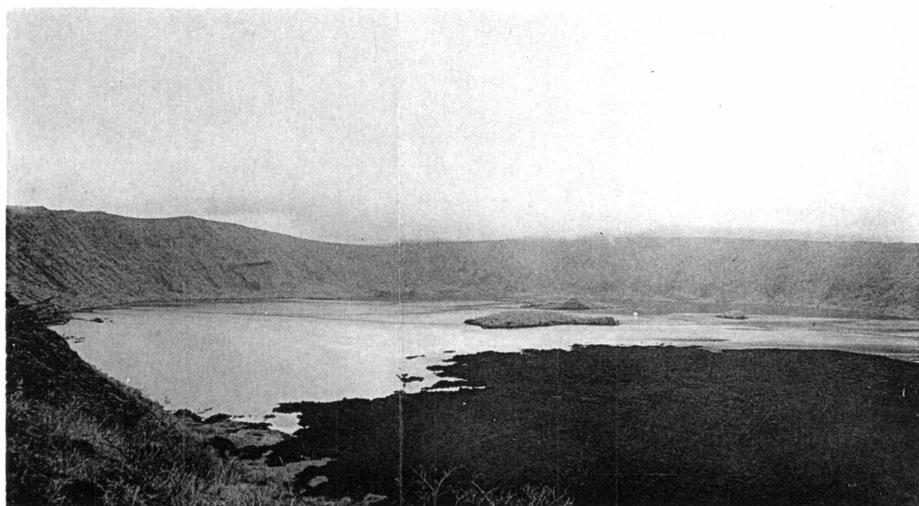


Fig. 231 Panorama of Crater Lake south of Tagus Cove, Albemarle Island



Fig. 232 Beach north of Tagus Cove, Albemarle Island



Fig. 233 Tagus Cove, Albemarle Island

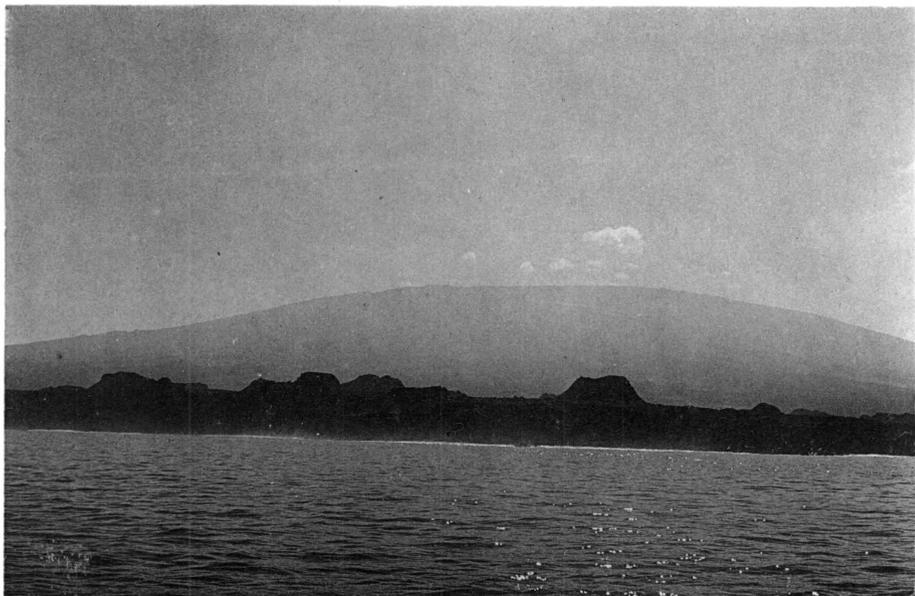


Fig. 234 Cristofer Point, Albemarle Island



