

SEA TURTLES - HOWLAND-BAKER-JARVIS

GH BALAZS

Pacific
Islands
National Wildlife
Refuges

**JOHNSTON ATOLL NWR
BAKER ISLAND NWR
HOWLAND ISLAND NWR
JARVIS ISLAND NWR**



**UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE**



As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.



Baker Island Refuge

DESCRIPTION

Johnston Atoll National Wildlife Refuge is a coral atoll situated between the Hawaiian Islands and the Line and Phoenix Islands in the northern Central Pacific Ocean. It is 825 miles southwest of Honolulu at latitude $16^{\circ}44'32''$ N and longitude $169^{\circ}30'5''$ W. Two of the four islands in the lagoon (North and East) are entirely manmade; a third (Johnston) now completely covers one of the two original islands. The fourth (Sand) is half original and half manmade with the two portions being connected by a quarter-mile-long causeway. Operational control of Johnston Atoll is under the Defense Nuclear Agency (DNA). Access is restricted. The refuge is managed cooperatively by the DNA and the U.S. Fish and Wildlife Service. Except for manmade structures, only low-growing vegetation is found on the islands.

Baker Island and Howland Island National Wildlife Refuges are isolated coral islands just north of the equator in the Central Pacific Ocean about 1,600 miles southwest of Honolulu, Hawaii. Baker Island Refuge contains 340 acres of land and 31,397 acres of submerged land and water. Howland Island Refuge contains 400 acres of land and 32,150 acres of submerged land and water. Both islands are uninhabited. They are vegetated by grasses, prostrate vines, and low-growing shrubs due to scant rainfall, constant wind, and the burning sun.

HISTORY

Johnston Atoll has had a varied history. From two small, insignificant islands, the atoll has grown into a large Department of Defense complex. The atoll was discovered on September 2, 1796 by the American Brig SALLY of Boston. The first landing, however, was accomplished in 1807 by Captain Charles James Johnston of the HMS CORNWALLIS. United States guano miners occupied and took possession of the islands in 1858. As a result of the 1923 TANAGER-WHIPPOORWILL Expedition, the atoll was made a Federal bird refuge in 1926 by Executive Order. The atoll was placed under the Department of the Navy in 1934 by Executive Order, which also kept the 1926 order in effect. A small naval base was begun in 1939. The base expanded through World War II. Operational control was transferred from the Navy to the U.S. Air Force in 1948. The facilities were expanded again during the Korean conflict. In 1957, a U.S. Coast Guard LORAN transmitting station was authorized. In 1958, operational control of the atoll came under the Defense Nuclear Agency.

Baker Island is thought to have been discovered by Michael Baker aboard a whaling ship from New Bedford, Massachusetts, in 1832. He raised the American flag and claimed the island for the United States during a second visit in 1839. Later, he sold the claim to the American Guano Company. Commander

Jarvis Island National Wildlife Refuge in the Line Islands Archipelago, is located just south of the equator about 1,300 miles due south of Honolulu, Hawaii. The refuge contains an 1,100-acre island that is vegetated by grasses, prostrate vines, and low-growing shrubs. It also is uninhabited. About 36,419 acres of submerged land and water are included within the refuge boundaries.

Rose Atoll National Wildlife Refuge includes the easternmost islands (Rose and Sand) of the Samoan Islands and is one of the smallest atolls in the world. It is the southernmost unit of the National Wildlife Refuge System. Total land surface is about 20 acres. About 1,480 acres of submerged land and water are also included within the refuge. Approximately 37,453 acres of surrounding submerged land and water outside the reef are managed cooperatively with the National Marine Fisheries Service. The nearly square, 2-mile wide coral atoll is 78 miles east-southeast of the nearest American Samoan island of Ta'u and 150 miles east-southeast of Pago Pago Harbor, Tutuila Island. Only seven species of plants including the baka tree, the introduced coconut palm, the beach heliotrope, and four species of forbes occur on Rose Island. Sand Island is devoid of vegetation. The refuge is managed cooperatively by the Government of American Samoa and the U.S. Fish and Wildlife Service.

Rose Atoll Refuge



Charles H. Davis of the U.S.S. ST. MARY'S landed, surveyed and took official possession of the island in August 1857. The American Guano Company continuously worked the deposits from 1859 to 1878 and removed tons of guano. Between 1886 and 1891, a British firm headquartered their Pacific guano digging operations on the island. On April 3, 1935, American colonists were landed on the island. They constructed a lighthouse, dwellings, cisterns, and planted trees during that period of radio and weather station establishment to support air commerce. American troops occupied the island in World War II and constructed airstrips, gun emplacements, and barracks. The island was abandoned following the war.

Birds killed in preparation for A. Earhart

The discovery of Howland Island occurred in 1822 by Captain George B. Worth in the Whaler OENO out of Nantucket. It was called Worth Island after him. The name "Howland" was given the island by Captain George E. Netcher of New Bedford who visited it with the Whaler ISABELLA on September 9, 1842. Howland was supposedly the name of the lookout who first sighted the island. On February 5, 1857, Alfred C. Benson and Charles H. Judd from the Hawaiian Vessel LIHOLIHO, commanded by Captain John Paty, landed on Howland to raise the American flag and take formal possession in the name of the American Guano Company of New York. In December 1858, the United States Guano Company also claimed the deposits on the island. After several years of contested rights, the American Guano Company prevailed and many tons of guano were removed until operations ceased in 1878. American colonists were landed on March 30, 1935, and a small settlement was constructed. Howland Island was quickly converted to an airstrip in 1937 for Amelia Earhart's ill-fated flight. American forces occupied the island after the outbreak of World War II. All the airstrips, roads, and buildings were abandoned after the war.

Although Polynesians probably visited Jarvis Island in prehistoric times, there is no evidence of occupancy. The island is thought to have been discovered August 21, 1821 by Captain Brown of the English ship, ELIZA FRANCIS, but several names (Bunker, Brook, Brock, Volunteer, and Jarvis) appeared on charts or in lists of discoveries prior to the 1821 date. The island was surveyed in December 1840 by the U.S. Exploring Expedition from the

PEACOCK and FLYING FISH. In March 1857, Honolulu representatives of the American Guano Company from the LIHOLIHO claimed it under the 1856 Guano Act. Later that year, Commander Charles H. Davis of the U.S.S. ST. MARYS surveyed the island and formally claimed it for the United States. Guano was dug from 1858 to 1879. The island was annexed by Great Britain on June 3, 1889 and a London and Melbourne guano company leased the island in 1906, but little, if any, guano was removed. A group of American colonists was landed on March 26, 1935. They constructed a number of wooden and stone buildings and installed a powerful radio over which weather data was transmitted to Honolulu for aviators operating in the Central Pacific. Most of the colonists left upon the advent of World War II. The radio station was abandoned and the island deserted until 1957, when scientists of the International Geophysical Year arrived. They deserted the island in 1958.

Feral cats were successfully eradicated from Baker Island in 1964, but populations continue to prey upon wildlife at Howland and Jarvis Islands. Refuge designation was given to all three areas in 1974.

Rose Atoll was discovered by Louis de Freycinet on October 21, 1819, during an around-the-world voyage of the L'URANIE and LA PHYSICIENE. He named the main island Rose Island "for a lady especially dear" to him, but did not approach closer than one and a half miles from the atoll. The first recorded landing was made by the U.S. Exploring Expedition under Commodore Charles Wilkes aboard the VINCENNES on October 7, 1839. Coconut trees were first introduced to Rose Island by B. F. Tilley, the first Governor of American Samoa, on July 10, 1900. On January 12, 1920, Commander W. J. Terhune, the Naval Governor of American Samoa, erected a concrete monument on Rose Island. Sometime during the early visits, the Polynesian rat was probably introduced to Rose Island, where a large population continues to prey on native wildlife.

All of the Pacific Island Refuges are classified as United States possessions.

SPECIES	REFUGE				
	Jo	Ba	Ho	Ja	Ro
Black-footed Albatross	r				
Laysan Albatross	r				
Wedge-tailed Shearwater	a*		r	u	
Christmas Shearwater	u*		x	r	
Newell's Manx Shearwater T	r				
Phoenix Petrel	x		r		
Bulwer's Petrel	u*				
White-throated Storm-Petrel				r	
Sooty Storm-Petrel	x				
Red-billed Tropicbird	r				
White-tailed Tropicbird	o				r
Red-tailed Tropicbird	c*	u*	u*	a*	c*
Blue-faced Booby	u	u*	a*	a*	u*
Brown Booby	c*	u	u*		c*
Red-footed Booby	a*	u	u	a*	a*
Great Frigate bird	c*	c	c*	c*	c*
Lesser Frigate bird	x	c	a*	u*	c*
Cattle Egret	x		x		
Reef Heron					u*
Pintail	o		x	x	
American Wigeon	o				
Northern Shoveler	o				
Peregrine Falcon	x				
Semipalmated Plover	x	x			
American Golden Plover	c	c	c	u	c
Black-bellied Plover	x				
Ruddy Turnstone	c	c	c	o	c
Bristle-thighed Curlew	u	u	u	u	u
Spotted Sandpiper	x				
Wandering Tattler	c	u	u	u	u
Willet	x				
Lesser Yellowlegs	x				
Sharp-tailed Sandpiper	x	o	r		
Pectoral Sandpiper	u	r	r		
Short-billed Dowitcher	x				
Western Sandpiper	x				
Buff-breasted Sandpiper	x				
Ruff	x				
Bar-tailed Godwit		r	r		
Sanderling	u	u		r	u
Wilson's Phalarope	x				
Glaucous-winged Gull	r				
Herring Gull	r				
Laughing Gull	r	x			
Franklin's Gull	x				

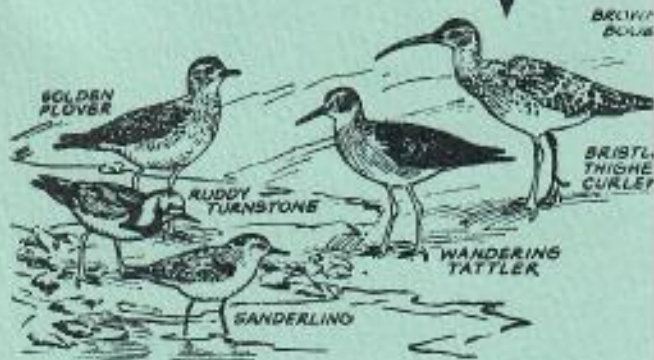
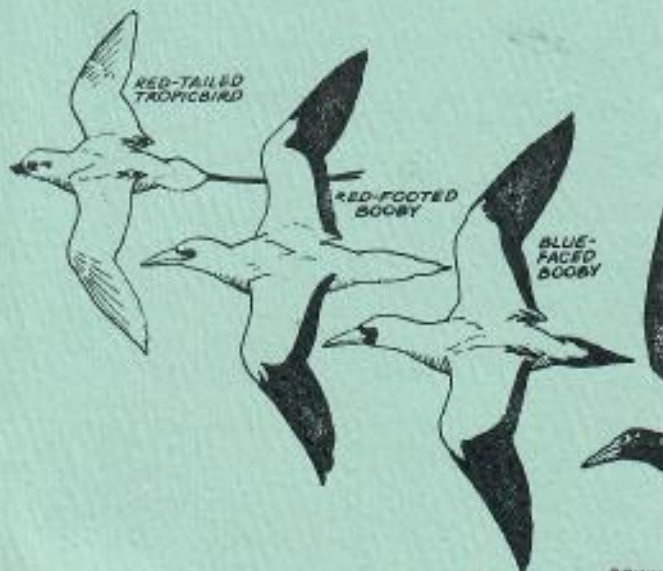


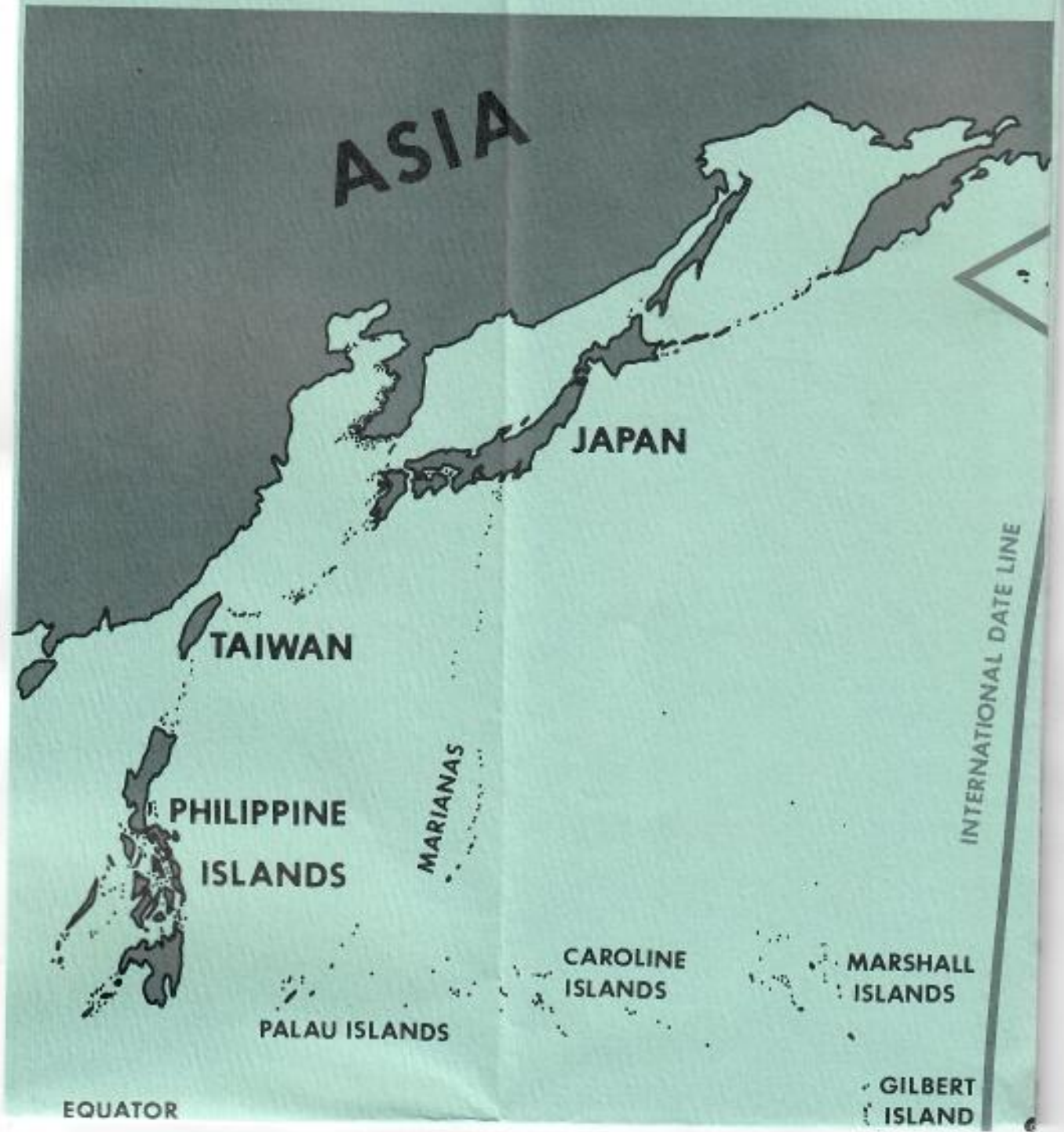
WILDLIFE

The marine life of Johnston Atoll is quite varied and abundant. Invertebrate forms, including 18 species of coelenterates (jellyfish to corals), over 58 species of molluscs, 12 species of annelids, 75 species of marine crustaceans and 68 species of insects, have been identified there. Vertebrate forms include over 194 inshore species of fish, the green sea turtle, the endangered Hawaiian monk seal, and 53 species of birds, including 22 species of migratory sea birds. Thirteen species of birds nest on the atoll.

