

from - American Polynesia and the Hawaiian Chain E.H. Bryan Jr.

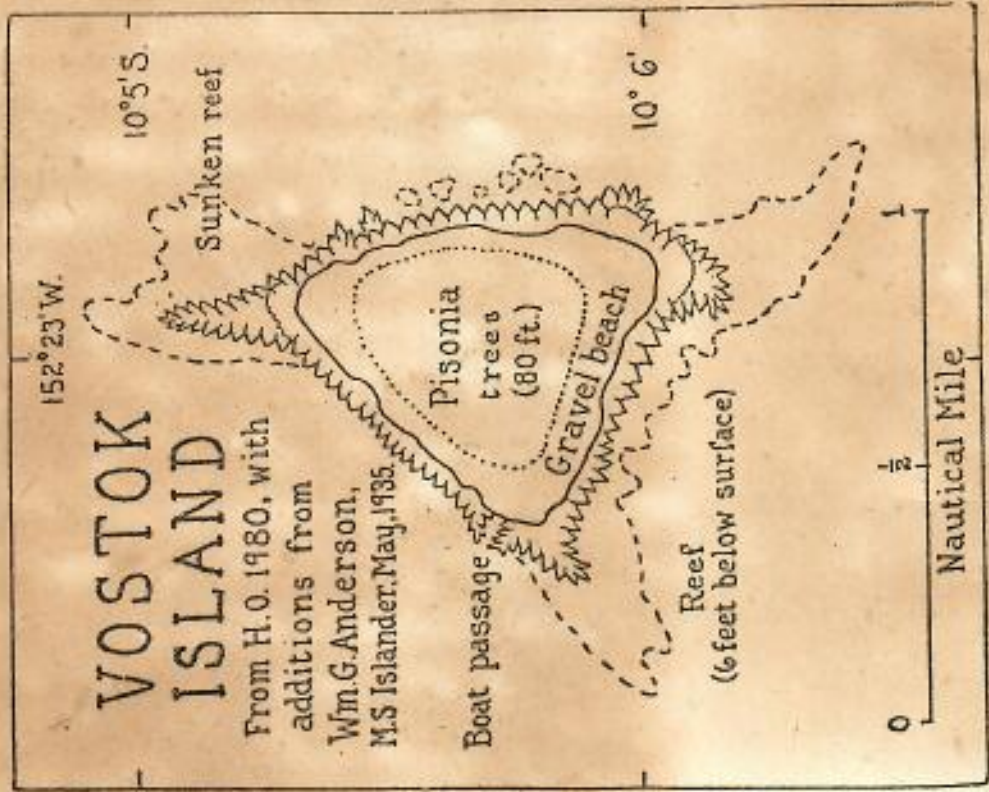
... children by his wife's sister and a ... descendants in these three lines make up the ... of the island. At first they intermarried. More recently ... married people from Peartyn, Manihiki, Rakeahanga, and Aitutaki have developed a strong and healthy population, which numbers ...

... Marsters died in 1899, and was succeeded by the eldest son ... al wife, William Marsters, 2d, who was 72 years old in 1935. The ... case is made out to all of the descendants through the heads of ... families. The people speak a peculiar dialect of English, and are ... t, hard-working, and law-abiding group. Their settlement of ... ractive houses is located on the northern part of the western islet. ... to their industry, they have met with one misfortune after another. ... her, 1883, there was a severe storm, which destroyed all of their ... The hurricane of 1914 wrecked houses and crops. In 1923, a ... leveled 27 of 30 homes, and destroyed the crops. During March ... 1926, the island was hit by another hurricane. Men, women, ... ven pitched in to repair damage and replant coconuts. They were ... ming to recover from that disaster, and gales experienced during ... and February, 1931, when another hurricane ravaged the island, ... ry, 1935, leaving the inhabitants dependent almost entirely upon ... od. Relief was sent them on the New Zealand government ship ... at the people, with food supplies low, and their resources nearly ... having great difficulty in making another start.

... island is under the New Zealand Cook Islands Administration. ... is maintained by the London Missionary Society, with an enroll- ... about 38. In 1936 the population numbered 90.

... has been the chief product of the atoll. Tropic bird feathers also ... some commercial value. Pigs and fowls are raised for home ... ion. About once a year a schooner calls to collect the copra and ... d and other supplies.

# CHAPTER 35 Vostok Island



Vostok Island lies 605 nautical miles south of the equator. It is about 325 miles east-northeast of Tongareva (Peartyn) Island, 86 miles north-northwest of Flint Island, 125 miles west of Caroline Island, 385 miles



south-southeast of Malden Island, and 800 miles northwest of Rarotonga.

It is a triangular, low sand and coral island, about 1,400 yards long, north and south, and not over 15 feet high to the land surface. The central part of the island is covered by a continuous thicket of buka (*Pisonia*) trees, which reach a height of about 80 feet above the sea. This type of vegetation is very distinctive, being found also on Rose Islet. The canopy is so dense that no other plants will grow beneath the buka trees. The soil is rich in humus, from decaying leaves and branches, damp about the bases of the soft, massive trunks.

Between the trees and the shore is a gravel beach, its inner part with low, scattered purslane herbs. Around the shore is a platform reef, a hundred yards or more wide, awash at low water. At the three corners the reef runs out into points, beyond which submerged reefs extend out 400 to 500 yards from shore. On the weather side the surf breaks heavily.

There is no good anchorage, and landing may be difficult. A narrow break in the reef, just north of the southwest corner, allows a small boat to reach shore when the sea is not too rough. Swift currents sweep past the island in a westerly direction, with a small eddy on the lee side.

The island is uninhabited. Sea birds nest in the buka trees and around the inner part of the gravel beach. There are the usual hermit crabs, lizards, and a few insects. Fish are fairly abundant near the reef.

The island was discovered by Captain F. von Bellingshausen, August 3, 1820. He named it for his vessel, variously spelled *Wostok*, *Vostok*, *Vostock*, *Wostock*, and *Bostock*. He did not land, nor does he give much description of the island.

During 1821 the island was sighted by Captain Stavers, in the ship *Tuscan*, and Captain Thornton, in the ship *Supply*. Captain Joshua Coffin, of the whale ship *Ganges*, called it *Reaper Island* in 1828. It was called *Leavitts Island* by the ship *Peruvian*.

On February 8, 1841, the U. S. Exploring Expedition's brig *Porpoise*, in command of Lieutenant-Commander Cadwalader Ringgold, examined the island, but reported landing as impossible. In his narrative of the expedition, Commodore Charles Wilkes called it *Stavers Island*, and also stated that he believed it to be the island seen by Captain Cash of the ship *Massachusetts*.

Despite the many reports of no landing place, H.M.S. *Constance* effected a landing on October 22, 1884, for Lt. J. R. H. MacFarlane collected specimens and eggs of a small black-checked noddy on the island.

No great difficulty in landing was experienced by Greg Anderson in 1935. He collected a specimen of the *Pisonia* in May, when south on the motor sampan *Islander*.