Fig. 235 Cape Berkeley, Albemarle Island



Fig. 236 Cartago Bay, Albemarle

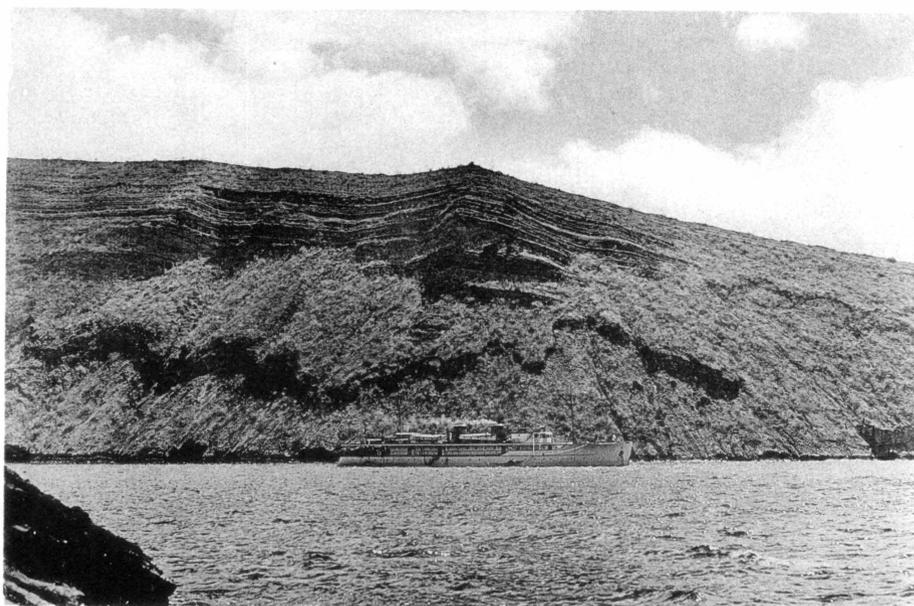


Fig. 237 Tagus Cove, Albemarle

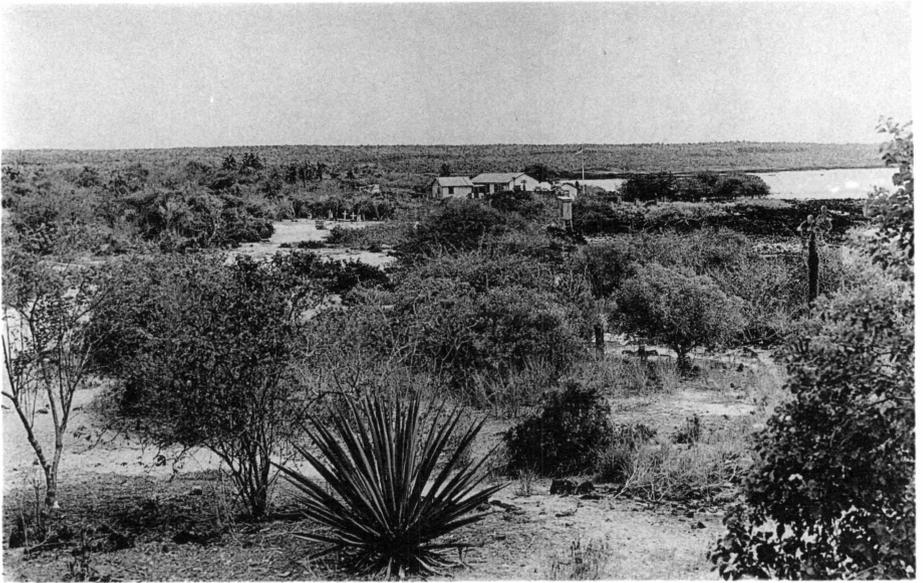


Fig. 238 Academy Bay, Indefatigable Island



Fig. 239 Barrington Island, Galapagos