From March 1963 through December 1966, the Smithsonian Institution's Pacific Ocean Biological Survey Program (POBSP) recorded 28 species of birds on Baker and Howland Islands during 44 visits. Included are 11 species of migratory sea birds on Baker Island and 17 species on Howland Island. Four species nest on Baker and eight species nest on Howland. POBSP personnel visited Jarvis Island on four occasions in March and November 1964, March 1965, and August 1966. Twenty species were recorded during these visits, including 14 species of migratory sea birds, of which 8 species nest.

The dynamics of atoll life are clear on small Rose Atoll. The atoll is a square reef of pink coral with a 100-foot wide passage linking a 6 to 50-foot deep, 2,000-yard wide lagoon to the sea. The buka trees provide crown nesting sites for red-footed boobies and frigate birds, while black noddies and white terns use the middle and lower branches. Vertebrate life includes well over 100 species of fish, the green and endangered hawksbill turtles, and 19 species of birds, including 12 species of migratory sea birds. Eleven sea bird species and the reef heron nest on the atoll islands.





ASIA

JAPAN

TAIWAN

PHILIPPINE ISLANDS

MARIANAS

PALAU ISLANDS

CAROLINE ISLANDS

MARSHALL ISLANDS

GILBERT ISLAND

EQUATOR

INTERNATIONAL DATE LINE

Baker NWR

NEW GUINEA

SOLOMON
ISLANDS

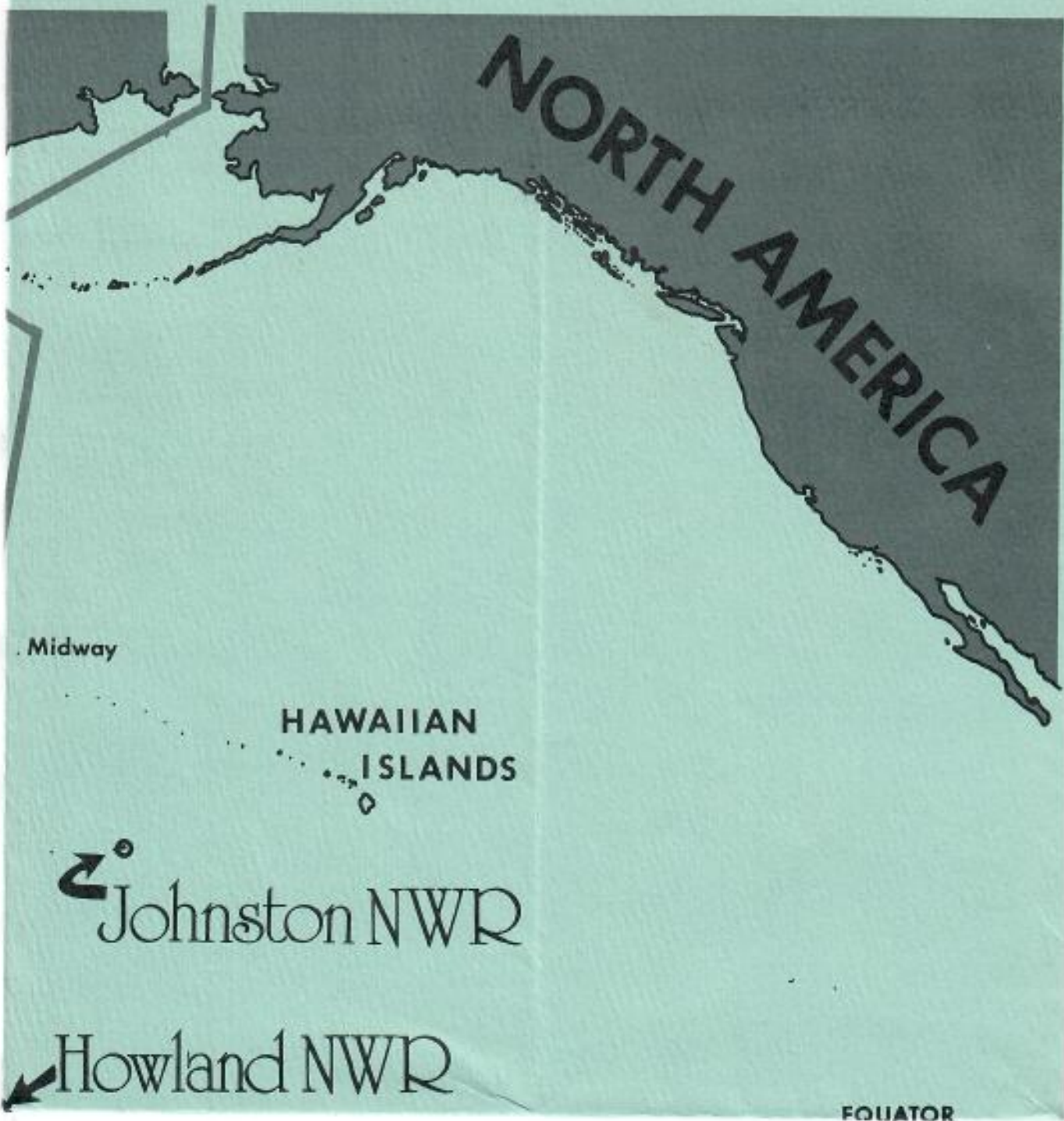
FIJI

AUSTRALIA

NEW
ZEALAND



NORTH AMERICA



Midway

HAWAIIAN ISLANDS

Johnston NWR

Howland NWR

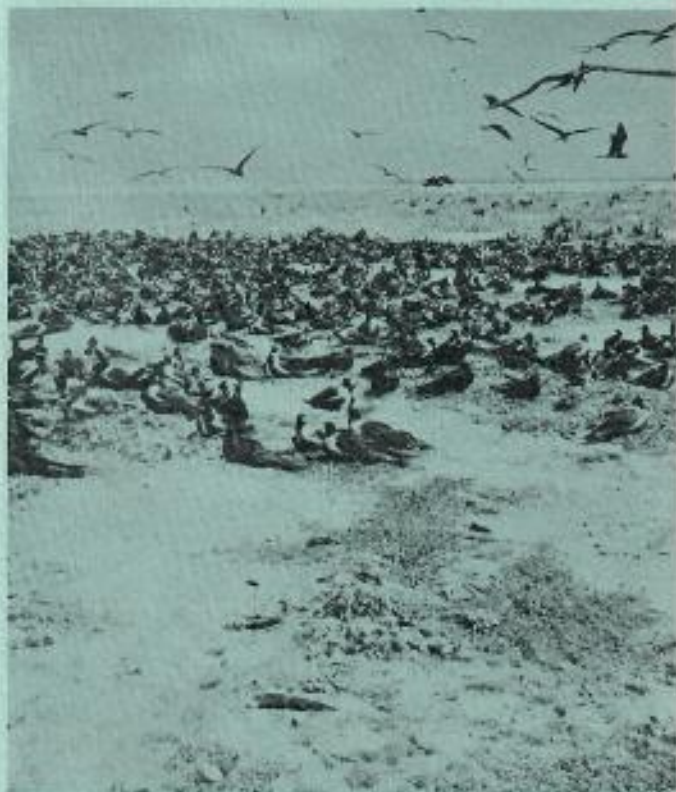
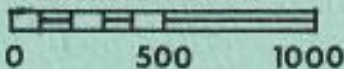
EQUATOR

Jarvis NWR

SAMOA



SCALE IN MILES



Lesser Frigatebirds - Jarvis Island Refuge

MANAGEMENT AND PUBLIC USE

Regulations for the protection and conservation of the natural resources, fish and wildlife, are in effect on all areas. Landing on the islands or entering into the refuges is authorized only under permits signed by the Refuge Manager. It is prohibited for any person to hunt, trap, capture, willfully disturb, or kill any bird, or take the eggs of such bird, on these refuges. No molesting or harvesting of turtles or seals is permitted. No animals or plant seeds may be taken into the refuges by humans. Public use is restricted to scientists and educators on a permit basis only.

Further information can be obtained by writing the Regional Director, U.S. Fish and Wildlife Service, Lloyd Five Hundred Building, 500 N.E. Multnomah Street, Portland, Oregon 97232 or the Refuge Manager, Hawaiian and Pacific Islands National Wildlife Refuges, U.S. Fish and Wildlife Service, Federal Building, Room 5302, 300 Ala Moana Boulevard, P.O. Box 50167, Honolulu, Oahu, Hawaii 96850.



WEDGETAILED SHEARWATER



CHRISTMAS ISLAND SHEARWATER



GRAY-BACKED TERN



SOOTY TERN



BLACK (WHITE-CAPPED) NODDY



FAIRY TERN



BROWN NODDY



BLACK TAIL



RED-TAILED TROPICBIRD



RED-FOOTED BOOBY

BLUE-FACED BOOBY



GREAT FRIGATEBIRD

LESSER FRIGATEBIRD



BROWN BOOBY



GOLDEN PLOVER



RUDDY TURNSTONE

BRISTLE-THIGHED GURLEW

WANDERING TATTLER

SANDERLING



BULWER'S PETREL



BROWN NODDY

BLACK TAIL

BLUE-GRAY NODDY



LESSER FRIGATEBIRD

BROWN BOOBY



RUDDY TURNSTONE



WANDERING TATTLER

SANDLERLING



12 tell of living 2 months adrift

Twelve survivors found aboard a 20-foot cabin cruiser that drifted for two months in the western Pacific said yesterday that they ate fish caught by hand and drank rain water to sustain themselves.

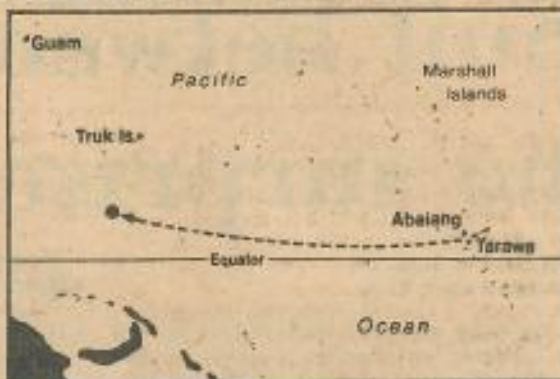
Nine others died from starvation and dehydration, the survivors said.

The survivors, believed to be Gilbertese, were taken to Truk, where doctors judged them in good health, according to Keith Spangler, a Coast Guard spokesman in Honolulu.

The six women, five men and one 3-year-old boy will be flown home to Kiribati today, he said.

The ordeal began when 21 people set out March 28 to make a 60-mile routine crossing between Absiang and Tarawa in Kiribati.

What was supposed to have been a trip of a few hours turned into a nightmare when the motor gave out.



Apparent route of cruiser drifting from Kiribati.

The group lived off provisions on the boat for two weeks before those ran out and they were forced to catch fish.

The rain water would last for "three to four days at a time," according to Spangler, and at times they were forced to drink sea water.

A fish-spotting helicopter belonging to a large tuna ship based in San Diego happened upon the cruiser and took the survivors to Truk.

Cats the Villains in Ecological Blunder

JOHANNESBURG, South Africa (AP) — When the South Africans came, the rats came too. So the South Africans imported cats. Then there were too many of them, but the South Africans brought in more.

The ecological misadventure began in 1947 when South Africa annexed Marion and Prince Edward Islands 1,150 miles to the southeast and put a weather observation station on Marion.

When the weathermen arrived, a number of rats slipped ashore and took up residence. It wasn't long before the meteorologists had lots of unwelcome rats for company.

Somebody thought of cats. In 1948, five common house cats were brought to the island and set free. They quickly ate their way through some of the rat population but also discovered it was easier to catch and eat the sea birds roosting on the island.

When they weren't out foraging, they were reproducing. By 1976, the feline population was estimated at 6,000, devouring 1.2 million birds a year. Petrels, graceful in the air but clumsy on the ground, were the favorite, but zoologists said other species also were endangered.

THE CATS HAD BEEN HUNTED. They had been trapped. Those that could be caught were sterilized. But the population boom continued.

In 1976, 100 more cats were brought to Marion. But these were infected with feline enteritis. They were delivered by helicopter to selected areas of the island.

"The virus does not affect anything else, and that is why we decided to use it," said Rudi van Aarde of Pretoria University's Mammal Research Institute. "The virus has spread successfully through the island and has reduced the mean population by 54 percent."

Now the zoologists are concerned that the 3,000 remaining cats, or some of their descendants, will produce a generation immune to the virus, and the population explosion will start all over again.

"No one jokes about the nine lives of cats any more," said Professor John Skinner of Pretoria University's Zoology Department.

Survivors of Sea Ordeal Recuperating in Hospital

Twelve survivors of a two-month ordeal at sea in the Western Pacific are in good condition today in a hospital on Moen Island in the Truk district of Micronesia, the Coast Guard reported.

The Pacific Islanders drifted 1,300 miles during the two months they were at sea in a 20-foot cabin cruiser which had developed engine problems.

They are scheduled to return to their home in Kiribati on an Air Micronesia flight June 10, the Coast Guard said.

