

THE FLORA OF MAKATEA

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INTRODUCTION

GENERAL FEATURES

The island of Makatea, sighted by Quiros (1606) and visited by Roggeveen (1722), belongs geographically to the Tuamotu Archipelago. It lies 126 miles north of Tahiti, and politically it is part of French Oceania. The name signifies "white slingstone" (*maka*, "slingstone"; *tea*, "white"). Because of the light reflected from its precipitous cliffs, Makatea has been called L'Île de la Lune—Island of the Moon. To the Tahitians it is known as "Maatea."

Like all Tuamotuan islands, Makatea consists of coral limestone. But unlike the other islands, which are atolls that rise not more than 20 feet above sea level and surround lagoons into which small crafts may enter through passes in the reef, Makatea stands high above sea level. Distinct lateral marks show three successive stages of elevation at long intervals apart. The remains of a prehistoric reptile in the phosphate deposits indicate a very remote period of uplift. Deep grottos in the face of the sheer cliffs must have been hollowed out by wave action when that part of the island was at sea level. (See pls. 1, 2.)

Makatea is about 5 miles long and 3 miles wide. Its plateaulike surface, comparatively flat, has an elevation of 190 to 220 feet. Its highest point, Putiare, is 372 feet above sea level. No barrier reef surrounds the island; precipitous coral cliffs rise sheer from the ocean. Fringing coral reefs extend outward some 500 feet from the base of the cliffs and end abruptly in a drop of 1,000 feet of deep water. There are but two short stretches of white sand beach—one on the northwest side of the island and another on the southeast side. (See fig. 1.)

At the base of the cliffs at the extreme northern end of the island a narrow coral bench, partly submerged by the sea, begins. This bench gradually increases in width and height southward and eastward until it is a white sand beach some 500 feet in width at its widest part. On this seashore bench are situated, some 20 to 50 feet above sea level, the native village of Temao and the shipping port, where are great storage warehouses, and where launches and boats are drawn up when not in use. It is to Temao that passengers and

freight come by power launches from steamers lying out in deep water. From Temoa the beach gradually narrows in an easterly direction until it finally ends abruptly at the base of inaccessible, perpendicular cliffs, so that it is impossible to walk in either direction completely around the island at sea level.

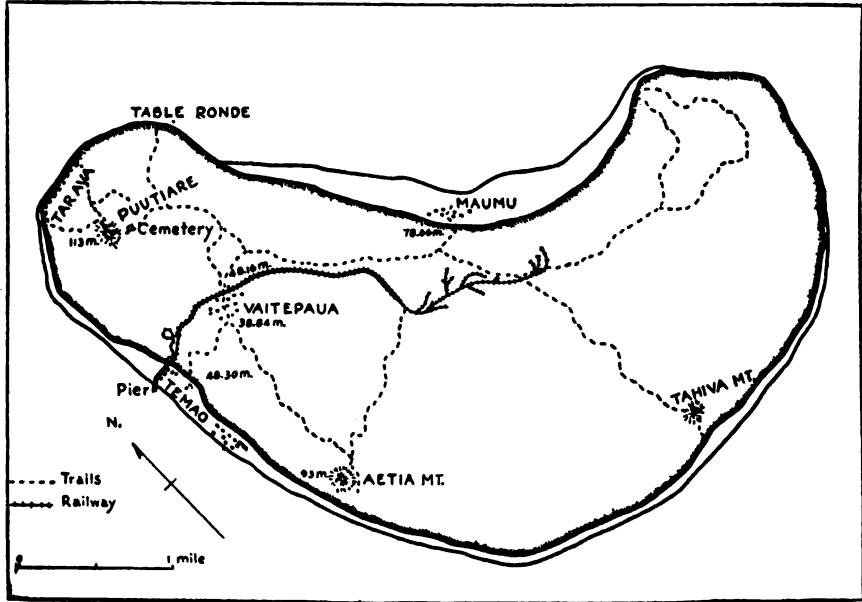


FIGURE 1.—Outline map of Makatea, based on a survey map of La Compagnie Française des Phosphates de l'Océanie.

The climate of Makatea is tropical, with a hot sun beating down during the daytime. It is humid during times of prevailing winds. Fortunately, the nights are comfortably cool. When the northeast trade wind blows the heat is tempered, and frequent showers keep the island green and beautiful. Hurricanes are infrequent. Occasional gales from the west do damage to the harbor, and shipping is suspended.

On the west side of the island a *funiculaire* 600 feet long runs from the beach to the plateau above (pl. 1, A). The only means of descent from the plateau to sea level on the northeast side of the island is at Maumu (Moumu), where a natural rock staircase has been hewn out of the solid coral. Men and women, as well as children going to school, patient horses, heavily laden, and horses drawing little two-wheeled carts, make their way daily up and down the more than 600 stone steps. Along the picturesque route shaded by magnificent trees is a trickling streamlet of sweet water dripping into a

sheltered cave, and larger grottos with stalactites in them. Grottos in the sea cliffs were used by the Polynesian inhabitants as resting places for their dead.

