



THE ROMANCE OF SCIENCE IN POLYNESIA

An Account of Five Years of Cruising Among the South Sea Islands

BY ROBERT CUSHMAN MURPHY

AUTHOR OF "SOUTH GEORGIA, AN OUTPOST OF THE ANTARCTIC," AND "THE MOST VALUABLE BIRD IN THE WORLD," IN THE NATIONAL GEOGRAPHIC MAGAZINE

With Illustrations from Photographs by Rollo H. Beck

TO numberless readers the flood of books and articles by war-weary sojourners in the southern Pacific has meant the discovery of a new literary field—one in which heavenly isles, green with the breadfruit and the hibiscus tree, ringed by sapphire lagoons and dancing surf, are the setting for the lives of languorous natives who retain the pristine charm of Adam and Eve.

Looking at the subject with a historic eye, however, it is illuminating to note that from the days of the early discoverers the lands and peoples of the Polynesian archipelagoes have periodically claimed the attention and excited the imagination of civilized mankind. The present tide of favor is only a recurrence, such as has taken place about once in every generation since 1760 or earlier.

In the beginning, the vital narratives of the great voyagers of the eighteenth century, such as James Cook in Britain and Bougainville in France, were read by practically all educated men of their day. That they exerted a profound effect is reflected in the prose, the poetry, the humane and religious zeal, the developing wanderlust, and even the social customs of the period.

About forty years after the death of Cook, or in the twenties of the nineteenth century, the activities of British non-conformist missionaries in the Society Islands, as described in William Ellis's "Polynesian Researches," once again focused the eyes of the world upon the ever-fascinating South Seas.

MELVILLE REVEALS CHARMS OF THE MARQUESANS IN "TYPEE"

Ellis's studies, one volume of which is a classic source book for first-hand records of Polynesian history, traits, and culture, passed through several editions. The memory of them had hardly faded, even from the popular mind, before the original "cannibal island thriller" appeared, in the form of Herman Melville's "Typee" (1846).

This work, which has recently shared in the general Melville revival, is a Yankee whaler's simple, personal account of four months' captivity among the then uncontaminated savages of the Marquesas Islands, the same people whom Captain Cook had long before called the finest race in the Pacific, for fair form and regular features "perhaps surpassing all other nations."



A WORKER IN THE TARO FIELDS OF RAPA

The taro has thick, tuberous roots and large heart-shaped leaves. The leaves are eaten as a sort of spinach, while the roots are used either like potatoes or in the form of *poi-poi*, which is made by boiling them, then grinding, and allowing the substance to ferment for a day or two. The result is a paste much esteemed by the natives.

"Typee" made Melville a literary lion the world over, and, although the book lacks the imaginative power of his whaling romance, "Moby Dick," it is, nevertheless, a tale which one can scarce lay aside unfinished. Moreover, the modern ethnologist does not hesitate to record the observations of its author with the same assurance that he would feel in quoting from a work of scientific scholarship.

Melville followed "Typee" with a sequel entitled "Omoo," dealing with the Society Group, and his success evidently spurred a host of lesser travelers, whalers, and romancers to burst into print.

A considerable proportion of the books of the era were by British "globe-trotters," and, although these are of very irregular merit, they contain scattered kernels of priceless information.

The South Sea cult, if it may be so called, found its way even into literature for children. One famous, though long forgotten, example should be cited—Ballantyne's "Coral Island," published in 1858.

This is a book of the "Swiss Family Robinson" order, only much more so! It is excruciatingly melodramatic, with a pious moral on every page, and quaintly absurd in its geography, natural history, and ethnology. It reflects the influence of Ellis and Melville; but the penguins (which inhabit coral atolls!) the coconuts (which grow without husks!) and many other surprising flights of fancy must be credited entirely to Ballantyne's creative imagination.



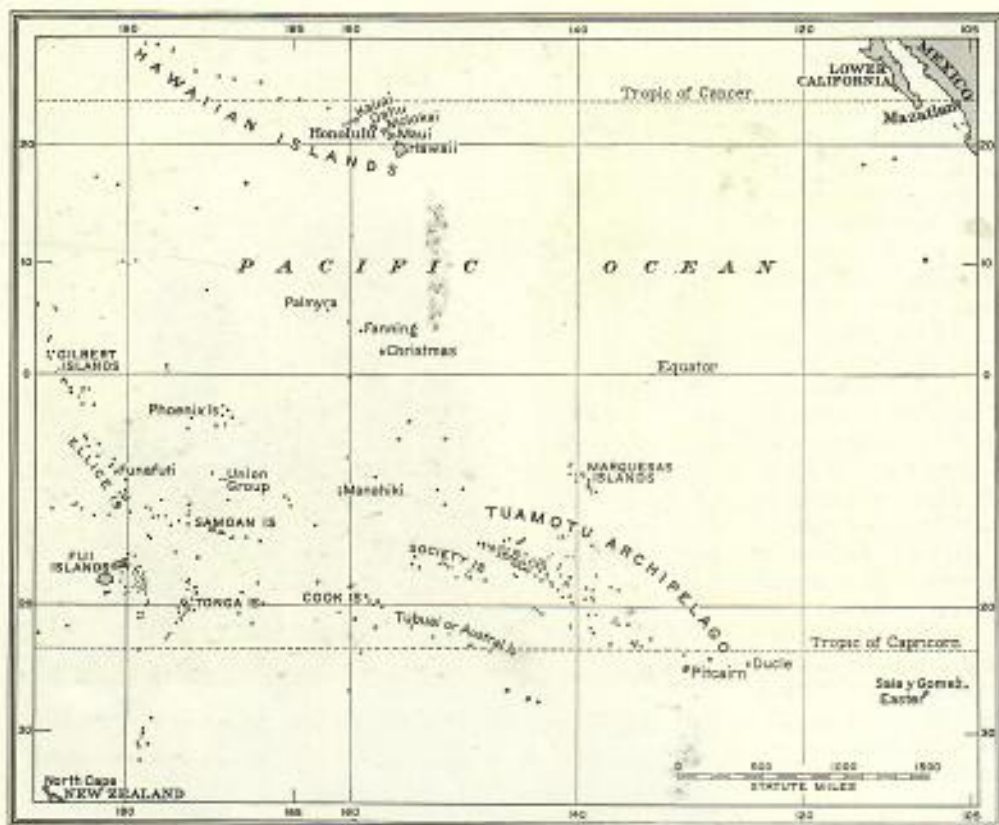
YOUTHFUL COPRA WORKERS OF APATAKI ISLAND

A native boy shows how simply a coconut can be husked on a stake.

Pens continued busily throughout what might be termed the Melville epoch, but it remained for Robert Louis Stevenson to place once more the stamp of genius upon Pacific literature.

"In the South Seas" and other essays are, of course, beguiling and informing. Stevenson is at his best, however, when recording his pure impressions of the islands and their inhabitants; when he turns to moralizing or quasi-scientific speculation, he is usually wrong.

In the more recent exploitation and advertisement of Polynesia, literary men have had to share the honors with painters. The artistry of John L. Farge and Paul Gauguin, for example, has had its part in the popular flare, no less than that



Drawn by James M. Darley

A SKETCH MAP OF THE ARCHIPELAGOES OF POLYNESIA

Polynesia ("Many Isles") comprises land areas of the Central Pacific Ocean lying within a rectangle bounded by the longitudes of 105° and 165° east, and latitudes 10° north and 30° south. (See also, detail map of the Tuamotu, Marquesas, and Austral Islands, page 366.)

of Stevenson and Pierre Loti. Finally, the group of contemporary writers have found among the islands subjects which are always alluring and, to the bulk of readers, always new.

So much for a brief sketch of the popular history of the South Pacific, the object of which is to show that at more or less regular intervals someone has had the talent to "rediscover" Polynesia, and to put the region into the minds of multitudes.

THE GREAT TALES OF COOK AND OTHER VOYAGERS

It must be emphasized that most of the great tales have not been written within our own lifetime. The modern reader cannot afford, indeed, to neglect the wealth of information and the thrill of glorious adventure suggested by the

names of Quiros, Roggewein, Forster, Sir Joseph Banks, Bligh, Vancouver, Wallis, Krusenstern, Marchand, Carteret, G. A. Byron (grandfather of the poet), James Wilson, F. D. Bennett, Kotzebue, Wilkes, La Pérouse, Porter, Langsdorff, Darwin, Fitzroy, du Petit-Thouars, Garcia, Dumont d'Urville, Beechey, and Stewart.

If one would know the South Pacific in its day of barbaric splendor he must go back to the yellowed pages of Cook's "Voyages," to read Homeric descriptions of Tongan feasts, of pagan sacrifices, or of the maneuvers of the Tahitian canoe fleet, with its 7,760 fighting spearmen, for the war against Moorea.

To turn from the present-day writers to James Cook is to feel

"like some watcher of the skies
When a new planet swims into his ken."



SEARCHING FOR THE MOUNTAIN BREEDING GROUNDS OF THE TAHITIAN PETREL,
Beyond the crest looms the Diadem, the loftiest of whose jutting spurs towers 4,000 feet above
the sea.



MODERN POLYNESIANS

Fishing parties on the fringing reef of Tahiti, in the harbor of the port and capital, Papeete.



INSPECTING THE NEST OF A MINA BIRD
IN TAHITI

The white man brought the mina to the South Seas. He also introduced the weavers, hawks, rock pigeons, and Indian bulbuls.

The genius of the great voyager, the strength of his character, and his gift for critical observation stand out everywhere in his record. After a reader has followed him and lived with him through crowded years of his travels, the futile tragedy at Hawaii which ended his noble career comes as a dramatic, fateful blow, such as is rarely equaled in either history or fiction.

GEOGRAPHY OF POLYNESIA

In our consideration of the Polynesian archipelagoes, New Zealand may be disregarded because of its geographic affinity with the Australasian land masses. Hawaii, likewise, will be omitted, partly because of its remote location, north of the Equator and outside the field of the American Museum's contemporary investigations, and, more especially, because President Grosvenor, of the National Geographic Society, has recently published an admirable account of his Hawaiian studies and personal field work, which filled an entire number of the NATIONAL GEOGRAPHIC MAGAZINE.*

The typically "South Sea" islands, some of which stand alone while a larger number enter into clusters of considerable magnitude, include such important groups as the Society, Tuamotu, Marquesas, Austral, Samoa, Ellice, Phoenix, Union, Manihiki, and Tonga Islands. In general, they lie within a rectangle bounded by the longitudes of 105° and 165° east, and latitudes of 10° north and 30° south (see map, page 358).

The total number of islands is impracticable to estimate, for an atoll of a single name may in reality be composed of scores of separate islets. Brigham's "Index to the Islands of the Pacific" lists about 2,650 main bodies of land, after the elimination of synonyms applied by successive European discoverers.

The terrestrial area is in the neighborhood of 3,500 square miles, exclusive of Hawaii and New Zealand. The Societies, one of the larger groups, comprise about

* See "The Hawaiian Islands: America's Strongest Outpost of Defense—the Volcanic Floral Wonderland of the World," by Gilbert Grosvenor, LL. D., in the NATIONAL GEOGRAPHIC MAGAZINE for February, 1924.



A WORLD WAR MONUMENT AT PAPEETE, TAHITI

"Les Etablissements Français de l'Océanie à leurs Enfants Morts pour la France 1914-1918" is the inscription on this marble memorial.

637 square miles; the Marquesas, 490; and the Tuamotus, for all their "Cloud of Islands," which is the meaning of the original native name—80 islands and numberless fragments—sum up to but 364 square miles.

Politically, the Society, Marquesas, Tuamotu, and Austral islands have been French since the middle and latter parts of the last century. Many of the others are British colonial possessions, or are now under New Zealand mandate.

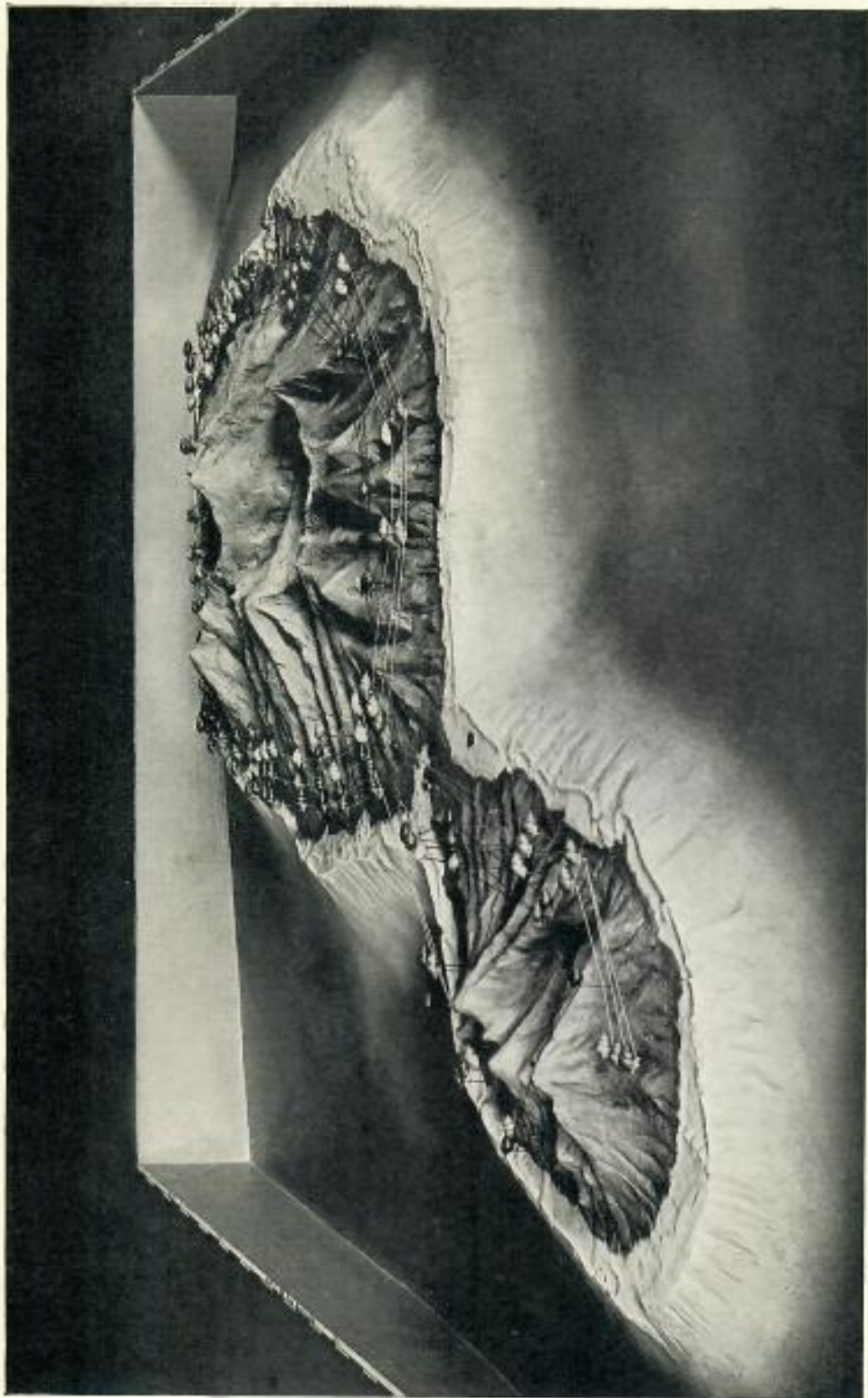
The United States has undisputed control over part of Samoa and less definite claims upon certain other islets. Easter Island and Sala-y-Gomez, the eastern outposts of the region, are Chilean.

For a clear record of the rather complicated status of post-war sovereignty, the reader is referred to the authoritative map of the Pacific, which was issued as a supplement to the NATIONAL GEOGRAPHIC MAGAZINE for December, 1921.

REEF-FORMING CORAL RESPONSIBLE FOR MANY ISLANDS

In the western South Pacific, as at Hawaii, volcanic phenomena are still in active progress, but, throughout the area with which we are here concerned, the earth-building fires have long been extinguished.

Disintegrating rock and erecting coral, separately or in combination, make up the



A PROFILE MAP OF TAHITI SHOWING THE ERODED VOLCANIC CORE, THE LAGOON, FRINGING REEF, AND BARRIER REEF

The main body of Tahiti consists of two high land masses connected by a low isthmus. The core of richly carpeted volcanic hills is surrounded by a coastal plain, which reaches a width of as much as a mile only at the mouths of the river valleys. Around the strand-belt are the fringing reefs, which extend, just awash or slightly submerged, into the lagoon moat (see text, page 363). Principles of geographical distribution are illustrated by land snails of the genus *Partufa*.

structure of the innumerable dots in the wide sea, although more fundamental movements in the floor of the ocean basin itself have often compensated for the wasting tendency of the one or vitiated the constructive power of the other.

At certain islands the bottoms of the very bays in which the old-time explorers anchored have sunk or risen with the subsequent action of forces beneath the ocean.

The limits of the range of reef-forming corals in the central Pacific are roughly indicated by the parallels of 28° north and 30° south. But steep shores, and consequent absence of shallow coastal shelves, prevent the growth of reef-corals even within the favored area. The beetling Marquesas, with all but strandless shorelines, are, for example, without a girdle of reefs.

TAHITI IS EXAMPLE OF COMPOSITE VOLCANIC AND CORAL ISLAND

At Tahiti, as a type of the composite islands which attain the peak of Polynesian diversity and beauty, the core of worn and richly carpeted volcanic hills is surrounded by a coastal plain which reaches a width as great as a mile only in the mouths of the river valleys (see relief map on preceding page).