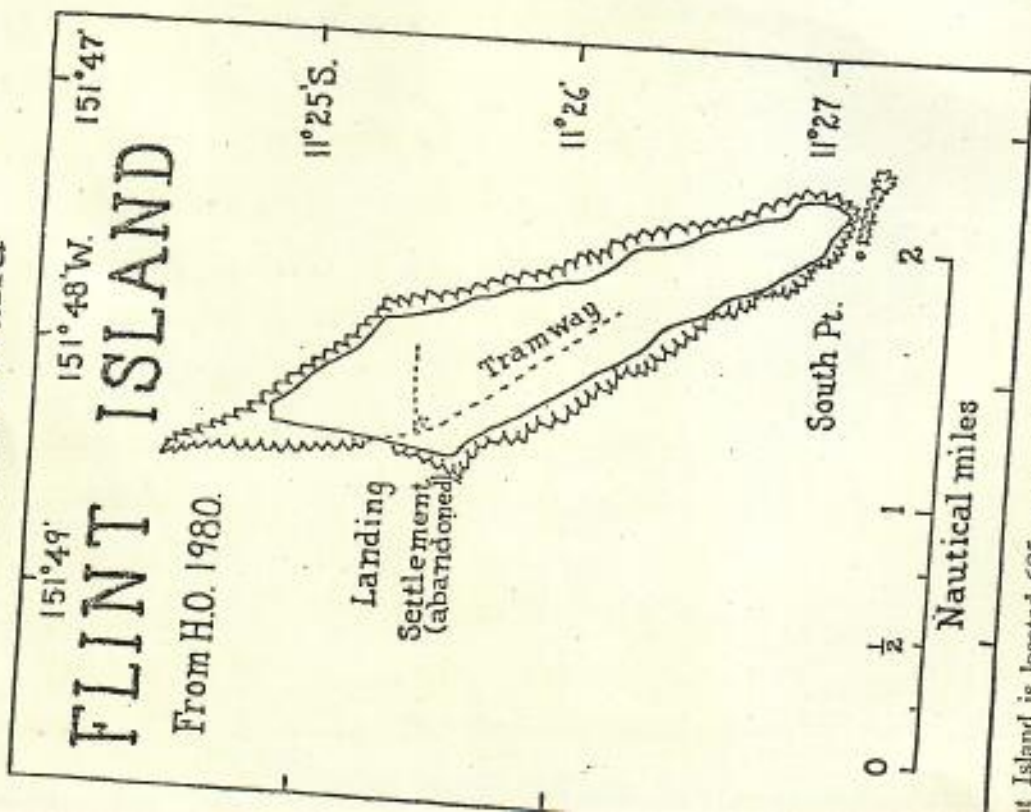
In the list of islands claimed by American guano diggers, under the Guano Act of August, 1856, this island appears twice, as *Stavers* and as *Anne Island*. No guano is known to have been dug by them, however.

According to last reports, *Vostok Island* is leased to an Auckland (N.Z.) firm, S. R. Maxwell and Co., Ltd., but apparently no use is being made of it.

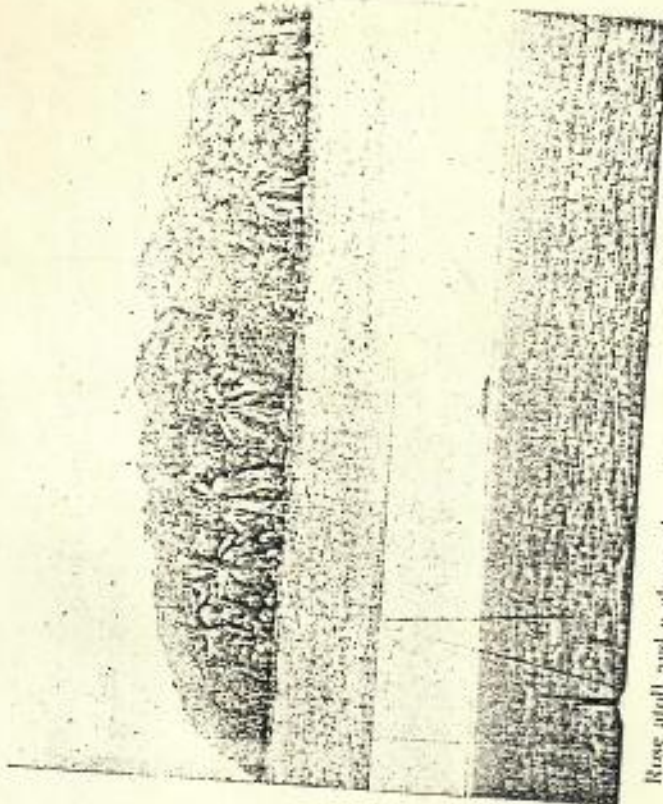


CHAPTER 36

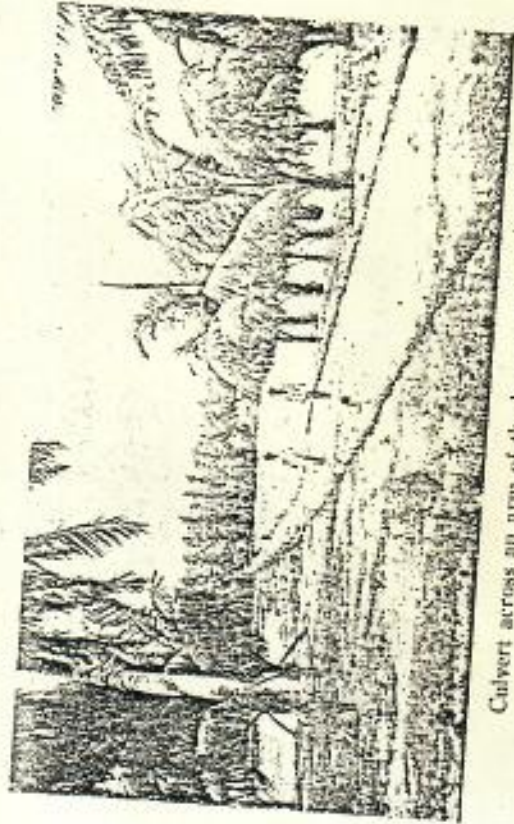
Flint Island



Flint Island is located 685 nautical miles south of the equator. It is 5 miles S.S.E. of Vostok Island, 125 miles S.W. of Caroline Island, and 10 miles N.N.W. of Papeete, Tahiti.



Rose atoll and a closer view of the *Pisonia* thicket on Rose Islet, 1938.



Culvert across an arm of the lagoon, Pukapuka, 1924.



It is a narrow coral island, two and a half miles long, N.N.W. and S.S.E., tapering toward both ends from a greatest width of half a mile. Its greatest land height is 22 feet. When visited by the brig Porpoise of the U. S. Exploring Expedition, February 5, 1841, it was reported to be thickly wooded. Since then, most of the forest has been replaced by coconut palms.

The island is surrounded by a narrow fringing reef, which extends nearly half a mile off the northern point. The surf breaks heavily on the east side, and also to some extent on the lee side. There is no safe anchorage. Landing is not easy, even at a spot on the northwest side where a break has been blasted through the fringing reef.

No information is available as to the first discovery of Flint Island, except that it was about 1801. It is said to have been named by Capt. Keen in 1835. Various voyagers sighted the island during the first half of the 19th century, but not even the U. S. Exploring Expedition landed.

The island was claimed by American guano diggers under the U. S. Guano Act of 1856, but apparently it was not occupied by them.

Some time in the 1870's Flint Island was leased by Great Britain to Houlder Brothers and Co., of London, for whom John T. Arundel was field manager. Extensive guano digging was carried on, especially between 1875 and 1880. Communication was chiefly with Papeete, but an occasional vessel arriving at Honolulu from Flint Island, or leaving Honolulu for that island, gives us information concerning activities.

Some idea of the difficulties encountered may be had from the following report of the Hawaiian brig W. H. Allen, Captain R. B. Chave, published in *The Friend* (Honolulu) in 1876. "Left Papeete harbor August 2nd at 5 p.m., in tow of the steam tug *Scotia*. Struck fresh breeze from E.S.E., which continued to Flint's Island, where we arrived on the 4th at 6:30 p.m. and brought up at the moorings under the west side of the island. On the 5th landed passengers and freight; on Monday, the 7th, a heavy sea set in on the reef, which continued until the 8th, rendering it impossible to communicate with the shore. Slipped from the moorings at 5 p.m. on the 10th with fresh breeze from the E. varying to E.S.E. ."

The moorings referred to consisted of a buoy anchored in 95 fathoms off the landing. Here guano was shipped. The guano was dug in the central part of the island and carried on a tramline to the landing. Traces still remain of the roadbed as suggested on the chart. The excavations



filled with brackish water and form two or three small lagoons. There is no fresh water other than that caught from rain.

In 1881, Mr. Arundel commenced to plant numbers of coconut palms on Flint, as an independent venture of his own. His ware-house for copra houses for the overseer and workmen were just southeast of the lagoon, where the guano diggers' camp had been. Arundel and Company withdrew from this region before 1890.

An outstanding event in the history of Flint Island was a total eclipse of the sun, visible there January 3, 1908. The eclipse was observed by an expedition from Lick Observatory, financed by W. H. Crocker. Professor Mrs. W. W. Campbell headed a group of observers, including Aitken, Wright and Perrine from Lick, Lewis from Berkeley, and Abbot from Smithsonian Institution. They were transported from Tahiti to Flint Island on the U.S.S. Annapolis, arriving December 9, 1907. A private expedition, organized by F. K. McClean, brought astronomers from Sydney. Rain threatened to spoil the eclipse, but it cleared in time to allow valuable observations to be made. The eclipse was 27 seconds ahead of the scheduled time. The sky above Flint Island was found to be four times as bright as over Mount Wilson, California. The position of the eclipse spot was determined to be  $11^{\circ} 25' 27''$  S.,  $151^{\circ} 48' 15''$  W. Mortimer was resident on the island at the time.