Several narrow roads on which horse-drawn carts can travel lead to different points on the plateau. Most of the inhabitants walk, but not a few of the younger folk use bicycles.

At the time of my visit to Makatea in 1932, the population of the island numbered 800, of whom 471 were employed in the Makatea Phosphate Company. It was an international group, including 17 French, 3 Swiss, 1 English, 1 American, 22 Japanese, 71 Chinese, 141 Indo-Chinese, and 215 native Polynesians.

PHOSPHATE

About the year 1900 a schooner needing drinking water put in to Makatea, where there was known to be a spring, called Vaihereu, containing fresh water. A voyager on the schooner went ashore to explore the island. While walking about he was astonished to find stones resembling the phosphate rock of the island of Nauru and forthwith gathered up a quantity of them. Upon his return to Nauru they were analyzed and found to be phosphate. An expert was then sent to Makatea, and soon afterward was founded the Pacific Phosphate Company, which in 1906 became La Compagnie Française des Phosphates de l'Océanie.

The deposits of phosphate are in the central part of the island in an elongated basin or depressed portion of the plateau, which was, without doubt, the ancient lagoon of the one-time atoll. The phosphate is found in deep pockets in the coral rocks. Some of it is in the form of coarse sand of a pale yellowish brown color; some in the form of pebbles, which may be crushed in the hand. In certain areas there are large deposits of loose phosphate sand and rocks. (See pl. 3.)

The origin of phosphate on Makatea is not fully known. It is said to be the combined result of the working of several elements and processes: guano, dead fish by the millions in the raised lagoon, coral animalcules, chemical action, heat, and pressure.

Equipment for mining the phosphate, transporting it to the shipping port, storing it in great drying houses, and loading it into cargo boats is modern and efficient. From the storage warehouses, whose combined capacity is 45,500 French tons, the phosphate is run out to the end of the 435-foot cantilever chute, where it is poured into baskets in boats waiting below. Each of the 27 boats in use carries 8 baskets and each basket contains 750 kilograms of phosphate. The boats are towed by a power launch out to the waiting cargo ship, which is tied to a floating buoy anchored by great chains in 1,200 feet of

water. Power is constantly kept up on the ship so that it can put out to sea at a moment's notice. (See pl. 1, A.)

ANIMAL LIFE

Few native land birds exist today on Makatea. Among the number are two species of fruit-eating pigeons (*Globicera aurorae*), called by the natives *rupe*; the other (*Ptilopus calcurus*), a smaller species of *rupe*. There is also a gray warbler that sips nectar from the flowers of the coconut. Two species of small cranes, one of which is jet-black and the other pure white, feed along the shores. If these cranes are captured when very young, they may easily be tamed and become delightful pets, flying off each day to fish and returning at sunset to their lofts. Of the sea birds, *Sula piscator*, *Stolidas stolidas*, *Stolidas hawaiiensis*, *Sterna lunata*, and *Gigas alba kittlitzii* are common along the shores. A few tropic birds (*Phaethon lepturus*) were seen nesting in the high cliffs. The shy *Urodynamus tahitensis*, which migrates annually to New Zealand, returns to Makatea for the nesting season. The peculiarly marked feathers of the *Urodynamus* are highly prized by native fishermen, who use them on especially constructed hooks as lure in catching a certain species of pelagic fish. Such migratory birds as the curlew (*Numenius tahitiensis*), the turnstone (*Arenaria interpres*), the golden plover (*Charadrius dominicus fulvus*), and the wandering tattler (*Heteractitis incanus*) are occasional visitors to Makatea.

Rats, mice, two species of lizards, roaches, centipedes, scorpions, flies, mosquitoes, beetles, ants, several species of moths, honeybees, wasps, spiders, wood-boring insects, and the ubiquitous termite are all found on Makatea.

The large land crab (*Bergas latro*), weighing as much as ten pounds, is plentiful on the island. It is very shy and hides during the day in holes in the coral rock. At night it comes out to search for its favorite food, the coconut. The natives place halved coconuts, filled with pounded-up coconut, at advantageous points in the woods. When the crab emerges from his hole at night and is attracted to the bait, the native with his flashlight discovers and seizes him. As an article of food the coconut crab is much esteemed by both the Europeans and natives.

PLANT LIFE

The plants of Makatea are represented by comparatively few species. So far as I have been able to observe, the one endemic species existing today is the palm (*Eupritchardia Vuylstekeana*), which is confined to one section of the island (pl. 5).

The flora has been greatly modified by introductions from the Society Islands, notably Tahiti. It is inevitable that the Polynesians, voyaging back

and forth, should bring plants from one to another near-by island. Thus, with few exceptions, plants collected by me on Makatea are the same as those I had previously seen growing on Tahiti. A set of the specimens I collected on Makatea is in Bernice P. Bishop Museum.

On the beach, limestone, breccia, sand, and débris washed ashore form material in which some plants will grow. Humus from fallen leaves assists somewhat. Were it not for frequent tropical showers beating in from the ocean, the beach would be dry, owing to its porosity.