This encircling strand is a strip of great fertility, and is the only zone of such cultural plants as the coconut, sugar cane, banana, coffee, and vanilla. It was also the sole belt of permanent human habitation, even when the classic isle supported 150,000 aboriginal people, the estimate of Sir Joseph Banks in the late 18th century.

The strand overlies an ancient lava bench and portions of a buried fringing reef, although the surface soil, a product of crumbling uplands, has now in many places a thickness of nearly 20 feet.

Around the strand-belt, which here and there narrows until it disappears altogether, are the fringing reefs. These extend, just awash or slightly submerged, into the lagoon-moat. The latter is of varying breadth, and of a maximum depth of about 18 fathoms. It is in turn protected from the battering rollers of the open Pacific by the barrier reef, which is broken by numerous passes, especially opposite the outlets of streams where the

flow of fresh water tends to inhibit the growth of coral.

At most points the moat is broad and navigable, but at intervals it narrows to such an extent that the fringing and barrier reefs practically coalesce.

The main body of Tahiti comprises two high land masses connected by a low isthmus. The larger mass culminates in several sharp peaks, of which Orohena is credited with an altitude of 7,321 feet.

Both Tahiti proper and its smaller peninsula have been dissected through tremendous erosion, which has produced many valleys with almost vertical walls and knifelike dividing ridges.

These gorges are, in fact, so sharply marked off one from another by factors of altitude and plant zones that the respective populations of such creatures as sedentary insects and land snails are as completely isolated from each other as if they were on opposite sides of the world. Professor Henry E. Crampton has taken advantage of the circumstances which have converted the various valleys into natural laboratories of evolution, and has published a brilliant series of studies upon the astonishing geographic variation in one genus of land mollusks inhabiting this single island.

Turning to the atolls, or coral rings without a central pile of hills, we find that several large Pacific groups include islands of no other type. Atolls, however, are rarely in the form of the perfectly symmetrical, palm-lined "doughnuts" so quaintly portrayed in the woodcuts of old geographies. Most of them are highly irregular in outline and, moreover, the land which actually projects above the surface of the ocean is more often a chain of disconnected islets or *motus* than a ribbon of continuous beach.

The principal entrance to the lagoon is usually at the northwesterly or leeward end, for corals thrive best and build the strongest bulwarks on windward shores, or where the southeast trade wind heaps up the waters which bear their sustenance.

Hau Island, of the vast Tuamotu archipelago, may serve as a characteristic example of the low islands. It is thirty miles in length, seven in breadth across the widest part of the lagoon, with the longer axis parallel with the course of the



A TROPHY OF THE TROLLED LINE: A TUNNY CAUGHT NEAR CHRISTMAS ISLAND



BIRD STUDY DE LUXE

The naturalists of the Whitney Expedition enjoyed the use of Péré Rougier's American motor cars at Christmas Island (see text, page 402). The subject being photographed is a man-of-war bird. At the nesting time these birds are seemingly without fear.



THE SHARK HAS STRUCK

A familiar scene to one who has traversed the tropical ocean in a windjammer.

trades. The only entrance is at the leeward end (see page 369).

The long thread of the reef is elsewhere unbroken by navigable channels, but the "dry land" is made up of more than 100 distinct units, of which the longest has an extent of perhaps eight miles.

Since the greatest width of the islets nowhere equals a mile, it is clear that the coral-studded lagoon makes up 99 per cent or more of the entire area of the atoll. This explains why it is possible for vessels to sail into the lagoons of certain Pacific coral-rings and to anchor *out of sight of land* in the heart of glassy and sheltered waters.

In such friendly lagoons the primitive atoll-dweller plied his paddle, and on the quiet inner beach he built his villages.

The jagged spit behind his home was often a desolate and uninhabited waste, while the outer stretches, toward the booming sea, were, as Stevenson tells us, the abode of horrible specters among which the superstitious islander would hardly venture alone.

Here the rollers crashed as if they envied the peace within, and sought to destroy it; but the greater their volume and power, the more luxuriant became the soft, living coating of the limy breast-works.

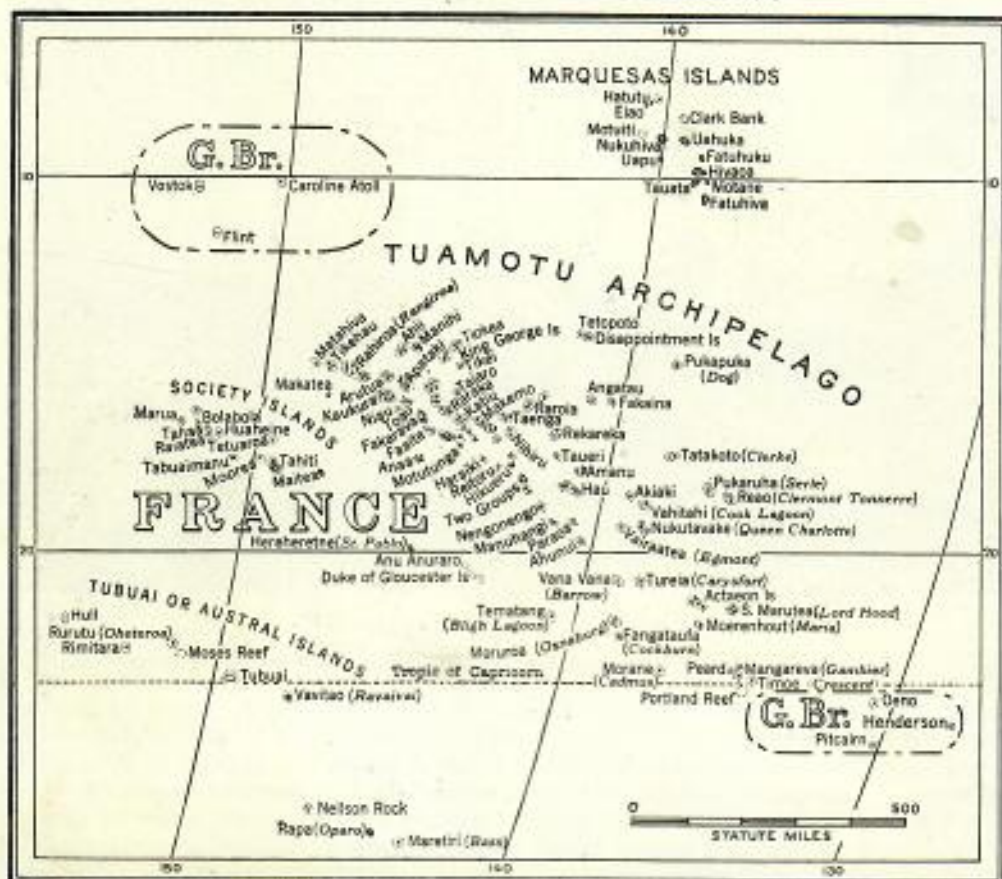
It is not difficult to comprehend that the seaward rim of an atoll, across which a hurricane might send an avalanche of water, should seem depressing to the Tuamotuan, whereas the native of such a lofty island as Nukuhiva could plunge joyfully into breakers which pounded his citadel in vain.

ORIGIN OF ATOLLS A SUBJECT OF FAMOUS CONTROVERSY

The scientific controversy regarding the origin of atolls is an old and famous one, and is not yet fully settled. Darwin held that the rings of coral, which sometimes rise from depths far below the limit at which reef-building polyps can live, are the result of the gradual wearing away or subsidence of a central land mass, accompanied by the equally slow upgrowth of the girdling reef.

According to this view, each atoll is in effect the barrier reef of an island which has vanished, or of a submarine mound which approaches the surface of the sea. More crudely stated, the atoll is the crown of a sinking volcano.

Sir John Murray, the botanist Guppy, and Professor Alexander Agassiz combatted this theory, and showed that reefs exist in parts of the Pacific where there



Drawn by A. H. Bumstead and James M. Darley

THE MARQUESAS, TUAMOTU, AND AUSTRAL ISLANDS (SEE, ALSO, MAP, PAGE 358)

The three main archipelagoes belong to France, while the small groups to the northwest and the southeast are British possessions. The aggregate land area of the Marquesas group is less than 500 square miles; of the Tuamotu ("Cloud of Islands"), 364 square miles. This map is a detail from the National Geographic Society's "Map of the Islands of the Pacific," in colors, size 24 x 18 inches.

is no evidence of subsidence, but where, on the contrary, there has been uplift.

Borings made at the atoll of Funafuti, however, both through the ring itself and through the bottom of the enclosed lagoon, revealed the presence of coral rock to a depth of 1,114 feet.

Since reef corals cannot grow below 20 fathoms, the Funafuti experiment points to a progressive sinking of the ocean floor in this region, and confirms the older explanation. Many facts of zoological distribution in the Pacific make it difficult to avoid the same conclusion.

CLIMATE AND VEGETATION OF POLYNESIA

The final type of island to be mentioned is the secondarily upraised or tilted atoll,

which may present cliffs and hills of considerable altitude and of misleading superficial appearance.

The greater number of the Polynesian islands lie within the zone of the southeast trade wind, and enjoy a mild and equable climate, although many of the groups near the Equator are subject to hurricanes.

Rainfall is naturally most copious on the windward, or southeasterly, slopes of the high islands. In the Marquesas the difference is so pronounced that the principal islands have a heavily forested windward face, and a leeward, semi-desert side, where the vegetation and the fauna may be quite distinct.

In the same way, a high island often produces a "rain shadow" which more or



BASS ROCKS, SOUTHWARD FROM RAPA, THE LAST OUTPOSTS BETWEEN POLYNESIA
AND THE ANTARCTIC

"Here there is no place to land on from out of the gray water. For without are sharp crags,
and round them the wave roars surging, and sheer the smooth rock rises" (Homer).



AN UPLIFTED CORAL CLIFF OF RURUTU: AUSTRAL GROUP

In places this structure of submarine origin now rears 300 feet above the sea (see text, page 366).

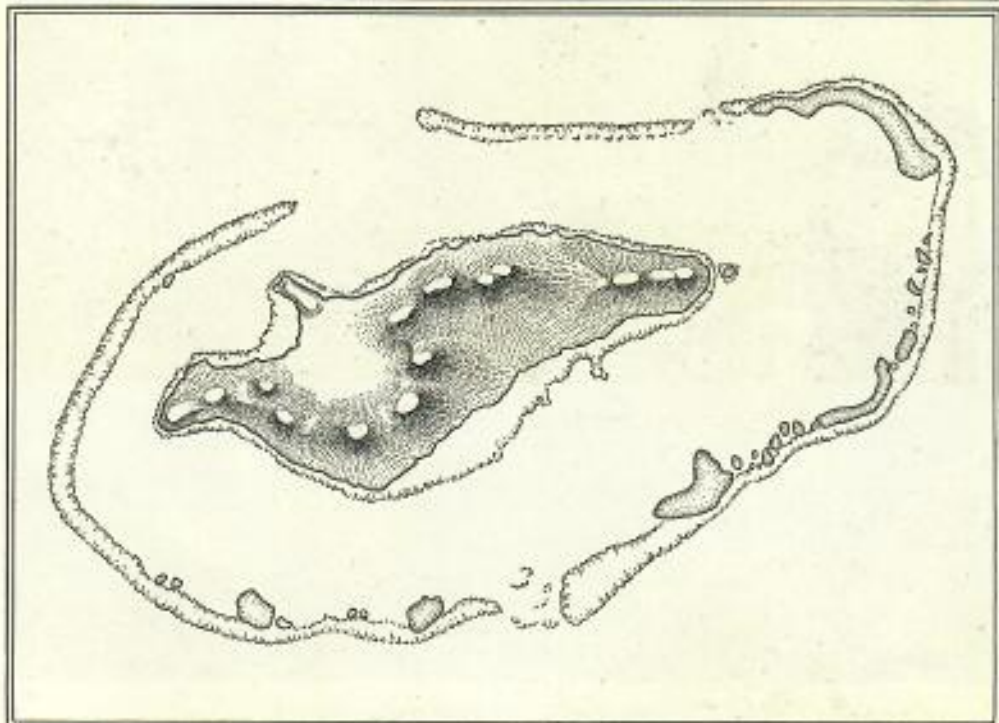


THE "FRANCE" BETWEEN BEETLING CLIFFS OF TAUATA ISLAND, MARQUESAS



THE ISLE OF FATUHIVA, MARQUESAS

In viewing this incredible little island from the sea, who would suspect that for ages its valleys harbored tribes that were sworn and bloodthirsty enemies? One shore was totally tabu, for example, to the hostile inhabitants of the other, beyond the mountains.



Drawn by William E. Belanck

THE TOPOGRAPHY OF A CORAL-RINGED VOLCANIC ISLE: PROFILE OF BOLABOLA, OF THE SOCIETY GROUP, AFTER ALEXANDER AGASSIZ

Below is Vavatao, of the Austral group, from a Hydrographic Office chart. These represent the type of Polynesian islands which attain the height of beauty and diversity. The drawings show the volcanic central mass, with weathered peaks, the thickly forested and more maturely weathered surrounding hills, the fringing reefs of the main body of land, the lagoon moat, and the inclosing barrier reef. The latter is partly awash, but is studded with higher islets, or *motus*, some of which support a rich growth of coconut palms and strand vegetation (see, also, relief map of Tahiti, page 362).

less thoroughly deprives its leeward neighbor of moisture, leading to considerable geographic diversity within small groups.

The Polynesian flora is pronouncedly Asiatic. The vegetation of the fertile volcanic islands is relatively rich; that of the coral islands scanty. Among the latter the coconut, pandanus, and mangrove

are almost the only conspicuous native trees.

In the high islands the more interesting forms of plant life, including all the species peculiar to the region, begin at an altitude of 1,000 feet or more above the sea. Orchids and ferns are abundant, the latter constituting fully 15 per cent of the total flora.



COFFEE PICKERS OF RAPA

These young women are not "posing," but were photographed unawares at their task.

At the Society Islands and elsewhere the indigenous valley forest is largely made up of tree ferns which descend well toward sea level in moist valleys, but not much below 1,500 feet on the drier coasts.

FEI, TARO, AND BREADFRUIT ARE IMPORTANT FOOD STAPLES

Features of the hillsides between 3,000 and 5,000 feet are the thickets of the fei, or Polynesian wild banana, an important source of food to-day as in prehistoric times (see page 385).

Another widely distributed staple, which, however, grows in the lowlands and is intensively cultivated, is the taro (see Color Plate IV), distantly related to our jack-in-the-pulpit. Both root and

leaves of this plant are edible after cooking has destroyed its acrid taste.

Still another important starchy food is supplied by the famous breadfruit, of which a score of varieties flourish among the Pacific islands.

The Marquesans of old practiced the laudable custom of planting breadfruit trees upon the birth of children, to insure the subsistence of their descendants. Owing to the dying out of the people and the lack of recent cultivation, the breadfruit is gradually disappearing over wide areas, for the seedless tree cannot compete unassisted with the more vigorous forest flora.

At such a long-settled island as Tahiti, a discerning visitor notes at once that



STRIPLINGS OF RIMITARA ISLAND, AUSTRAL GROUP, BOUND FOR SEA

enormous changes in the vegetation have occurred since the discovery. The transformation is most evident in the coastal plain, but even on the higher slopes many of the native plants have been driven out or upward by such interlopers as the guava and the tropical American lantana.

INTRODUCED PLANT PESTS RESPONSIBLE
FOR SOUTH SEA "JUNGLES"

The rapid dissemination of the thorny lantana is due to the agency of another introduced form of life—the Indian starling, or "mina."

Writing of similar conditions in Hawaii, Brigham says: "The lantana (*L. camara*) was cultivated for years in gardens in the Hawaiian Islands, but it showed no tendency to spread until the so-called

mina (*Acridotheres tristis*) was introduced, when the berry became its favorite food and the indigestible seed was scattered everywhere."

Although the Polynesian islands were never lacking in areas of dense and tangled vegetation, it is the introduced plant-pests, rather than native flora, which are responsible for much of the impenetrable "jungle" found to-day.

In the higher, less affected places the steepness of the slope and the crumbling nature of the soil and rock contribute more toward the "inexplorable" conditions than the thickness of the vegetation.

The absence of poisonous plants on most of the islands and the paucity of native edible fruits are further characteristics of the Polynesian flora.



RAT-PROOF STOREHOUSES FOR COPRA IN THE LAGOON OF KAUEHI

On some of the islets of the South Pacific, as at Tahiti, rats and mice were the only indigenous mammals found by white men. They have become a real pest, and the natives have devised water-bound storehouses for their harvested crops.

All the fruits which now abound in the gardens and orchards have been introduced since the time of the early discoverers.

RATS AND MICE WERE FORMERLY ONLY
LAND MAMMALS OF POLYNESIA

Throughout the easterly Polynesian groups, rats and mice were the only native land mammals, and the ancestors of some of these may have been first brought into the region by early human migrants. One must go at least as far west as Samoa before even bats become an added element in the mammalian fauna.

Reptiles have only slightly better representation. Except for sea-snakes, there is none of the serpent kind in the long expanse between Samoa and the Galápagos Islands.

The clinging-footed geckos are the commonest of Polynesian reptiles, no less than eight genera occurring, together with half that many genera of the small lizards known as skinks.

Amphibians are practically wanting, for although a single species of toad inhabits Hawaii, we must make a long jump beyond the western limits of the region—to the Fiji and Solomon Islands—before we encounter frogs, salamanders, or another toad.

The birds of the South Sea Islands, both indigenous species and migrants, naturally exemplify a wide variety of marine and terrestrial forms and warrant special consideration in some future number of this magazine.*

MELVILLE ACCUSES REVENGEFUL WHALER
OF INTRODUCING MOSQUITOES

The writer knows little about the insect population, except that the number and variety decrease as one progresses in an easterly direction from islands close to Australia and Malaysia.