In 1911 the island was leased to S. R. Maxwell and Co., Ltd. About 70 native workmen, under a white manager, cared for the harvesting of copra from about 30,000 coconut palms. The latest report is that the island has been abandoned. This has not been verified.

On October 16, 1934, the Bishop Museum's Mangarevan Expedition landed at Flint Island, and botanical collections were made by Dr. H. St. John and F. R. Fosberg. In Bishop Museum Occasional Papers, vol. XII, they list 36 species of plants and discuss the vegetation. They say: "The original vegetation of this island has been practically destroyed, and the island is now an intensively cultivated copra plantation. Introduced weeds are abundant around the houses and in the plantation under coconut palms. *Carica papaya* grows, apparently spontaneously, here and there in the plantation. Around the houses several edible and ornamental plants are cultivated." Only traces of the original flora exist.

## CHAPTER 37

### Caroline Island

Caroline Island lies 596 nautical miles south of the equator. It is about 125 miles east of Vostok, 125 miles northeast of Flint, 420 miles southeast of Starbuck, 640 miles west of Hivaooa, Marquessas, and 450 miles north and a little west of Papeete, Tahiti.

It is a long, slender atoll, shaped like the bone point of a southeastern Polynesian trolling hook. It measures about five and three-quarters miles north and south, tapering from a width of a little over a mile at the southern end; about thirteen miles in circumference. Two dozen islets surround a shallow lagoon, into which there is no passage through the connecting reef which will admit more than a ship's boat.

The islets are 15 to 20 feet high to the top of the highest land. Most of them are covered with groves of coconut palms and the remnants of low forest trees, 12 to 15 feet high, tree heliotrope, pandanus, *Cordia*, *Morinda*, with here and there a taller *Calophyllum* or *Pisonia* tree.

The reef does not dry at low water. The sea breaks heavily on the weather side. The reef is said to extend about a mile off the southwest and southeast points, although not so shown on charts. There is no anchorage. Landing can be made through a narrow break in the reef off the northwest point of the southern islet. At high water a ship's boat can reach shore; at low water one must wade 1,400 feet across the reef in knee-deep water.

The climate is warm but pleasant, with equable temperature. There may be sudden showers, especially at night. Water may be had by digging, there having been two wells on the southern islet and one on Nake Islet in 1883. The southeast trade wind blows during much of the year, varied by winds from the north and east. In 1878 a hurricane destroyed most of the coconut palms.

Sea and migratory birds are numerous. The only land mammals are reddish-brown rats. Fish are abundant both about the reef and in the lagoon.

There must have been Polynesian inhabitants on Caroline Island some time prior to its discovery, for graves, containing adzes, and native temple



platforms have been found, especially on the two sides of the largest marae, located on the west side of the island. George W. Robertson, of Liverpool, was published in the *Annals of Science* report of the 1883 eclipse expedition.

The island was discovered, December 16, 1795, by Captain William Robert Broughton, in the British sloop Providence, who passed at a distance of six miles. He named it Carolina "in compliment to the eldest daughter of Sir P. Stephens," then first Lord of the British Admiralty. In 1821 it was seen by Captain Thornton of the English whaler Supply, for whom it has been called Thornton Island. Other early names were Hirst's, Clark's and Independence Island.

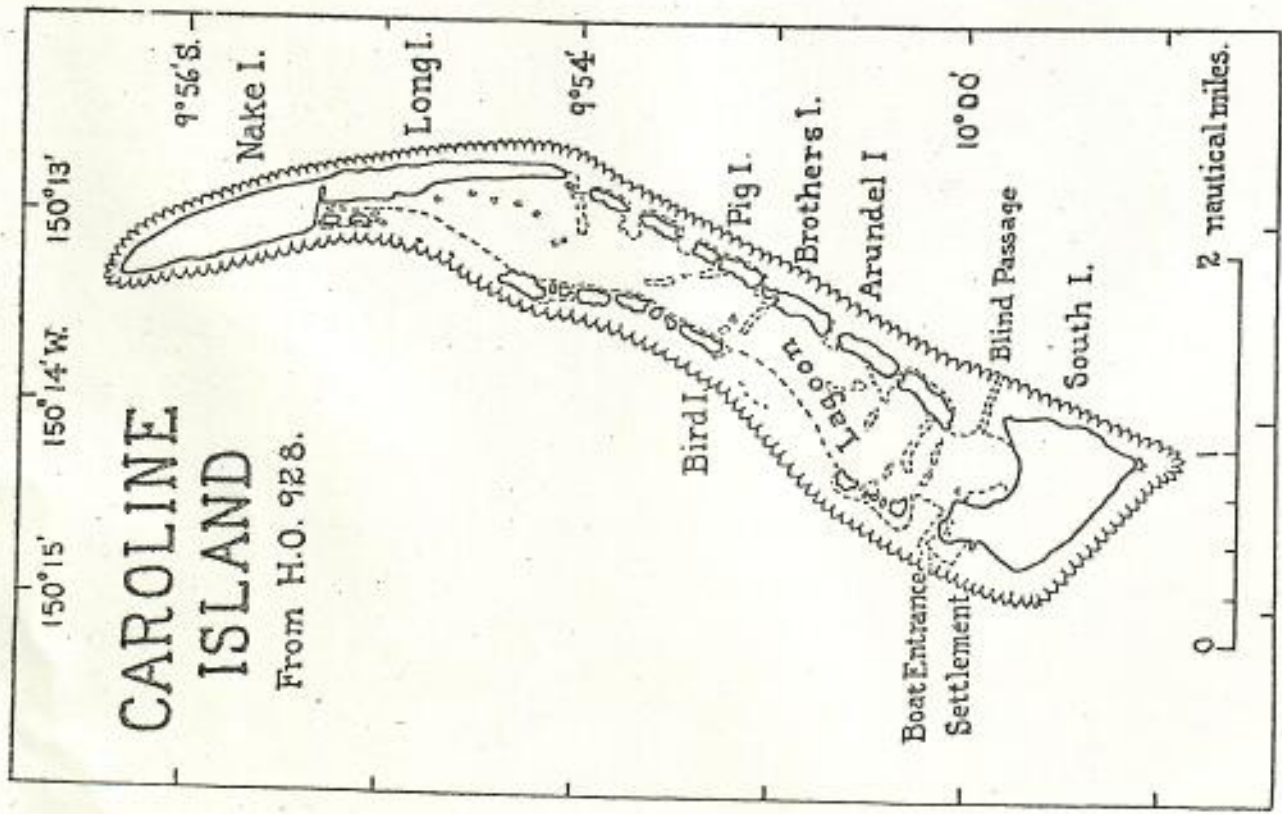
Lieutenant Hiram Paulding, who visited the island October 10, 1825, in the U. S. schooner Dolphin, gives an interesting account. Captain Stavers landed in 1828, leaving some hogs, of which there was no later trace.

One of the most extensive accounts of Caroline Island is that given by Frederick Debell Bennett, in his "Narrative of a whaling voyage around the globe," vol. 1, pages 365-378, 1840. This account has been reprinted in the *Paradise of the Pacific* magazine for November, 1939. Bennett landed April 23, 1835.

Between 1865 and 1872 Messrs. Brown and Brothers planted coconuts on Caroline Island. On July 9, 1868, the British flag was hoisted by Commander George Nares, of H.M.S. Reindeer. He reported 27 persons living in the settlement on the southern islet, raising stock, pigs, and poultry; salting fish; and planting coconuts and extracting coconut oil. In 1870 Lieutenant Chauvinière, of the French transport *Somme*, described it as a low lagoon island, similar to those in the Tuamotu group.

In 1872 the island was leased by Queen Victoria to Houlder Brothers and Company, of London. They dug some little amount of guano. In 1881 their manager, John T. Arundel, took over the lease himself, planting numerous coconut palms. In 1883 he employed four men, one woman, and two children on the island. During these years ships were moored to a buoy, anchored 120 yards off the reef in 90 fathoms of water. There was evidence of several wrecks on the reef.