On the strand at Temao the vegetation is sparse. A few coconut trees grow near the laborers' cottages, also a few stunted specimens of *Hibiscus tiliaceus* and *Crinum asiaticum*, and some ornamentals. Toward the east where the strand widens, grows *Guettarda speciosa*, *Pipturus velutinus*, and a few clumps of *Tournefortia argentea*. Around about these trees is an undergrowth of such ferns as *Polypodium Phymatodes*, *Asplenium nidus*, and a few groups of *Taetsia fructicosa* (ti plants).

In the sandy stretches grow several species of grasses: *Syntherisma pelagica* variety γ ; *Cynodon dactylon*, *Cenchrus echinatus*, *Lepturus repens*, and *Sporobolus diander*. Hanging from crevices in the high cliffs are many plants of *Ficus prolixa*, on which are clinging the parasitic *Cassytha filiformis*. There are also a few dwarfed *Pandanus*, and a few *Capparis sandwichiana*. During the rainy season these plants get their share of water. At such times quite a flow of water issues from the base of the cliffs at a number of places. It is led into a pipeline, and pumped into tanks at the village of Temao for domestic use.

On the northeast side of the island at sea level the picturesque native fishing village of Maumu is reached either from the sea—a hazardous undertaking—or by walking down the coral staircase from the plateau above. The strand here is longer and much wider than that at Temao. Where the beach is composed of fine sand, plant life is sparse. It includes, however, *Scaevola frutescens* (apata), *Pemphis acidula*, *Tournefortia argentea*, *Suriana maritima*, *Crinum asiaticum*, *Cynodon dactylon*, and bunches of *Syntherisma pelagica* variety γ . Farther inland, near the cliffs where the soil contains some organic matter, grow *Pandanus*, *Calophyllum inophyllum* (kamani), *Terminalia catappa*, *Terminalia littoralis*, *Thespesia populnea* (miro), *Tamarindus indica*, *Cordia subcordata*, *Morinda citrifolia*, and a few trees of *Mangifera indica*. Especially noticeable are the astonishing numbers of splendid *Gardenia taitensis* (tiare tahiti) under cultivation and growing luxuriantly in the strong winds and salt spray. The strand is the natural habitat of this fragrant plant; I have never seen such profusion of flowers as on those plants at Maumu. Nearer the cliffs, and in the shade of such native trees as *Glochidion ramiflorum*, *Tarenna sambucina*, *Premna tahitensis*, *Canthium barbatum*, and

Hernandia ovigera grow quantities of the succulent *Tacca pinnatifida* (*pia*) and *Taetsia fruticosa* (*lau ti*). A few fine trees of *Artocarpus communis* (*uru*) are cultivated for their wholesome breadfruit. Along the whole stretch of this strand grow large numbers of coconut trees. Some of them have been planted in regular order; others sprout at random and form dense thickets. Along the sandy stretches at the foot of the cliffs are such weeds as *Rhaphis aciculata*, *Lepturus repens*, *Bidens pilosa*, *Euphorbia prostrata*, and *Cenchrus echinatus*, whose troublesome bur causes great discomfort to the barefooted pedestrian.

Under careful cultivation are found such useful plants as *Ananas comosus*, *Manihot utilissima*, and *Cyrtosperma Chamissonis*, which grows in low, swampy places, converted by excavation into brackish-water swamps. This species of giant taro produces large tubers much esteemed as food after being cooked in the native oven. It is of slow growth, requiring several years for the tubers to reach maturity.

Hanging to the coral cliffs is *Capparis sandwichiana*, bearing large white fragrant blossoms. On the cliffs grow also *Ficus prolixa*, *Casuarina equisetifolia*, and *Polypodium Phymatodes*.

Commonly growing in open spaces are several species of grasses, including *Syntherisma pelagica* variety γ , *Sorghum halepensis*, *Cenotheca lappacea*, *Cynodon dactylon*, *Sporobolus diander*, and *Miscanthus japonicus*.

In the home gardens of the natives are grown such ornamentals as *Hibiscus rosa-sinensis*, *Plumeria acutifolia*, *Nerium indicum*, *Acalypha Wilkesiana*. A few patches of *Saccharum officinalis* (*to*) are cultivated; the extracted juice is used in the preparation of native medicines.

On the plateau of Makatea, where the soil in many places is rich in phosphate, plants grow luxuriantly despite the great masses of coral rock cropping up everywhere. Here botanizing is no easy task because of the multitude of deep holes that have, during the passing of years, grown up with all sorts of wayside weeds, ferns, and other plants, so that often what seems to be solid ground turns out to be a pitfall. Then there are tall pillars of coral rock (*feo*) that impede progress in climbing. (See pl. 4.)

Along the margins of the plateau grow *Barringtonia asiatica*, especially on the northern wind-swept end of the island high above the sea where there is a large forest of them. There are also in this zone a few trees of *Eugenia malaccensis*, *Eugenia Jambolana*, *Aleurites moluccana*, *Ficus prolixa*, and *Psidium guajava*, which have been planted by the native people.