Nine of the 21 residents of Abaiang Island aboard the boat, however, did not survive the trip that began March 26 as an intended two-hour, 23-mile trip to the neighboring island of Tarawa, the capital of Kiribati, formally known as the Gilbert Islands, the Associated Press reported.

Authorities said the bodies of those who died apparently were buried at sea one by one, but there was no information on when the deaths occurred, AP reported.

A helicopter spotting fish for the San Diego-based tuna boat Tifaimona sighted the drifting cabin cruiser Friday, about 700 miles southeast of Guam, according to a Coast Guard spokesman on Guam.

The survivors were transferred to a U.S. Trust Territory vessel and taken to Moen where they were being treated for malnutrition, dehydration and exposure, according to a hospital nurse.

Some of the 21 on the boat were going on vacation and others were taking food to a market in Tarawa, according to Cinrata Teanene, a police constable on Tarawa. The boat's single engine quit and the vessel began to drift on prevailing currents to the west.

The food they had aboard ran out after two weeks and they subsisted on rain water and fish they could catch with their bare hands, including shark, the Coast Guard said.

96pp.

Conserving our fish and wildlife Heritage Annual Report - FY 1975 USFWS

outlined future migratory bird land acquisition and waterfowl and pheasant and quail waterfowl habitat problems and needs in each flyway.

The Service also initiated a cooperative effort with State fish and game agencies to identify and describe wetland habitat acquisition and protection needs and opportunities. A person in each flyway and region was designated to coordinate these efforts by identifying significant waterfowl habitat not currently protected by State or Federal ownership, developing a qualitative and quantitative description of each area, including data on waterfowl use, threats to habitat, and methods of protection; and monitoring the status as to changes in waterfowl use and threats to habitat.

The Service updated the 1964 wetland inventory in the 115 county glaciated prairie region of North Dakota, South Dakota, and Minnesota to determine wetland losses and the remaining wetland base. Waterfowl habitat lost to drainage in all areas was significant.

The Service's accelerated wetland acquisition program began in 1961 with the enactment of the Wetland Loan Act which authorized a \$105 million loan to be used, with annual duck stamp receipts, to acquire wetlands and other waterfowl habitat. By the end of FY 1975, approximately 400,000 acres of refuges and 1,400,000 acres of waterfowl production areas had been acquired, or 72 percent of the objective.

Effect of Inflation

The effect of inflation on the goals of the accelerated land acquisition program bears a great deal on when and how the original acreage goal of 2.5 million acres of land can be reached. To date, approximately 1,806,000 acres of land have been acquired since FY 1961. Had inflation not taken place, the original goal of 2.5 million acres should have been achieved in FY 1974. This acreage goal has recently been revised upward to 3.8 million acres which is to be reached by FY 1986.

The inflation in agricultural land values far exceeds typical interest rate increases and consumer price index increases because of demand and scarcity. In many cases the escalation of land value in this program exceeds the escalation rate for agricultural lands because the areas are water oriented and in demand by recreational or industrial users.

THE EFFECT OF INFLATION ON WETLAND ACQUISITION

Fiscal Year	Original Goal	Actual Acquisition	Percentage of Goal
1961	2,500,000	1,806,000	72.2%
1975	2,500,000	1,806,000	72.2%
1986	3,800,000	1,806,000	47.5%

Four Pacific Islands Become New Wildlife Refuges

One of the birds, *the frigatebird*, which *was converted in 1974 to a refuge for the frigatebird*. It had 1974 as national wildlife refuge for *million of seabirds* thousands of *of ed* and as nesting sites for *sea turtles*.

Two of the other islands *also have colorful histories*. *Discovered by New Bedford whalers in the early 19th century, they were centers of guano mining operations in the 1880s colonized by Americans in the 1930's when radio and weather stations for air commerce were being established in the Pacific and, finally, were strips and weather stations during World War II.*

The 401-acre Howland Island National Wildlife Refuge containing a beacon *named after Amelia Earhart*, the 340-acre Baker Island National Wildlife Refuge and the 1,100-acre Jarvis Island National Wildlife Refuge, all located between 1,300 and 1,500 miles southwest of Honolulu, were officially designated as wildlife refuges in the Federal Register in July 1974.

The fourth island, one of the world's smallest atolls, 18-acre Rose Atoll in American Samoa was also set aside as a national wildlife refuge to preserve *sea turtles* *and* *undisturbed by man for sea turtles* *and* *dozens of bird species* and for scientific *study*.

Citizens Urged to Buy Duck Stamps

One of the largest single efforts in North America to insure the future of wildlife - the Migratory Bird Hunting Stamp program - was expanded in August 1974 to encourage *citizens* outside the hunting community to buy *stamps*.

Status Surveys of Migratory Birds

"Show Me" Tours

For many years the Service has conducted tours of key waterfowl breeding areas to familiar-

Cats Still Holding Out on 2 Tiny Pacific Isles

By Harry Whitten
Star-Bulletin Writer

Felis catus or *Felis domesticus*, the household cat, has traveled far in the thousands of years since it was first domesticated by the ancient Egyptians.

Today some of the Egyptian cats' descendants inhabit two desolate islands that are but dots in the vast expanses of the Central Pacific. They have been eliminated from a third island.

The island cats are feral—domestic animals gone wild. And they are a nuisance to the U.S. Fish and Wildlife Service which administers national wildlife refuges on Jarvis, Howland and Baker islands. They are a nuisance because of the well-known feline proclivity for eating birds.

The three islands have a history that includes discovery by Yankee sailing captains, exploitation by guano companies, and colonization just before World War II by Hawaiian youths from the Kamehameha Schools.

Barry Brady, assistant refuge manager, tells about a biological survey of the islands in which he participated late last spring.

The trip's purpose was to survey birds as to species and number, conduct predator control,

and do some refuge maintenance work, such as replacing weathered signs.

THERE WERE THREE IN THE scientific party: Brady; Gordon Black, maintenance man for the refuges, and Ralph Kirkpatrick, wildlife management teacher at Ball State University, Indiana. Kirkpatrick plans to publish a report on his research concerning the cat population in the Central Pacific.

Brady met the research vessel *Machias* on Tarawa in the Gilbert Islands and then proceeded to Howland for a week, to Baker for half a day, and to Jarvis for a week and a half.

The expedition eliminated the majority of the cats on Howland, but about 10 are still there, Brady said. The cats had previously been eliminated from Baker. The expedition got about a third of the estimated 300 cats on Jarvis.

The cats are descended from pets brought to the islands by colonists and which remained after the colonists left.

An article by Warren B. King in the March 1973 issue of the *Wilson Bulletin*, an ornithological publication, says that Jarvis, 1.6 square miles in size, is now uninhabited but an attempt at colonization was made in 1938-40. It was occupied again in 1966 by scientists connected with the International Geophysical Year.

THE SAME ARTICLE SAYS that Howland, 0.64 square miles, was colonized between 1935 and 1942, and that an airstrip and lighthouse were built, intended for use by the flier Amelia Earhart. The island was used by U.S. troops during World War II.

The article says the cats were exterminated in 1964 by members of the Smithsonian Institution's Pacific Ocean Biological Survey Program but reappeared in 1966 after a visit by the U.S. military.

The cats on both Jarvis and Howland did the good deed of extirpating the Polynesian rat, once abundant.

Baker, 0.53 square miles in area, also was used by U.S. troops during World War II. Its small cat population was eliminated in 1964.

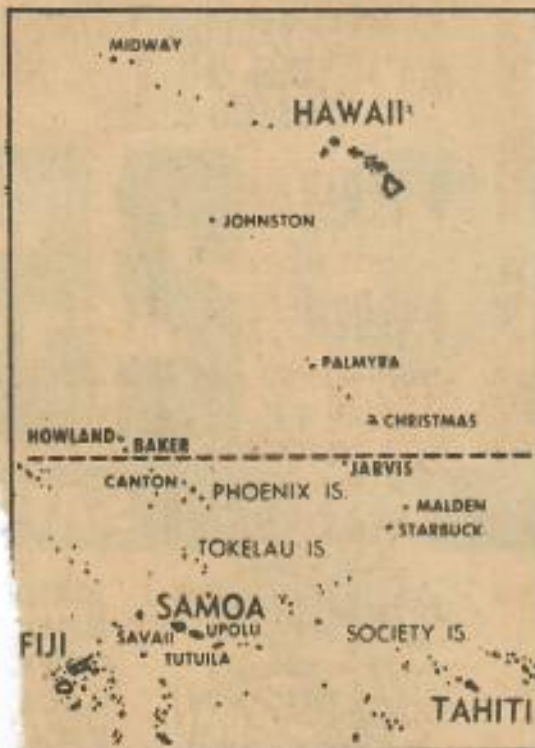
"Within months three species of seabirds previously absent were breeding on Baker, having emigrated from Howland," King said in his article.

Brady says the Fish and Wildlife Service has a logistical problem in visiting the islands and has in the past arranged to accompany Coast Guard trips to repair aids to navigation.

THIS WILL BECOME MORE difficult since the Coast Guard is automating its stations.

Brady explains that it is an unnatural situation for cats to be on these islands.

"They have eradicated entire species of





birds, but the populations came back after the cats were gone. There are very few uninhabited islands where seabirds can go to breed and not be harassed by predators."

Baker and Howland are about 1,600 miles southwest of Honolulu. Jarvis is about 1,300 miles due south of Honolulu.

The Smithsonian Institution's biological survey in the 1960s recorded 28 species of birds on Baker and Howland and 20 species on Jarvis.

Feral cats also have been a problem in Hawaii. Charles Van Riper III, who has made an intensive study of the palila, an endangered bird species on Mauna Kea, found that the cat was the chief predator.

The three islands were colonized in the 1935-41 years to assert American claim to them, since Britain also claimed them.

AMONG THE HAWAIIAN YOUTHS who lived at various times as colonists on the islands were several who later became prominent in Hawaii, including the late George N. West, longtime Star-Bulletin writer; Hartwell Blake, former Kauai County chairman; and Abraham Piihanaia, former head of the Hawaiian Homes Commission.

The colonists checked the weather, farmed, studied birds, collected specimens for Bishop Museum, fished, mapped the islands, and prepared a landing strip on Howland.

Two colonists, Joseph Keliihanani and Richard Waley, were killed by Japanese air attacks on Howland Dec. 18, 1941.

The islands were annexed by President Franklin D. Roosevelt shortly before the outbreak of World War II. Military installations were placed on them during the war but the islands were abandoned after the war.

They became wildlife refuges in 1974. Johnston Atoll and Rose Atoll, in the Samoan Islands, also are national wildlife refuges.

BERNICE P. BISHOP MUSEUM

P. O. Box 6037, Honolulu, Hawaii 96818 • Telephone 847-3511

October 11, 1973

Dr. George H. Balazs,
Hawaii Institute of Marine Biology,
P.O.Box 1346,
Kaneohe, Hawaii 96744

Dear Dr. Balazs:

I read with much interest your article in the Elepaio (33 (12), June 1973) on the Status of marine turtles in the Hawaiian Islands, and Helen Altonn's account of your trip to Canton to investigate turtles breeding on that island (Honolulu Star Bulletin, May 24, 1973).

I am in the course of writing a short history of the activities of the "colonists" on Jarvis, Howland and Baker (1935 to 1941). In the course of doing so, I have read the daily logs of the young men stationed on the islands, including brief observations of seeing, catching, and eating turtles, particularly on Jarvis and Howland. They, of course, did not know what species they were dealing with; but I rather assumed that they were Chelonia.

Do you make the "Pacific Green Turtle" to be Chelonia mydas (Linn.)? I gathered from the Mrs. Altonn's account that what you found in Canton was "something new", or was that only her way of putting it?

Would you be interested in what the boys say about turtles on those islands?

I would be interested in keeping in touch with what you have to say about turtles in Hawaii and the central Pacific.

Yours very sincerely,

E. H. Bryan, Jr.

Edwin H. Bryan, Jr., Manager

Pacific Scientific Information Center

Bryan, E.H. 1974. Panalāua
memoirs. Pacific Scientific Infor-
mation Center, Bernice P. Bishop Museum,
Honolulu, 249 pp.

U.S. Department of the Interior. 1976. Conserving
our fish and wildlife heritage.
Annual report FY 1975, Fish and
Wildlife Service, Washington, D.C.,
96 pp.

HOWLAND - BAKER - JARVIS

from Barry Brady (11-1-79)

May-June (?) 1979 trip to these islands was made to eliminate cats.

At Howland, 12 and 1 pregnant female were killed (total seen).

At Jarvis, 100's were seen, but no way to kill them.

At Baker, four (?) killed - or more seen (?). Unclear from conversation.

In March 1980, islands will be visited for 24 hours each, by USCG Buoy tender to check cat populations.

from Bryan +
JARVIS - 1935
22 Aug

check -
Guano deposits -
Digging 5 -
Polynesian ruins

page 68

Captured an enormous turtle -
tracks on beach -
attempted to "drive" it home along beach.
west coast

page 74

6 Oct. "A large turtle was seen,
believed to weigh in excess of 500 lbs.⁺"

Howland - 1935

page 99 "Sharks and turtles are
abundant in the waters around
the island"

Baker
see page 115 - photo of
water-worn coral rocks
along shore
"correlating this with washing
away of sand beach"

See King, W.B. cats on Howland - JARVIS
check w/cummings, Black, Brady

the L-shaped cornerstones—it is quite likely that it dates not earlier than the sixteenth century.