As would be expected, the insect fauna of the coral Tuamotus is poor indeed when contrasted with that of the luxuriant forests of Melanesian isles. Biting flies are an annoyance at certain of the

* See, also, "Bird Life Among Lava Rock and Coral Sand" (on the Leeward Islands of the Hawaiian Group), by Dr. Alexander Wetmore, in the NATIONAL GEOGRAPHIC MAGAZINE for July, 1925.

Marquesas Islands and elsewhere, while mosquitoes, which doubtless include native species, are among the curses charged against the invading white man.

The tale of the alleged introduction of mosquitoes into Moorea, of the Society Islands, is related by Melville in "Omoo." It is quoted without warrant as to its accuracy:

"Some years previous a whaling captain, touching at an adjoining bay, got into difficulties with its inhabitants, and at last carried his complaint before one of the native tribunals; but receiving no satisfaction, and deeming himself aggrieved, he resolved upon taking signal revenge. One night, he towed a rotten old water-cask ashore, and left it in a neglected taro patch where the ground was warm and moist. Hence the mosquitoes."

FIRST HORSES AND GOATS ASTOUNDED
NATIVES

The domestic animals which the primitive Polynesian navigators carried with them on their remarkable wanderings apparently comprised only poultry, dogs, and pigs. These have been so constantly augmented within the historic period that it is now difficult to tell what the original types were like. The modern chickens, for example, which are wild or feral on all the wooded islands, depart widely from the ancestral jungle fowl, and show the characters of many domestic strains.

Early in the last century Bennett noted that the hogs of the Marquesas "still exhibit, in great purity, the gaunt form, acute snout, arched back, high tail, pricked ears, and small deer-like feet, of the original Polynesian breed."

Razor-backed animals are still to be found, but even on small islands remote from the trade routes, one now sees many round, short-legged pigs of highly cultivated appearance.

The early travelers record amusing incidents of the amazement of the islanders when they first saw such monsters as horses and goats, and of their difficulties when they set themselves the Adam's task of naming them.

"To all the exotic quadrupeds," writes Bennett, "the Tahitians apply the generic names of their indigenous kinds, giving to the larger the name of *buaa*, or pig, and to



COCONUTS READY TO BE CONVERTED INTO COPRA

The sun-dried meat of the coconut is the chief article of commerce of the South Seas. It is estimated that 1,000 full-size nuts will yield approximately 500 pounds of copra, from which 25 gallons of oil can be obtained.



DRYING COPRA AT MANGAREVA

In addition to its use in soaps and the manufacture of candles, coconut oil is now successfully utilized in the manufacture of oleomargarine.

All the fruits which now abound in the gardens and orchards have been introduced since the time of the early discoverers.

RATS AND MICE WERE FORMERLY ONLY
LAND MAMMALS OF POLYNESIA

Throughout the easterly Polynesian groups, rats and mice were the only native land mammals, and the ancestors of some of these may have been first brought into the region by early human migrants. One must go at least as far west as Samoa before even bats become an added element in the mammalian fauna.

Reptiles have only slightly better representation. Except for sea-snakes, there is none of the serpent kind in the long expanse between Samoa and the Galápagos Islands.

The clinging-footed geckos are the commonest of Polynesian reptiles, no less than eight genera occurring, together with half that many genera of the small lizards known as skinks.

Amphibians are practically wanting, for although a single species of toad inhabits Hawaii, we must make a long jump beyond the western limits of the region—to the Fiji and Solomon Islands—before we encounter frogs, salamanders, or another toad.

The birds of the South Sea Islands, both indigenous species and migrants, naturally exemplify a wide variety of marine and terrestrial forms and warrant special consideration in some future number of this magazine.*

MELVILLE ACCUSES REVENGEFUL WHALER
OF INTRODUCING MOSQUITOES

The writer knows little about the insect population, except that the number and variety decrease as one progresses in an easterly direction from islands close to Australia and Malaysia.

As would be expected, the insect fauna of the coral Tuamotus is poor indeed when contrasted with that of the luxuriant forests of Melanesian isles. Biting flies are an annoyance at certain of the

* See, also, "Bird Life Among Lava Rock and Coral Sand" (on the Leeward Islands of the Hawaiian Group), by Dr. Alexander Wetmore, in the NATIONAL GEOGRAPHIC MAGAZINE for July, 1925.

Marquesas Islands and elsewhere, while mosquitoes, which doubtless include native species, are among the curses charged against the invading white man.

The tale of the alleged introduction of mosquitoes into Moorea, of the Society Islands, is related by Melville in "Omoo." It is quoted without warrant as to its accuracy:

"Some years previous a whaling captain, touching at an adjoining bay, got into difficulties with its inhabitants, and at last carried his complaint before one of the native tribunals; but receiving no satisfaction, and deeming himself aggrieved, he resolved upon taking signal revenge. One night, he towed a rotten old water-cask ashore, and left it in a neglected taro patch where the ground was warm and moist. Hence the mosquitoes."

FIRST HORSES AND GOATS ASTOUNDED
NATIVES

The domestic animals which the primitive Polynesian navigators carried with them on their remarkable wanderings apparently comprised only poultry, dogs, and pigs. These have been so constantly augmented within the historic period that it is now difficult to tell what the original types were like. The modern chickens, for example, which are wild or feral on all the wooded islands, depart widely from the ancestral jungle fowl, and show the characters of many domestic strains.

Early in the last century Bennett noted that the hogs of the Marquesas "still exhibit, in great purity, the gaunt form, acute snout, arched back, high tail, pricked ears, and small deer-like feet, of the original Polynesian breed."

Razor-backed animals are still to be found, but even on small islands remote from the trade routes, one now sees many round, short-legged pigs of highly cultivated appearance.

The early travelers record amusing incidents of the amazement of the islanders when they first saw such monsters as horses and goats, and of their difficulties when they set themselves the Adam's task of naming them.

"To all the exotic quadrupeds," writes Bennett, "the Tahitians apply the generic names of their indigenous kinds, giving to the larger the name of *buaa*, or pig, and to



DRYING COPRA ON TUREIA ISLAND

The coconut crop is not only profitable, but it requires no labor in cultivation and comparatively little effort in harvesting.

the smaller that of *uri*, the dog, or *iore*, the rat. The ox they name *buaa-toro*, or pig with a long neck; the horse, *buaa-horo-fenua*, or pig that runs quickly over the ground; the goat, *buaa-niho*, pig with teeth (horns) on its head. . . . The monkey, of which some examples have been taken to their shores, they call *wi-taata*, the man-dog; and the cat, *iore-pii-fare*, the rat that climbs the house."

ABORIGINAL POLYNESIANS A TALL, HANDSOME PEOPLE

Most of the islands which can strictly be called Polynesian are, or formerly were, inhabited by a rather tall and handsome aboriginal people, representing a mixed race, but very distinct from the dark-skinned and frizzly-haired Australasian natives.

In the literature of Polynesia no branch of knowledge is so obscured by uncertainty and confusion as that concerning the origin, relationships, and migrations

of the people. Their entrance into the oceanic islands has been traced back indefinitely, to about the first century of the Christian era.

Dr. E. S. C. Handy has recently concluded from genealogical evidence that such a remote group of islands as the Marquesas may have been settled in the tenth century.

The racial status of the Polynesians is, if possible, even more complex a subject than that of their tenure of the numerous archipelagoes.

Earlier students not only emphasized their uniformity in culture and language, but also pointed to them as an example of striking uniformity of physical type, extending over a widely varying environment. They are described as being almost identical in appearance from Hawaii to New Zealand and from Samoa to Rapanui (Easter Island).

A great deal of sheer speculation, and no little nonsense, has been written about



A COPRA-LADEN SLOOP IN THE LAGOON CHANNEL OF MANIHI, TUAMOTU ARCHIPELAGO, WITH THE "FRANCE" IN THE BACKGROUND



BRAIDING HOUSE WALLS FROM PALM FRONDS: KAUEHI ISLAND, TUAMOTUS

In addition to the copra of commerce, the coconut palm supplies the South Sea native with one of his chief articles of food, a refreshing drink, an intoxicating beverage, timber and thatch material for his dwelling, water vessels, and fiber for ropes.



A MARQUESAN WOMAN WOOD-CARVER OF HANAVAVE VALLEY, FATUHIVA ISLAND

this subject. It is only within the last few years that the investigations of trained anthropologists have begun to solve the problems.

The late Dr. Louis R. Sullivan, Associate Curator of Anthropology in the American Museum of Natural History, says of racial types in Polynesia:

"The now rapidly accumulating data on the biology of the inhabitants of the Pacific islands are beginning to indicate clearly that the 'Polynesians' are in no sense to be considered a uniform racial type. The 'Polynesian type' is, in fact, an abstract concept, into the make-up of which have entered the characteristics of several varying physical types.

"Anthropologists have long disagreed on the racial affinities of the Polynesians. Some have classified them as Mongols, others as Caucasians; while still others have maintained that they are a special race. This in itself is strong evidence that the Polynesians are a badly mixed people, for, whenever there has been a general disagreement as to the racial affinities of any group, it has been found almost invariably that the group was non-homogeneous.

"There is much vagueness as to what

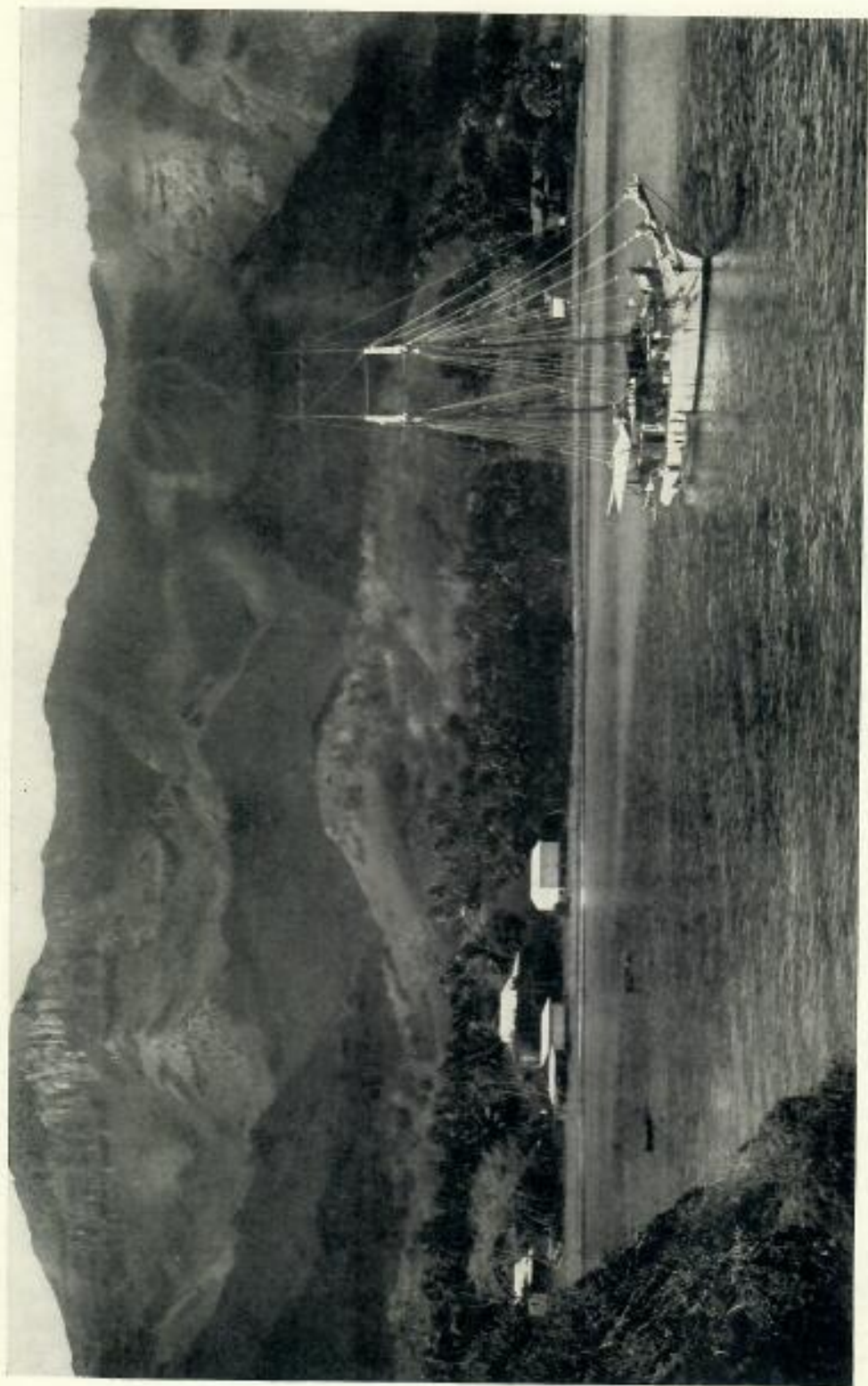
constitutes a Polynesian, but as generally conceived and described, he is a tall and remarkably well proportioned type, with a short head, a high and relatively narrow nose, straight or slightly wavy black hair, and a yellowish brown skin.

"In no part of Polynesia from which we have information does this type make up the entire population at the present time. There is strong evidence that in times past, and not so very long past either, this element was entirely absent, or not present in any appreciable strength."

ISLAND WOMEN IMPRESSED EARLY VOYAGERS AS PARAGONS OF BEAUTY

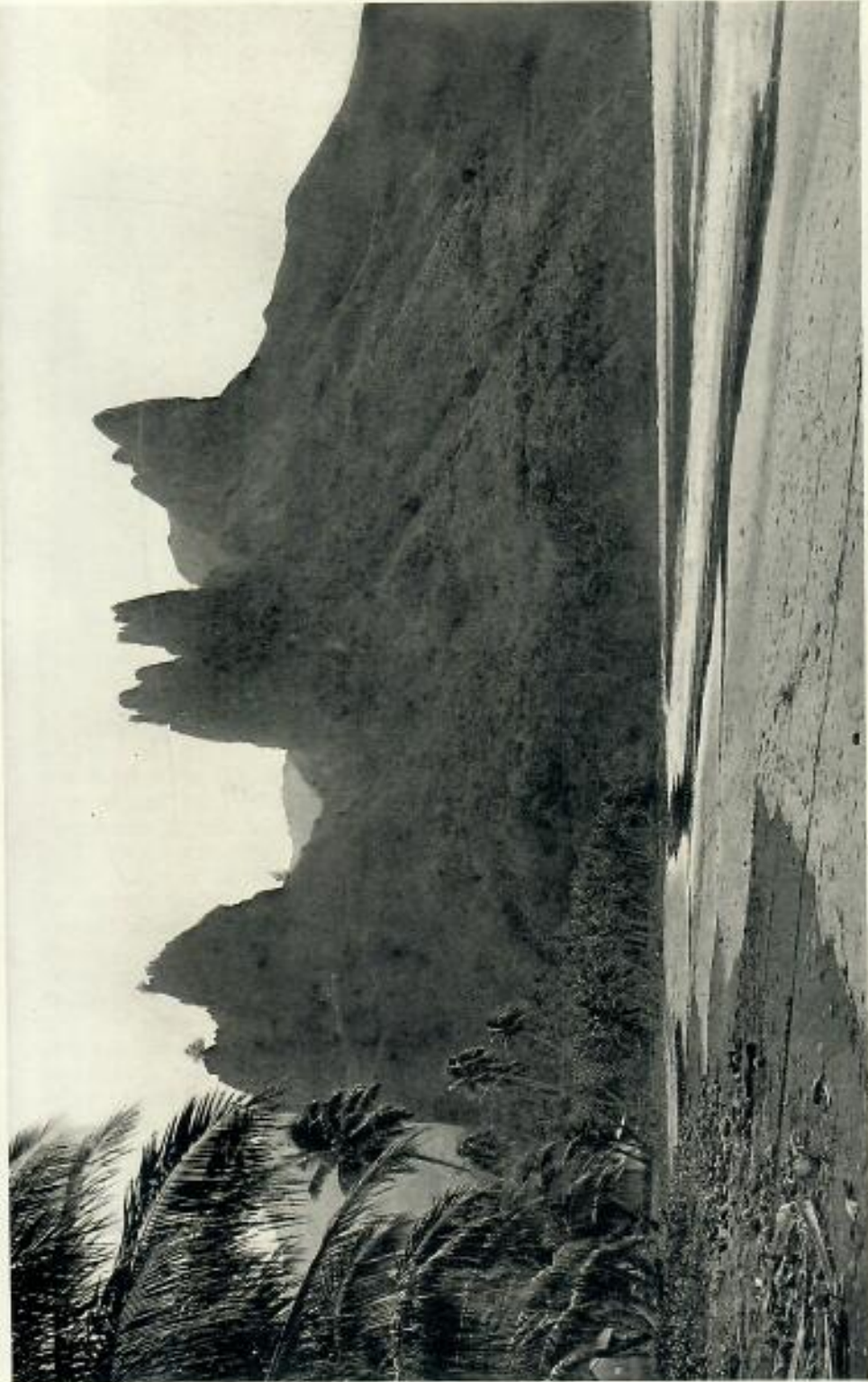
According to Dr. Sullivan, the racial affinity of the Pacific islanders with ourselves is not nearly as close as the romancers assume.

It is undeniable, however, that temperamentally as well as physically the Polynesians seem to share an extraordinary number of traits with people of European stock. The apparent resemblances, together with the charm of their idyllic islands, have combined to endow them with a peculiarly strong attraction for the white men who have come among them during more than two centuries.



A QUIET ANCHORAGE OFF NUKUHIVA ISLAND

Fourteen miles in length and ten miles wide, Nukuhiva is the principal island of the Marquesas group. There are three safe harbors on the southern side.