Over the whole area of the plateau and especially at the eastern end are indigenous trees, such as *Ceodes umbraculifera* (*puatea*), several species of *Pandanus*, *Canthium barbatum*, *Pipturus velutinus*, *Allophylus ternatus*, *Hibiscus tiliaceus*, *Celtis paniculata*, *Melochia odorata* (*ma'o*), *Xylosma suave-*

olens (ramatia), and *Homalium acuminatum*. *Homalium*, together with *Rapanea ovalis*, composes a large part of the forest. In the shade of these trees grow such succulents as *Procris pedunculata*, *Fleurya ruderalis*, and *Tacca pinnatifida (pia)*. In a few places *Cassytha filiformis* is seen winding its stemless and rootless lengths around shrubs and trees.

Near habitations are such useful trees as *Annona reticulata*, *Thespesia populnea*, *Coccoloba uvifera*, *Carica papaya*, *Artocarpus communis*, several varieties of banana, and stately trees of *Ficus prolixa*. There are a number of attractive private home gardens on Makatea, notably that of Madame Gagneux, wife of the Director of the Phosphate Company. She is an enthusiastic and intelligent horticulturist, and her garden is full of lovely flowering trees, vines, and other plants admirably arranged.

ACKNOWLEDGMENTS

I desire herewith to express my appreciation of the valuable assistance given me in my work by a number of residents of Makatea, both Europeans and Polynesians.

To Monsieur André Gagneux, Directeur de la Compagnie Française des Phosphates de l'Océanie, my profound gratitude is given for his constant and friendly attitude toward my work, for providing me with every facility to carry it on, and for making it possible for me to go safely into difficult and all but inaccessible parts of the island by providing me with guides whose expert knowledge of the island was unquestioned. My sincere appreciation is due to both Monsieur and Madame Gagneux for their generous and delightful hospitality.

To Monsieur Maurice Jay, Monsieur Golaz, and Monsieur Soron I am indebted for some of the photographs with which this work is illustrated; to Monsieur Normann and his son Edouard for their expert guidance over difficult trails; to Monsieur Gooding for gifts of interesting plants; to Matua and his wife Mamata of Maumu for assistance in making collections, especially in obtaining wood specimens of native forest trees; and to other residents of Makatea whose assistance and generous hospitality helped to make my sojourn on the island one of pleasant memories.

I wish to acknowledge the assistance of Dr. Elmer D. Merrill in identifying many of the plants collected and of Dr. Harold St. John in determining and describing certain species.

OPHIOGLOSSACEAE

Ophioglossum pendulum Linnaeus.

Plant of pendent habit, having fleshy, membranous, sickle-shaped fronds, 2-6 feet long, 0.75-1.25 inches broad, terminating in a fork, narrow at the base, without a midrib. Fertile spike 4-10 inches long, 0.25 inch broad, issuing from the face of a sterile frond on a short peduncle, the spore cases along the edges.

Found growing on trees and logs in damp woods. Not common. Native name *lipini* (ribbon).

POLYPODIACEAE

Asplenium nidus Linnaeus.

Caudex erect, short, thick. Fronds 2-6 feet long, 2.5-8 inches broad, margins entire, wavy; midrib coarse, stiff, brown. Sori linear, along the veins at the upper ends of the fronds.

This fern is plentiful, especially in the damp forest, growing on trees and rocks. Native name, *oaha*.

Davallia solida (Forster) Swartz.

Strong-growing plant, having creeping rhizomes covered with stiff, ferruginous scales. Stipes 6-18 inches long, naked, light brown, glossy. Fronds open, tripinnate, 12-18 inches long. Pinnæ broadly lanceolate. Sori smooth, in the upper portion of the pinnules.

A common fern on the island; grows on rocks, forming thick masses of rotten fern roots and humus, on which seeds of other species lodge and take root.

Nephrolepis hirsutula (Forster) Presl.

Fern having pinnate fronds 2-3 feet long. Stipes straw-colored, clothed with fine downlike hairs. Pinnæ close, horizontal, acute or obtuse, linear, serrated near the tips. Sori round, marginal.

More of this fern than any other species on the island. Native name, *amoa rahi*.

Polypodium Phymatodes Linnaeus.

Plant having a creeping rhizome. Stipes 12-15 inches long, smooth. Fronds 8-15 inches long, deeply pinnatifid. Segments entire, connected, lanceolate, acute or acuminate. Spores light yellow, abundant; sori confined chiefly to two rows on each side of the midrib of the segments.

Native name, *metua puaa*.

PSILOTACEAE

Psilotum nudum Swartz.

Erect plant, having a short, thick rhizome. Stems angular, 8-12 inches high, branching. Leaves minute. Fruiting bodies or spores globular, small, consisting of a yellow powder.

Common in damp sections of the forests, on rocks and logs. Spores used medicinally by the natives.

PANDANACEAE

Pandanus tectorius Solander.