Stone vault burials are widely distributed in Polynesia, but the use in ancient times of large slab-faced platforms as burial monuments is a feature of western Polynesia and especially characteristic of Tonga. Before classing the Fanning tomb as Tongan because of its proximity to the dressed-stone enclosure, it is well to take into consideration the stone pounder collected from the tomb by Sir Humphrey Berkeley and described by Alexander (20, p. 5) as of "gypsum," and similar to one in Bernice P. Bishop Museum from

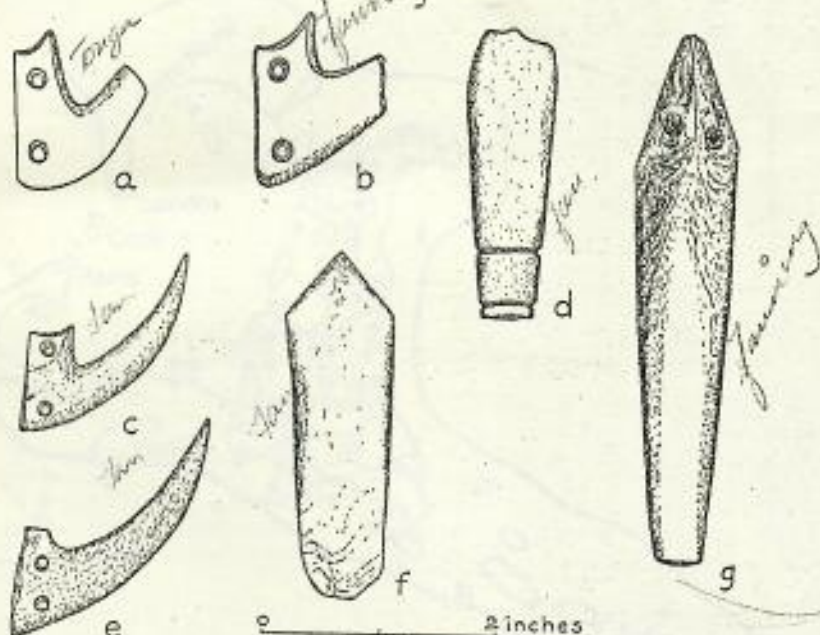


FIGURE 6.—Parts of composite hooks: a, from Tonga, from photograph; b-g, from Fanning Island tomb, drawn to scale from specimens in B. P. Bishop Museum. a, broken point of turtle shell, heirloom belonging to Prince Tungi of Tonga; b, broken point of pearl shell; c, point of pearl shell; d, back of lower part of pearl-shell lure; e, point of bone; f, back of upper part of lure; g, lure of pearl shell.

the Tuamotus, but more artistic. In the Museum there are no Tuamotuan pounders of calcite (which is undoubtedly the material Alexander meant); calcite pounders are restricted to the Cook and Austral islands. The son of Sir Humphrey Berkeley refers to the material as "alabaster" and his memory sketch of the Fanning pounder is of typical Mangaian form. Stone pounders have not been collected from Tonga or other islands in western Polynesia. It may be significant that the Greig brothers, who seem to have assisted Humphrey Berkeley in his search, do not mention the pounder.

LIBRARY OF

GEORGE H. BALAZS

Howland - sites

Starbuck - no sites

Jarvis - no sites

The porpoise teeth, bored to be strung, offer another puzzle. They are not included in the long list of Tongan ornaments given by McKern (25). They were extensively employed by the Marquesans, but there is no evidence of their use by other Polynesians.

The Fanning Island fishhooks (fig. 6, b-g) show no clear relation to those from other parts of Polynesia. By reason of the two holes bored in the base and the upward projecting limb of the base the points are western Polynesian in type, but in other respects they are dissimilar. They most closely resemble the old Tongan point shown in figure 6, a. But in this the tip of the point is missing, and if it had a barb, as is usual with historic Tongan hooks, it would be unlike the Fanning hooks. That some Tongan hooks are barbless is suggested by a photograph of a hook which was in the possession of the Rev. R. Page of Tongatabu (25). There is a possibility, however, that this is not a true Tongan hook. The lures of the Fanning hooks are peculiar in being sharply angular at the top. This feature is paralleled elsewhere in Polynesia only in prehistoric stone shanks from New Zealand as described by Teviotdale (32, figs. 1, 3, 4). The Fanning lures, like the Tongan, are larger and better made than the Samoan, but are quite different from the historic whalebone Tongan lures backed with a strip of pearl shell. But if the Fanning hooks are assumed to be an ancient form which has subsequently become modified and displaced, Tonga seems the more likely place of origin.

CHRISTMAS ISLAND

EARLY DESCRIPTIONS

At the time of his discovery of Christmas Island (1777), Captain Cook remained nine days in order to provision his ships with fish and turtle. Parties were sent in all directions over the island. Cook (10, pp. 184-187) states:

A few coconut trees were seen in two or three places, but in general the land has a very barren appearance. . . . There is not a single coconut tree in the southeast part of the island. . . .

Having some coconuts . . . in a state of vegetation, I ordered them to be planted on the little island [Cook Island]. . . . Not a drop of fresh water was anywhere found, though frequently dug for. . . . There were not the smallest traces of any human being's ever having been here before us, and indeed, should anyone be so unfortunate as to be accidentally driven upon the island, or left there, it is hard to say that he could be able to prolong existence. . . . On the few coco trees upon the island, the number of which did not exceed thirty, very little fruit was found, and in general what was found was either not fully grown or had the juice salt or brackish.

Captain Benson (2, vol. 1, pp. 64-68), who with his crew was shipwrecked on the island for seven months in 1836, gives a contrasting account:

On the western parts there are some scattered groups of coconut trees; the whole number of trees must be about 2,000. On the point which forms the southern entrance to the lagoon there is a grove of these trees having the names of several whale ships carved upon them. These ships must from time to time have sent their boats on shore to procure coconuts. . . .

I should not have conjectured that any human being had ever landed on the eastern part of the island, had I not seen in several places near where my ship was lost a number of stones piled up in the form of squares and raised about 3 feet from the ground. They were evidently the work of human hands, but for what purpose I could form no idea. I had one of them cleared away, thinking there might possibly be some human bones underneath, but after digging considerably we discovered nothing to substantiate this belief.

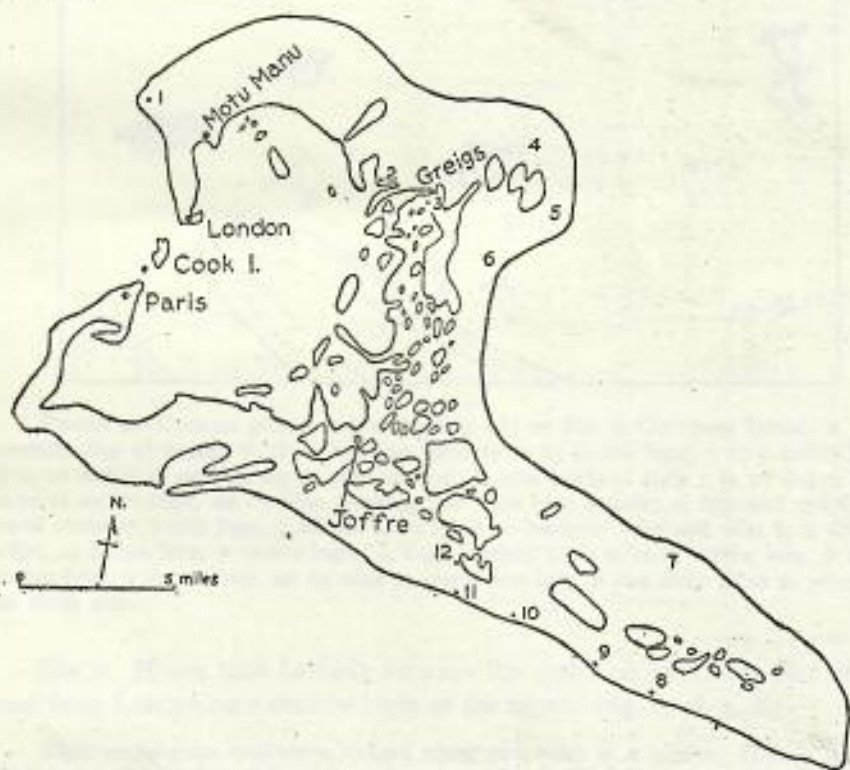


FIGURE 7.—Outline map of Christmas Island based on map of the Central Pacific Coconut Plantations, Ltd. Numbers refer to archaeological sites.

Regarding the abundance of coconuts, the statements of Cook and Benson seem irreconcilable. Although visitors to the islands during the period 1777-1836 probably planted some coconuts, and although under favorable conditions the trees increase rather rapidly, an increase on the island from 30 to 2,000 trees in 60 years is incredible. Single trees which Mr. William Greig planted 50 to 60 years ago have but two to four seedlings growing up beside

them. Furthermore, the trees planted by Cook grew and died without reproducing. Monsieur Coulon, in charge of planting at Christmas Island in 1924, told me that he had found fallen, rotted trunks of coconut trees on barren Cook Island. He found similar trunks in the existing groves at "Paris," where Cook found trees, and at the extreme southwestern point of Christmas Island.

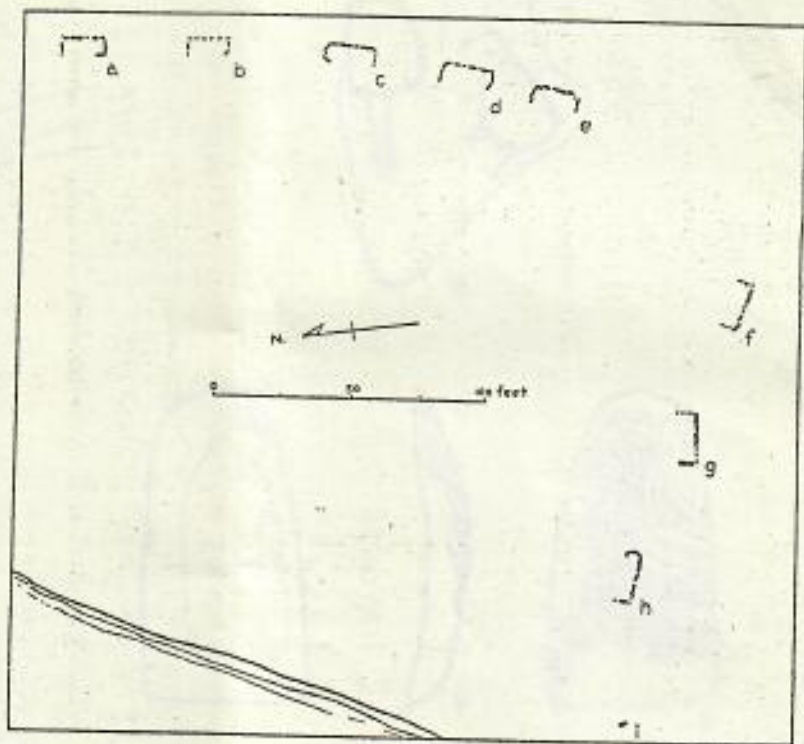


FIGURE 8.—Structures at Site 2, Christmas Island: a, b, 7 by 16 feet; c, 7 by 19.5 feet; d-f, 7 by 19 feet; g, 8 by 18.5 feet, h, 6 by 19.5 feet; i, upright slab 13 inches wide, 1 inch thick, 20 inches above ground, 9 inches below ground.

ARCHAEOLOGICAL REMAINS

The late Father Emmanuel Rougier (28, 29), who leased Christmas Island in 1913, discovered and described several archaeological remains. During the visit of the *Kaimiloa* (December 8 to 17, 1924) he and his nephew, Monsieur Paul Emmanuel Rougier, most generously put at my disposal every available means to facilitate a detailed study of their archaeological discoveries. I was thus able to visit all the principal sites except those on the east coast. (See fig. 7.)

Site 1. Platform at the northwest extremity of the island, a few paces back of the crest of the beach and directly opposite a small pass suitable for whaleboats.

According to Father Rougier, the platform was 4 meters long, 2 wide, 2 high, and on it stood a large slab upright. Excavation showed it to be a marae, not a tomb. At the time of my visit the site was marked by a rough, scattered pile of large coral stones, covering an area of 24 by 30 feet and nowhere more than 2 feet high.

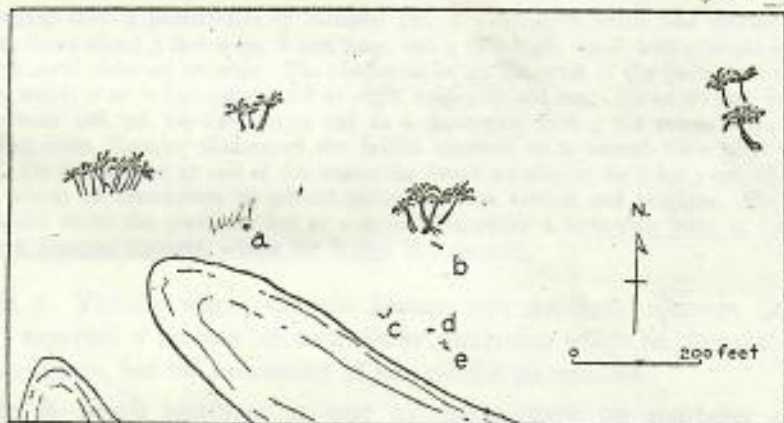


FIGURE 9.—Coconut groves and house sites (?) at Site 3, Christmas Island: a, well, recently dug or redug; b, three hardpan slabs 10 to 13 inches long, 3 to 5 inches high, 8 to 10 inches in ground, set on edge in row; c, nine hardpan slabs 3 to 22 inches long, 2 to 18 inches high, set on edge marking two sides of a square; d, flattened cylindrical coral stone 17 inches long, 7 inches wide, lying on hardpan slabs and next to a slab on edge, 24 inches long, 7 inches high; e, four hardpan slabs 9 to 21 inches long, 8 to 11 inches high, 9 inches deep, set on edge in row 8 feet long, a few slabs serve as pavement on north side.

Site 2. House sites halfway between the 19th and 20th kilometer marks east from London on a shallow bight of the lagoon (fig. 8; pl. 3, B).

Eight rectangular enclosures ranged along two sides of a square. Each is marked by thin, roughly broken slabs of hardpan set on edge in lines which form three sides of a rectangle opening onto the lagoon bight. The slabs are firmly planted to a depth of 0.5 to 1.5 feet and project above the ground an equal number of inches. (See pl. 3, B.) A thorough search about these ruins, including the trenching (fig. 8, a) and excavations (fig. 8, f), and sifting of material (fig. 8, c) to a depth of 2 inches, revealed not a single artifact. Digging at the base of an upright slab (fig. 8, i), a bed of ashes was found 9 inches from the east side and 9 inches below the surface. No cooking stones were observed. Monsieur Coulon speaks of two similar solitary uprights on the narrow peninsula south of Site 2. A section of the soil at this village site shows at the top $\frac{1}{4}$ inch of guano-impregnated slime, and below it 2.5 inches of sand, 1 inch of the hardpan of which the slabs are composed, and 19 inches of sand. The hardpan had been broken through for the imbedding of the slabs.

Rougier (29, p. 25) believed the structures at Site 2 to be maraes, but they do not resemble maraes. It is not impossible that these house sites belonged to the period 1870-

1880 when Mr. William Greig of Manihiki planted coconuts a mile and a half east of this place. It is significant however, that no broken glass or scraps of iron have been found. Captain Cook shows on his map of 1778, coconut trees near the coast opposite this part of the lagoon.