On May 6, 1883, a total eclipse of the sun was visible from Caroline Island. It was observed by a party of American astronomers, headed by Edward S. Holden, and two British observers. They were transported from Callao, Peru, to the island on the U.S.S. Hartford, arriving April 21, 1883. A French expedition also observed this eclipse. A map of the island

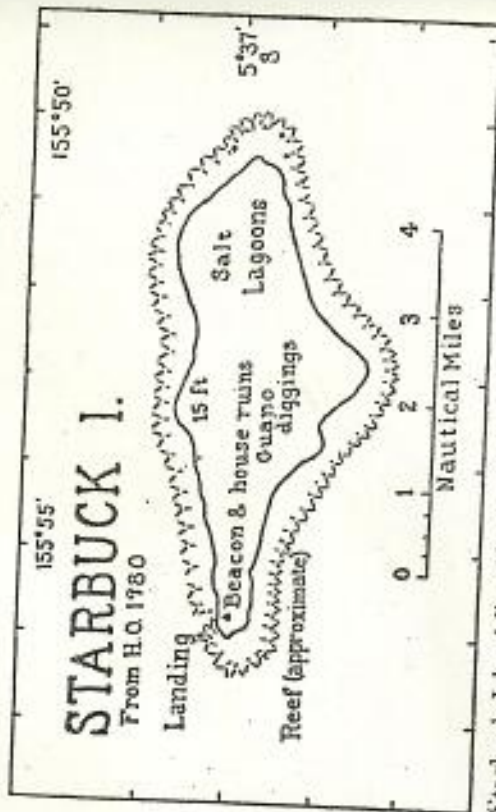




... by Lieutenant E. F. Quailtrough, U.S.N., and natural history  
 specimens were collected by Dr. W. S. Dixon, both of the U.S.S. Hartford.  
 Insects were collected by Dr. Palisa of the French expedition. The posi-  
 tion of the observation spot was determined to be almost exactly 10 degrees  
 south and 150 degrees 14 minutes, 24 seconds west.

The island is now leased to S. R. Maxwell and Company. In 1926 the  
 inhabitants numbered 10. In 1936 there were two Tahitians and their  
 families living on the island.

## CHAPTER 38 Starbuck Island



Starbuck Island lies 336 nautical miles south of the equator. It is 235 miles northeast of Tongareva (Penrlyn), 345 miles northwest of Vostok, 400 miles southeast of Jarvis, 450 miles south-southeast of Christmas, and 108 miles south-southwest of Malden.

It is a low, flat coral island, with a greatest height, along the beach crest, of about 15 feet. Within this crest the island is depressed, with small salt lagoons near the eastern end. The shape is described as that of a shoulder of mutton, with the knuckle at the west end. It is 5½ miles long, east and west, by 2¼ miles greatest width, tapering toward both ends. The area is given as about one square mile.

The steep beach is surrounded by a fringing reef, which averages about 1,000 yards in width, a little wider at the eastern point. Near the west point a break has been blasted in the reef, making possible a rather difficult, and at times dangerous, landing. There is no safe anchorage. During the guano-digging period vessels tied up to two mooring bitts near the landing.

The appearance of this island is well described by John T. Arundel in an address before the Geographical Society of the Pacific, at San Francisco in March, 1885.



"At first nothing but a strong white glare in the western sky, painfully bright and shining, even at the distance of four miles or so; then, as the vessel rose on the tops of the waves, a long low line of white sand becomes visible; then, as we gradually got nearer, we could see wrecks of ships at intervals, strewn along the coast, and clusters of white sea-birds resting upon them; and, as we got to the western end, a few houses, of which we had come to take possession, and towering high above all, the remains of the French transport Euryale, which had been sailed ashore about twelve months previously, while on the passage from Tahiti to San Francisco."

Going ashore through the passage in the reef, Arundel stated that he narrowly escaped capsizing in passing the surf. He notes that for periods of as much as two weeks it was impossible to either land or leave the island, although the ship lay but an eighth of a mile away. On shore he could not sleep at first because of the noise made by the myriads of sea birds. The vegetation consisted of half a dozen species of herbs and a low shrub. So inconspicuous is the island, with strong current sweeping past it to the west-southwest, that many fine ships have piled up upon its reefs. Arundel counted seven wrecks when he landed.

At the eastern end, Arundel noted, were some salt lagoons, "where thousands of tons of the purest kind of salt was found in various forms, coarse and fine." They varied in size, being almost dry at times. It was dangerous to approach them. One of Arundel's workmen sank up to his shoulders before he was pulled out. From the west end beacon, ridge after ridge of old block coral was visible, enclosing the guano beds.

Another description was given by a sailor on the British ship George Thompson, under Capt. William Shepherd, which moored to load guano in October, 1872. "I think they ought to call this the island of desolation; it is indeed a desolate region. It puts me in mind of a vast flat iceberg. The coral is all over it, ground to fine powder, which looks much like sand. The kanakas have to launch surfboats over and through great monster seas and load the ships. The climate is beautiful and delightful. A nice breeze from the S.E. is always blowing. There are only five white men and about 100 kanakas."

Starbuck Island was discovered by Captain Valentine Starbuck, in the English whale ship *L'Aigle*, in 1823. He called it Volunteer Island. That same year he took the Hawaiian king, Liholiho (Kamehameha II), his wife and party to England, November, 1823, to March, 1824. The royal couple died in England, and their bodies were sent back to Hawaii on

H.M.S. Blonde, Captain Lord Byron. On August 1, 1823, the Blonde passed by Starbuck, but did not land. "The appearance was still more uninviting than that of Maiden Island, there not being even the trees to enliven the flat coral rock."

It was taken possession of by Commodore Swinburn, in H.M.S. Mutine, in December, 1866. Guano digging began soon after. The French transport Euryale was wrecked on the night of March 10, 1870. The date of Arundel's arrival would have been 1871. Records in *The Friend* (Honolulu) of shipping to and from Starbuck, at the port of Honolulu, are frequent during 1871-1874. After the island was given up by Arundel, it was revisited by the company which worked Maiden Island.

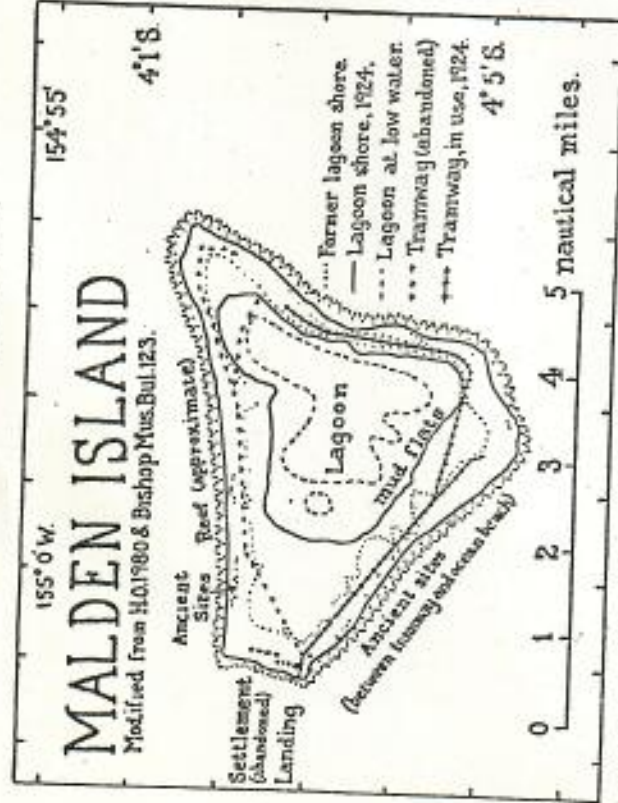
One provision of the British lease was that a tall beacon should be erected, so that the island might be seen at more than four miles. One was maintained near the west point. In 1926 it consisted of a large wooden pyramid about 25 feet high, in fair condition, although the island long since had been abandoned. In 1937, H.M.S. Achilles reported it still standing, although the houses and sheds were in ruins. A vessel visits the island at intervals to see if there have been any wrecks.

Besides Starbuck and Volunteer, the island has been known by several names, including Low, Starve, Hero, Barren, and Coral Queen.



## CHAPTER 39

# Malden Island



Malden Island lies 241 nautical miles south of the equator. It is located 108 miles N.N.E. of Starbuck, 460 miles N.W. of Caroline, 365 miles S.S.E. of Christmas, and 373 miles S.E. of Jarvis Island.