SPIRES OF NUKUHIVA ISLAND FROM HATIHEU BAY

Stevenson has described the vale and bay of Hatihue as inclosed on three sides by a bowl of mountains, while on the fourth the rampart has been bombardred into ruins. "The interior of this vessel is crowded with lovely and valuable trees—orange, breadfruit, mummy-apple, cocoa, the island chestnut—and for weeds, the pine (pandanus) and the banana. Four perennial streams water and keep it green; and along the dell, first of one, then of another, of these, the road, for a considerable distance, descends into this fortunate valley."



YOUNG TARO AT RAPA

In southern Polynesia the starchy root of this water-growing plant replaces the equatorial breadfruit as the basis of poi-*poi*.

As regards the famed personal attractiveness of the Polynesian women, due allowance must, of course, be made for an almost entirely subjective factor in the early records—the enthusiastic state of mind of European or American seafarers who had been cooped up with companions of only their own sex during voyages many months in length.

The island women would naturally seem paragons of beauty, moreover, to voyagers who had touched *en route* at the Strait of Magellan or at primitive African or Australian havens.

The relative leisure in which most of the women spent their lives, their distinctly "feminine" natures as judged by European standards, and their locally broad and independent views concerning the distribution of their favors, all had effect in creating an impression which has grown into a fetish.

Native ideas of sexual morality were, as a matter of fact, by no means uniform; a reader of Cook, or of any of the other early navigators, will find abundant evidence that originally the freedom observed at certain groups of islands was

balanced by rigid ideas of chastity at others.

From Tahiti, and still more from the Marquesas, the tradition of beauty coupled with almost total lack of restriction seems to have pervaded the world. The propaganda, if it may be so called, dates back to Quiros and has been carried on by Cook, Marchand, Krusenstern, Porter, and a host of later travelers, as well as, indirectly, by missionaries and others who could regard no part of the condition without abhorrence.

And yet not one of the early writers gained an inkling of the real significance of native customs which departed from the ethics or the social code of Europe!

The whalers who visited the Marquesas mainly to take part in debauchery, returned home filled with pious condemnation. More godly sojourners attributed the whole state of affairs entirely to the zeal of the devil.

Krusenstern explains the depravity of young Marquesan women as due to the cupidity of the men of their families, who sought by vicarious means to obtain iron or other useful material from the white



RAPA GIRLS BOUND FOR THE TARO FIELDS

At the right is the end of the white church of Aburei Bay. The members of the expedition presented a case of kerosene for the mariner's light on this church, and were rewarded by a deluge of gifts from the hospitable islanders (see text, page 425).



MATRONS OF RAPPA POUNDING TARO ROOTS, AS THE FIRST STAGE IN THE MANUFACTURE OF POIPOI

The natives of Rapa, as shown by both physical characteristics and their dialect of the Polynesian language, are more akin to the primitive inhabitants of the New Zealand region than to those of the Society Islands.



A DAMSEL OF RAPA WITH A BURDEN OF TARO ROOTS, WHICH SHE HAS CARRIED A MILE ACROSS THE MOUNTAINOUS RIDGES

men. Stevenson, with even greater error, regarded the misdeeds which he records as chiefly a new development resulting from recent degeneration of the inhabitants.

WHITE MAN BROUGHT A PANDORA'S BOX OF TROUBLE TO MARQUESANS

It has remained for modern ethnologists, working without mental bias among the sad remnant of the Marquesans, to demonstrate that the native customs can not justly be summed up and dismissed as mere depravity.

The obvious answer to such a charge is that the ancient code worked too well—that it enabled the inhabitants of the islands to develop through long centuries

into a splendid type of savage, who exhibited in marked degree virtues which are a necessary requisite of happy, successful family and tribal existence.

Marriage among the Marquesans, for example, was characterized by quite as much loyalty and affection as among any other primitive people, even though (or perhaps because) the wedded state came rather as an end than as a beginning in the intimate relationships of men and women.

The manner of life, whatever its abstract ethical status, was eminently practical during the period of isolation. With the coming of the white man, however, a Pandora's box of predatory and destructive influences was opened, and the Mar-



A LAD OF RAPA IN HIS TARO-LADEN OUTRIGGER

In a region of amphibious people, the men of Rapa are particularly noted as boatmen (see text, page 425). Of old they were favored as recruits for the Yankee whaling vessels, with the result that to-day there is a preponderance of women in this island's population.

quesans were wiped out before they had received much encouragement to alter their ways.

Readers who are familiar with the sorely misinterpreted record of Polynesian vices owe it to themselves to round out their information by referring to Dr. Handy's admirable study of "The Native Culture in the Marquesas."

A LOYAL, GENEROUS, FRIENDLY, AND
IMAGINATIVE PEOPLE

Dr. Handy stresses the democracy and truthfulness of the Marquesans, and attributes to them "loyalty, generosity, and gratitude in friendly personal relationship; a keen appreciation of individual integrity expressed in personal independence with clear conceptions of justice and honor; high refinements, subtleties, and graces in social and aesthetic expression; and capacity for rational and imaginative thought belonging to a very high order of intelligence."

Of such kind were the Pacific people who were among the first to melt away after ships had moored in their roadsteads. "The tribe of Hapaa," wrote Stevenson, "is said to have numbered some 400, when the smallpox came and

reduced them by one-fourth. Six months later a woman developed tubercular consumption; and the disease spread like a fire about the valley, and in less than a year two survivors, a man and a woman, fled from that new-created solitude."

MARQUESANS ARE GRADUALLY
DISAPPEARING

To-day the inhabitants of the once populous Marquesas number about 1,800, including a handful of whites and many Chinese mixed-bloods.*

The story is characteristic, for, while the Samoans and certain other islanders have fared better, occasional pestilences, to which they are in nowise inured, still carry away large proportions of the population.

From the days of discovery the Polynesians have been subject to every disintegrating evil. The altruism of a few pioneer missionaries has been unable permanently to stay them.

* See, also, "A Vanishing People of the South Seas: The Tragic Fate of the Marquesan Cannibals, Noted for Their Warlike Courage and Physical Beauty," by John W. Church, in the NATIONAL GEOGRAPHIC MAGAZINE for October, 1919.



TUMANU, AN OLD WARRIOR OF TUREIA ISLAND,
TUAMOTU GROUP

His canoe, on the beach of the lagoon, is joined with sennit in the ancient Polynesian manner. The canoes of the Tuamotuans were of such superior make in the old days that the primitive Tahitians dignified them with the name of *pahi*, a term applied only to their own war canoes and to the ships of the white men.

One of the most successful evangelical ventures in the South Seas was that of the early British mission at the Society Islands.

Ellis's record of the years of devoted labor without visible sign of response, and then of the sudden tumbling of the pagan régime as if by divine fiat, makes dramatic reading even for one not interested in the special cause. Whole families, communities, and tribes at Tahiti and the neighboring islands suddenly expressed a desire to become Christian. Within a matter of days or weeks, the old order

tumbled like a house of cards.

The temperament of the Polynesians seems to be well adapted to acceptance of a literal, one might say a primitive, type of Christianity.

At Pitcairn Island, and in a very few other localities where extraneous influences have not yet obliterated it, the simple and fervent religious life, naïve and unashamed, recalls descriptions of the church in patriarchal times.

THE WHITNEY SOUTH SEA EXPEDITION

The preceding brief account of the history of discovery in Polynesia, and of the profound changes which are still taking place, points to the importance of further scientific investigation.

Opportunities now existing must be seized within the span of the present generation or they will slip away irrevocably. This is the reason for the intensive activity of the Bishop Museum, of Honolulu, in many branches of Pacific research, as well as for the contemporary work of the American Museum of Natural History.

Five years ago, Mr. Harry Payne Whitney agreed to support for the American Museum a notable project in the Pacific. The choice of a leader in the field was fixed by virtue of former accomplishments upon Mr. Rollo H. Beck, a veteran exploring naturalist who had previously served on expeditions in South American waters and elsewhere. Thus the Whitney South Sea Expedition was launched.

After a reconnaissance of Tahiti and of

several adjacent parts of Polynesia, Mr. Beck purchased the auxiliary schooner *France*, a step which made the expedition independent of sailing schedules and trade routes. The *France* has since visited more than 100 islands of the Society, Marquesas, Tuamotu, Austral, Cook, Samoan, and Fiji groups.

Collection and study of the birds of the South Seas have been the primary objects (see text, page 394), but many other animals and plant specimens have also been obtained. Photographs illustrating the environment, the animal life, and the appearance and customs of the human inhabitants, have been taken. Especially valuable are the camera's records of those localities—regrettably numerous—in which the state of the fauna and of the people is still altering materially in response to external transformations.

Some idea of the extraordinary industrial activity occasionally undertaken in even the most out-of-the-way islands may be gained from a description of a pearl-diving season.

AMONG THE PEARL DIVERS

The opening of this great event in the French colonies comes in July. Since diving is not permitted during successive years at the same island, all gear, stocks of merchandise, and building material must be taken to new islands in annual rotation—no small undertaking when it is remembered that a coral atoll which normally supports perhaps 200 persons,



A MAN OF MOOREA, SOCIETY ISLANDS

This stalwart native is carrying two bunches of fei, or mountain bananas, and his fighting cock. Heavy loads of fei are carried down many miles from the upland forests.

may become during the diving season the abiding place of thousands.

The following quotation is from a recent press account:

"This year the open island is Hikueru, one of the Tuamotus, 400 miles to the eastward of Tahiti. Already this lonely atoll is taking on a metropolitan appearance. The profits to be gained come not only from the pearl-shell won from the lagoon, but from the sale of all kinds of wares dear to the native heart and from the providing of entertainment to refresh the weary diver and his women folk after the labors of the day are over.

"The average native diver wins a good



A DANCING GIRL, OF TAKAROA

The Manchester cotton prints have long since replaced the native *tapa*, or bark cloth.

sum from the bottom of the lagoon and much of it goes on expensive silk dresses for his wife and daughters, on the delectable canned goods of the *popaa* (white man) and on the movies.

"This year there are to be, it is said, three moving picture theaters, any number of motor cars for hire—the length of the roadway in Hikueru is less than a half mile, but that apparently makes no difference—a brass band, and, it is reported, electric lights along the Great White Way of this little ring of coral sand.

"Late advices indicate that the season this year at Hikueru will be the most active in many years. It is estimated there will be at least 1,000 divers at the island. These, together with their families and the traders with their staffs, will swell the population of the island during the season to nearly 4,000."

The effects of such concentration upon the breeding birds and other forms of indigenous life are easy to imagine!

After the preliminary field work at Tahiti, in 1920-21, Mr. Beck and his companions sailed northward to Christmas



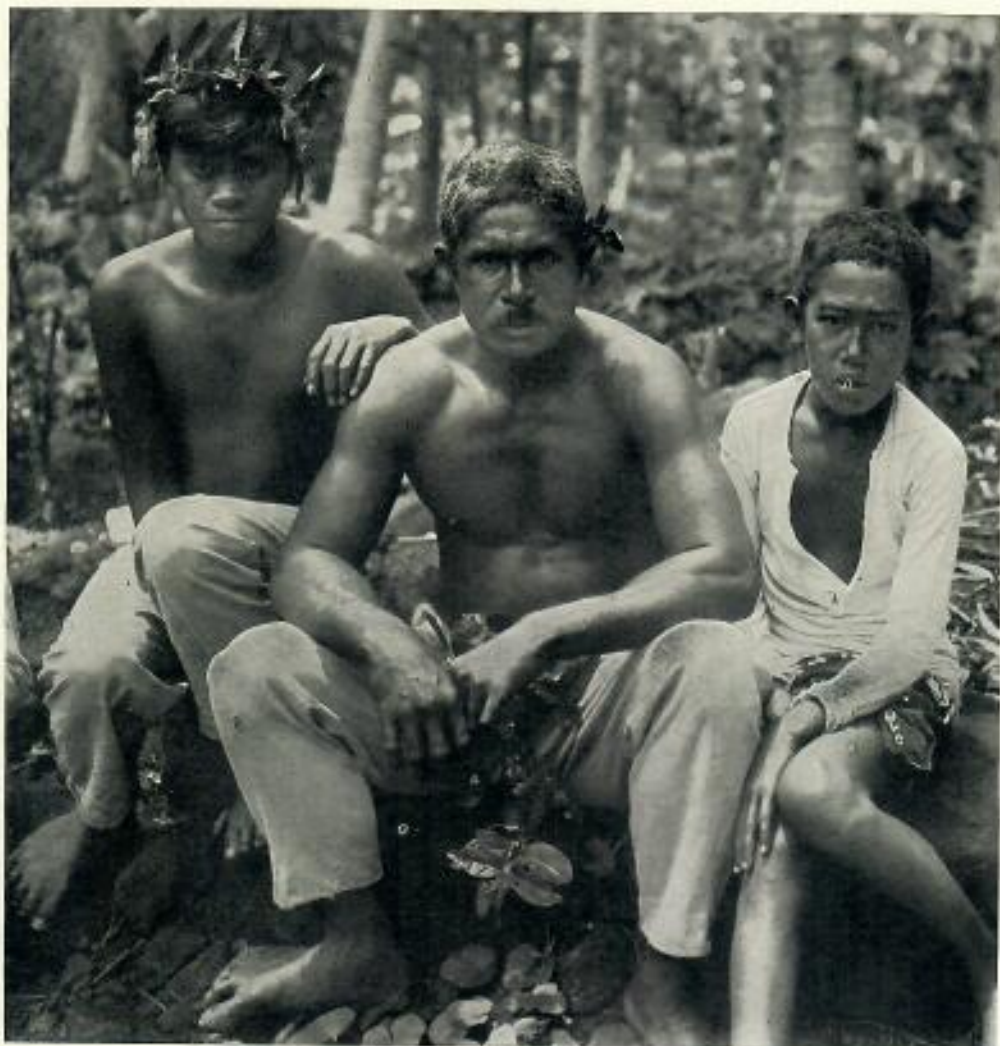
THE CALL TO SUNDAY SCHOOL, FAAITE ISLAND, TUAMOTU GROUP

A cotton jacket over the pareu (see Color Plate VI) and a straw hat make up this lad's Sabbath attire.



YOUTHFUL FISHERMEN OF RURUTU ISLAND, AUSTRAL GROUP

The children of Polynesia have always been treated with great tenderness. The early missionaries, who looked at nearly every custom askance, recognized the primitive islands as a children's paradise. Destruction of new-born infants was, to be sure, extensively practiced in the Society Islands and elsewhere, but this evil had its root in overpopulation and periodical food shortage.



FATHER AND SONS ON THE MARQUESAN ISLAND OF TAUATA

The Marquesas Archipelago has long been famed for the fine physique of its people. The wearing of wreaths, and of flowers in the ears, is a widespread custom in Polynesia.

Island, where Père Rougier operates great coconut plantations.

Then the *France* made the first of three visits to the romantic Marquesas. Then far southward among the Austral Islands, removed somewhat from the blight of civilization, and on to lonely Rapa, the "Uttermost Thule" of the Pacific, renowned for peerless sailors and interminable hospitality (see pages 419-425).

Next, eastward to isolated Pitcairn, where the descendants of Commodore Bligh's seamen, who fled into oblivion after the notorious *Bounty* mutiny of 1790, were found happy, law-abiding, and

devout, suffering not at all for the stormy sins of the fathers (see, also, page 392).

After reaching her easternmost goal at Ducie Island, the *France* turned again toward Tahiti by way of the thickly strewn Tuamotus, sending ashore her boats at every rock or palm-green strand.

FOLLOWING THE "FRANCE"

While we cannot keep in the wake of the *France* within the brief scope of this article, we can skip about among the Polynesian isles by drawing upon the voluminous notes of Mr. Beck and his comrades, Messrs. Ernest H. Quayle and

José G. Correia, recording some of their impressions and comparing these with experiences of earlier pioneers.

Upon landing in Tahiti, the members of the expedition arranged with two native guides for a trip into the interior. On the morning of October 11, they left Papeete by motor, a pleasant ten-mile ride along the western coast of the island, to the mouth of the Punaruu River, where the guides were to join them.

Minas were calling loudly from the tops of the taller trees; terns were sailing over the smooth lagoon, and migrant shore birds whistling on the beach; while the steady boom of breakers on the barrier reef offshore was mingled with the rustling of near-by coconut fronds.

Interspersed with neglected palm groves were little patches of finely cultivated ground where Chinese gardeners, the inheritors of Polynesia, raised in rigidly straight rows the various vegetables for which they found a market in Papeete.

When the car reached the Punaruu River, the luggage was soon transferred into four sacks which were swung on poles borne on the stalwart shoulders of the islanders. The latter then led the way along the trail which wound into the gorge of the Punaruu. At its mouth this canyon was half a mile in width, but it narrowed rapidly to 100 yards, with precipitous walls on either side.

Three miles from the entrance the party came upon a small tract where an industrious native had cleared off a bit of



LITTLE MAIDENS OF TAUATA ISLAND

The sweet Marquesan smile has captivated all visitors from the early days of Pacific discovery.

the steep, rocky hillside, and had planted it with papaya trees which were laden with green fruit.

Wading back and forth across the stream as one side or the other seemed to offer the smoothest trail, the travelers after three hours turned out of the main gorge and picked their way along a rivulet that trickled down between yet narrower walls. Stopping by a shady pool, Tafia, the head guide, dropped his burden and pointed up the left cliff to indicate the route.