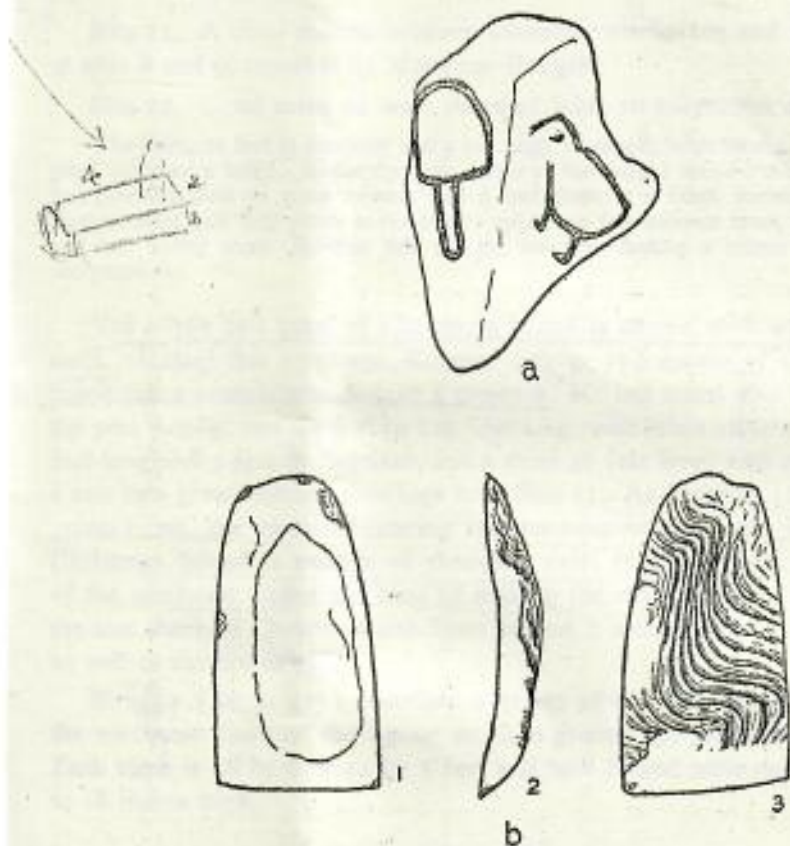


FIGURE 10.—Artifacts from Christmas Island: a, petroglyph from mound at Site 9; b, *Tridacna* shell adz from Site 4, length 3 inches, width of cutting edge 1.5 inches, thickness 0.5 inches, weight 2.5 ounces; 1, front; 2, side; 3, back.

Site 3. Coconut groves and ruins 22 kilometers east of London (fig. 9).

The four groves of coconuts, I was told by Monsieur Coulon, were planted by William Greig about 1880. At a point 20 feet south of one grove are three hardpan slabs set on edge in alignment, and 125 feet southwest of these a number of other slabs are set along two sides of a square. East of them is a beach-worn coral stone 17 inches long, 7 inches wide, and farther east are four slabs on edge. These features, which Rougier (29, p. 28) thought indicated an ancient village, are possibly referable to the occupation by William Greig.

Site 4. Location of shell adz (fig. 10, b) picked up by Monsieur Coulon 200 yards from the beach on the northeast shore.

Site 5. Grave on the northeast point. Rougier (29, p. 127) writes:

About 1 mile from the beacon, along the beach, there is one tomb 14 by 3 feet, divided in the middle by a stone to indicate that two are buried there. Before arriving at the tomb there is a rest of stone wall or shelter with a path made of flat stones, also old shipwrecks on the stones.

Site 6. Two graves on the east coast about 5 miles south of the beacon on the northeast point.

Judging from a photograph by Rougier (28, p. 120), each grave was marked by a stone platform about 3 feet wide, 6 feet long, and 1 foot high, faced with a single course of rough coral slabs set on edge. The platforms lie on the crest of the beach and end-on to each other, 1 or 2 feet apart, and at right angles to the sea. About 30 feet west of these graves (28, pp. 129-130; 29, p. 29) in a depression among the stones 6 feet long by 3 feet wide, Rougier discovered the brittle remnant of a human tibia bone and a patella. On the surface at one of the graves he found an adz, 11 by 3 by 3 cm, of black basalt, which he remembers as quadrangular in cross section and tangless. No bones were found under the platform, but at a depth of 1 meter a very thin layer of fine ash indicated, Rougier thought, where the bodies had decayed.

Site 7. Vicinity where Captain Benson was wrecked. Benson (2, pp. 64-68) reported a number of rectangular platforms which he thought were possibly graves, but the excavation of one yielded no remains.

Site 8. Small platform at 91st kilometer mark on southeast coast, reported by the nephew of Father Rougier.

Site 9. Platforms, petroglyphs (fig. 10, a), and fireplace near the 95th kilometer mark on the southeast coast.

A platform or mound, 9.5 by 11 feet and 2 feet high, made of rough pieces of coral, parallel to the beach 74 yards distant. At one end stood an upright piece of coral rock. On removing the stones from the center of the pile, Monsieur Rougier discovered a vault roofed by flat slabs placed across slabs set on edge. Within it was a fragment of a human tibia.

Forty feet north of this mound is another, roughly circular, 6 feet in diameter, and not more than 1.5 feet high. On its top stood a petroglyph stone (fig. 10, a) which is now in the Papeete Museum. It is a piece of coral 26 inches high, 21 inches in greatest width, the two adjacent, smoothest faces of the stone incised to a depth of 1 inch. The inner side of the grooves is nearly vertical, the outer side is at a considerable slant. A stone adz is more likely to have made these cuts than a metal adz or hatchet. Monsieur Rougier took this mound to pieces and excavated under it but found no trace of human bones or other remains.

Fifty feet farther north, where a covering of sand permits the growth of *Tournefortia*, four slabs on edge make a fireplace.

Site 10. Two stone mounds (pl. 3, A) and an excavation at the 100th kilometer mark on the south coast.

The two coral mounds lie about 50 yards from the crest of the beach on bare, stony ground. Inland from them, at a distance of 130 yards, is an artificial depression in the sand, 15 yards in diameter and 3 feet deep and partly surrounded by a low mound of sand. The first mound is roughly rectangular, measures 7 by 11 feet, about 1 foot high,

its long axis trending N. 100° E. On the center stands a rough coral stone 1 foot high. Excavation to the depth of 2 feet revealed 8 inches of loose stones 1 to 3 inches in diameter, under which was sand mixed with stones. There were no traces of a burial. Fifteen yards north of this mound is another mound, roughly circular, 18 feet in diameter and 2 feet high. No upright stone stands on this mound.

Site 11. A coral mound between kilometer marks 103 and 104 like those at sites 8 and 9, reported by Monsieur Rougier.

Site 12. Coral cairn on west shore of lake, 10 kilometers east of Joffre.

The cairn, 10 feet in diameter and 2 feet high, of rough, large blocks of coral, loosely piled, stood on a ledge. Under the very center of the cairn I found a 2-inch fragment of half-petrified bone of some animal, and 2 feet from it a small vertebra of a whale. One hundred and fifty yards north of this cairn are five coconut trees, one parent tree and four young trees. Rougier (28, p. 133) mentions finding a rotten trunk, probably 100 years old.

The whole east coast of Christmas Island is strewn with wreckage of all sorts. Among this wreckage, Rougier (29, p. 25) speaks of the prows of a canoe and a mast terminating in a crescent. He has noted also tree trunks of the pine family, one more than 120 feet long, with roots attached, another 60 feet long and 3 feet in diameter, and a third 30 feet long, with roots attached. I saw two great, rotting pine logs near Site 11. As Rougier (29, p. 25) has pointed out, the eastward-flowing counter-equatorial current just north of Christmas Island is capable of throwing drift from the west into the path of the southeast trades and thus of making the strong current that sets onto the east shore of Christmas and flows around it a carrier for drift of western as well as eastern origin.

Rougier (28, p. 125) describes a group of six post-European tombs on the northeast shore of the lagoon on bare ground, 50 yards from the water. Each tomb is 16 by 6 or 14 by 5 feet and well fenced with slabs on edge, 10 to 18 inches high.

SUMMARY

Christmas Island has not so far yielded definite evidence of settlement by Polynesians. The two sites which might have been villages have yielded no artifacts—an indication of temporary occupation. Though a number of structures have been found which might have been simple platform maraes, it is not possible to prove that they are maraes. The few scattered traces of early Polynesian visitors or castaways are the coconut groves, basalt adz, shell adz, petroglyph, coral mounds and platforms, and burials. The basalt adz was certainly from some volcanic island. If its form is as Rougier remembered it, it probably came from western Polynesia. The shell adz (fig. 10, b) is of a type common in Micronesia and the Ellice Islands which appears as far east as Pukapuka and Tongareva. It is quite distinct from the Tongan shell adzes

made from the thick hinge of the *Tridacna* and from the Tuamotuan shell adzes ground out in definite shapes. The petroglyphs are Polynesian. Although their form is too generalized to make it possible to associate them with a definite area, it can be seen that they resemble Hawaiian rather than Tahitian petroglyphs. The simple coral mounds surmounted by an upright stone, the cist burial, and the simple burial are all difficult to assign to any particular source. Evidently these traces of Polynesian visitors or castaways belong to quite different periods and come from quite different directions.

JARVIS ISLAND

Jarvis Island, a "sandy flat" 1.7 square miles in area, is supposed to have been discovered by Captain Brown in the English ship *Eliza Francis* in 1821. It was surveyed by the officers of the U. S. S. *St. Mary's* in 1857 (16, p. 70). In 1889 it was annexed to Great Britain. The Pacific Phosphate Company of London and Melbourne leased the island in 1906. Thorough exploration by the Whippoorwill Expedition in 1924 produced no Polynesian ruins or artifacts. Photographs taken by the Expedition show two neat coral platforms which are apparently modern tombs. One seems to be 1 foot high and is formed by two courses of flat coral stones laid horizontally. An upright coral slab stands on the platform near one end. The other "tomb" is marked by an uncarved foot and headstone, paved between with coral slabs. A wooden plank placed upright in the sand and not associated with any stone structure read: "To the memory of Capt. Alex. Aliny, 1st assistant of Jarvis Island, who died May 15, 1873, from injuries by being thrown from a car."

MALDEN ISLAND

GENERAL FEATURES

Malden Island (fig. 11) is a triangular atoll not more than 4.5 miles long on any side, nowhere more than 25 feet above sea level, and bounded by a fringing reef not exceeding 200 yards in width. The lagoon communicates with the sea by underground channels.

The island has much the same appearance as when it was discovered by Byron in H. M. S. *Blonde* on July 29, 1825. The "several clumps of thick fresh-looking trees [*Pisonia*], so compact that at a distance they were taken for rocks," have suffered from the depredations of goats introduced in the 60's, when the island was first exploited for guano. Remnants of these clumps survive on the northwest and southwest points, comprising in all 15 trees. Besides the *Sida* bush, the vegetation consists of grasses and weeds, coarse bunch grass predominating. The Polynesian rat noted by Byron has

been exterminated by the introduced cats. The lagoon is inhabited by numerous fish (*Trachynotus*) which evidently pass to and from the ocean through the underground channels. When the island was discovered, the frigate birds were "almost sufficient to darken the skies with their numbers," and other families of birds were represented in great numbers. In December, 1924, except for the thousands of sooty terns (*Sterna fuliginosa*), strikingly few sea birds were seen, and not more than 75 frigate birds.

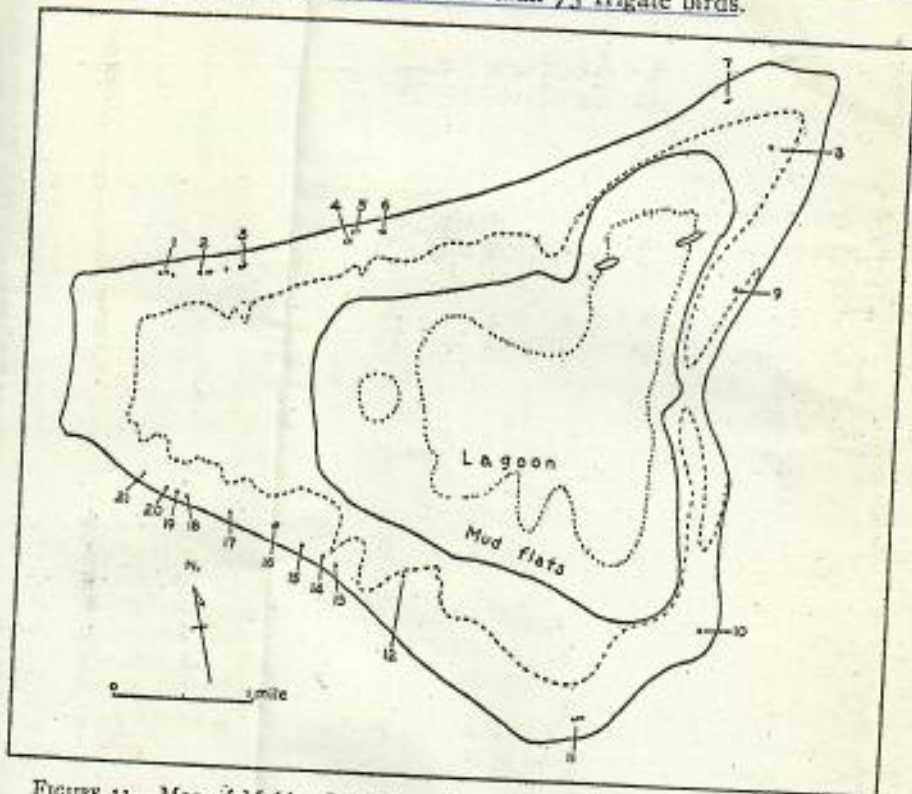


FIGURE 11.—Map of Malden Island based on map of Malden Island Proprietary Co., Ltd., outer dotted line indicates ancient shore line of lagoon, inner line the extent of lagoon in 1924. Numbers refer to archaeological sites.