An erect-growing tree 10 to 25 feet in height. From the branches to the ground aerial roots descend, giving the trunk additional support. Mature leaves, 2.5-10 feet long and 1.5-3 inches broad, crowded at the ends of the branches, have numerous hard, short, curved spines or hooks along the margins and on the under side of the midrib. Staminate and pistillate flowers on separate trees. Staminate or male inflorescence terminal, pendulous, having several rows of large, white, fragrant, lanceolate, concave bracts, 6-10 inches long. Several oblong, conglomerate heads 3 inches long appear at the axils of these bracts. Stamens numerous, covered with a fragrant yellow pollen. Pistillate flowers, which eventually compose the fruit, in a compact head, also pendulous, in the shape of a simple spadix surrounded by several white bracts which soon turn pale green. Syncarp or fruit head composed of 25-60 tapering drupes; several varieties are known to the natives, who distinguish a difference due to the size of the drupes and the color of the fleshy tips, some being red, others yellow.

Comprises a large portion of the native forest. The wood from the trunks of the male trees is very hard and was formerly used in constructing native houses. From the leaves mats, baskets, and other useful things are woven. Native name, *ara*.

GRAMINEAE

Cenchrus calyculatus Cavanilles.

Perennial, having stout, stiff, long stems, nodes swollen, 2-4 inches apart. Blades linear, flat, longer than the internodes, scabrous on the margins. Raceme 3-5 inches long; burs closely packed on a spike.

Only one specimen seen.

Cenchrus echinatus Linnaeus.

Annual, the culm much-branched, decumbent at the base. Stems 1-2 feet high, scabrous below the inflorescence. Sheath glabrous, blades long and narrow, flat, acute. Racemes 3-5 inches long. The numerous small burs, arranged one above the other, have hooked spines.

A common pantropic weed. Native name, *piripiri*.

Centotheca lappacea Desvaux.

Glabrous, stout-growing grass. Culms erect, 12-15 inches high. Nodes 1.5 inches apart. Sheaths clasping, extending beyond the nodes. Blades acute, 4-6 inches long, 0.5-0.75 inch broad; margins wavy, scabrous. Panicle terminal, erect. Fruit acuminate.

Native names, *mou koekoe*, *oheohe*.

Cynodon dactylon (Linnaeus) Persoon.

Recumbent herb, having creeping, rooting stems. The ascending branches produce

the flowering, digitate spikes, 1-1.5 inches long. Blade linear, flat, hairy around the base, keel ciliate.

Common in many places about the island.

Digitaria pruriens (Trinius) Busse.

Culms prostrate at the base, often seen rooting at the joints, glabrous. Sheaths pilose. Blade flat, lax, 3-5 inches long, acuminate, margins scabrous. Flower spike 10-15 inches long, racemes several.

Common along paths.

Eleusine indica (Linnaeus) Gaertner.

Small, erect, tufted grass, 6-12 inches high, having spreading, flat, narrow blades. Flower spikes 3-6, sessile, 1-3 inches long.

A common weed along the paths and in gardens. Native name, *tamau-mau* or *tamaomao*.

Eragrostis amabilis (Linnaeus) Wight and Arnott.

Glabrous annual, having erect, slender culms, 4-12 inches high. Blades flat, striate, narrow, thin, 3.5 inches long. Sheaths glabrous, striate, pilose at the throat. Panicle open, oblong, 2-6 inches long, spikelets 4-6 flowered.

Common in pastures.

Lepturus repens (Forster) R. Brown.

Perennial, branching, creeping grass, culms ascending or erect. Blades acuminate, glabrous, flat, narrow, clasping, scabrous on the margins. Internodes as much as 6 inches long. Spike 3-5 inches long, erect.

Common on the beach at Temoa and at Maumu.

Miscanthus japonicus Anderson.

Tall, perennial herb, having terminal, feathery panicles. Blades long, flat, edges armed with miniature sharp teeth.

The light stems, or the main axis after flowering, are collected, and from the outside a fine quality of material is prepared and plaited into hats. Native name, *kakao*.

Paspalum orbiculare Forster.

Glabrous perennial, having erect culms 2-3 feet high. Blades narrow, 4-10 inches long, 0.25 inch broad. Racemes 4-6, spikelets tawny, fruit brownish.

Common in moist places.

Rhaphis aciculata (Retzius) Desvaux.

Annual creeper of robust habit. Blades narrow, clasping the stem. Culm erect, 4-6

inches high. Fruit small, awnlike on a slender spike, becomes detached and adheres to clothing.

Probably of early introduction. Native name, *piripiri*.

Saccharum officinarum Linnaeus.

Erect, stout, solid-jointed plant, 6-15 feet high. Leaves 1.25-2 inches broad, margins scabrous, sheaths clasping, hispid. Panicle of flowers on a terminal spike, 1-3 feet long.

Cultivated by the natives for the juice, which was often used in the preparation of their native medicines. Several varieties seen, of very early introduction. Native name, *to*.

Holcus halepensis Linnaeus.

Erect perennial, having stout, creeping rhizomes. Culm erect. Blade 15-20 inches long, 1 inch broad, scabrous on the margins, rounded at the base, clasping the stem. Nodes 2-5 inches apart. Flowers forming a large spreading panicle.

A common introduced grass, growing in the woods, along the paths, and in the open pastures.

Sporobolus diander (Retzius) Beauvois.