A faint trail led skyward, so, after a leisurely lunch, they began the thousand-foot climb, finally surmounting the precipice near a group of welcome coconut



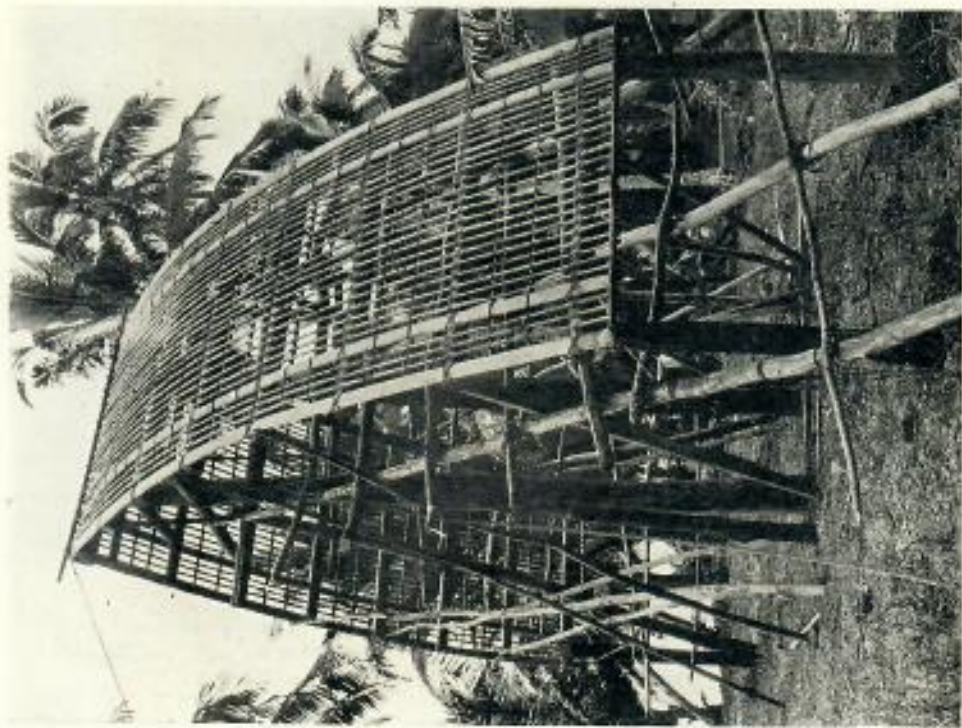
COOLIES AT WORK IN THE PHOSPHATE BEDS OF MAKATEA

The richest of the Pacific's many phosphate islands is Nauru (see the NATIONAL GEOGRAPHIC MAGAZINE for December, 1921).



POLYNESIAN MASONS

They are rebuilding with coral blocks the wall of the church on Tureia Island. The mortar trenches suggest small canoes.



A STAGE IN THE ERECTION OF A SAMOAN RESIDENCE,
ISLAND OF OLOSENGA



A FISHING CANOE OF AMERICAN SAMOA, WITH SHELLS
DECORATING PROW AND STERN



MEN OF PITCAIRN, AHOY!

The male population of one of the most romantic spots on earth is seen coming out to visit the *France*. The treasured whaleboat could have come from nowhere on earth but Buzzards Bay.

A RESIDENCE OF PITCAIRN, THE VERITABLE PROSPERO'S ISLE OF THE
"BOUNTY" MUTINEERS

Pitcairn was discovered by Carteret on July 2, 1767, but the foundation of its fame dates from Bligh's famous voyage in the *Bounty*, 20 years later. The mutiny is one of the most blood-stirring and most often told romances of the sea. The present inhabitants are descendants of the mutineers. They are of mixed blood, but in appearance the Caucasian features predominate. They are notable in Polynesia for virtue, piety, supreme contentment with their island home, and for a simple, patriarchal type of Christianity.

palms. After a draught of fresh coconut milk and a few minutes' rest, they started forward again through the gloomy forest, emerging at a grassy depression where a few golden plovers, recent arrivals from far-off Alaska, were resting about the borders of a small pond.

A mile beyond the pond they halted beside a brook for the night. The scarcity of birds during the first day was attributed by Mr. Beck to the rain which had fallen in frequent showers.

A PIG IS COOKED IN TAHITIAN STYLE

The next morning was bright and hot, so it was decided to hunt for the day in the vicinity of camp.

Tafia accompanied Mr. and Mrs. Beck toward the foot of towering cliffs which bounded the plateau to the eastward. Before reaching the base of the cliffs, they began to note roughly built stone walls which supported terraces of earth against the hillside. Dozens of these structures were observed during the course of the day.

An occasional cooing dove or chattering kingfisher was heard though seldom seen in the tall trees which reared above the lower tangle of brush. Game seemed scarce, but while the naturalists were enjoying some juicy oranges at the base of the tree out of which the guide had dropped them, a wild pig was attracted to the spot by the thud of falling fruit. Hastily slipping a heavy charge into his fowling piece, Mr. Beck added the unlucky porker to the larder.

Tafia, all smiles, at once began to break up twigs and branches, and, after piling them carefully together, fired the heap. Next he inclosed the flames with chunks of lava and, as the fire began to burn well, piled on still more rocks. Within ten minutes conditions seemed to be to his liking, so he took the pig and pulled it rhythmically back and forth over the heated stones.

In a short time clear patches appeared on the scratched surface; a little more rubbing, and a few deft pulls with his fingers under the legs and about the ears, completed the depilating process. It was astonishing to watch a dirty, bristly, brindle pig become a clean, smooth, white-skinned carcass.



THE SCHOONER "FRANCE" LUFFING TO PICK UP THE COLLECTOR OF SEA BIRDS

Within less than half an hour from the time the victim had walked to its fate, Tafia was carrying the bristleless body campward.

After this exhibition of Tafia's skill, he was instructed to cook the animal in the ancestral Tahitian manner.

The meat was accordingly cut into convenient pieces and thoroughly washed in the brook. Then it was placed on a thick layer of green leaves above a pile of rocks which had been heating for some time. Another layer of leaves was laid over the meat, and the whole covered with stones.

CATS ACCUSED OF DESTROYING BIRDS OF TAHITI

When supper-time came the appetizing food was removed. After the choicest parts had been eaten, the remainder was cut from the bones, and rammed into three large, green bamboo segments. These were laid on the still hot stones, covered once more with leaves, and taken out next morning, deliciously cooked, to furnish all with meat rations for the next three days.

Thus, by employing the principle of the fireless cooker, do the Polynesians pre-



A HUNGRY CHICK: NESTLING MAN-OF-WAR BIRD OF MARIA ISLAND; TUAMOTUS

pare dishes which for economy and tooth-someness cannot be excelled.

The next camp, built against a great overhanging rock and well roofed with the leaves of a mountain tuber, was not altogether proof against the tropical downpour that assailed the party during the first night beneath it.

First in one place and then in another, the dripping wetness would strike through; a shift of position would be made, and then a wait for the next leak.

The little brook, 20 feet below, which had been dropping in tiny rapids and cascades from one shallow pool to another, changed its placid murmur to a lusty rumble as it rolled stones along its bed and carried down the heavy volume of

water from the reeking watershed.

A sunny morning dried the moisture on the foliage, but the search for birds was again disappointing. Two or three Tahitian crag-swallows flying back and forth in the dark shade of orange trees, a pair of noisy kingfishers pursuing insects instead of perching above the water with an eye for finny prey, and companies of the boisterous, introduced minas, comprised the species seen.

The negligible number of native birds in so seemingly favorable an environment was new in Mr. Beck's experience. One could hardly believe that the rats, which are such a pest in the lower parts of the island, had destroyed the nests of the native birds while permitting the imported minas and weaver-finches to increase.

It seems more likely that cats, running wild for a century, may have exterminated several of the ground-living species which were formerly found in these mountains.

As the guides had assured Mr. Beck that they knew where shearwaters nested close under the cliffs of the highest peaks, the journey inland and upward was continued. The trail led past well laden orange and lemon trees, beneath which were thick tracks of the wild hogs.

Camp was made near the famous Diadem (see page 359), and here, at an altitude of 2,700 feet, the roof was shingled with the great leaves of the fei, the plants of which grew by hundreds all about.

Few ripe clusters of these wild bananas were observed, for native carriers had



A RESTING MAN-OF-WAR BIRD OF DUCIE ISLAND



DIVESTING A TROPIC BIRD OF ITS DECORATIVE RED PLUMES WHILE IT STICKS TIGHT TO ITS EGG

This bird can neither perch nor stand up. It nests on the ground and must shuffle away on its breast before taking flight. The long, red tail plumes of this tireless flier (see Color Plate XII) have always been prized ornaments of the South Sea people. Islets where the birds nested in good-sized communities were formerly monopolized by Polynesian rulers as sources of wealth.



A LARGE MOUTHFUL

A Tuamotuan purple-crowned fruit pigeon accepting a berry from the captain of the *France*.

recently visited the groves and had trundled the weighty bunches down a 10-mile trail to the coast, where they could be marketed at about 10 francs apiece.

A VAST PLATFORM WHERE CEREMONIAL
DANCES WERE ONCE HELD

A two days' hunt in nearly unscalable mountain country, where the rope was more than once necessary for the safety of the climbers, revealed only a few deserted burrows of the hoped-for ocean birds.

Leaving the camp near the Diadem, they hiked down a sharp ridge, penetrating a canyon which opened into the main watercourse from Mont Orohena, highest peak of the Society Islands.

Following down the brawling stream, they soon reached a rockbound waterfall, and it became necessary to scale the straight bank and scramble over the spur that descended between converging rivers.

Atop the spur was a vast square platform of hewn rock, formerly the scene of ceremonial dances and other impressive pagan rites. A more inaccessible site, under present-day conditions, would be hard to imagine, but when the coast below teemed with human inhabitants it may have been otherwise.

A few more days of camping and hunting among the thick ferns and bamboo brakes of the lower upland basins, and the party returned to the mouth of the Puna-ruu. To ornithologists the trip was not



MAN-OF-WAR BIRDS PERCHED HIGH ABOVE THE SHIMMERING PACIFIC: EIAO ISLAND, MARQUESAS

During the mating season the male man-of-war, or frigate, bird wears an inflatable sack of flame-red at his throat, a sort of toy balloon, with which he lures the female bird to the nesting site which he has chosen. (See, also, "Bird Life Among Lava Rock and Coral Sand," in the NATIONAL GEOGRAPHIC MAGAZINE for July, 1925.)



RED-FOOTED BOOBIES AND THEIR NESTS: HATUTU ISLAND, MARQUESAS

Two members of the booby family, the brown- and the blue-faced, lay their eggs on the ground, but the red-footed species, like the man-of-war bird, nests in trees.

highly satisfactory, but to those who appreciate the incomparable mountain loveliness of "la Suisse Tahitienne" it left nothing to be desired.

EXPLORING A SOUTH PACIFIC ISLAND IN A FORD

In January, 1921, Messrs. Beck and Quayle made the voyage to Christmas Island, north of the Equator, where, in sharp contrast with the Tahitian field work, they conducted their hunting in a Ford!

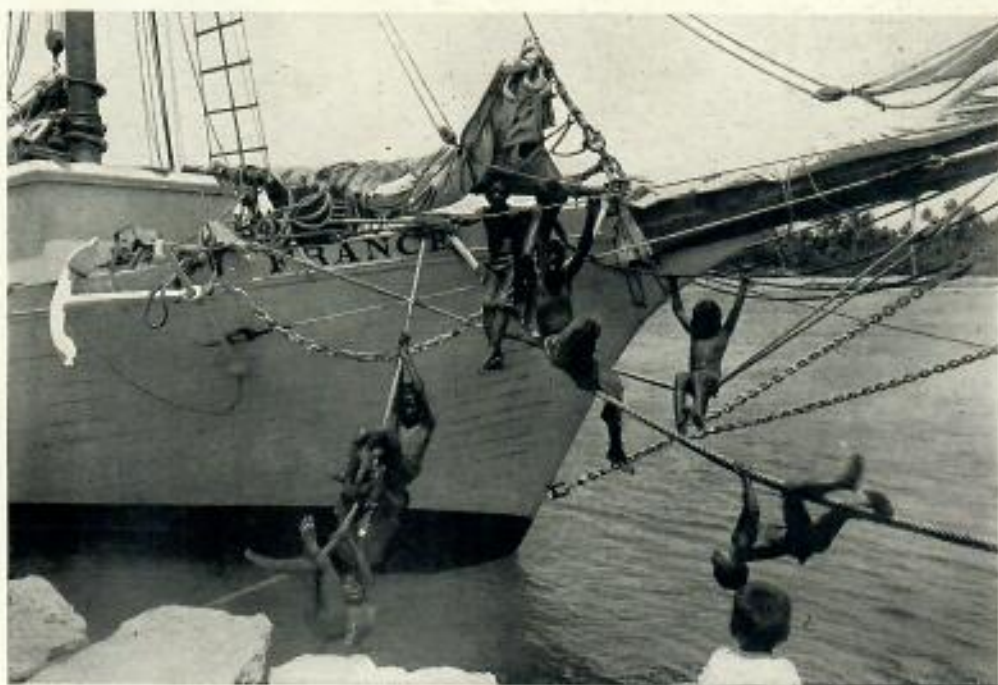
The first view of Christmas Island was of two or three distant sand hills. It was obtained several hours after the vessel should have been at the center of the island, if the skipper's morning observations were to be credited! Discounting the astronomical calculations, they had been sailing steadily westward, knowing by the constantly increasing numbers of seabirds that they were heading on the right course.

Just before dark the mate climbed to the masthead and reported land both dead



THE PRECARIOUS NEST OF A FAIRY TERN

The most delicately beautiful of all sea birds (see illustration, page 401) deposits its single egg on the rough bark of a horizontal limb, upon a broken stub or even on the shaft of a palm frond.



AFTER SCHOOL HOURS AT MANIHI

The native boys used the *France* and its hawsers as a gymnasium.



SOOTY TERNS ABOVE THE GREAT BREEDING COLONY OF KAUEHI ISLAND; TUAMOTUS

These birds (*Sterna fuscata*), familiarly called "white-wakes," are so numerous that Yankee whalers, who were accustomed to gather the eggs for food, reckoned the population by "acreage" rather than by numbers, and so recorded the extent of the colonies in their log books.



A FAIRY TERN, THE LOVELIEST OF SEA BIRDS

The adults of this species are snow white, with dark bills and feet and extraordinarily large eyes.



PORTRAIT OF A RED-FOOTED BOOBY SHELTERING HER CHICKS

This is a long-tailed, perching species and the only Pacific booby which builds its nest in trees.

ahead and on the starboard bow. They then realized that they were off the treacherous bight on the eastern coast of the island.

On account of a strong ocean current, a sailing vessel in a light breeze has little chance of beating out of this pocket if she has entered more than a short distance. So sails were trimmed, the motor started, and the schooner stood offshore until the approach of daylight.

Later in the day the *France* moored at the spot where Captain Cook had first dropped anchor on Christmas day, 1777.

At six o'clock on the following morning the naturalists were rowed ashore and found a dark-skinned chauffeur awaiting their pleasure at the wharf.

To watch boobies, man-of-war birds, several species of terns, and many other birds from the breezy front seat of a Ford, which had neither a top to obstruct the vision nor a windshield to block camera or gun, was hardly to be anticipated when starting for remote and rarely visited islands in the South Seas (p. 364).

A short stretch of elevated coral rock near the settlement of the copra workers had required paving, and the readiest material had evidently been coconut fronds. At low speed, the Ford negotiated this strip very handily. Thereafter it proved good going for 20 or more miles, although at one or two crossings over narrow isthmuses the bristling coral looked dangerous for tires.

For a few miles after leaving "London," the port of Christmas Island, the road wound through endless series of coconut groves, and the skill of the Polynesian driver in missing most of the fallen nuts which dotted the roadway gave constant cause for wonder.

Whenever the wheels struck a glancing blow, the nuts shot to one side—and how the land crabs scurried! At the approach of the machine many of these crustaceans would dodge into holes, but occasionally one would stand ground and raise threatening claws.

BIRDS WITH "TOY-BALLOON" THROATS

In low bushes along the way, sometimes only a foot or two above the ground, the man-of-war birds were occupying loosely built nests. Three or four of the red-

pouched males were often seen sitting together on a shrub, with wings extended and heads pointed skyward toward some soaring female. Their distended throat sacs looked like toy balloons, and when such birds were driven from their perches, they seemed to find difficulty in carrying the encumbrance, and would travel on an uneven keel until the sac collapsed.

Male birds appeared greatly to outnumber females. Whenever one of either sex was frightened from its nest, a strange male was always likely to swoop down and settle contentedly on the egg, whereupon the presumably rightful owner would make vicious but vain lunges at the intruder.