On the afternoon of the discovery of the island, a party was landed for a few hours' exploration. Andrew Bloxam (3, p. 80), naturalist on the *Blonde*, reports:

In one spot along the coast I observed what is evidently the work of human hands, though apparently of ancient date. It is a parallelogram of coral stones, with a pillar erected in the middle of a single stone 7 feet high. We left a bottle here containing a notice of our arrival. The Surveyor [Malden], who had walked to another part of the island, informed us that he had met with about 40 such buildings, but in a more perfect state, extending along the shore . . . at a short distance from each other, but no inscrip-

NEWS RELEASE

U.S. FISH AND WILDLIFE SERVICE - REGION 1
1002 N.E. HOLLADAY STREET
PORTLAND, OREGON 97232-4181

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HAWAII AND THE PACIFIC ISLANDS

90-15
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Re: David Ellinger - 503/231-6121
April 20, 1990

AMERICA'S WILDEST WILDLIFE REFUGES

by
Frank L. Kenney

Seldom seen and little known--except at critical junctures of history--are America's most remote National Wildlife Refuges. Their names are as common as those of the town basketball team. But Baker, Howland, Jarvis, Johnston, and Rose are five tiny islands in the loneliest sector of the Pacific.

Vital unics of the U.S. Fish and Wildlife Service's system of 452 wildlife refuges, their lagoons and shoals are rich fisheries, and their dry areas furnish roosting and nesting grounds for huge bird populations. Green sea turtles, sought worldwide for their eggs, flesh, and shells, find safe havens here. Similarly, sperm, humpback, and other whales cruise the vast U.S.-protected waters between the refuge islands.

(over)

This is the third in a series of occasional feature news releases about U.S. Fish and Wildlife Service activities in the Pacific region by Frank Kenney, a retired agency employee with 26 years of experience in natural resource conservation and outdoor writing.

Due to their far-flung frontier positions all five have been involved in international affairs and intrigue. Each, during its long existence, has had its dramatic, mysterious, and sometimes tragic moments.

Born on the restless floor of the Pacific Basin, the islands emerged as volcanoes more than 75 million years ago--then slowly sank beneath the ocean surface of their own weight and the global rising of ocean waters. Flower-like coral polyps, which prefer a depth of about 150 feet, encrusted themselves around the peaks with calcium ingested from the sea.

As the mountains settled beneath the waves, these organisms continued to build toward the surface upon the remains of their ancestors. Thus, they created limestone reefs which capped the sunken peaks like leveled crowns. When the ocean subsided to its present level, the reefs emerged as islands.

What makes these remote islands so fascinating is the latter-day evolution that took place on them from elements cast up from the sea or borne on the wind. Every living organism from fungi to plants, and bacteria to birds, had to find these places by accident.

Aquatic organisms flourished in the sunny surrounding shallows; sea turtles, sharks, and fish arrived, as did, eventually, fish-eating birds, multiple species of terns, shearwaters, boobies, tropicbirds, frigatebirds and others--far too many to enumerate.

However, two of these birds, the frigatebird and the fairy tern--and the green sea turtle--seem more deeply involved in the biological history of the islands than all of the others combined. The turtle, in fact, probably used these islands when they were still volcanic cones.

A relict of the Dinosaur Age, the green sea turtle flourished for eons in all of the equatorial oceans until quite recently. Now, regrettably, it has vanished from many parts of the world. It is considered threatened. As such the Endangered Species Act... prohibits the importation, exportation, sale, trade, or shipment--of *Chelonia mydas* or their parts, or products made from them... in the United States.

"Green turtles are holding their own here," U.S. Fish and Wildlife Service biologist Doug Forsell explained in a telephone interview from Johnston Island where he is stationed. "Each winter two hundred of them feed on algae and sea grasses along the south shore of this atoll. But they swim more than 400 miles north to the French Frigate Shoals for nesting. Other turtles from the South Pacific come to Rose Atoll to nest."

Such geographic descriptions creep into Forsell's language to express the distances and the very nature of these most remote of the island refuges. He and Jerry Leincke, the current manager in Honolulu, biologist Stewart Forer, and former managers Robert Shallenberger and Palmer Sekora, also speak in the broad terms of centuries, thousands of miles, and millions of birds:

"Fifteen centuries ago the first Polynesians crossed these waters..."

"Johnston is 825 miles from the Honolulu refuge headquarters..."

"Rose is nearly 2,000 miles south of Johnston..."

"Jarvis, Howland, and Baker straddle the equator between..."

"Ten million sea birds use these islands..."

"Those on the equator are strictly coral islands," Forsell explains. "Johnston and Rose are atolls. That means the latter two have lagoons. Johnston Atoll is the farthest from any other island. But it's also the only one that's inhabited by humans--over 1,000 military and civilian personnel and myself, of course."

He said that the reason for the large number of personnel is the Johnston Atoll Chemical Agent Demilitarization System currently under development there. JACADS is, in fact, the prototype model for worldwide reduction of chemical weapons. Forsell's duties include monitoring the bicon and anticipating and reporting all potential hazards to wildlife and fisheries on Johnston as well as on Baker, Howland, Jarvis, and Rose islands.

Through the crackle of the long-distance telephone link-up, he describes the two tiny islets of Rose Atoll as what people like to think tropical islands ought to be. They rest on a square-shaped coral reef which is pinkish colored, hence the rose name. Bare giant clams, small sharks, and many kinds of fish inhabit the lagoon. Green sea turtles nest on the beaches of the islets. Tall trees grow on the higher ground. Among these are some coconut palms which were planted a long time ago by Samoans, according to their custom whenever visiting such uninhabited places. A monument was placed on the island about 60 years ago by the Governor of Samoa. A dug pit suggests at least temporary human occupation in the past.

"Everybody leaves something behind," Forsell says. "But my problem is getting to the islands in the first place. It takes a lot of negotiating. Since travel expenses are limited in the refuge budget, I recently sailed to Howland with a group of ham radio operators who wanted to broadcast a couple days from this remote island." He hastened to add, "They had to get special permission, and they had to take me along to protect wildlife. Those islands are pretty free from human disturbance."

Boat People Came

They always have been save a few times in the past when strangers appeared in nearby waters. A thousand years before Magellan passed close by Howland and Baker, Polynesian families came this way in large catamarans. Boat people of another time who, without instruments, charts, or even a written language, sailed northeasterly seeming to know about the Hawaiian Islands--possibly from memorized instructions of even earlier explorers.

Sailing northeasterly from ancestral island homes in the western Pacific, they guided on certain stars that appeared on the horizon at night and, in the daytime, watched for subtle swells and currents just as land-bound people orient themselves with hills and rivers. They carried pet frigatebirds, along with dogs, pigs, chickens and, unfortunately, diminutive rats from their previous island homes.

When food supplies needed replenishing, they looked for small islands similar to these five where they could find birds, eggs, turtles and, in the surrounding shallows, fish. They searched for the clouds that form over land and the green opalescent shine of limestone shoals. If they saw neither of those signs, they'd release a frigatebird and note the way it flew, as Noah did with the dove. They left no trace of ever visiting any of these five islands... unless some of the current Polynesian rats have long family histories.

In the spring of 1521, Ferdinand Magellan's three remaining ships, manned by starving crews, crossed the equator just east of what is now the International Date Line on a course which took them very near Baker and Howland islands. They sighted neither and, though no edible vegetation on either island would have arrested the scurvy, fresh raw eggs might have sustained the lives of 19 who perished before the ships arrived in the Marianas.

One of the survivors, Antonio Pigafetta, recorded in his diary: "...had not God and his blessed Mother given us so good weather, we would all have died of hunger in that exceeding vast sea. Of a verity I believe no such voyage will ever again be made."

His prediction was, of course, inaccurate. In 1778, British explorer James Cook set a course northward from Tahiti across uncharted waters. Mention is made in his logbook of standing off a desert island on Christmas Eve while his crew roved ashore to capture big turtles to supplement their daily "portable soup" and barreled salt-beef fare.

While Captain Cook's notation that 300 were killed that day implies vanton waste, it also indicates the great numbers of these splendid 500-pound animals that once swam the equatorial oceans. Green sea turtles still move onto sandy beaches to nest but not in such swarms as two centuries ago.

Each female excavates a 2-foot-deep hole into which she deposits a hundred or so eggs. After burying them, she abruptly returns to the surf. In about 2 months the young hatch and all of them, equipped with marvelous instincts to guide them through a half century of life, dig to the surface at once as the nest erupts with small turtles. Then, as programmed, they march to the sea. A frigatebird might be their first enemy, a fisherman's net the next and--in many parts of the world--a turtle poacher the last. Their skins are sought for leather, shells for jewelry, meat and eggs for food. Soup from green turtle cartilage, in fact, is a popular gourmet delicacy in Germany and Japan.

The decline of green sea turtles began about Captain Cook's time, 200 years ago, when world exploration launched the colonial age. His log makes no mention of sighting Johnston Island, where he's have found predecessors of the current turtle population. He continued one north to discover Hawaii in January of 1778. His death at the hands of natives was ironically similar to that of Magellan. Though his research was cut short, his journals spawned the rapid growth of European and American shipping in the Pacific.

Oil for the Legs of China

In the mid-1830's many whalers left the depleted pods of the Atlantic and began plying the Pacific for blubber. The thick layer of fat under the skin of all whales was, in those days, the civilized world's main source of oil for domestic and industrial uses. It was the only available fuel for lighting, the only practical lubricant for the earliest wheels of the industrial revolution.

The sperm whale, which may reach a length of 65 feet and weigh 60 tons, was most sought after because of both the quantity and quality of the oil that species yielded. A sperm whale may supply up to 500 gallons of oil after rendering and boiling out the "case." This cavity, occupying most of the whale's huge head, is filled with a pure liquid oil which is barreled without further processing. Since sperm whales prefer the warmer waters, the mid-Pacific basin attracted many whalers.

Seaman Jess Munger of the "St. George" wrote, "November 13, 1851: Made Jarvis Island this afternoon. This island...is a mere heap of snow white pebbles, and red and white coral thrown up a few feet above the level of the ocean, by some convulsion of nature. Its appearance at a distance closely resembles that of field ice. It is about a mile in diameter and rises gradually from the water for about 15 rods, when it again descends a little all around so as to form a sort of basin. This basin contains all the inhabitants of the island which consist of nothing more than boobys, sea gulls, and other waterfowl that scoop out their nests in the pebbles. There is not a particle of soil on the island, consequently no vegetation. Two of our boats were pulled in for collecting shells, etc. and c..."

Hunger and other seafarers of those days helped capture not only sperm whales, but humpbacked and right whales (which they called "black fish"). They confined their pursuits to those slower swimmers. But blue whales, having a maximum length of 100 feet and a weight of 150 tons, were safe until steam-powered chase boats were put into use. The largest creatures ever to live on this earth can swim 25 miles an hour and were far too fast for rowboats.

Commerce with the Orient also flourished during the 1800's. Tall-masted American clipperships and broad-beamed windjammers piled the Pacific carrying whale oil, gold, wool, tea, and every conceivable type of cargo that would turn a profit.

Gun Powder's Source

One of these was guano--centuries-old accumulations of bird droppings--which was mined and shipped from all of the islands but Rose to provide phosphorous-rich fertilizer for gardens and crops. It also supplied the nitrates needed in the manufacture of black powder for America's Mexican, Civil, and Indian wars.

Competition for the resource on Baker became so acute that the American Guano Company mounted a 3-inch-bore, muzzle-loading cannon on a pedestal to defend its claim against trespass by the U.S. Guano Company. The 5-foot cannon still lies on the ground on the west side of Baker Island.

"Clutter comes with the territory," Forsell continues, meaning the debris of human efforts--ruins, graves, a lonely beacon and runway which still awaits the arrival of a forlorn woman fiar, World War Two's ubiquitous 55-gallon oil drums, and even a bomber. But what seems to disturb Forsell the most are the animals people left behind. "Somebody introduced Norway rats, mice and, consequently, domestic cats," he says.

The rodents that escaped the guano ships did enormous damage to nesting bird populations. The well-meant release of cats, as has happened elsewhere with introduced predators, compounded the problem. The cats found nestlings much the easier prey.

"There were hundreds of cats," Forsell says. "Ninety percent were black, possibly an evolved advantage for hunting at night or perhaps as protection from the sun. We've finally eliminated them, but they had drastically reduced the bird populations on these islands for many years."

One account attributes the cat incursion to "colonists," of the 1930's. U.S. airlines wanted to create commercial flights to Australia and the Orient. Johnston, Jarvis, and Baker seemed likely mid-ocean landing fields, so the United States Government moved quickly to solidify its claims to these islands.

Crews of young men were recruited from Honolulu and sent to the lonely islands ostensibly to establish radio stations and conduct weather, oceanic, and wildlife observations. The latter duties included the capture and banding of seabirds. In actuality, however, the crews were confirming American sovereignty according to international law.

"From that experiment we learned a lot about the tenacity seabirds have for a particular place and the remarkable ages they reach," Forsell says. "Shearwaters can live for 40 years; boobies and frigate birds, at least 20."

Pan American World Airways, in 1935, demonstrated that it could fly its new, four-engine, China Clipper seaplanes to the Orient with a single stop at Wake Island, however, thus removing the need for landing fields at Jarvis, Baker, or Howland.

Amelia Earhart's Light

"We must be over you but we cannot see you!" a terse female voice finally came through the Coast Guard radio on the "Itasca." The cutter stood off Howland July 2, 1937, awaiting the arrival of the famed aviatrice. A landing strip and a beacon had been built on the island for her Lockheed Electra. The rugged, powerful plane was to be refueled here before carrying her and her navigator, Fred Noonan, to California and completion of the first round-the-world-at-the-equator flight.

Before the radio operator could fix her location, she switched channels and called, "Gas is running low!" A few minutes later she said they were circling but still couldn't spot the island or receive any signals from the ship. The radio operator was frustrated because after each call she'd immediately change to another channel. "We are running north and south," were her last words.

America mourned the loss of this brave woman and her navigator. Some refused to accept the tragedy and that set off a controversy which continues even today. At least two of the former refuge managers, however, have no doubts at all about her fate.

Refuge manager Robert Shallenberger chartered a Samoan boat to take him to Rose Atoll but when its captain navigated to where it should be, neither he nor Shallenberger could see any sign of land. They found only the placid ocean and gray clouds across the horizon. Eventually, the captain pointed to a subtle tinge of color reflected on the lower side of one of the clouds and said, as other Polynesians have for thousands of years, "There it is!"

In 1975, Service employee Palmer Sekora flew to Melbourne, Australia, to catch a Coast Guard ice breaker which was returning to San Diego after a season on McMurdo Sound. The plan was for the ship to take him to Howland and there to wait while its crew members helped him post the island as a national wildlife refuge. Again, as with Shallenberger--and long before with Amelia Earhart--the island seemed to have vanished in the great swell of the Pacific.