It is a triangular, flat coral island, about 5 miles long (east and west) by  $4\frac{1}{2}$  miles wide. Its east-central portion is occupied by a very salty lagoon, the outline of which changes with the tide. The map indicates the high and low water outline as observed by a Bishop Museum party in 1924. The land area is given by the guano company as 10,700 acres, with an additional 9,000 acres of lagoon.

There is evidence that at some time in the past the sea broke through the east rim and flooded a much larger area of the central basin. This is indicated by the dotted line on the map. It is also claimed that the island has risen several feet with reference to sea level. This also would have accounted for a former larger lagoon.

The enclosing ridge is nowhere more than 25 or 30 feet high. Most of the island cannot be seen at a distance of over 7 or 8 miles. There are numerous small, reddish fish in the lagoon which evidently pass through some underground channel to and from the sea.

The shore is surrounded by a narrow fringing reef, the greatest width of which is variously given as between 200 and 600 yards. A steep beach rises from the reef and forms a rim about 400 yards wide, in places with successive ridges of coral and marine debris, cast up by storms.

Anchorage is precarious, for there is deep water off the edge of the reef. During the guano days, buoys anchored off the west end, in 80 to 100 fathoms, provided mooring for small vessels. In 1926 there were two of these left. Landing often is difficult, despite a small pier near the south end of the west shore. At times, due to the swell, it is better to land on the beach just north of this pier.

A weather record was kept on Malden for many years, almost continuously from 1890 to 1919. This shows a warm but pleasant climate, despite its uniformity. The mean pressure varies but little from 29.86 inches of mercury. The mean temperature is 84.8 degrees F., with 75 and 99 degrees marking the extremes. Trade winds predominate: 62 per cent from the east, 21 from the northeast, 8 from the southeast, 4 from the north, 3 per cent calm, and the other 2 per cent from the northwest and west. Violent storms are rare. There generally is a current past Malden from the east varying from northeast to southeast with the seasons.

The most variable factor in the climate is the rainfall. The yearly average is 28.62, but it has varied from less than four inches (1908) to over 93.5 inches (1914). The record came to an end in October, 1919, but during the ten months of that year it rained 95.45 inches. No rain at all fell during nineteen different months, and only a trace in many more. The heaviest rainfall is between January and May. During March, 1914, it rained 25.73 inches.

There is abundant evidence to show that Polynesians lived on Malden before its discovery by white men. Earliest explorers reported stone-faced platforms and graves. Several descriptions have been given of these, together with speculations as to when and by whom they were built.

The late Dr. J. Macmillan Brown draws a highly imaginative picture of "great temple pyramids" dating from a time when Malden formed part of a "vanquished empire," and people coming on pilgrimages to it from "fertile archipelagos within canoe distance of its shores," which now have sunk.



Kenneth P. Emory, Bishop Museum anthropologist, who studied the ruins in 1924, has published an account which agrees not at all with these fantastic ideas. The stone structures are located around the beach ridges, principally on the north and south. They include temple platforms, called marae, house sites, and graves. They indicate that Polynesians lived on Malden for several generations, and that this was not many centuries ago. Comparisons with stone structures on Tuamotu atolls show that a population of between 100 and 200 natives could have produced all of the Malden structures. Marae of a similar type are found on Raivavae, one of the Austral Islands. The natives got their water from wells, remains of which have been found, always dry or salty at present.

Malden was discovered July 29, 1825, by Captain Lord Byron, in H.M.S. Blonde. He had just taken to Hawaii the bodies of Kameliameha II and his wife, who had died in England. It was named for Charles Robert Malden, Lieutenant, R.N., who landed and made observations on shore. Andrew Bloxam, naturalist of the Blonde, also landed, and his diary, published in 1925 by Bishop Museum, gives more complete observations than the official narrative of the voyage.

The "several clumps of thick, fresh-looking (*Pisonia*) trees, so compact that at a distance they were taken for rocks" are still there, although, like much of the other vegetation, damaged by goats which were introduced in the 1860's. Other plants include *Sida* shrubs, bunchgrass, and low herbs, a total of about ten species. Polynesian rats, found on the island, now have been exterminated by introduced cats. Sea birds of the usual kinds, formerly abundant, in 1924, were rare except for sooty terns. Two kinds of lizards and a few insects also have been reported. An account of the natural history and an analysis of the guano were given by W. A. Dixon in 1877.

The island was called Independence by Brayton in 1836. The story is told that the extensive guano deposits were discovered by an American whaling master in 1848, but that he decided to finish his cruise before exploiting any of it. Soon after, another whaler came along and noted the layers of guano. Her captain immediately sailed for Sydney, where he sold his discovery for a considerable sum.

Thus was started a series of guano enterprises, which worked the island, with considerable profit, for nearly seventy years. In 1876 there were 79 persons on the island. Just prior to 1889, Messrs. Grice, Drummer and Co., of Victoria, employed 8 Europeans and 150 Polynesians on Malden. Natives of Niue dug and transported the guano, and Cook Islanders from

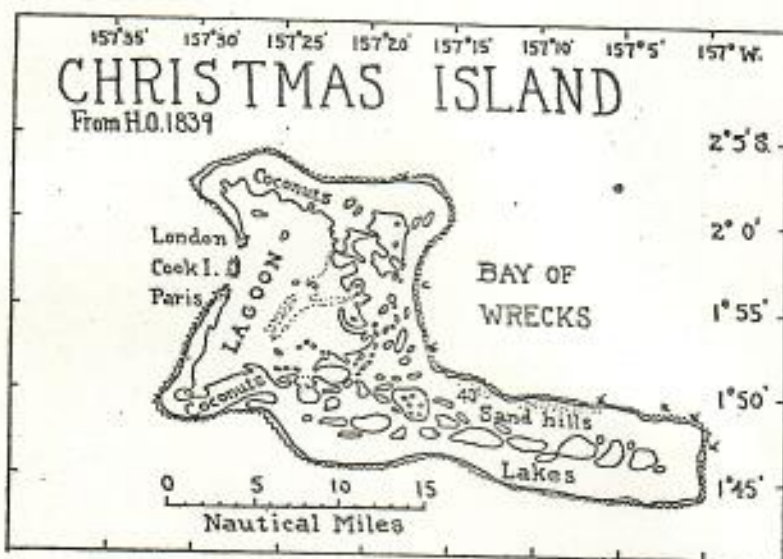
Aitutaki handled the boats. Water had to be distilled by the guano driers in dry years. Coconuts, planted by the guano driers a few years and then died.

Malden was claimed by Americans under the Guano Act of 1856, but by then the Australian firm already was established there. On January 1, 1922, Malden was leased to Malden Island Proprietary, Ltd., of Melbourne, for 21 years, but they did not stay out their lease, and the island has been abandoned during the past few years.



## CHAPTER 41

# Christmas Island



Christmas Island lies 105 nautical miles north of the equator. It is 200 miles northeast of Jarvis, 153 miles southeast of Fanning, 238 miles southeast of Washington Island, 357 miles southeast of Palmyra, and 1160 miles south of Honolulu.

It is the largest of the low coral islands in the central Pacific, measuring 35 statute miles east and west by 24 miles greatest width. The land area by one account is given as 60,000 acres, by another as 160 square miles (102,400 acres), and by a third as 250 square miles (160,000 acres). This last account gives the total surface within the reef as 382 square miles, a third of which is occupied by brackish or salt lakes and the lagoon. This latter measures 12 by 8 miles and occupies much of the western third of the island.

The height of the land averages 10 feet or less, but there are a few lines of sand hills which reach a height of 20 to 40 feet. The highest of these are along the southern shore of the Bay of Wrecks. A strong current sweeps into this bay from the east and has caused many sailing



ships and even a steamer or two to pile up on the jagged reef, which averages 100 to 300 feet wide.

North and south of the lagoon are groves of coconut palms, most of which were planted after 1880. These can be seen from the deck of a vessel at 10 or 12 miles. But the northeast and southeast points are so low that they are only visible from a few miles. Beacons have been set up on these points, that behind the southeast point being a conical structure of iron, 45 feet high.