CHRISTMAS ISLAND HAS UNIQUE WARBLER

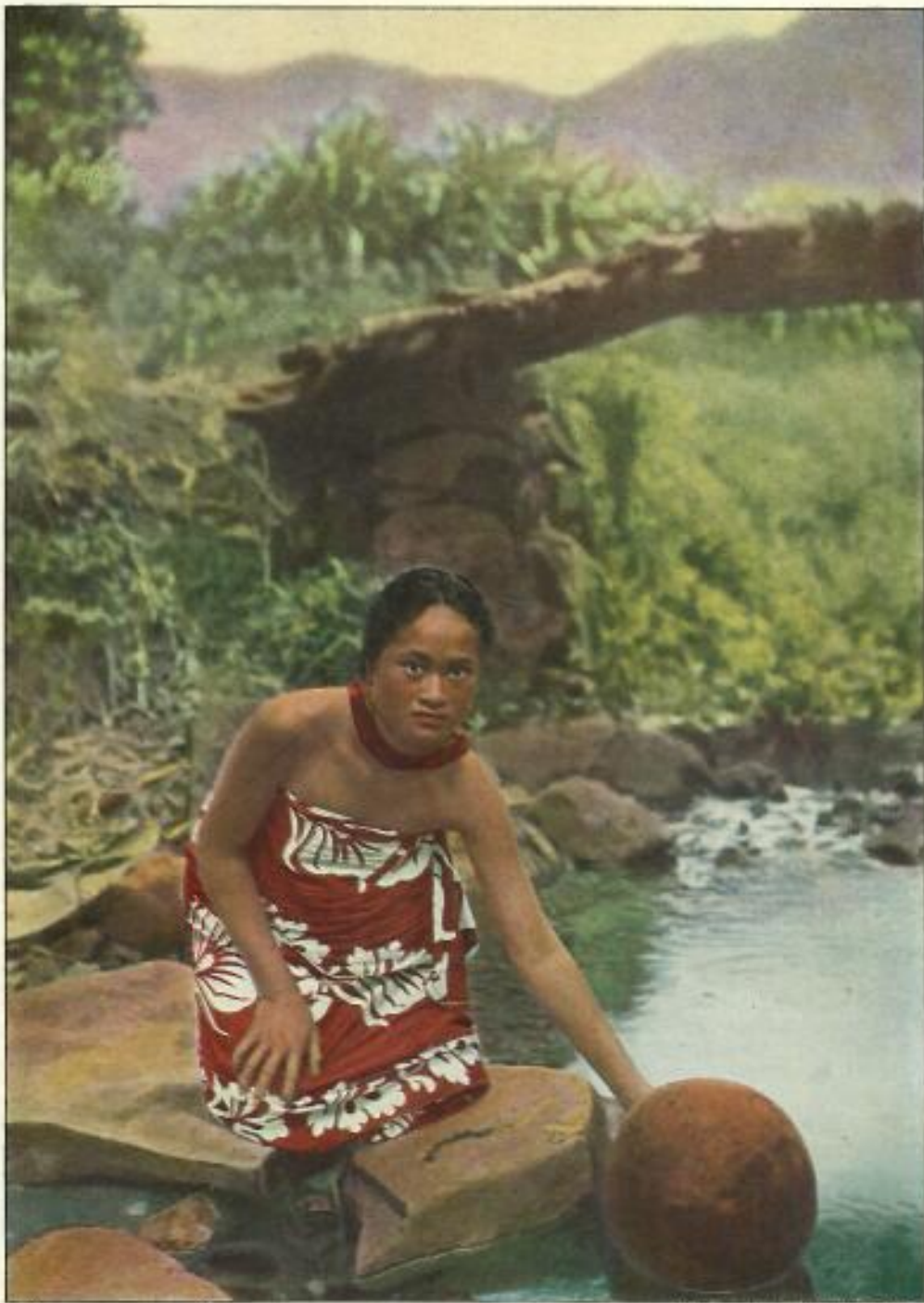
At many of the islets or motus in the great lagoon of Christmas Island, large breeding colonies of petrels, tropic birds, terns of seven species, and other rare water birds were found. The only land bird of the island—the *kohikoko*—a little gray warbler found nowhere else in the world, and not previously represented by specimens in any museum, was also collected.

The sooty terns of Christmas Island range regularly 150 miles out to sea from their nesting colonies. The island, which looms but a few feet above sea level, can hardly be visible to the birds at a greater distance than 20 miles. Although many do their fishing inside this range, flocks of from 10 to 300 go several times farther. That the darkness of night has no perceptible effect upon their coming and going, is evidenced by their creaking cries, which one can hear as they pass a ship.

Even the combination of darkness, dense fog, and drizzly rain does not prevent sea birds from finding their nests, as is proved by the fact that several kinds of petrels select the thick forests of high islands in which to dig their burrows, and then depart from and return to them only at night.

At several members of the Marquesas Group and at the majority of the 51 islets of the Tuamotu Archipelago visited the members of the Whitney Expedition were the first naturalists ever to make zoölogical observations of any description. What changes, incidentally, their notes reveal,

IRIDESCENT ISLES OF THE SOUTH SEAS



© Photograph by Rollo H. Beck

A MAIDEN OF RAPA, AUSTRAL ISLANDS

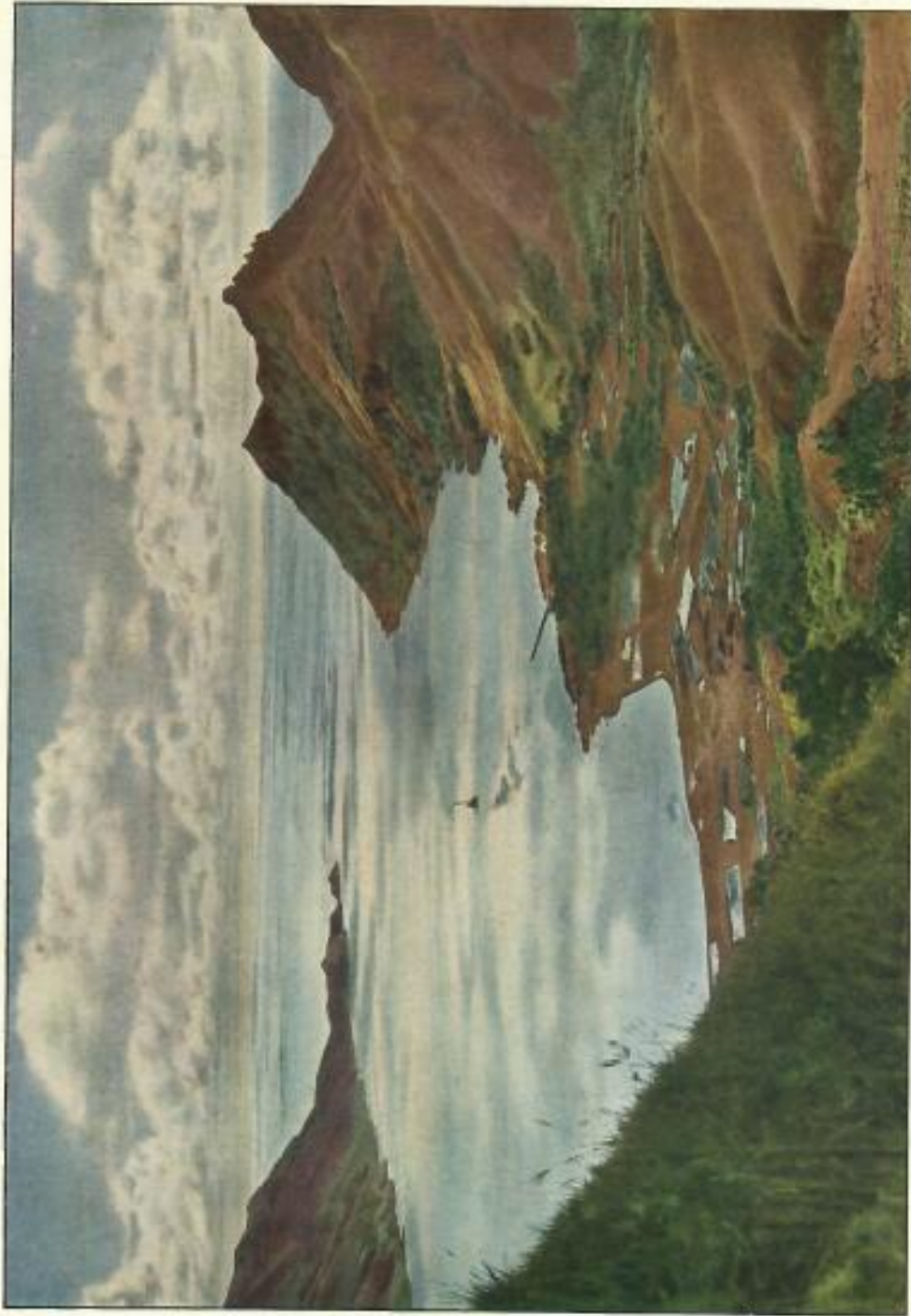
Papote, filling her gourd at the brook, as her forbears have done from time immemorial.



Photograph by Keith H. Beck

A SEA-BEATEN GLEN OF THE MARQUESAS

Omoo Valley, in the small island of Fatahiva, the essence of all that is loveliest in the isles of the South Seas.



©
A HAVEN IN DISTANT RAPA
Photograph by Rullo H. Beck

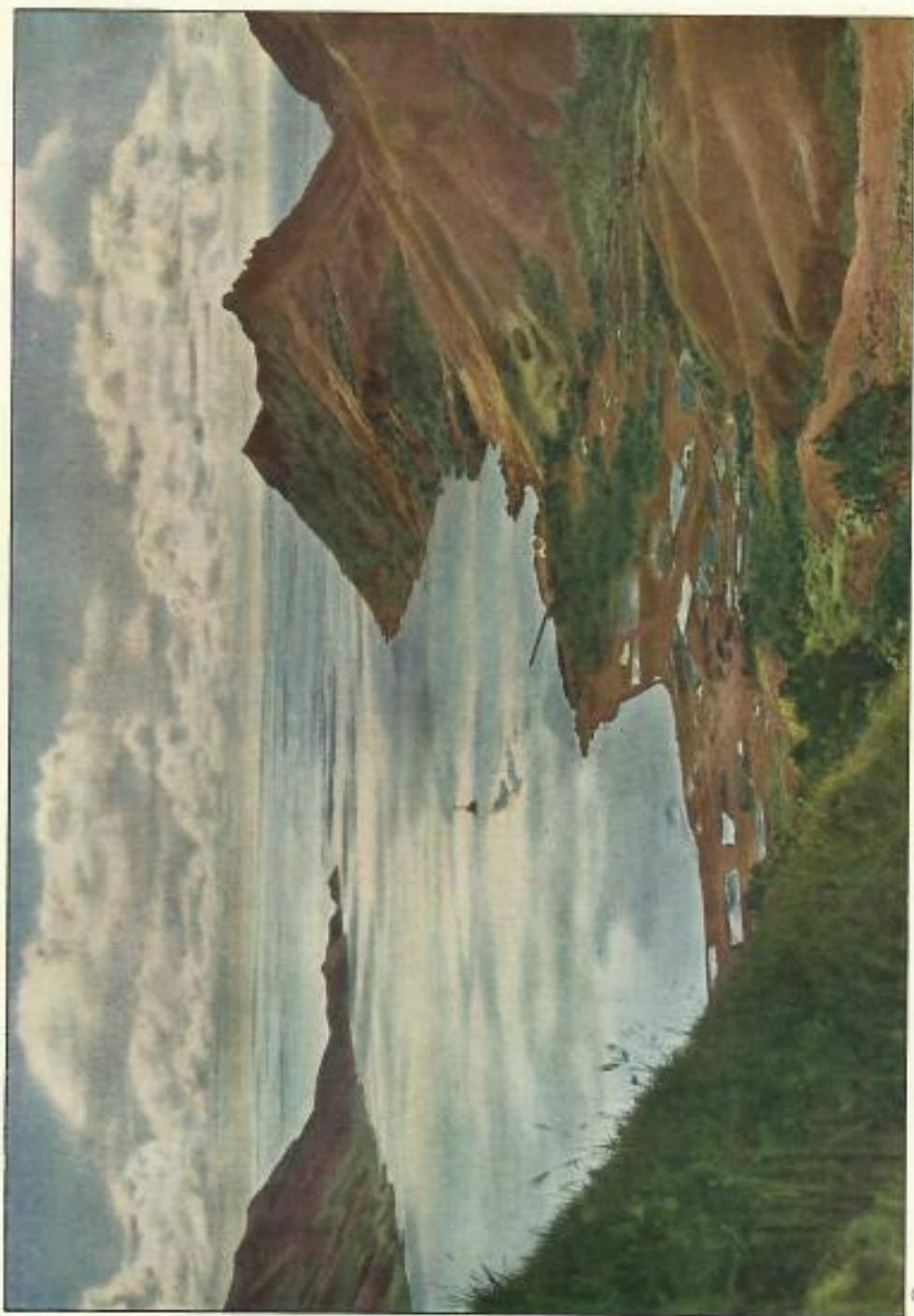
Ahuriri Bay, the harbor of Rapa, southernmost island of eastern Polynesia. Beds of taro, whose roots are a food staple in the South Seas, gleam on the narrow plain at the head of the bay. Beyond the grove are the stone pier and the community church, the Whitney Expedition schooner at anchor, and the bright Pacific stretching eastward.



Photograph by Rollo H. Beck

TAIOHAE BAY, NUKUHIWA ISLAND

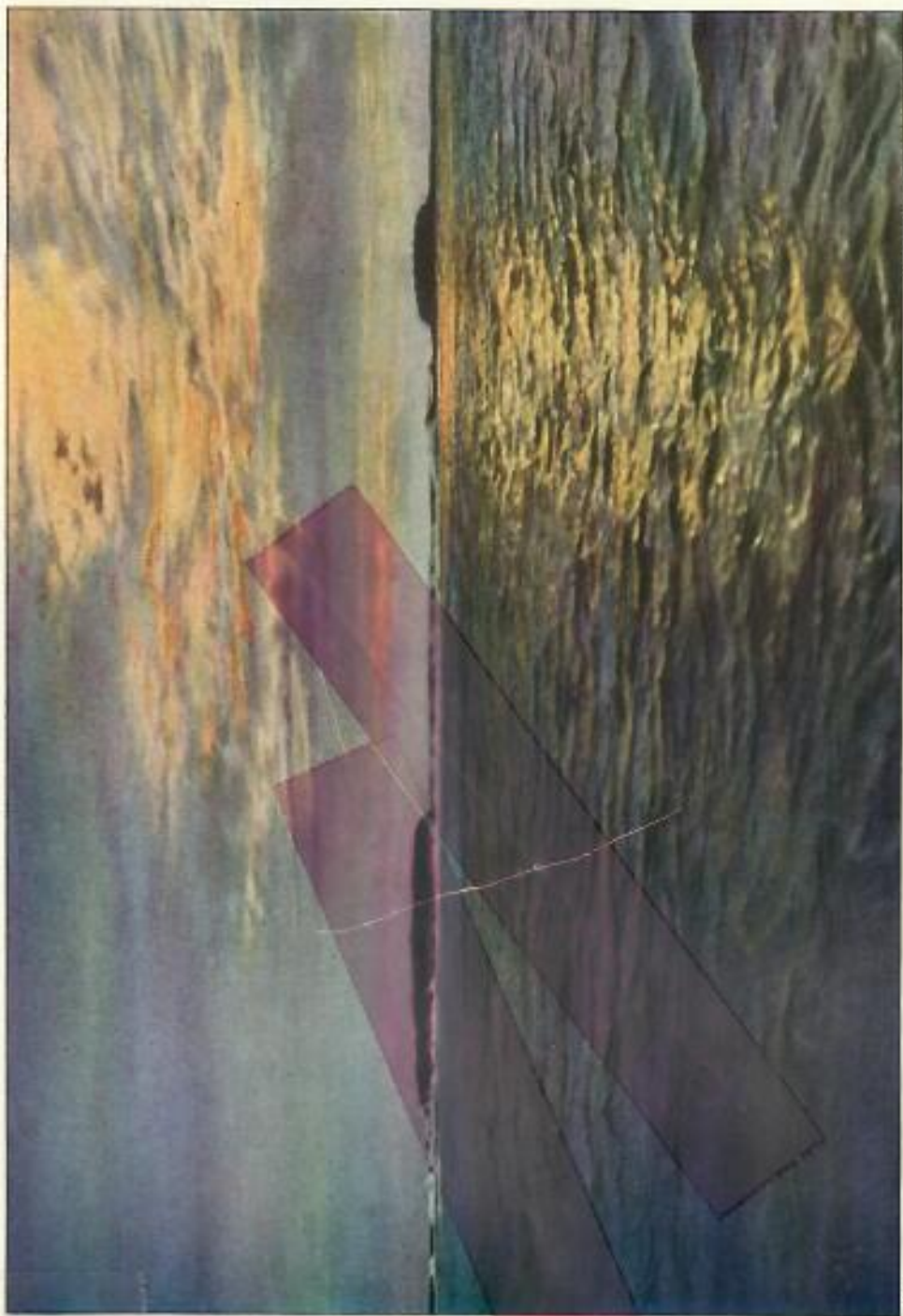
A characteristic scene on the dry or leeward coast of one of the Marquesas, with copra and trading schooners at anchor.