The ship's helicopter was finally put into use and Sekora went along as an observer. The pilot flew a wide and seemingly fruitless sea-search pattern until, as also happened to Amelia Earhart, the fuel supply ran low. The pilot said they had just enough left to return the ship.

At that moment Sekora, who is himself a flier, spotted a pale green opalescence far in the distance ahead. A critical decision had to be made. Sekora prevailed and a short while later he and the pilot, unlike those long ago aviators, safely landed.

During the same year Amelia Earhart's plane was lost at sea, Japan aggressively extended its "Greater East Asia Co-Prosperty Sphere" toward the Pacific Islands. Rightfully concerned, the United States began thinking of the islands as outposts. Construction companies, having transferred Johnston into an airbase, built landing strips and beacons on Jarvis and Baker similar to Amelia Earhart's light on Howland.

Soon after Pearl Harbor, Japanese naval units shelled or bombed all four islands. A Japanese bomber attacked, but did not sink, the destroyer "Hale" after it had rescued the four survivors from Baker on January 31, 1942. In 1943, U.S. forces occupied Baker and kept it garrisoned for the duration. GI's stationed on both Johnston and Baker wrote home of the big turtles and the thousands of birds, most particularly about the frigatebird and the delicate, and fearless, fairy tern. The latter's snowy plumage and the eyes, and curious habit of greeting all comers by fluttering overhead provided a much needed diversion. When it perched on runways craters during unloading operations it robbed the war of some of its stark reality.

Unlike other terns, which lay their eggs in shallow depressions on bare ground, the fairy tern usually locates in a tree, though it never did master the art of building a nest. Instead it seeks a fork or slot between two parallel branches, or even a slight depression on a limb to cradle the egg.

On Johnston a female tern was seen carefully fessling her way along a horizontal limb. When she found a slight hollow, she claimed it and soon laid have located a similar spot on any high surface such as a ledge on a bluff or even a man-made structure.

One fairy tern was discovered trustingly brooding her egg on the elevating gear of a 4-inch-bore howitzer. The six marines detailed to the coastal gun emplacement were pleased with this small element of potential life. They guarded it and, watch by watch, eagerly awaited further development.

When an inspection was due one of the gun crew would carefully pocket the egg. Then all would maintain a stiff military stance while the adult tern fluttered nervously overhead and the officer went about his routine. As soon as the officer left, the precious egg was returned to its place.

Normally, in about 3 weeks a downy chick would have emerged, probably while the mother was brooding it lest it teeter off into space before it understood the narrow limits of its perch. This egg, however, never hatched, through both the brooding and the watches continued long past the due date.

The war went away and so did the gun crew. Far to the south, Baker Island was entirely abandoned, though some of the war's impedimenta remains to this day. Forsell explains that over the years the tops of the oil drums rusted away and those standing upright became deadly traps to many of the seabirds who fell into them. He said that he and others had spent a lot of time turning the barrels onto their sides where they immediately became favorite nesting places for shade-seeking tropicbirds.

"Dirty Nellie" Molders

But on Baker's badly deteriorated runway, a dilapidated B-29 bomber also rests. "A dozen years ago," Forsell says of the lone symbol of America's triumph in the Pacific, "the plane stood up on its wheels. The cheesecake picture of a girl and the name, "Dirty Nellie," was still visible under the cockpit window. Now, the paint's peeled away, and the landing gear collapsed. But the birds love her."

Fairy terns perch on the Superfortress's back and tail. Red-tailed tropicbirds nest under its crumpled wings. Boobies stroll penguin-like along on top its 141-foot wings. Frigatebirds use the old landing strip for their own running take-offs.

"With a wing span of about 7 feet," Forsell says, "and a total weight of 2 pounds or less--the largest ratio of any living bird anywhere--the frigatebird can soar for hours with little expenditure of energy."

It skims the waves to catch fish with its long, hook-ended beak without otherwise touching the water. But foul weather doesn't bother it in the least. In fact, it tends to ride out storms aloft as the whipped up whitecaps expose more menhaden, pinfish, and mullet for predation, hence another one of its aliases, the "hurricane bird."

Like the B-29, it is also called "Man-o'-war," though it was named that by early seamen who were reminded of three-masted frigates. It has at least one more, the "pirate bird." "They pick on the boobies and tropicbirds," Forsell says. "If one sees a boobie coming in with a catch, he'll chase it, harass it, even tweak its tail until the victim finally drops its fish. The frigatebird then dives and retrieves the prize."

Part of the male frigatebird's mating preparations include inflating his bright red gular pouch, a process that takes up to half an hour to accomplish. When the display reaches full size, the bird seems to be resting his beak on a tightly inflated toy balloon with its hooked end precariously close to causing a blowout. He can fly with the pouch distended and, though he must notice additional drag, it's a tradeoff, since the bigger the gular pouch the more apt he is to attract a mate.

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JOURNAL OF THE 1938 LINE ISLAND EXPEDITION

By Walter Donagho
(concluded)

August 1, continued: I noticed large black skinks about the trunks of several coconut palms, and started trying to catch them, the boys also setting in when they found what I was after. There was also a larger lizard that resembled a monitor, brown on the back, yellow on the belly; it ran up the trunk of a palm. I tried to catch it but it escaped among the stems and trash of the crown, where there was a second lizard. One of the boys went up after it, hoping to scare it out, but had no luck. I procured a skink, however, and went on up the valley, through open pastures. Several sunken pools marked the course of the valley's stream, and in them I collected dragonflies. I scared up a pair of Samoan teal from one of them. (Samoan teal closely related to the Hawaiian duck)

The boys did not seem to be finding any trail for me, and it was getting late, so I turned back, as I had spent some time in the valley and had to be ready to catch the Leone bus to the Station.

August 2: This day I decided I would go over the Pago Pago pass and visit the village of Fagasa on the other side. The morning was a fine one and the road bustled with activity. Samoans were going to and from the Station, groups of boys were swimming just offshore. One Samoan carrying two calabashes suspended from the ends of a shoulder yoke demanded twenty-five cents for posing for a picture!

After leaving Pago Pago, I passed the ruins of the old church that had been destroyed by a severe hurricane a few years ago. A new church had replaced it, nearby.

The road led on up the valley, soon becoming a trail that wound in and out through coconut and banana plantations and finally plunged into the forest. The vine-covered trees of the open glades teemed with insects. I spent some time there, improving my collection. Very large and beautiful tree ferns were common, many as high as the coconut palms below--twenty feet and over. Many Samoans were on the trail, all going to Pago Pago. All gave pleasant greetings. On the ridge, the son of the chief of Fagasa came along.

The trail descended rapidly through thick jungle, and then through coconut plantations into the village below. Here was an unspoiled Samoan village, Alas, it was marred by a much too large white church. Many children played about in the clearing before the church. (Samoans are fond of children and have many of them) The only other frame structure was, presumably, the minister's house. The chief had a large house, next to a larger community house in the clearing opposite the church. Other homes were scattered about under the breadfruit trees. The large bay was edged with a beautiful sand beach.

A Samoan boy met me and offered to show me around. We went down the bay to another small cluster of houses. Having found out what I wanted, he recruited several other boys for a lizard hunt. In a coconut grove, we caught several skinks. He led me further, through taro patches and breadfruit groves to a clearing where other boys were roasting breadfruit in some coals. Taking one out and breaking it open with a hand-carved wooden adze, he gave me a half. I dipped it into some coconut sauce in a coconut shell and enjoyed the feast.

Soon I returned to Pago Pago and to the Station, where the Fita Fita Guard were marching in a review. They looked very smart, with much snap to their maneuvers.

All day long, Samoans came out to the "Taney" in their canoes, to sell mats, tapa, hula skirts, and hand carved models of canoes and war clubs... We sailed from Tutuila that evening:

August 3: Dawn found us approaching the small islands of Ofu and Olosega, in the Manu'a group, American Samoa. Ofu is about 1500 feet in height, Olosega is a very steep, high peak rising over 2000 feet out of the sea. The north and south sides of the peak are very precipitous, terminating in a knife-like ridge. The east side is less steep and is covered with a good forest. It levels out near the shore, giving room for a coconut grove. Passing Olosega Island, the larger, higher island of Tau came into view. This is a single mountain, over 3000 feet high, with steep sides; it is more or less level on top. The sides are covered with a luxuriant jungle.

We approached the island and anchored off a small bay, around which nestled a small village. The bay was framed with high tuff cliffs, which shut it off. A trail ran along the cliffs from the east, however. Several Samoans came out to meet us in canoes before we reached our anchorage. Soon after anchoring, a large longboat, with a Samoan crew at the oars, their rhythm beaten by the coxswain on a tin gasoline can, pulled alongside, whereupon the officers and guests of the "Taney" piled in and were rowed away. They were invited to a mammoth feast given in their honor by the High Chief Tofele, who resided in a large village on the other side of the bluffs behind the bay.

I went in on one of the boats, and at the shore found a Samoan village unspoiled even by a church. Many Samoans here did not speak English... I came across one old man hewing out a canoe with an adze which was a flat piece of flint fastened to a handcarved wooden handle. Another group of Samoans were thatching a roof of coconut palm fronds...

The trail that led out of this landlocked bay passed along the foot of the tuff cliffs, through forests of hala and other plants, skirted a smaller bay with a beautiful beach, then climbed up along the cliff. A Samoan boy carrying a bunch of bananas offered me a couple. Farther on I met an old man who asked me if I wanted a drink of coconut milk. Before I had a chance to answer, he started down the trail, beckoning me to follow. Turning off into a side trail, we entered a small grove. Here he climbed a tree and broke off a coconut. After descending, he cracked it open on a sharp point and handed it to me. I proceeded to drain it of its sweet contents. I don't believe there are many other people as hospitable as the Samoans. They do everything they can to make the visitor's stay as pleasant as possible, without the slightest urging...

Returning to the main trail, I followed it on, coming down the bluffs and passing through cool coconut groves which rang with the notes of the iao bird. Fruit doves boomed from forest recesses not far distant, and I heard strange bird notes, high and sweet. The beautiful bright red, green and blue shapes flying about among the palms turned out to be parakeets. Other birds seen were swiftlets, and one kingfisher, seen in the forest about the little bay, I also noted a fuia.

As evening approached, the longboat from the main village returned, and the "Taney" prepared to leave. A fruit bat flew about above the bluffs as the "Taney" sailed out of the little bay. Night found us cruising along the north coast of Tau, bound for Rose Island.

August 4: We stood off Rose Island at dawn this morning. The island is a small atoll, with two small sand islets. Seemingly out of place on one of the otherwise barren and desolate islets, was a grove of large buka trees.

The "Taney's" launch passed through the narrow channel and crossed the lagoon, dodging numerous coral heads, to the larger of the islets. Many frigate birds flew above, though I did not find any nesting on the island. We were surprised, upon landing, to find a large cement monument erected near the grove of trees with an inscription, NO TRESPASSING! It emphasized the unpardonable offense of trespassing on a desert island, and disclosed the names of the owners of the island.

Birds were not uncommon on the island. I found several brown boobies nesting, and several red-footed boobies frequented the buka trees. Among the trees was a colony of sooty terns; white terns also frequented the trees. Mr. Bryan noted a blue reef heron.

We stayed only an hour. Passing through the channel, we let out a fishing line and trolled, catching several fish. The fishing stopped as soon as we had cleared the channel.

August 5: Sighted and came to off Puka Puka, or Danger Island, this afternoon. Here was another beautiful coral atoll, with a lagoon of the most delicate coloring. We anchored off the main island, Puka Puka. The two other islands, Motu Kotava, and Motu Kou, are at the other points of the triangle that makes up the atoll.

No sooner had the "Taney" anchored than boats of the islanders put out for us with articles of trade. The islanders themselves were not as picturesque as those of Atafu, for here they wore ordinary clothes. Among the many articles they had to sell were hat bands of cowry shells. Worth about eight dollars in Honolulu, they traded them here for a few bars of soap!

August 6: Arrived off our last island this morning--Jarvis--the largest of the equatorial islands that we visited. It is about two by two and a half miles, and is quite barren, save for a very scanty growth of portulaca. The interior is a large, dry lagoon, surrounded by a ridge that encircles the island. There was a large flat seep near the center, which was quite boggy in places.

Upon landing, Mr. Mumro set out to the north along the wide coastal ridge, which was covered with flat coral slabs. This was an excellent nesting area for bosun birds and we spent much time banding them here. Continuing on, we approached the north end of the island where the coastal ridge was covered with tufty grass. Here there were large colonies of sooty terns which were in the egg-laying and chick-bearing period. What a great number of chicks! They literally covered the ground in places. Frigate birds hovered over the colonies, waiting a chance to swoop down and grab an unsuspecting chick to make a meal of it. The terns on their eggs were unusually courageous, it being easy to approach right up to them. They hovered over their eggs, glaring at us, scolding us, beating their wings violently. Others swooped right down to our heads, and we caught some of these, banding several. We crossed the salt flats to the other side of the island and found a small colony of red-footed boobies nesting on the ground at one spot. No trees were available, so they had to be content with the ground. Many grey noddies frequented

the edges of the flats. All of them flocked over to get a glimpse of us as we passed through. There were more here than I had seen anywhere else.

Blue-faced boobies nested here and there over the plains, and there were small, scattered colonies of frigate birds. But the birds were not nearly as numerous as on Howland and Enderbury.

Coming to the east point of the island, I noticed several burrows in a sandy stretch of ground. Reaching down into one of them, my hand came in contact with some tail feathers. Grabbing them and pulling, I dragged out a wedge-tailed shearwater.

I walked alone down the east beach of the island, Mr. Munro having returned to camp. Many brown boobies sat on the rocks here and there. I came to the wreck of an old sailing vessel on the beach near the south end of the island--which was the wreck of the "Amaranth". The two halves of the broken vessel lay end to end, with much wreckage scattered about.

The rim along the southeastern side of the island was covered with a jumble of coral slabs... (unfinished)

The End

ARRIVAL AND DEATH OF A PHALAROPE

One evening in February I had the thrilling experience of adding to my limited knowledge of ornithology when I was called to identify a bird which had been found in my neighborhood, Waikiki. I learned it had been found about 11 o'clock in the morning squatting under and near the front tire of a parked car on Kalia Road. It missed being cat-bait by a narrow margin when it was discovered. At first glance it resembled a sanderling. However, I could not be sure for I had never held a live sanderling in my hand for close observation. The feet were lobed like those of a Coot; its bill was long and broad for the size of the bird; its coloring was predominantly white with mottled brown spots; the breast feathers were dense rather than thick, similar to those of a duck; the neck was not very long and the entire bird not over 6 or 7 inches long (I did not measure it). The bird had wounds, not fresh, on the back of its head and neck; however, it did not seem to be incapacitated. It was very weak, no doubt from lack of food. Because it was not a cage bird I decided that to keep it was too great a problem, so I called Mr. Breese of the Zoo, he accepted the task of caring for it, and the bird was quickly delivered into his keeping. Unfortunately it did not survive the night, but inasmuch as it was in good condition, its skin will be mounted for future use at the zoo.