Dr. E. Christophersen (in Bishop Museum Bulletin 44) records 24 species of plants as growing naturally on Christmas Island. These include a few *Tournefortia* trees, three *Pisonia* trees, clumps of *Scartola* shrubs, four kinds of grasses, seven kinds of low shrubs, and the rest herbs. The taller growth is in the western third of the island; grassland and low shrubs in the middle portion; and the eastern end is largely bare. The lakes are practically at sea level. Near the settlements *Erythrina*, hibiscus, and pandanus trees and other ornamental plants have been set out.

In addition to the usual sea and migratory species of birds there is a native land warbler, related to species on other south Pacific islands and on Laysan Island. Introduced cats, which have gone wild, have helped to exterminate the rats. There are fishes in some of the lakes and marine life is abundant in the lagoon and around the reef.

Winds generally blow from the eastward: northeast from November to May and southeast from June to October. There is a strong westerly current past the island. Anchorage is good off the west side, and landing excellent near the two entrances into the lagoon. Rainfall is variable, but usually averages between 25 and 35 inches a year.

Kenneth P. Emory, Bishop Museum anthropologist, described a dozen archaeological sites which he saw in 1924, or which were described to him by Father Emmanuel Rougier and Monsieur Coulon. But in summary he states that Christmas Island has not yet yielded definite evidence of settlement by Polynesians. The few traces of native stone work and the artifacts found belong to different periods and come from different directions, suggesting chance Polynesian visitors or castaways.

The island was discovered by Captain James Cook, in the ships *Resolution* and *Discovery*, December 24, 1777. They stayed until the following 2nd of January, in order to refresh the men; obtain coconuts, fish and turtles; and observe an eclipse of the sun. Cook said: "As we kept *cir* Christmas here, I called this discovery Christmas Island."

So much publicity resulted from Cook's account, that many whale ships and other vessels visited the island in search of safe anchorage, provisions, and shore leave for wearied crews. F. D. Bennett gives an interesting account of the visit of the *Tuscan* in 1834.

On October 10, 1836, the English ship *Briton*, Captain George Benson, was wrecked on the northeast side of the Bay of Wrecks. The Captain and 29 men were rescued by the American whale ship *Charles Frederic*, Captain Brown, May 23, 1837. An interesting account of the experiences on the island is given in the *Hawaiian Spectator*, vol. 1, pages 64-68, 1838, together with a chart of the island.

Captain J. Scott, in H.M.S. *Samarang*, made observations in 1842 (or 1840). The Bremen whale ship *Mozart* was wrecked in December, 1847, rescue being made by the American whaler *J. E. Donnell*. The following month the Chilean ship *Maria Helena* went ashore. The passengers included U. S. Commissioner Anthony Ten Eyck and family and other prominent persons. They were rescued by the French corvette *Sarcelle*, in April, 1848, after word was taken to Honolulu by some of the crew in the ship's long boat.

In November, 1856, the lumber vessel, *J. C. Fremont*, was cast ashore in the Bay of Wrecks. The wreck was sold to *J. I. Dowsett*, of Honolulu, and about 160,000 feet of lumber were salvaged on the ship *John Dunlap*, schooner *Warwick*, and brig *Hiro*, July-October, 1857.

The island was examined for guano prior to 1857 by Capt. John Stetson, of New Haven, Conn. It was taken possession of by Capt. *J. L. Pendleton* of the ship *John Marshall*, in behalf of *A. G. Benson* and associates, under deed from *Stetson* dated May 11, 1857. The *U. S. Guano Co.* acquired the rights in November, 1858, and worked the island for guano for several years.

In 1865 a lease to Christmas Island was given by the British to the Anglo-Australian Guano Co. The island was visited in 1866 by the company's vessel, *Marie Louise*, Captain *Pie*, out of Hobart, Tasmania. But the enterprise was found unproductive, and the lease was cancelled in 1869 at the company's request.

License was also granted *Alfred Houlder*, June 9, 1871. But when the lessee's representative, *Dr. Weston*, arrived to inspect the island, July 5, 1872, he found three men on the island employed by *C. A. Williams* of Honolulu. What was more, the U.S.S. *Narragansett* had just been there and had taken formal possession for the United States. *Chdr. Meade's* report of this said, "I recognized this occupancy, subject to the



many whale  
anchorage,  
gives an

to the U.S. Government, and so informed the U.S. Minister  
at the Hawaiian Islands." Mr. Houlder requested that his lease  
be cancelled, which was done.

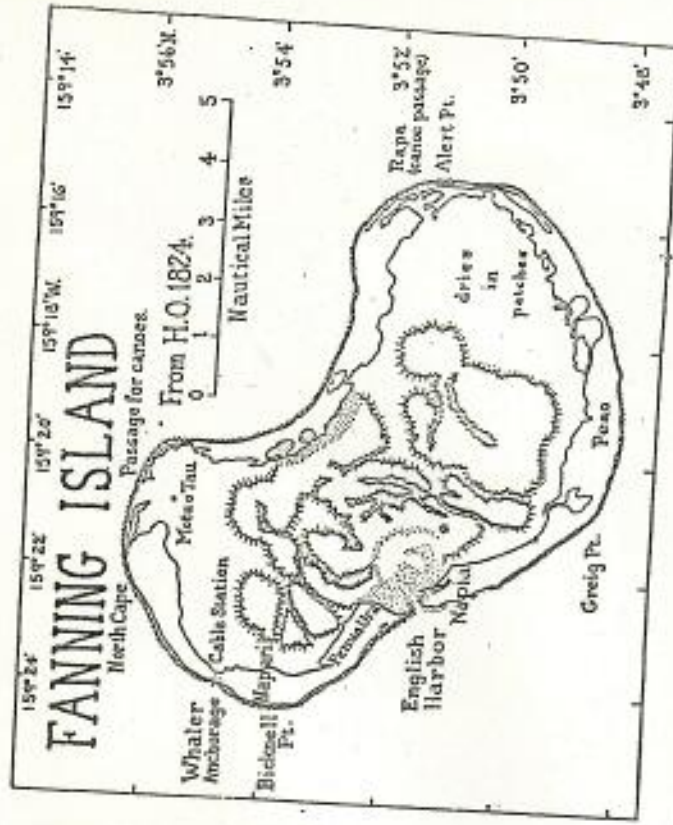
Captain Wm. Wiseman, of H.M.S. Caroline, annexed the island to  
Great Britain March 17, 1888, despite American protest. The British  
leased the island to Lever's Pacific Plantations Limited, June, 1902, for  
99 years. They planted 72,863 coconut palms on 1,457 acres and intro-  
duced "silver lip" pearl shells into the lagoon. The S. S. Aeon was  
wrecked on the east point in 1908. Japanese poachers occupied the aban-  
doned island about 1911, killing thousands of birds.

Father Emmanuel Rougier took over the lease from Lever Brothers,  
Dec. 17, 1913. The Central Pacific Coconut Plantations, Ltd. acquired  
the island from him October 27, 1914. They pay 200 pounds a year tax  
and lease, and still use the island. Franta Jerabak, Czechoslovakian, has  
been manager, since the death of Father Rougier, with 14 Tahitian work-  
men and 6 women, in 1937. He harvested about 400 tons of copra a year  
from approximately 750,000 coconut palms. Besides London and Paris,  
the two principal settlements, the workmen have several small camps  
scattered among the coconut groves, to which they move during harvest-  
ing.

November 28, 1919, Great Britain reasserted her sovereignty over  
the island. In February, 1937, a British radio operator was established  
there, to send daily weather signals, and, incidentally, keep and eye on  
the island.

## CHAPTER 42

# Fanning Island



Fanning Island lies 228 nautical miles north of the equator. It is about 153 miles northwest of Christmas, 260 miles a little east of north from Jarvis, 75 miles southeast of Washington Island, and 200 miles southeast of Palmyra.

The island is a roughly oval coral atoll, 9.5 nautical miles northwest and southeast, by 6 miles wide. One writer describes it as shaped like a footprint, adding that the people of Manihiki called it Tapuanerangi, "heavenly footprint." The land area is variously given as 13, 15, 17, and 26 square miles, and 8,500 acres. The first and last agree roughly, and seem about correct. The enclosed lagoon has an area of 42.6 square miles. The deepest water in the lagoon is about 50 feet, only three-quarters of a square mile exceeds 30 feet in depth, and most of it is very shallow.