Fig. 240 Conway Bay, Indefatigable Island

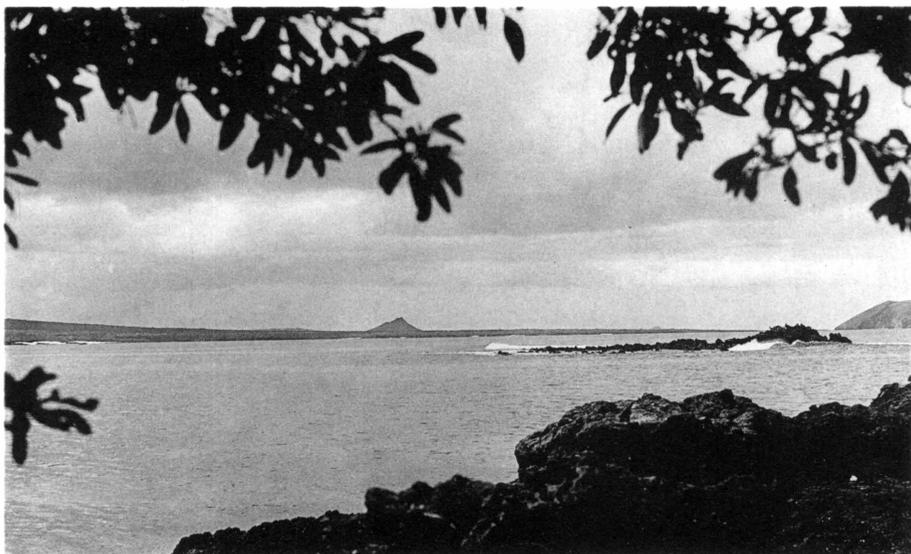


Fig. 241 Reef in Conway Bay, Indefatigable Island

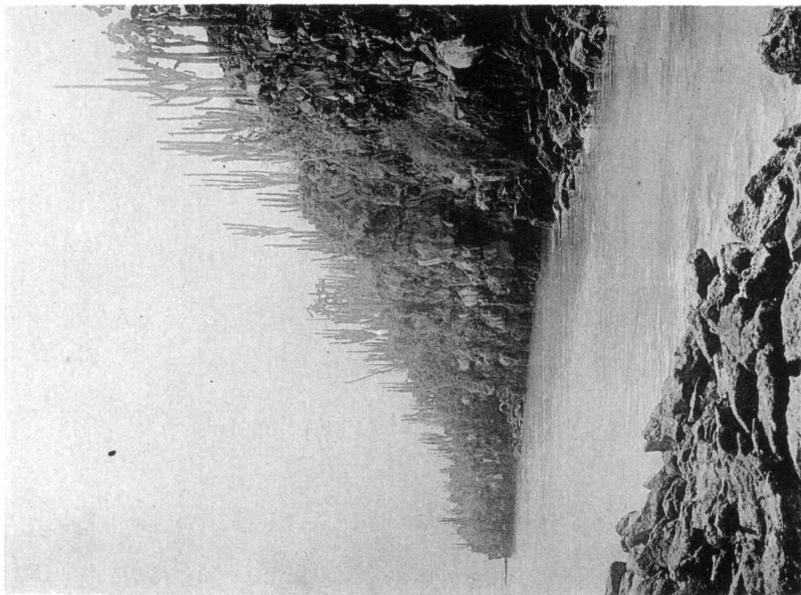


Fig. 243 Academy Bay, Indefatigable Island

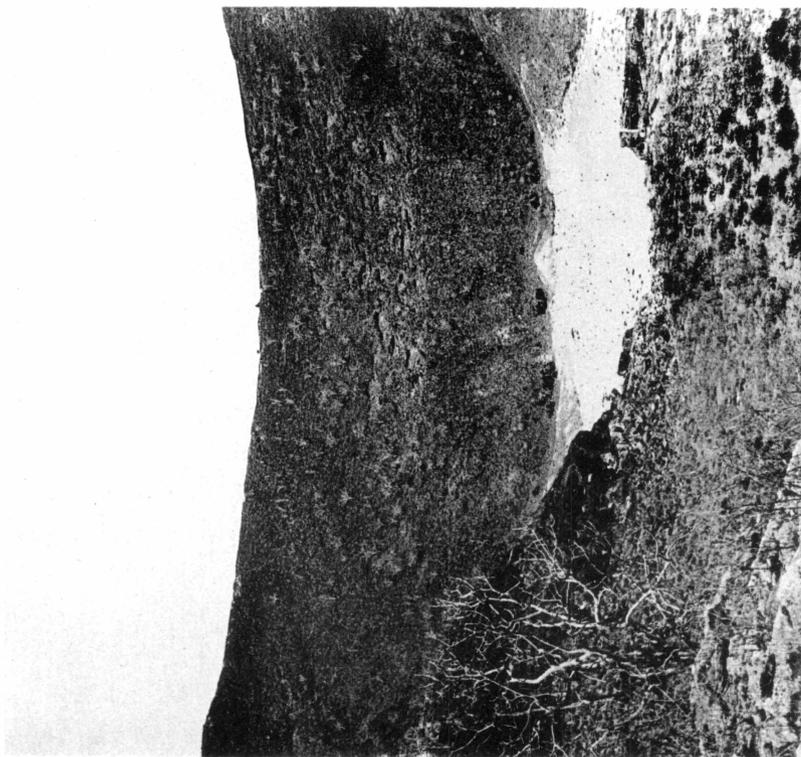