© Photograph by Rolio H. Beck

A HAVEN IN DISTANT RAPA

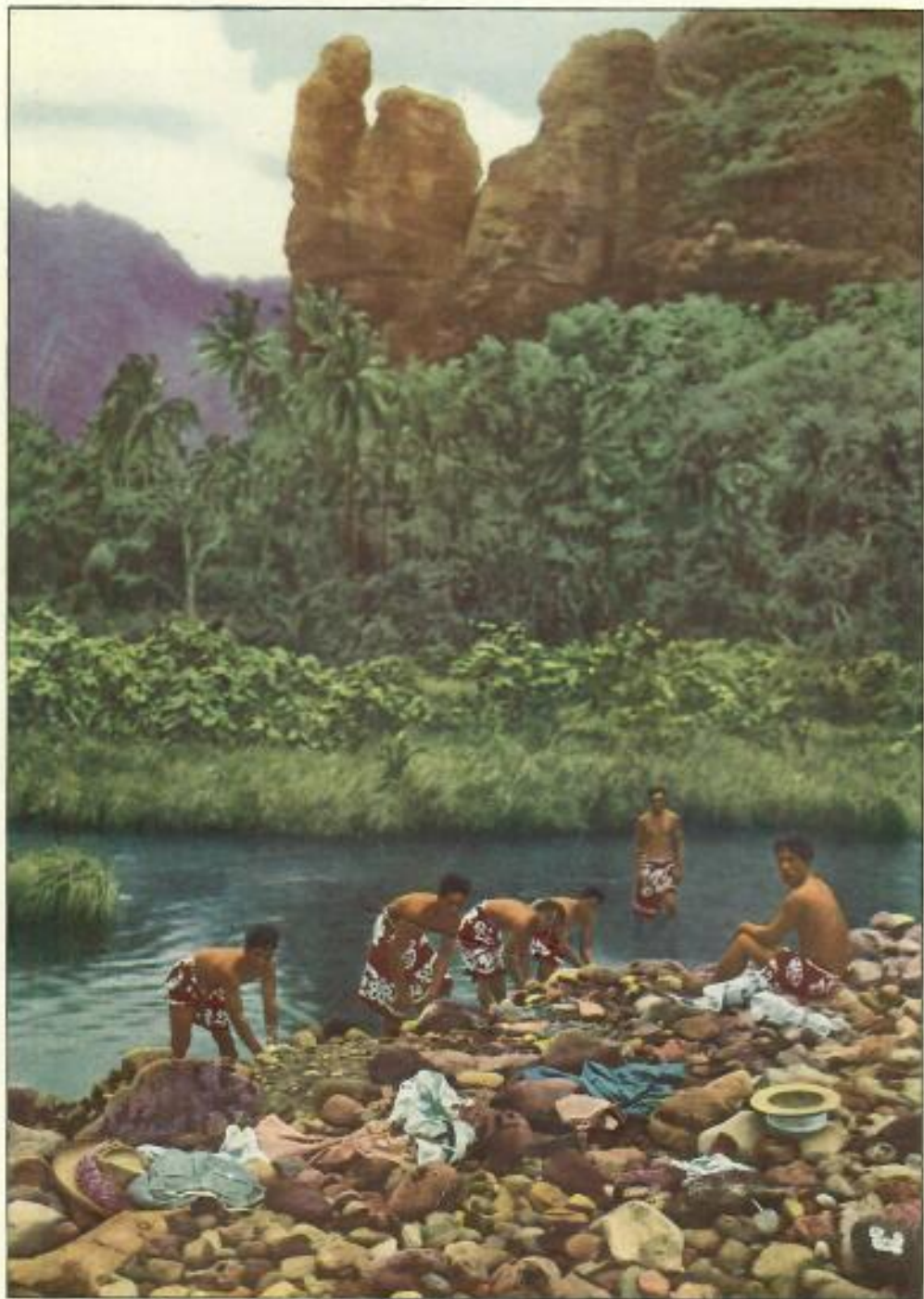
Ahurei Bay, the harbor of Rapa, southernmost island of eastern Polynesia. Beds of taro, whose roots are a food staple in the South Seas, gleam on the narrow plain at the head of the bay. Beyond the grove are the stone pier and the community church, the Whitney Expedition schooner at anchor, and the bright Pacific stretching eastward.



Photograph by Rollo H. Beck

LES ILES DANGEREUSES

"The Dangerous Islands" of French Oceania are well named. The photograph shows the looming reefs and islets of Teniararo, one of the numberless atolls of the vast Tuamotu Archipelago, as first seen from the deck of the *France*.



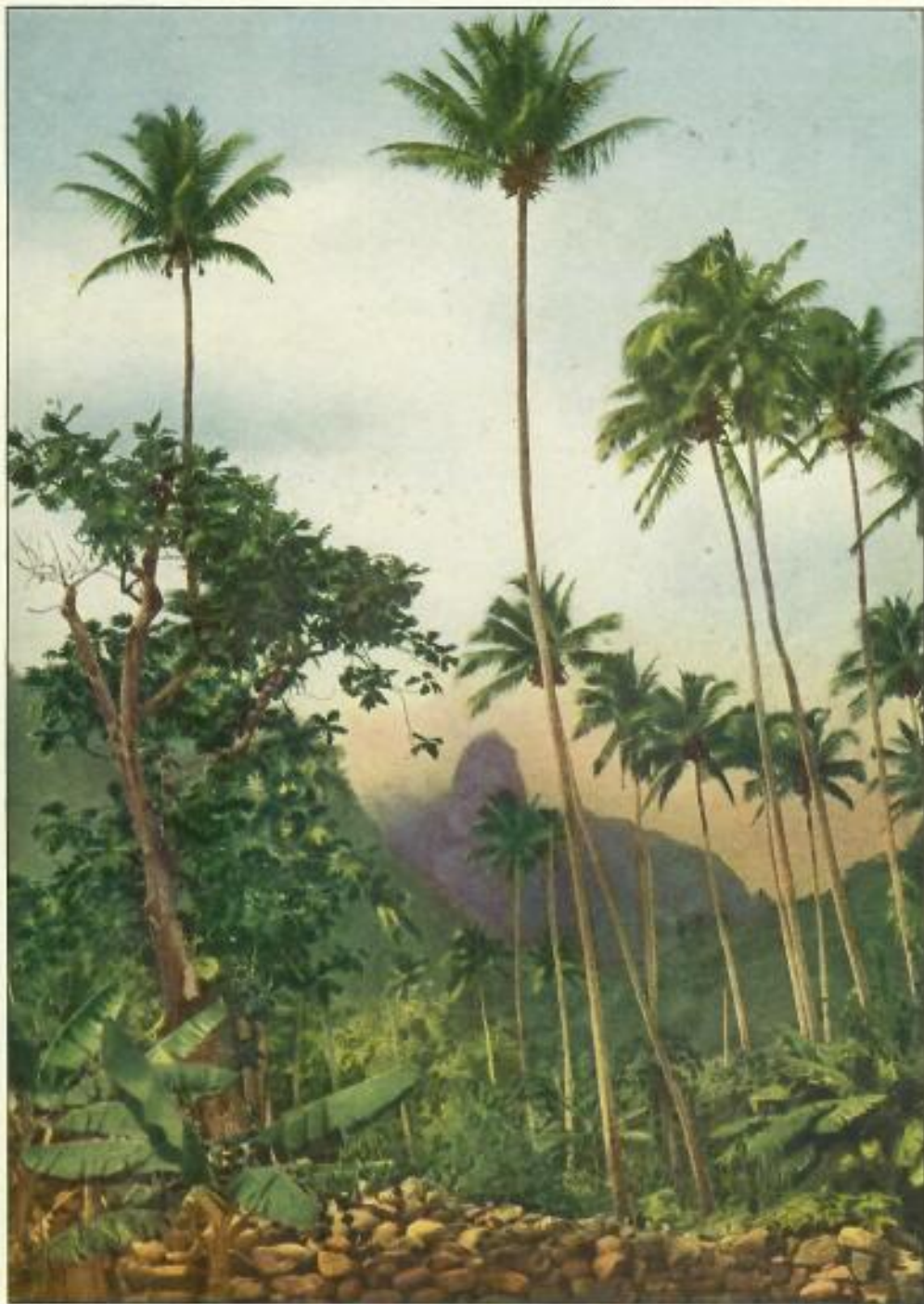
©

WASH DAY AFTER A LONG VOYAGE

Photograph by Rollo H. Beck

In a clear streamlet beneath the weathered, lava battlements of Omoa Valley in Fatuhiva Island, Marquesas Group, the Polynesian sailors of the schooner *France* wash their prosaic, workaday clothing of shipboard, reverting for the time to the picturesque attire of the red *pareu*, a strip of calico which in recent years has supplanted the *tapa* cloth made from beaten tree bark.

IRIDESCENT ISLES OF THE SOUTH SEAS

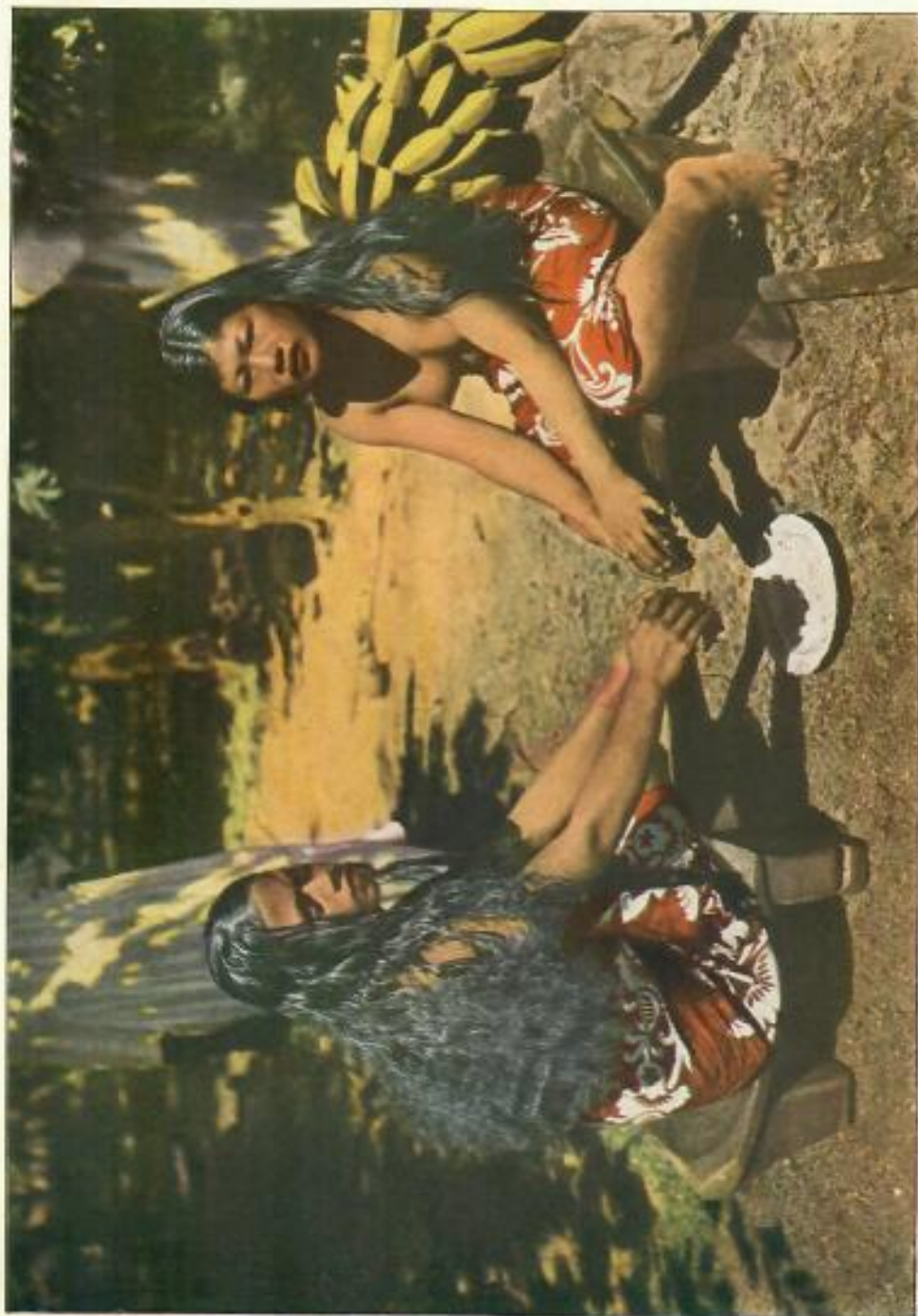


©

Photograph by Rollo H. Beck

THE "GIRAFFE OF VEGETABLES": HUAPU, MARQUESAS

So Stevenson calls the coconut palm. Speaking of the rock formations, he wrote, "—the needles of Ua-pu . . . pricked about the line of the horizon; like the pinnacles of some ornate and monstrous church, they stood there, in the sparkling brightness of the morning, the fit sign-board of a world of wonders."



Photograph by Rolfo H. Beck

HOUSEHOLD LABOR IN RIMITARA

Natives of Rimitara, Austral Islands, grating coconut meat. The effective utensils are carved upon the "necks" of the heavy, quadrupedal stools. The native girl at the right shows pronounced mongoloid characteristics.



©

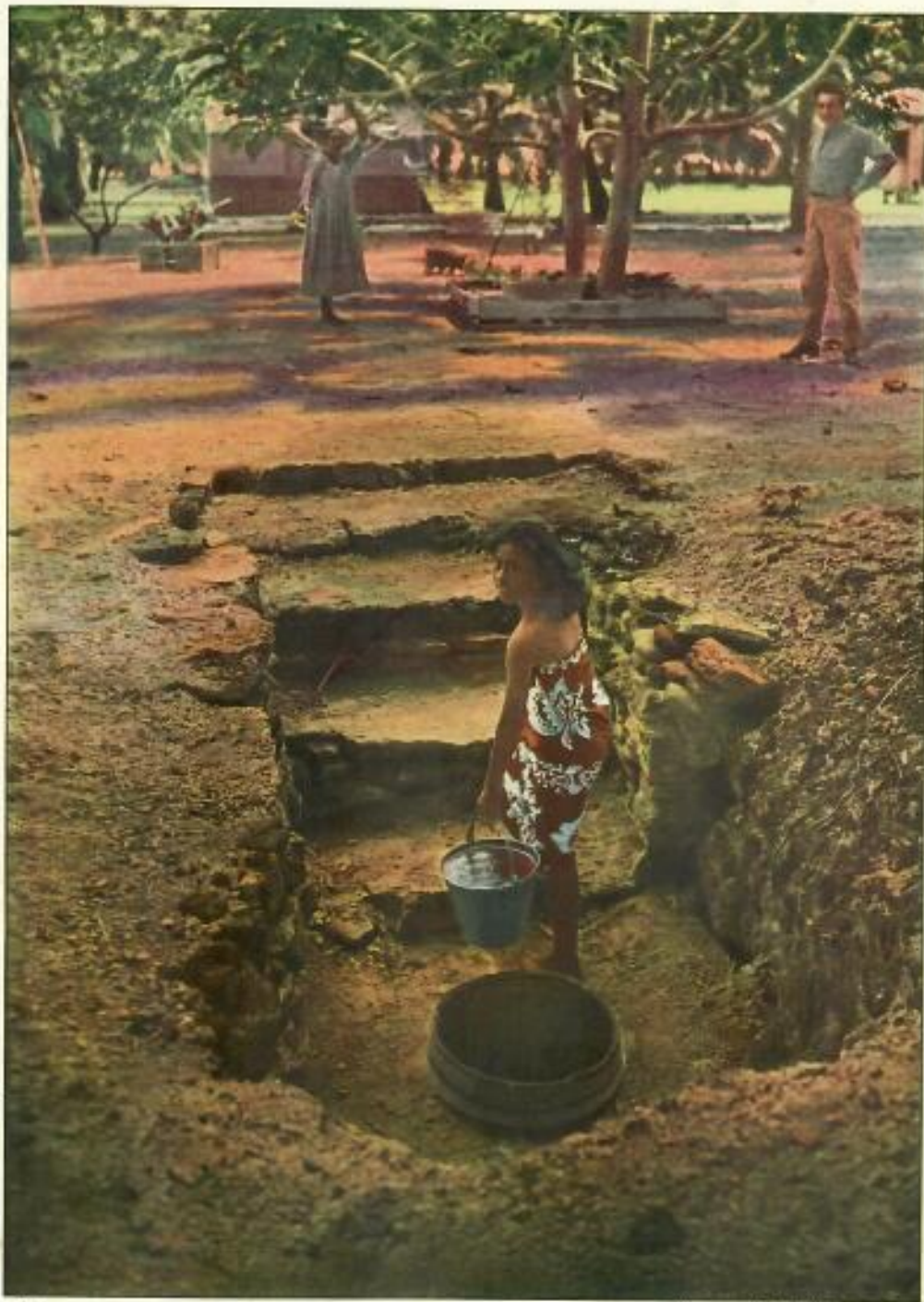
LADS OF RAPA

Photograph by Rollo H. Beck

These boys, who served as guides, fail to understand the elation caused by the discovery of a Polynesian teal's nest.



IRIDESCENT ISLES OF THE SOUTH SEAS



©

A WELL ON KAUKURA ISLAND

Photograph by Rollo H. Beck

The fresh water of the Tuamotus comes from shallow surface diggings, and is derived from rain or through natural filtration from the ocean.

when compared with records of a century or 50 years ago!

The Gambier cluster of the Tuamotus, for example, in which is included Mangareva, government seat of the eastern half of the colony, has now a population of 500. Formerly it was inhabited by 1,900 natives.

Crumbling stone houses line the shores of Mangareva. A convent, which in years past housed hundreds of girls, is to-day covered by the growths of the encroaching jungle and will soon be only a memory.

The cathedral of the island is larger than that in Papeete, and is decorated about the altar with thousands of pearl shells, telling of a congregation that is no more.

Anaa, in the western part of the archipelago, has but a handful of people, yet it was once the savage stronghold of the Tuamotus and was reputed to have a population of 5,000, as noted by Wilkes in 1839. In common with many others among the low islands of the Tuamotus, Anaa has suffered severely from hurricanes.

With reference to the dwindling and rapidly shifting population of the Tuamotus, under modern industrial conditions, Mr. Beck's journal mentions a motion-picture theater at the island of Takoumé, with nobody now living within five miles of the building!

RAPA WAS ONCE A FORTIFIED STRONGHOLD

Of the Austral or Tubuai Group, far south of the Societies, the most fascinating island is Rapa, which lies detached from the others, well beyond the Tropic of Capricorn.

Rapa was discovered by Vancouver in 1791. For the next 35 years the native savages had little contact with the outside world, but about 1825 they began to be Christianized through the first intercourse with Tahitian missions.

In later years Rapa became a favorite port of call for whaleships, because the men of the island were peerless boatmen, but with the decline of whaling, the curtain of isolation once more descended. Now Rapa is visited only two or three times a year.

Twice during the Whitney Expedition periods of a week or longer were spent at

Rapa. On the first visit Mr. Beck tramped off across the taro fields and through the coffee groves toward one of the ancient and mysterious forts that top the ridge of the island (see illustration, page 420).

Climbing through ferns knee-deep, he soon reached the crest. Four distinct levels on the ridge had been protected by built-up rockwork, and at the highest point a massive wall had been constructed as a last stronghold. On a leveled terrace just below was a small rainwater cistern.