Perennial, having creeping rhizomes. Culms erect, 8-14 inches high, glabrous. Blades narrow, finely tapering, involute. Panicle a spike 4-8 inches long, 0.25 inch broad. Spikelets small, numerous, oblong, reddish brown.

Common along the benches near the sea.

Syntherisma pelagica variety γ F. Brown.

Perennial, glabrous herb. Blades numerous, clasping the stem, narrow, acuminate. Culms stiff, erect, slender, up to 24 inches long. Spreading at the base, branching at the nodes. Fruit on a spike 4-6 inches long.

Common grass growing in sand on the beach at Temao and at Maumu.

CYPERACEAE

Kyllinga monocephala (Linnaeus) Rottboell.

Small, erect plant, having slender stems. Habitat arenose. Leaves grasslike, thin, flat, margins narrow, scabrous. Flowers and fruit in a single globular head, supported by three leafy bracts 3 to 6 inches long, their margins rough.

Common in damp places, growing in sand along paths and roads. Native name, *mou opoonui*.

Mariscus pennatus (Lamarck) Merrill.

Tall, glaucous, erect sedge, having long, stiff, narrow leaves, the upper and under surfaces hispid, margins scabrous. Umbel terminate, compact, flower stems triangular.

Common in many places, in shaded woods and on the sandy beach below Temao, and also at Maumu village. The flower stems, when drawn between

two sticks, bruised, and shredded, form a mass of matted fibers used to strain liquids, or to filter and separate coconut milk from grated coconut meat. Native name, *mou haari*.

Mariscus cyperinus (Retzius) Vahl.

Herb, 6-12 inches high, having narrow, glabrous leaves or blades two-thirds the length of the stem. Midrib scabrous. Umbel compact.

Common along the seashore at Temoa and at Maumu. Native name, *mou*.

PALMAE

Cocos nucifera Linnaeus.

A tall tree with a single straight stem, many specimens reaching a height of 75 feet, bearing at the top nuts and a cluster of long, pinnate leaves.

The most useful of the plants that grow on Makatea. The trunk furnishes building material and farm implements. The leaves and leaflets are woven into baskets of many shapes and forms, used for conveying food and other articles. The terminal at the top is edible. The young nuts furnish water and food; and the dry meat of the mature nut, called copra, sold in the markets of the world, is the principal means by which the natives get their livelihood. Several varieties are distinguished by the natives by the shape of the nut and the color of the husk before maturity.

Cocos nucifera variety *palmyraensis* is grown for the extra long fibers contained in the husk, which when braided into strands is known as sennit and is used in the construction of native houses and in assembling parts of canoes. Sennit withstands salt water very much longer than cotton or other rope fibers.

At the present time within the areas where phosphate has been removed there are few coconut trees remaining of any great age, as the process of collecting rock and sand phosphate first requires the removal of all vegetation, including the stately palms; but new growth soon returns, and other coconuts, which in time produce fruit, are planted in their places. At Maumu a few trees grown from selected nuts bear fruit of extraordinary size; the nuts are used as domestic utensils. Native name, *niu*.

Eupritchardia Vuylstekeana (H. Wendland) O. Kuntze.

Trunk straight, 15-40 feet high, smooth, 8-12 inches in diameter near the base, gradually increasing in diameter to about 8-10 feet from the ground, then becoming narrower near the top. Leaves fan-shaped, on unarmed petioles 5-7 feet long, concave on the upper surface, edges sharp, quite glabrous except near the base of the costa, which has a slight covering of tomentum easily removed; blade glabrous, split into 60 segments to about 4 feet, the segments again slit into 2 linear lobes 18-24 inches long, ending in acute, dual tips, 1.5 inches long, having hard rounded points. Spadix 1.5-3 feet long, thrice branching, on a long axillary peduncle; flowers sessile along the entire twisted branches of the panicle. Drupes abundant, globose, 0.25 inch thick, terminated by the remains of the carpels.

This species, though scattered over a large area, is confined to one section of the low portion of the central part of the island between the villages of Vaitepaua and Aitea. It is the only endemic plant on Makatea. In former times the natives used the large leaves for thatching their houses, and from the young fronds wove such useful articles as hats, baskets, and mats. I collected specimens of this palm in August, 1926. Native name, *koko matea*.

ARACEAE

***Alocasia macrorrhiza* (Linnaeus) Schott.**

Large, caulescent herb, having ovate, sagittate, light-green blades, with wavy margins, prominent midrib and veins; petioles long. The flower spathe, made up of numerous pinkish-white florets, protected by a sheath or hood, rises from the axil of the petiole.

Common under cultivation; the roots edible, but used only in times of scarcity of food. Native name, *ape*.

***Caladium bicolor* Ventenat.**

Cultivated tuberous annual having ornamental hastate-peltate leaves. Leaf blade ovate, sagittate, variegated on the upper surface; petiole long.

***Colocasia esculenta* variety *antiquorum* (Schott) Hubbard and Rehder.**

Aquatic herb, producing edible tubers or corms. Leaves glaucous, cordate, peltate; blade light green; petiole reddish, 2 feet long.

On account of scarcity of rainfall this plant is but sparingly cultivated. Native name, *taro*.