Fig. 242 Daphne Major Island, Galapagos

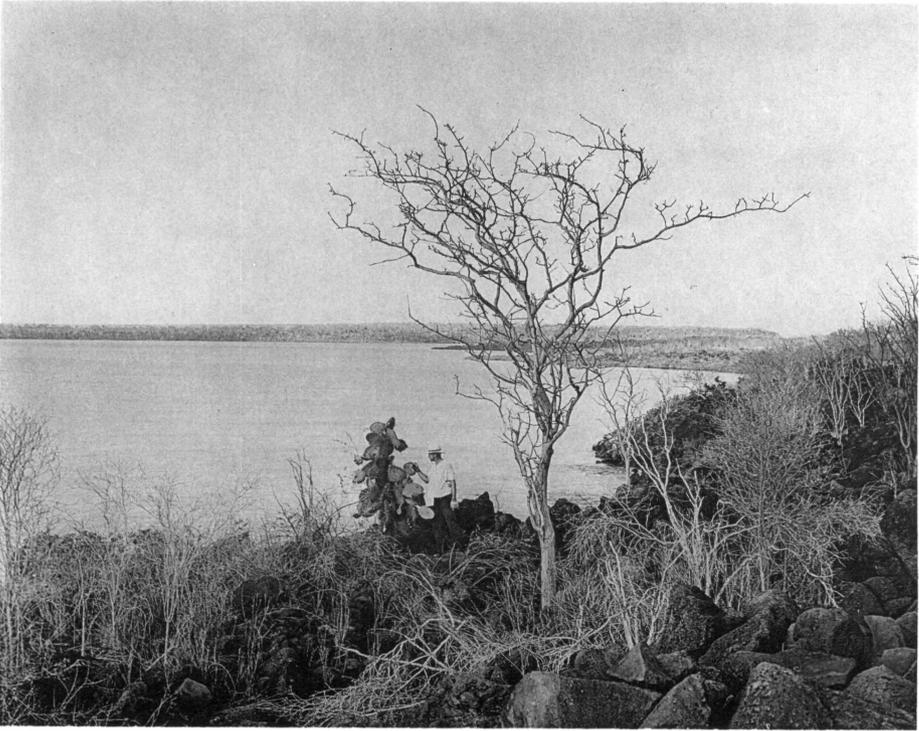


Fig. 244 South Seymour Island from Indefatigable

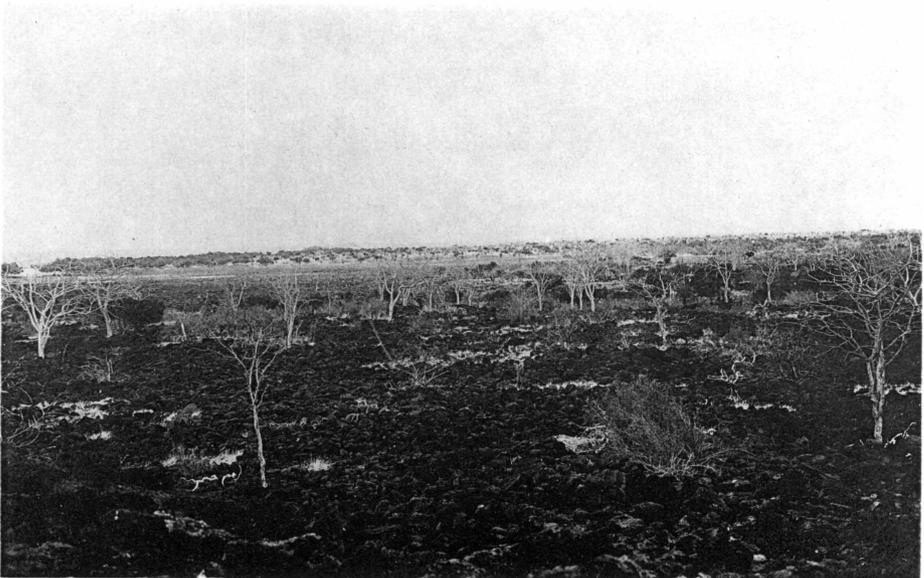


Fig. 245 South Seymour Island



Fig. 246 South Seymour Island looking toward Indefatigable



Fig. 247 North Seymour Island