Four miles away in an air line, two other forts stood up against the sky. These were so built that a small force could defend itself against a host of besiegers as long as food and water held out. The only approach was by way of the ridge, for the adjacent sides of the mountain were too steep to scale.

Down to eastward the beautiful harbor of Ahurei, with scattered taro beds about its head, showed clearly (see Color Plate IV), while high above the village wild goats could be distinguished along the craggy ridge. South of the fort the hill rose to nearly 2,000 feet, forming a backbone of unclimbable cliffs, while toward the west and north other ridges divided narrow valleys and cut the island into sharply defined districts.

Upon returning to the shore, Mr. Beck found the captain and mate and their wives enjoying the charming garden of the French administrator, where fig and orange trees were weighted with fruit.

A splendid crop of tobacco, maturing in a small grove, also bore witness to the rich soil and the favorable climate.

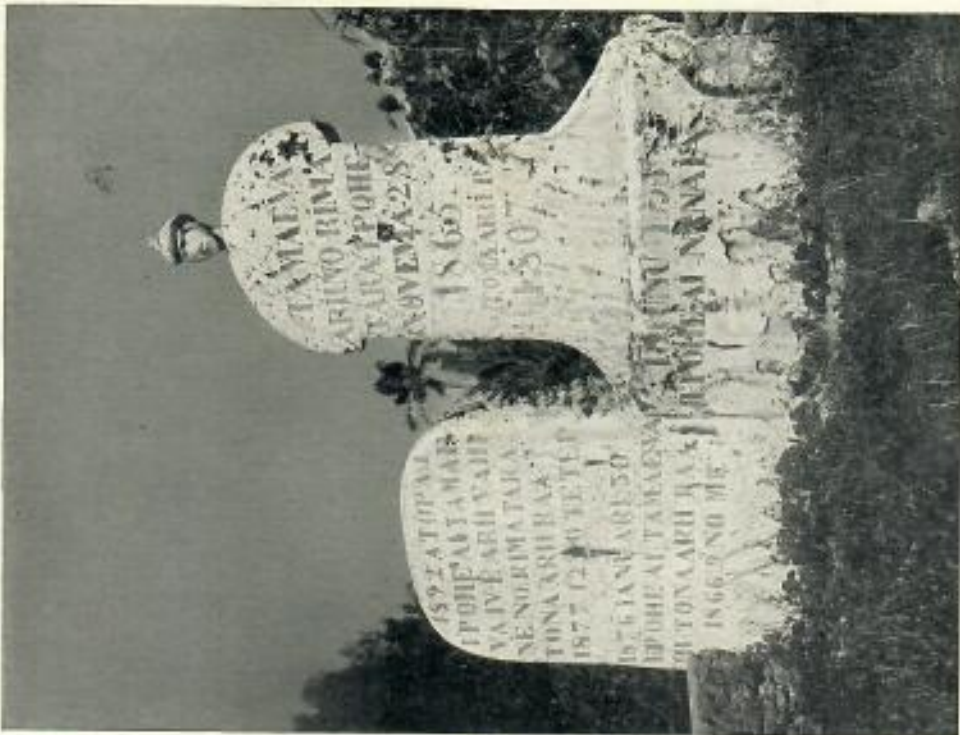
THE TRIALS OF DINNER GUESTS IN RAPA

While they were lingering in the garden, the native chief's son arrived to lead the visiting guests to a Sunday feast. On the way thither they were followed by a troop of the island children, some in shirts, some in *parous*, one in the discarded vest of an itinerant visitor, and several of the youngest wearing nothing at all. As they entered what was at first supposed to be the residence of the chief's son, the supercargo, who knew the customs of Rapa, warned all the strangers to eat lightly, as they would be expected to partake of food at several additional homes.



POLYNESIAN FORTIFICATIONS ON THE CRESTS OF RAPA (SEE PAGE 419)

The full significance of these ancient structures is hardly less enigmatical than that of the great stone monuments of Rapauni, or Easter Island. (See "The Mystery of Easter Island," by Mrs. Scoresby Routledge, in the NATIONAL GEOGRAPHIC MAGAZINE for December, 1921.)



A KING'S TOMBSTONE ON RIMITARA ISLAND

A Christian memorial, but not without reminiscence of the old paganism.

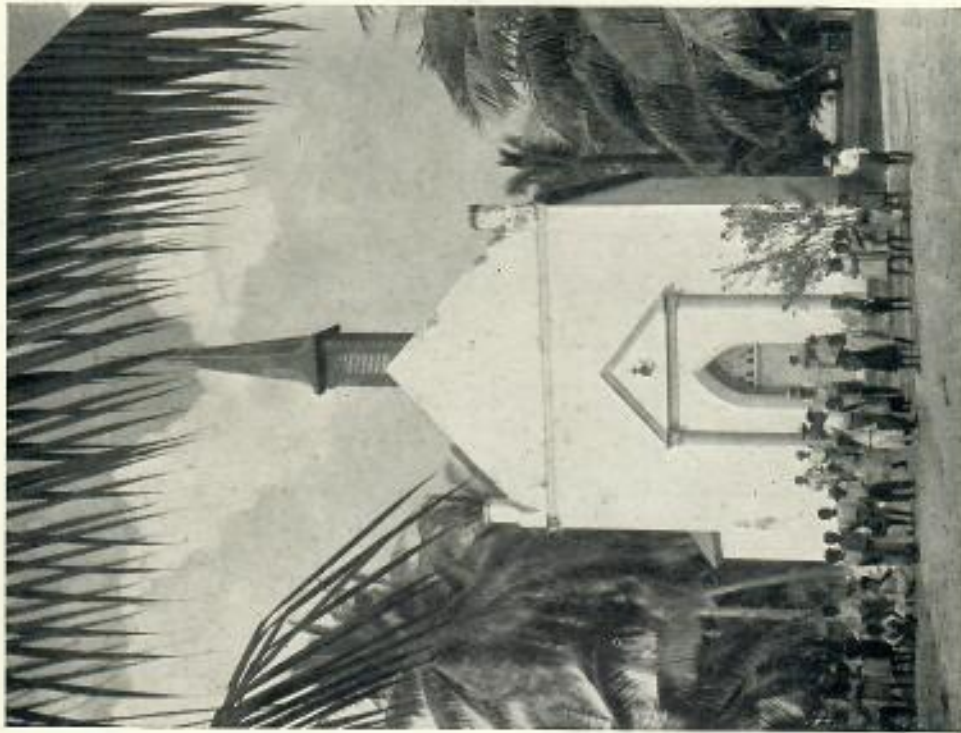


AN OLD IDOL IN THE FOREST OF VAVITAO

Many such stone carvings (*tiki*) were overthrown and destroyed after the Christianization of the natives.



A SCHOOL TEACHER AND HER SISTER ON THE OBSERVATION POST
OF MANIHI ISLAND, TUAMOTU GROUP



THE ROMAN CATHOLIC CHURCH AT MAKEMO ISLAND,
TUAMOTU GROUP



A PREHISTORIC WALL OF LICHEN-COVERED SLABS, RIMITARA ISLAND

Fresh banana leaves had been laid in a row across the mat-covered floor, and at each place was a plate containing one or two whole fish, another with several large pieces of juicy pork, and beside the plates a taro root. Seating themselves on the mats, the diners ate with their fingers.

When the first few pieces of fish gave way to the pork, the serving maids brought in the *poi*, the Polynesian staff of life resembling sticky, yeasty dough, neatly wrapped in the broad green leaves of the *rauti* plant.

While they were still eating, the son of the chief appeared again and advised them to hurry, as dinner was awaiting them at his home. So, leaving the untasted residue of the first banquet, they walked to the scene of a similar repast. In addition to fish, however, they here found a whole lobster at each place, and two taro roots instead of only one.

Before this meal had proceeded far, the captain leaned back from his partly eaten lobster, which was close to two feet long, and in deference to his example the other guests first slackened their pace and then ceased.

They next passed along a lane to a thatched cottage smaller than the others, and encountered a repetition of what had gone before, except that deliciously cooked chickens replaced the pork.

The supercargo again reminded them to eat sparingly, as a hearty appetite should be reserved for the chief's home, to be visited next!

When the party finally strolled over to the large dwelling of the chief, his wife and three or four girls welcomed them in the open yard before the door (see Color Plate IX).

In this house, lobster, pork, and chicken were in readiness as a last test of gustatory capacity. The taro had been increased to three big roots, although a small bit from the end of one root would easily have sufficed for a meal.

Besides the staples, the chief had supplied coconut milk in which to dip the meat and roots, a rare beverage in Rapa, as coconuts can be obtained only from ships coming from more northerly islands. They were served also with molasses made from the roots of the *rauti*. The syrup was placed on the plate with the



TAKING NATURAL HISTORY NOTES ON FAKARAVA ISLAND,
TUAMOTUS



AN AGED INHABITANT OF TAENGA, ONE OF THE CORAL ISLETS
OF THE TUAMOTUS



HARDSHIPS OF AN EXPLORER'S LIFE

The leader of the Whitney Expedition and the engineer of the *France* are about to regale themselves with boar's head, fish, chicken, breadfruit, poi, poi, fruits, and other staples of Mangareva (see, also, account of the feasts on the island of Rapa, pages 419-424).

poi, enabling the latter to go down more easily than when it was lubricated with water only.

At the conclusion of what, fortunately, proved to be the last meal, bananas were passed around.

FAREWELL GIFTS BESTOWED BY A
HOSPITABLE PEOPLE

On another day, a few of the hardy, energetic native fishermen made a trip to the lobster beds at the entrance of Ahurei Bay, and brought back 100 lobsters for the visitors. Practically every house in the village entertained one or more of the schooner's crew during the entire stay.

At the captain's suggestion a case of kerosene was presented to the church, the light of which shows up brightly as vessels enter the harbor.

That this courtesy was appreciated by the inhabitants was shown by their gifts on the day of leavetaking. A count of the acquisitions on deck, after the departure of the pilot, showed 5 sacks of taro, 18 packages of poi wrapped in rauti leaves, 19 boxes of taro and poi, 15

bunches of bananas, 22 rabbits, and 14 goats. Very few of these items had been purchased; the greater number were presents from the most hospitable people in the Pacific.

The girls and younger women at Rapa do most of the labor in the taro fields, while the older women attend to the housekeeping (see illustrations, pages 370, 381, and 382). The exemption of the men from agricultural labor allows them more time for fishing, and as a result of their sea experience they are much sought by captains of sailing vessels at Papeete.

The constant demand for Rapa men during a period of nearly a century has led to a considerable preponderance of women in the island population.

RAPA NATIVES ARE PEERLESS BOATMEN

Upon the second visit of the expedition, when the *France* was three or four miles from shore, a boat came out to meet the schooner. The men had made no allowance for the fact that an engine was aiding the sails, and within a minute they



TWO MEMBERS OF THE EXPEDITION DISCOVER A BOOBY'S NEST ON FAKARAVA ISLAND

were left 100 yards astern. But when the cabin boy, a native of Rapa, called out to them to catch up and be towed, they bent their oars and showed what they could do.

The schooner was progressing at a rate of about six miles an hour, but the boat was going at twice that speed when it neared and overtook her.

On another occasion a Rapa crew rowed five miles to an islet on which certain sea birds were nesting. Two of the members of the crew were only about 13 years of age, but when a heavy storm arose these lads stood the test of pulling for hours against a head wind and a rising sea, even though the poorly balanced, homemade oars weighed close to 50 pounds.

GIRLS OF RAPA ARE EXPERT IN HANDLING
OUTRIGGER CANOES

The girls of Rapa are scarcely less skillful in using their unstable-looking outrigger canoes. At evening they would

frequently pass the schooner on their way home from taro fields on the far side of the bay, with heavy loads of the roots weighing down their narrow dugouts almost to the swamping point (see illustration, page 381).

From babyhood these people become familiar with the sea. At all hours the children can be seen playing in the water or paddling tiny canoes alongshore.

The whole population of Rapa, exclusive of a few lepers confined in another valley, was living in or near the village on Ahurei Bay at the time of the Whitney Expedition visits.

Five or six valleys that formerly supported villages (and which may have warred with one another in their oceanic microcosm from immemorial time) are now deserted.

Only the lofty, stone forts, last refuge of the inhabitants of these communities (see page 420), still stand as monuments on the hilltops, and can be discerned from far at sea.

VOLUME XLVIII

NUMBER FOUR

THE NATIONAL GEOGRAPHIC MAGAZINE

OCTOBER, 1925



CONTENTS

SIXTEEN PAGES OF ILLUSTRATIONS IN FULL COLOR

The Romance of Science in Polynesia

With 69 Illustrations

ROBERT CUSHMAN MURPHY

Iridescent Isles of the South Seas

16 Illustrations in Full Color

Collarin' Cape Cod

With 46 Illustrations

LIEUTENANT H. R. THURBER, U. S. N.

MacMillan in the Field

With 3 Illustrations

PUBLISHED BY THE
NATIONAL GEOGRAPHIC SOCIETY
HUBBARD MEMORIAL HALL
WASHINGTON, D.C.

\$3.50 A YEAR

50¢ THE COPY

NATIONAL GEOGRAPHIC SOCIETY

GEOGRAPHIC ADMINISTRATION BUILDINGS

SIXTEENTH AND M STREETS NORTHWEST, WASHINGTON, D. C.

GILBERT GROSVENOR, President
JOHN OLIVER LA GORCE, Vice-President
JOHN JOY EDSON, Treasurer
BOYD TAYLOR, Assistant Treasurer
HENRY WHITE, Vice-President
O. P. AUSTIN, Secretary
GEO. W. HUTCHISON, Associate Secretary
EDWIN P. GROSVENOR, General Counsel
FREDERICK V. COVILLE, Chairman Committee on Research

EXECUTIVE STAFF OF THE NATIONAL GEOGRAPHIC MAGAZINE

GILBERT GROSVENOR, EDITOR

JOHN OLIVER LA GORCE, Associate Editor
WILLIAM J. SHOWALTER, Assistant Editor
RALPH A. GRAVES, Assistant Editor
FRANKLIN I. FISHER, Chief of Illustrations Division
J. R. HILDEBRAND, Chief of School Service

BOARD OF TRUSTEES

CHARLES J. BELL, President American Security and Trust Company
JOHN JOY EDSON, Chairman of the Board, Washington Loan & Trust Company
DAVID FAIRCHILD, In charge of Agricultural Explorations, U. S. Department of Agriculture
C. HART MERRIAM, Member National Academy of Sciences
O. P. AUSTIN, Statistician
GEORGE R. PUTNAM, Commissioner U. S. Bureau of Lighthouses
GEORGE SHIRAS, JR., Formerly Member U. S. Congress, Faunal Naturalist, and Wild-game Photographer
E. LESTER JONES, Director U. S. Coast and Geodetic Survey
WILLIAM HOWARD TAFT, Chief Justice of the United States
GRANT SQUIRES, Military Intelligence Division, General Staff, New York
C. M. CHESTER, Rear Admiral U. S. Navy, Formerly Supt. U. S. Naval Observatory
J. HOWARD GORE, Prof. Emeritus Mathematics, The George Washington University
FREDERICK V. COVILLE, Botanist, U. S. Department of Agriculture
RUDOLPH KAUFFMANN, Managing Editor The Evening Star
JOHN FOOTE, M. D., Professor of Pediatrics, Georgetown University
JOHN OLIVER LA GORCE, Associate Editor National Geographic Magazine
CHARLES C. DAWES, Vice-President of the United States
JOHN BARTON PAYNE, Chairman American Red Cross
A. W. GREELY, Arctic Explorer, Major General U. S. Army
GILBERT GROSVENOR, Editor of National Geographic Magazine
GEORGE OTIS SMITH, Director U. S. Geological Survey
O. H. TITTMANN, Formerly Superintendent U. S. Coast and Geodetic Survey
HENRY WHITE, Member American Peace Commission, Formerly U. S. Ambassador to France, Italy, etc.
STEPHEN T. MATHER, Director National Park Service

ORGANIZED FOR "THE INCREASE AND DIFFUSION OF GEOGRAPHIC KNOWLEDGE"

TO carry out the purposes for which it was founded thirty-seven years ago, the National Geographic Society publishes this Magazine. All receipts are invested in the Magazine itself or expended directly to promote geographic knowledge.

ARTICLES and photographs are desired. For material which the Magazine can use, generous remuneration is made. Contributions should be accompanied by an addressed return envelope and postage.

IMMEDIATELY after the terrific eruption of the world's largest crater, Mt. Katmai, in Alaska, a National Geographic Society expedition was sent to make observations of this remarkable phenomenon. Four expeditions have followed and the extraordinary scientific data resulting given to the world. In this vicinity an eighth wonder of the world was discovered and explored—"The Valley of Ten Thousand Smokes," a vast area of steaming, sprouting fissures. As a result of The Society's discoveries this area has been created a National Monument by proclamation of the President of the United States.

AT an expense of over \$50,000 The Society sent a notable series of expeditions into Peru to investigate the traces of the Inca race. Their

discoveries form a large share of our knowledge of a civilization waning when Pizarro first set foot in Peru.

THE Society also had the honor of subscribing a substantial sum to the expedition of Admiral Peary, who discovered the North Pole.

NOT long ago The Society granted \$25,000, and in addition \$75,000 was given by individual members to the Government when the congressional appropriation for the purpose was insufficient, and the finest of the giant sequoia trees of California were thereby saved for the American people.

THE Society is conducting extensive explorations and excavations in northwestern New Mexico, which was one of the most densely populated areas in North America before Columbus came, a region where prehistoric peoples lived in vast communal dwellings and whose customs, ceremonies, and name have been engulfed in an oblivion.

THE Society also is maintaining expeditions in the unknown area adjacent to the San Juan River in southeastern Utah, and in Yunnan, Kweichow, and Kansu, China—all regions virgin to scientific study.