Mr. Breese and Munro later identified the bird as a red phalarope (Phalaropus fulicarius Linnaeus), an adult in changing plumage.

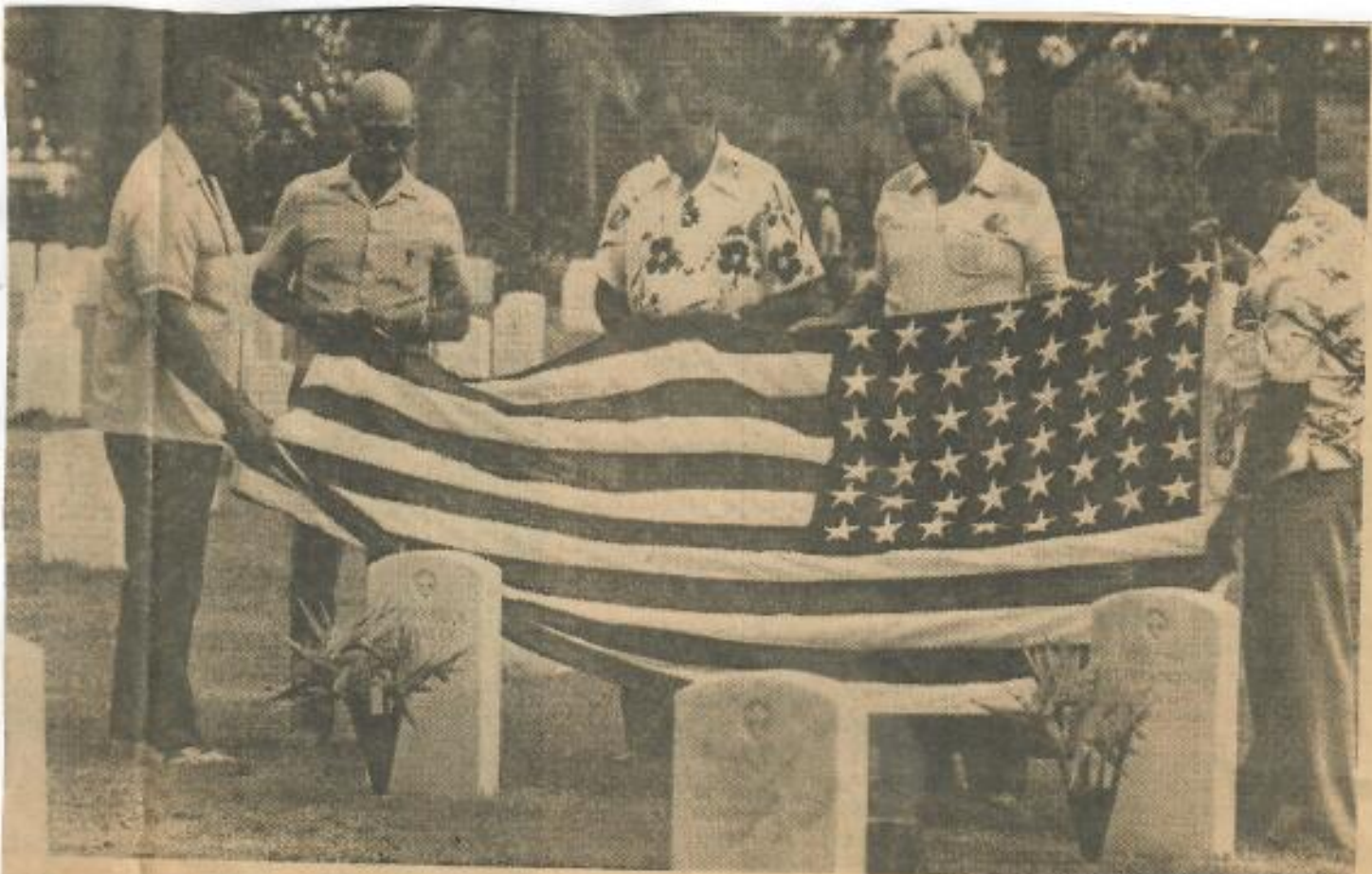
(see page 141 of BIRDS OF HAWAII by George C. Munro)

It is generally surmised that prevailing sea winds brought the bird to our shore and, as mentioned by Mr. Munro, "This bird has been reported on several islands. One was given me at Makaweli, Kauai, in November 1896. During 1941 a number were seen to have migrated here. Four at least were picked up dead on the windward coast of Oahu. All were preserved as specimens and were found to be very thin though in good feather. It would seem that they cannot find the sustenance they require in our waters and die of starvation!

Ruth R. Rockafellow



Jarvis Island, Jan. 19, 1937: "Goodbye, we'll see you in three months."



Advertiser photo by Ron Jeff

With 48-star flag from Baker Island yesterday at Schofield, from left: Eugene Burke, Joe Kim, William Whaley, Solomon Kalama, Walter Burke.



**bob
krauss**

Advertiser columnist

Surfing in Hawaii at age 17, Richard Whaley had no inkling of the strange fate he was soon to meet in the Line Islands. More than forty years later and 1,000 miles away, his former companions remember.

Castaways honors — 40 years later

C

Names and Faces C2
Classified C3-13

FOCU



Landing men and supplies on Howland Island: In dangerous surf a towline was used to haul a longboat between the beach and waiting boats offshore.

Richard Whaley and Joe Keliiahahanui were the forgotten castaway heroes of World War II until yesterday.

They have lain side by side in a tiny cemetery at Schofield Barracks for nearly 40 years, their deeds unsung, their names unrecorded in Hawaii history books, their memories dim even among Kamehameha School classmates.

Yesterday they received recognition 1,000 miles from the barren coral atoll where they died on Dec. 8, 1941, during a Robinson Crusoe adventure that ended in war.

Survivors of that adventure gathered around the graves to say a prayer and spread the 48-star flag that was flying when a Japanese submarine and a bomber blasted their lonely outposts.

No one is better fitted to honor the names of Richard Whaley and Joe Keliiahahanui than their companions — other young men from Kamehameha School who were trapped under fire for nearly two months on their lonely islands.

"The bomber came over every day," said Walter Burke of Aiea, one of the survivors.

"We dug fox holes and stayed under cover. Early in the morning and late in the evening we caught lobster and squid to eat. It wasn't until Jan. 28, 1942, that the U.S.S. Helm, a destroyer, picked us up.

"Richard and Joe had to be buried on Howland Island where they were killed. Their bodies were moved to Schofield Cemetery in the 1950s. Very few people even know it happened.

"When they brought us back to Hawaii, they kept us at Pearl Harbor for a month before they let us go. Then they told us not to talk about it."

The strange story of Richard Whaley and Joe Keliiahahanui began in the 1930s, when Pan American World Airways was pioneering air travel across the Pacific.

"There was great interest in the U.S. Department of Interior in establishing United States possession for Pacific Islands that might serve as air

bases," said Abe Piianaia, director of Hawaiian Studies at the University of Hawaii, who is also a survivor.

"I believe the idea came out of the then Bureau of Air Commerce, a single desk at Interior. The director was Bill Miller. His idea was to colonize the uninhabited Equatorial Line Islands and establish American possession.

"In Hawaii, he met Bishop Estate trustee Albert Judd, who suggested that Hawaiian boys from Kamehameha Schools would make good colonists because they were disciplined."

The unique operation began in 1935. Some 135 boys participated until World War II put a bloody end to their occupation of Jarvis, Howland and Baker Islands.

"In the beginning, we lived in pup tents," said Solomon Kalama of Kailua, one of the colonists.

"There is no fresh water on the islands. A supply ship brought it in 52-gallon drums. If the sea was too rough to bring it to the beach in boats, they just dumped the barrels over the side and let them float in.

"You don't know how heavy a drum like that is until you try to roll it across a soft sand beach. There were only four of us on each island at a time.

"The drums were so heavy we didn't try to roll them across the island to the camp if they landed on the wrong side. We'd just walk across the island when we needed water."

Eugene Burke of Aiea, brother of Walter, said their main job was taking weather observations and sending back weather reports on a ham radio.

"There wasn't much to keep us busy," he said. "When I stood on top of Baker the first time, 20 feet above sea level, I said to myself, 'Can I make it out here for six months?' The challenge made it exciting."

Walter Burke was on Baker when the war broke

out. The colonists with him, all Hawaiians, were Blue Makua, James Coyle and James Pease.

On nearby Howland Island, the colonists were Richard Whaley, Joe Keliiahahanui, Thomas Bederman and Elvin Matson.

"The four of us on Baker lived in a wooden shack we called the Government House," said Burke. "There was one on each of the islands.

"I got up on Dec. 8 at dawn and took the flag outside to raise it. There was a Japanese submarine about 100 yards off shore. I heard a 'whang' and a shell blasted the top off the government house.

"I ran inside and told the boys we'd better skedaddle out of there. I tell you, we were four scared Hawaiians taking off across the island. Jesse Owens couldn't have run any faster.

"We hid all day. A bomber came over and dropped some bombs. I think it was the bomber that killed Joe and Richard on Howland. But none of us really knows how it happened because the other two boys never wanted to talk about it.

"That night we sneaked back to the Government House. The shells had blasted everything. But we saved some tin from the roof and made sun shades for our fox holes. We covered the tin with brush so the bomber couldn't see us.

"That bomber was based in the Marianas Islands. It was a big, four-engine flying boat that came over every day around noon.

"We saved as much of the food as we could. The rats had gotten into the sugar. There was a little coffee. It's easy to live off the land there. We had plenty of dried fish. You can pick up squid and lobster with your hand.

"For greens, we picked palolo leaves.

"That Christmas we had lobster for dinner. We sang Christmas carols under the moon that night. I wasn't sure we'd ever get picked up and I expected the Japanese to land any time.

"When the U.S. Navy ship came, I thought it was Japanese and told the boys to stay hidden.

The ship put a boat over and started rowing to the beach. I thought, 'Oh boy, we've had it now.' Then I saw blond hair and I knew they weren't Japanese."

At the last minute, Burke cut his foot on a piece of iron, he said. He was bleeding so badly he was afraid of attracting sharks if he swam to the boat and the Navy officer in charge refused to row to quieter water.

"It was Blue Makua who swam back and got me to swim to the boat," said Burke.

"During the whole time we were being bombed, I kept the flag. Before we left the island, I buried it in a gunnysack and piled stones over it. In 1943, I went back to Baker to help build the airstrip.

"The first thing I did was find the rock pile and dig up my flag. I brought it home and have kept it ever since."

Burke said he went to Howland Island with some of the construction crew to find the graves of Whaley and Keliiahahanui. Later, the bodies were taken to Schofield and reburied.

Somehow, nobody ever got around to arranging public recognition for two of America's early casualties of World War II. So their friends decided at a reunion last week that it was time to honor the memory of their fallen comrades.

They are all in their 60s, those Kamehameha School boys who used to surf on redwood boards.

The party included William Whaley, brother of Richard, well known as a former professional baseball player. The former colonists present were the Burkes, Solomon Kalama and Joe Kim.

Eugene Burke spoke over the graves for the group:

"At this time it is appropriate that we say a silent prayer for these two. They are with us in spirit. They fill our hearts with pride. They gave their lives for us."

For a long time the survivors stood beside the graves talking story, remembering.

Everyone



UPI photo

Amelia Earhart and her navigator, Fred Noonan, with map of the Pacific that shows the route of their last flight.

It would have been the biggest party ever held on remote Howland Island but the guest of honor, Amelia Earhart, never showed up.

Instead, the world's most famous aviatrix disappeared in the Pacific to spawn the biggest search and rescue operation ever assembled up to that time. Two young men from Hawaii found themselves shanghaied on one of the ships.

Solomon Kalama and Eugene Burke, former Kamehameha School students, reminisced last week about Earhart's mysterious disappearance and their unexpected part in the search for her. Kalama and Burke were stationed on Howland, a bleak coral island near the Equator, as colonizers in June 1937 when Earhart neared the end of an around-the-world flight. She was to land at Howland after flying from New Guinea.

The young men helped prepare

showed except Amelia

for their well-known guest.

"There were four of us living on the island in a wooden shack called the Government House," said Kalama. "It had two rooms, a bedroom with four bunkhouse style bunks and a living room where we kept the radio.

"There was no wall paper, just bare boards.

"One of the mothers sent us some curtains. We put them up in the window of the bedroom where Amelia was going to sleep. They were the first curtains on Howland.

"We also fixed up a shower for her. It was made out of a 52-gallon oil drum raised up with a pipe leading to a number 10 tomato can with nail holes punched in the bottom. That was the shower head. We built a wooden floor and hung canvas shower curtains."

The U.S. Coast Guard Cutter Itaska, which served as a supply

ship, was on hand for the big arrival.

Kalama still has in his scrapbook the orders issued aboard the ship on June 29, 1937, for Earhart's arrival. Uniform of the day was to be white trousers, white jumper and white hat. Tennis shoes were optional.

The crew of the Itaska had prepared a musical review for the famous pilot with an opening chorus from "Merry Widow." The lyrics go like this:

"Amelia, Amelia,
"We wait for you.
"Amelia, Amelia,
"You are now due.
"Amelia our own dear Amelia,
"Our Aye . . . Vee . . . Aye
. . . Trix."

The cast included an emperor of the island, native troops, a Mr. Braswell, the crew of the ship and Amelia herself.

Kalama and Burke said while they were waiting for the arrival,

they went out to the Itaska to get groceries.

"We were eating ice cream when the captain suddenly ordered the anchor raised," said Kalama. "He said we've got to go out and look for Amelia.

"They stopped all shore parties and took the boats in. There was no way for us to get back to the island. The next thing we knew, we were at sea.

"We were there for several weeks, steaming among the Gilbert and Ellis Islands looking for Amelia Earhart. We wanted to search in the Carolines but those were under Japanese control and we couldn't.

"I remember we ran out of gas and the U.S.S. Colorado, a battleship, had to give us some. They say it was the biggest air sea search in the Pacific up to that time."

— By Bob Krauss