There are three narrow breaks in the 31 miles of land rim. At two of these the reef admits passage only for a canoe in good weather. The third entrance, at English Harbor, has a width of 300 yards, with depths of 25 to 30 feet in the middle. There is a 5 knot current through this passage at ebb and flow. Vessels may anchor immediately inside the entrance. For small vessels, drawing 10 feet or less, there is a spacious anchorage beyond a sand bar. There is a concrete jetty at which vessels drawing less than 18 feet may load. Vessels also may anchor at Whaler Anchorage, on the northwest side. Here is located the pier of the cable station, at or near which landing is generally good.

The rim of the island is very low, made up of a beach crest, about 10 or 12 feet high, within which much of the land is only 2 to 3 feet above sea level. The land is thickly covered with coconut palms and the remains of native bush. These reach a height of 60 to 90 feet, making the island visible from the deck of a vessel at about 15 miles.

The beach is backed by a dense growth of *Scaevola* and tree heliotrope. Here and there *Pisonia* trees stand out above the coconut palms. Pandanus and a few introduced fruit and ornamental trees occur. Open spaces are carpeted with bunchgrass, purslane, morning-glory vines and low herbs and shrubs. The soil is fertile and breadfruit, bananas, figs, pineapples, taro, and arrowroot grow readily. Soil has been imported from Honolulu for vegetable gardens.

Surrounding the island is a narrow fringing reef, nowhere more than 1,500 yards wide, along most of the shore much narrower. Marine life is abundant along the reef and in the lagoon. Land crabs are numerous, making burrows in the sand. There are the usual sea and migratory birds, and in addition a highly colored parrakeet and a warbler. Several accounts of the bird life have been published.

The climate although warm is very uniform and healthful, with the mean temperature 83.5 (73 to 92) degrees F., modified by nearly continual trade winds. These blow from the southeast 45 percent, from the east 30 percent, and from the northeast 13 percent of the time. The annual rainfall is variable, but usually is between 80 and 100 inches, with as much as 125 inches, and occasional drier years. The late fall usually is the driest time of the year. The barometer stays close to 30 inches of mercury. The weather is worst in March and April, but severe storms are rare.

Kenneth P. Emory, Bishop Museum anthropologist, describes (1934 and 1939) stone ruins, adzes, a fishhook and other ethnological speci-

mens found on Fanning. He concludes that the people from Tonga about the 15th century.

Fanning was discovered by Captain Edmund Fanning, in the American ship *Betsy*, at 3 a. m., June 11, 1798. Fanning's narrative of the shipwreck and his description of the island make good reading.

Several whalers visited Fanning. One commanded by Capt. Mather, called it American Island in 1814. An account of the island is given by Captain Legouarant de Tromelin, of the French corvette *La Bayonnaise*, which visited the island in 1828. At least four vessels arrived at Honolulu from Fanning between 1843 and 1853.

A short time prior to 1855, Captain Henry English, with 150 natives from Manihiki (Huwaphries) Island, settled on Fanning and commenced the production of coconut oil. He placed the island under British protection when Captain W. H. Morshead visited it in H.M.S. *Dido*, October 16, 1855. Shipping records in *The Friend*, *The Polynesian*, and *The Gazette* (all published in Honolulu) give some idea of the amount of coconut oil produced. In 1859 two vessels arrived at Honolulu with 15,000 gallons; in 1860, one vessel with 10,000 gallons; 1861, three vessels with 30,000 gallons; 1862, four vessels with 44,000 gallons; and 1863, four vessels with 10,800 gallons.

About 1857, a whaling ship brought to Fanning an Ayrshire Scotsman, William Greig. A short time later he was joined by an American, George Bicknell. Both married native islanders. Greig's wife was Tenuau Atu (1842-1917), sister of the king of Manihiki. Both men died on Fanning. Greig on July 27, 1892. The three sons of Greig remained on Fanning; but the descendants of Bicknell gradually moved away. His heir sold his share of Fanning and Washington Islands to a man in Suva, from whom it was acquired by Father Emmanuel Rougier.

A firm, Fanning Island, Limited, was formed which operated Fanning and Washington Islands until 1935. Due to low price of copra, in that year it was sold to a subsidiary of Burns, Philp and Co., Ltd., operating under the name of Fanning Island Plantations, Ltd.

According to shipping records in Honolulu, there was a guano digging boom on Fanning between 1877 and 1879, for ships of many flags sailed there to load guano. Some vessels were wrecked, such as the British bark *Crosby*, 1879. In 1885 guano still was being shipped. But in 1887 lumber was taken there to make copra drying and storage sheds, and from then on copra was the chief industry on the island.



was formally annexed to Great Britain by Captain William  
H.M.S. Caroline, March 15, 1888.

A cable relay station was established in 1902. This breaks the stretch  
from Bamfield, Vancouver Island, to Suva; 3,300 miles, Bamfield to  
Fanning; 2,200 miles, Fanning to Suva. Up to 1931, Union S.S. Co.  
freighters stopped with supplies. Since then the island has been supplied  
from Honolulu, the S. S. Dickenson making quarterly trips.

Many comforts are provided, such as radio, refrigeration, electric  
lights (from Diesel generators), a doctor, tennis court, library, even a  
branch of the New Zealand Savings Bank, to make pleasant the two year  
tours of duty of the cable station personnel and their wives, numbering  
about 20 white people. Storage tanks hold about 8,000 gallons of rain  
water, and well water also is reported to be both good and plentiful.

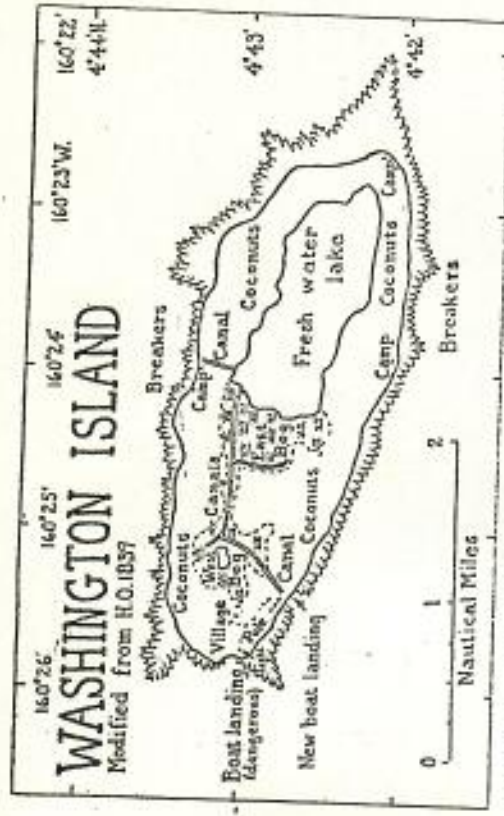
In September, 1914, the German cruiser Nurnburg slipped up to  
Fanning, flying the French flag. They landed and wrecked the cable  
station, cut the cable, and destroyed a cache of spare instruments. With  
the assistance of Hugh Greig, who dived for the severed ends of the  
cable, communication was reestablished within two weeks. In 1939, it  
was reported that the island was being fortified against a repetition of  
this; but the report was denied, it being stated that an undefended island  
of purely commercial importance was safer.

At English Harbor, headquarters of the copra plantation, there are  
3 or 4 more white people and between 100 and 150 Gilbert Island work-  
men. It was reported in 1939 that 300 new Gilbertese recruits were being  
taken to Fanning.

The island is administered from Ocean Island, 1880 miles away, but  
there is a resident agent immediately in charge. New Zealand stamps  
have been used for postage.

## CHAPTER 43

# Washington Island



Washington Island lies 282 nautical miles north of the equator. It is  
about 75 miles northwest of Fanning, 238 miles northwest of Christmas,  
and 120 miles southeast of Palmyra. It also has been called New York  
and Prospect.

It is a distinctive sand and coral island, about 3.4 miles long by 1.3  
miles, greatest width. The circumference is about 9 miles and the area  
less than 4 square miles. Most of the beach rim reaches elevations of 9  
or 10 feet, with a few places, especially toward the west end, where the  
crest may be 15 feet high. The land is densely covered with coconut  
palms and forest trees (75 to 90 feet) making the island visible from  
the deck of a ship at 15 miles.

Most of the beach is of fine sand. The fringing reef is not over 200  
yards wide, except at a few places: 1,000 yards at the east point, 800  
yards at the northwest point, and 600 yards wide at the southwest point.  
The island seems to be building westward, for at the west end is an  
area of about 2 square miles with depths between 5 and 20 fathoms. It  
is 14 fathoms deep 2.5 miles off the west point.