Fig. 248 Chatham Island



Fig. 249 Chatham Island, village of Progreso

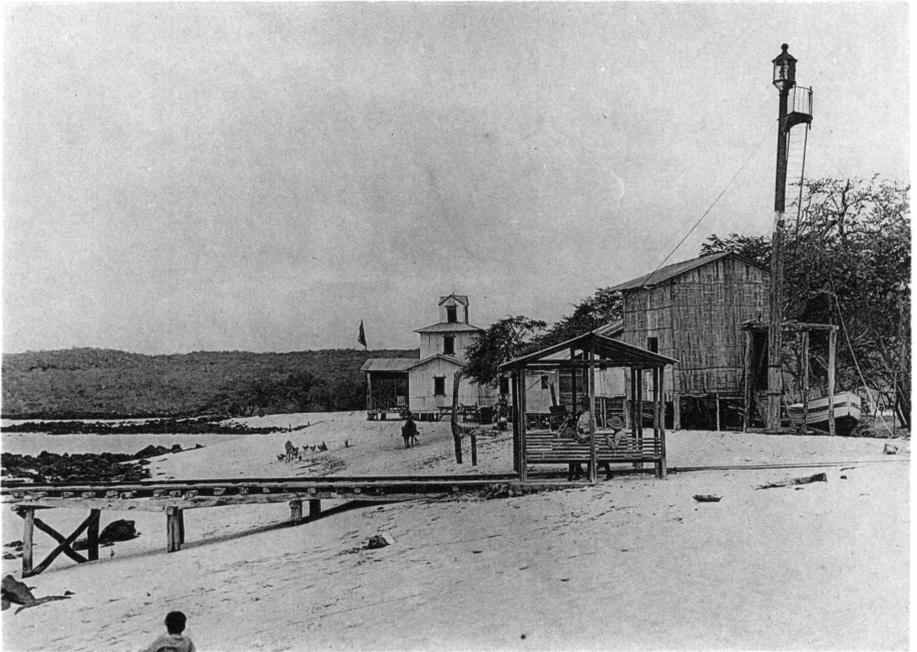


Fig. 250 Chatham Island, Wreck Bay Lighthouse



Fig. 251 Chatham Island, Wreck Bay



Fig. 252 Post Office Bay, Charles Island

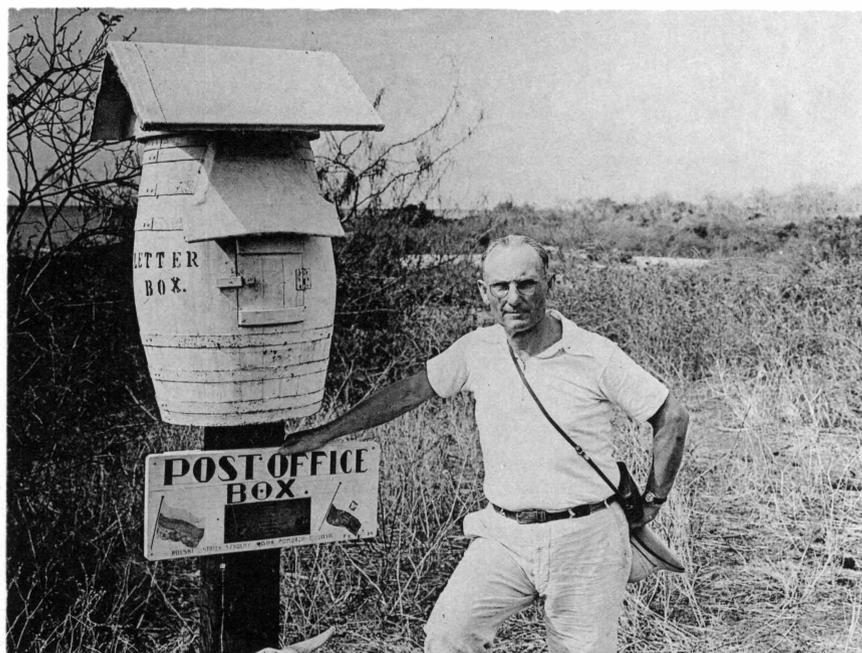