***Cyrtosperma Chamissonis* (Schott) Merrill.**

Cultivated giant herb, having large, hastate, acuminate, entire leaves. Leaf blade 2-5 feet long; petiole spiny, 3-8 feet long. Flowers reddish brown, in a spathe 8-10 inches long. Tubers large, appearing above the ground, requiring several years to mature.

Seen only at Maumu in a brackish-water sump near the sea. Native name, *maota, buraka*.

***Scindapsus aureus* Engler and Krause.**

Climbing perennial, having a stout stem. Leaves ovate, entire, deeply cordate; blade 12-16 inches long, light green, shiny, splashed with white.

Common in gardens growing on trees, also escaped from cultivation.

***Xanthosoma atrovirens* C. Koch and Bouche.**

Cultivated tuberous herb, having large, glaucous, fleshy arrow-shaped leaves, on thick petioles. Leaf blade light green, surface wrinkled, veins prominent, sinus open. Flowers unisexual, in a large spathe or protecting hood, light yellowish green, fragrant.

Common about native dwellings. The young tubers and tender leaves are cooked and used as food. Native name, *taru'a*.

BROMELIACEAE

Ananas comosus (Linnaeus) Merrill.

Erect, cultivated herb, having stiff, narrow leaves borne in a rosette, the margins armed with short thorns. Flowers aggregated, developing on an erect stem from the center of the rosette. Fruit a compact sorosis.

Common under cultivation—the common pineapple. Native name, *anana*.

COMMELINACEAE

Commelina nudiflora Linnaeus.

Creeping herb with succulent stems. Leaves alternate, oblong-lanceolate. Flowers pale blue, in terminal bracts.

Common in damp places, in the woods, and shaded localities. Native name, *aihere pape*.

Zebrina pendula Schnizlein.

Trailing, half-succulent herb, having alternate, entire, lanceolate, acuminate leaves. Leaf blade 1.75 inches long, 0.5-0.75 inch broad, under side rich purple, upper side silvery green, streaked with darker green and white. Flowers red, in two terminal boat-shaped bracts.

Common plant, escaped from cultivation, growing over rocks and crevices in shady places.

LILIACEAE

Taetsia fruticosa (Linnaeus) Merrill.

Erect shrub, having broad lanceolate, acuminate, entire smooth pale-green leaves. Leaf blade 21-24 inches long, 3-6 inches broad, base narrowing into a stout petiole; nerves branching off the midrib at an acute angle. Flowers small, whitish yellow, in a pendulous panicle.

Common in open and damp woods. Also cultivated by the natives. Native name, *lau ti*.

HAEMODORACEAE

Sansevieria Roxburghii Schultes.

Erect herb, 1-3 feet high, having stiff, narrow leaves, 9 inches to 2 feet long, 1-3 inches broad. Flowers greenish white, on a long spikelike raceme issuing from the base of the plant. Fruit small, globose, yellow when mature, 0.25 inch in diameter, on a tapering spike.

Commonly cultivated, also seen growing in the rocks, escaped from gardens.

AMARYLLIDACEAE

Fourcroya longaeva Karwinsky and Zuccarini.

Slender, erect herb, having lanceolate, acute leaf blades, 4-7 feet long, 3-6 inches

broad. Flowers in a panicle, 6 petals, greenish white, on a spike 10-20 feet high issuing from the center of the plant. Fruits green nutlets, sessile, attached to the spike.

Common plant of early introduction. The natives use the fiber contained in the long blades or leaves as a substitute for rope.

Crinum asiaticum Linnaeus.

Large, erect-growing, lilylike plant. Leaves narrow, entire, acuminate, 4-6 feet long, 3-5 inches broad. Flowers white, in an umbel at the end of a hollow scape, rising from the axils of leaves near the base. This species bears fleshy, globose, green-colored fruits, 1.5 inches in diameter, in which are contained large seeds, generally two.

Common along the strand at Maumu and at Temoa near sea level. Cultivated as a protecting hedge against wind and salt spray.

TACCACEAE

Tacca pinnatifida Forster.

Erect, hollow-stemmed herb, having 3-parted, irregularly pinnatifid, radical leaves marked with light and dark-green stripes; petioles long. Flowers numerous, at the end of a hollow scape 1-3 feet high. Fruits yellowish green, oblong, ribbed, 0.5-1.25 inches long, 0.5-1 inch in diameter, on long peduncles, having a persistent calyx and containing numerous seeds.

Formerly cultivated, grows wild in the woods. Native name, *pia*.

DIOSCOREACEAE

Dioscorea bulbifera Linnaeus.

Strong, climbing vine, having wiry stems. Leaves alternate, entire, cordate, sharply acuminate, auriculate, with a deep basal sinus; 5-7 nerved, the outer pair of nerves united; blade 4 inches long, 3.5-4 inches broad, glabrous, light green. Produces edible tubers.

Not cultivated, growing wild in the woods. A conspicuous plant on account of its aerial axillary tubers. Native name, *hoi*.

Dioscorea pentaphylla Linnaeus.