Although vessels may anchor on this bank, the anchorage is very uncomfortable because of lack of protection. Landing is possible only at the west end. Here it is uncertain, often dangerous, and in rough weather impossible. A new landing, developed on the south side, half a mile from the southwest point, is said to be better. The distinctive feature about Washington Island is that the eastern half contains a fresh water lake, and the western half two peat bogs. These occupy the former lagoon basin, as shown by marine shells and white coral sand on the lake bottom and beneath the layers of peat.

The peat consists of a dense, interlaced mass of partly decayed plant fibers, dark brown or black in color. Its surface is 2 or 3 feet above sea level. At the center of the bogs it averages 3 to 3.5 feet thick, a few places up to 5 feet. It decreases to a few inches thick around the margin of the bogs. In the west bog there is an "island" of coconut palms, its soil underlain by peat.

The surface of the lake is about 3 feet above sea level. It measures nearly 2 miles long by .7 mile wide, and averages about 5 feet deep, although it is reported to reach a depth of 30 feet. The water level is maintained by the heavy rainfall. The lake gradually is encroaching into the east bog.

Dr. C. K. Wentworth (1931) suggested that Washington Island was first built as an atoll at a time when the sea stood at a higher level. As the sea level fell, the lagoon became a closed basin, the salt water seeped or evaporated away; and heavy rainfall produced the fresh water lake. Plants filled the western portion with peat. The lake now is being enlarged.

Partly to drain the bogs, but principally for the sake of transportation, canals have been dug across both bogs, along a narrow strip of bog connecting them, from the west bog to the south shore, and from the lake to the north shore. It is said that part, at least, of the canals was dug by the wives of Gilbert Islands workmen. The level of the water in both canals and lake is controlled by means of dam gates. Along the canals, power and row boats ply to transport workmen and collect coconuts.

Dr. Christophersen (1927) lists 35 species of plants, but many of these are weeds. The vegetation forms several associations. Along the beach crest are mainly tree heliotrope and *Lepturus* bunchgrass, with some *Scaevola* thickets. Within this is a dense stand of coconut palms, over 2,100 acres, only 200 acres of which have been planted. Among the

coconut palms are trees, *Pisonia*, pandanus, and tree heliotrope; and beneath all is a dense undergrowth of birds-nest, polypody, and other ferns.

Each bog measures 200 to 250 acres, and is bare of coconuts and trees. Around the margin of the bog are pandanus trees and large taro-like aroids (*Cyrtosperma*), up to 5 feet high, inferior to taro but edible. In the bogs are bulrushes (*Scirpus*), 5 to 7 feet tall, in solid clumps. In 1924, the water table was 8 or 10 inches down, the bogs being firm enough to walk on.

Judging by the vegetation, the rainfall is heavier on Washington than on Fanning. Otherwise the climate is much the same, high temperature being tempered by trade winds.

The Alexandrine rat, lizards, land and coconut crabs, and land and sea birds like those on Fanning are the principal animals. The reef abounds with marine life.

Kenneth P. Emory, Bishop Museum anthropologist, states (1934) that no artifacts of local origin have been found on Washington Island, although ancient stone-walled enclosures have been found. The people of Manihiki called the island Arapata, and Tuamotu natives called it Teraina. About 1906, James Greig found a canoe hull in a peat bog, resting on the old sand bottom and covered by 50 inches of peat. It was of *Calophyllum* wood, a tree not found on Washington, and only recently brought to Fanning. It may be ancient and of Tongan origin. It is preserved in Bishop Museum.

Washington Island was discovered by Captain Edmund Fanning, in the American ship Betsy, June 12, 1798. He remarked on its beautiful green and flourishing appearance, and named it for President George Washington. He did not land.

Edward Lucett, merchant from Tahiti, passed the island June 19, 1848. He says: "It is about 3 miles long and rather more than a mile in width; elevated from 12 to 15 feet above the level of the sea: its surface presents an unbroken mass of vegetation."

Under the name of Pruspect, the island was claimed by American guano interests, under the Guano Act of 1856. Apparently no use was made of it.

Its history is like that of Fanning. It was occupied by Captain John English and Manihiki natives about 1860; then by William Greig and George Bicknell, about 1870. When visited by the U.S.S. Portsmouth in 1874, Bicknell was employing 50 Tahitians as laborers. James Bick-



... arrived that when he visited the island in 1882 his uncle  
... from Manihiki to gather coconuts, and in 1894, Gilbert

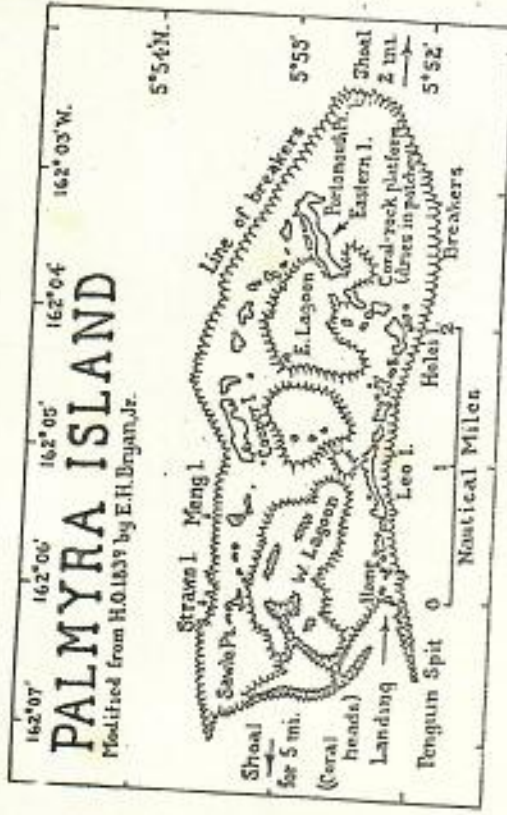
Washington Island was annexed to Great Britain by Commander Nichols, in H.M.S. Cormorant, May 29, 1889. For some years it was in charge of Capt. Bernhard Anderson and his wife Marian, daughter of William Greig. After Capt. Anderson's death, 1906, the sons of William Greig occupied the island. They employed about 200 Gilbert Island natives.

The island became part of the assets of Fanning Island, Ltd. In 1935 these were transferred to a subsidiary of Burns, Philp and Co., called Fanning Island Plantations, Ltd. It had been practically abandoned in 1924. In 1935, under the new company, the making of copra was renewed. In 1937 there were 3 Europeans and 80 Gilbert Island workmen on the island. The natives work under a three year contract. One clause provides that they do not have to work in the rain; and how it can ruin on Washington Island.

The village consists of several houses near the southwest point. Here have been planted such fruit and ornamental trees as breadfruit, papayas, bananas, guavas, sweet sop, plumeria, and hibiscus. A light is shown on a 70 foot tower, on the southwest point, when a ship is expected. Near there are two black radio masts and a conspicuous red-roofed shed. Supplies are brought about twice a year. The administration is from Ocean Island, through the resident agent on Fanning.

Good descriptions of both Fanning and Washington are given by Prof. Wm. B. Herms (1926), who visited the islands in 1924 to advise on the control of a weevil damaging the coconut palms. B. P. Bishop Museum also had an expedition to these islands in 1924.

## CHAPTER 44 Palmyra Island



Palmyra Island lies 352 nautical miles north of the equator. It is about 120 miles northwestward of Washington Island, 200 miles north-west of Fanning Island, 33 miles southeastward of Kingman Reef, and 960 miles south by west of Honolulu.

The atoll consists of about 50 small islets, having a total area of about 250 acres, in a horse shoe surrounding three lagoons. The islets stand but 5 or 6 feet above sea level, but dense vegetation rises to a height of 75 to 90 feet, making the island visible from the deck of a ship at about 15 miles, when it is clear.

Surrounding the islets and the lagoons is a platform of coral and hard sand. Upon this one can walk from one islet to another, even at high water. At low water parts of the platform are dry. This platform measures  $4\frac{3}{4}$  miles east and west by  $1\frac{1}{2}$  miles wide.

From its eastern end a shoal extends eastward for two miles. From its western end it is shoal for about five miles, the inner mile of which is thickly dotted with coral heads. On this western shoal ships may anchor