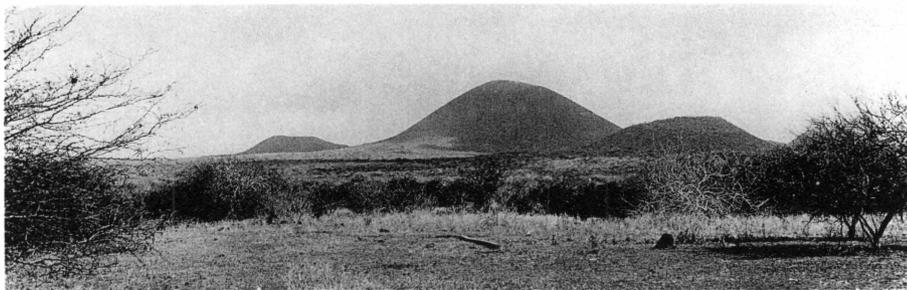


Fig. 253 Captain Hancock at barrel post office



Figs. 254-256 Charles Island, vicinity of Black Beach

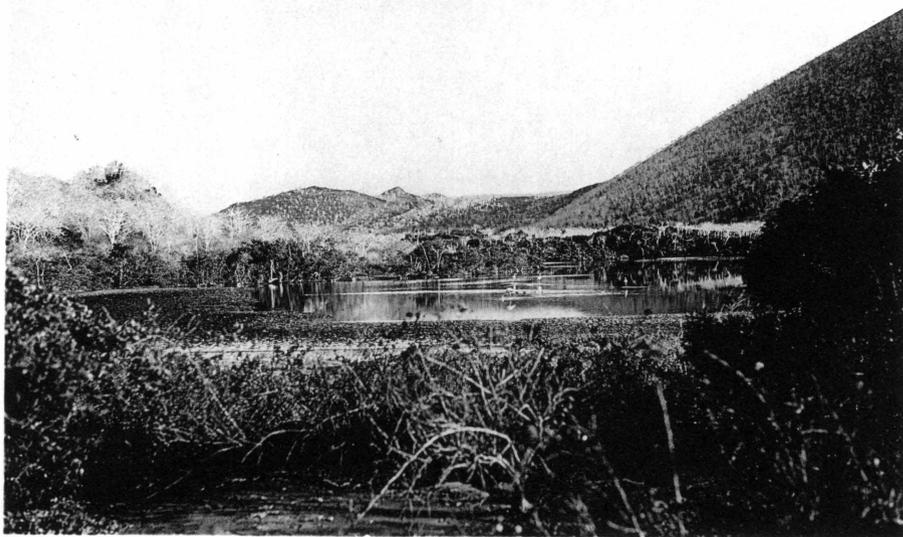


Fig. 257 Charles Island, lagoon, Post Office Bay



Fig. 258 Hood Island, Galapagos