Herbaceous twining plant, having angular stems. Leaves alternate, cuspidate, lanceolate; blades having 3-5 palmately lobed segments. Produces large, edible tubers.

Common plant in the open woods, northern end of the island. Native name, *pirita*, *patara*, or *paauara*.

Dioscorea esculenta (Lambert) Burkill.

Creeping vine, having alternate, entire, heart-shaped, acuminate leaves. Leaf blade 0.125-2 inches long. Along the stems are axillary thorns, 0.0625 inch long, occurring at irregular distances. Produces edible tubers 1-3 inches long.

Not cultivated, growing only in the damp woods. Native name, *hoi tia*.

MUSACEAE

Musa Cavendishii Lambert.

Erect, stemless plant, having a short trunk of leaf stalks. Leaves glabrous, 6-8 in a dense, spreading head; blades 3-5 feet long, 1 foot broad; petiole grooved on the upper surface. Flower spike short, drooping. Fruits numerous, 4-5 inches long, seedless; skin thick, flesh delicately fragrant.

Cultivated by the natives. Native name, *maia*.

Musa paradisiaca Linnaeus.

Cultivated perennial herb, having entire, oblong leaves. Leaf blade 5-8 feet long, 8-12 inches broad, arranged in a large, terminal head; petiole thick, rounded on the under side, grooved along the upper surface, the sheath clasping the stem. Flower spike terminal, at first erect, gradually drooping, pendulous. The flower bud consists of several overlapping red fleshy bracts covering the blossoms. The bracts generally fall after fertilization takes place; the ovary swells and forms the fruit, which is arranged in alternate groups, one above the other, attached to the stout stem by a short peduncle. Fruits 6-9 inches long, 1.25 inches thick, curved; skin thin; flesh yellow, of fine flavor and texture.

Native name, *maia, meia*.

ZINGIBERACEAE

Alpinia purpurata Schumann.

Erect, many-stemmed plant, having gingerlike rhizomes. Stalks 4-6 feet high. Leaves alternate, acute, lanceolate, 6-20 inches long, 2-4 inches broad, glabrous, finely feather-veined; petiole short, decurrent, clasping the stem. Flowers few, small, white, at axils of the scarlet bracts, which are alternately formed on a tapering, terminal, pendent, showy raceme.

A rare plant. Introduced.

Zingiber Zerumbet (Linnaeus) Roscoe.

Stout, erect herb, 15-20 inches high, sprouting from a tuberous horizontal rhizome. Leaves alternate, lanceolate, entire, acuminate, 1-8 inches long, 0.75-1.25 inches wide, thin, both surfaces glabrous or slightly pilose on the under side; midrib prominent; petiole short. Flowers white, in an oblong foliose head, surrounded by spathe-like, dull-green bracts which become dull red when mature.

Common in the damp, dark woods. Native name, *opuhi*.

Hedychium flavum Roxburgh.

Erect herb, 3-6 feet high, having acuminate, oblong, alternate, entire, sessile leaves, glabrous on the upper side, hairy on the under side; blade 12-18 inches long, 2-2.75 inches broad. Flowers in a dense terminal spike, pale yellow, very fragrant.

Cultivated for the flowers, which are made into wreaths for personal adornment. Native name, *opuhi papaa*.

CANNACEAE

***Canna indica* Linnaeus.**

Stoloniferous plant, having a slender, erect stem 2-4 feet high. Leaves alternate, acute, oblong; blade 1-1.5 feet long; petiole short, clasping the stem. Flowers red, in a terminal, elongated spike. Fruit a glabrous capsule, containing several hard, black, round seeds, 0.375 inch in diameter.

Plants having variegated leaves. Flowers of various shades and colors were seen under cultivation.

ORCHIDACEAE

***Oberonia glandulosa* J. Lindley.**

Small orchid, on native trees. Leaves distichous, lanceolate. Flowers small, on a terminal spike 3-5 inches long.

Plentiful in the woods near the north side of the island.

***Taeniophyllum asperulum* H. G. Reichenbach.**

Small plant, having a flat, central, creeping rootstock attached to the moist bark of native trees. Flowers small, 0.125 inch long, yellowish green, on slender peduncles. Fruit a linear pod 1 inch long.

Common in the damp, dark woods.

***Vanilla planifolia* Andrews.**

Climbing vine, having stout, fleshy stems and axillary roots clinging to the bark of trees. Leaves alternate, entire, lanceolate, acuminate, glabrous, sessile. Blade 3-4 inches long, 1.25-1.75 inches broad, coriaceous. Flowers greenish yellow.

Rather rare. Grown as an ornamental.

CASUARINACEAE

***Casuarina equisetifolia* Linnaeus.**

Large leafless tree, having drooping branches. The simple pale-green jointed branches comprise the foliage. Flowers small. Fruit a cone or head consisting of many sections, a single seed in each.

A few specimens seen on the island, not common. The wood is hard and used for forming sharp-pointed sticks on which to remove the husks of coconuts. Native name, *tou, aito*.

PIPERACEAE

***Peperomia Moerenhouti* C. De Candolle variety *subglabra* Setchell.**

Small, succulent herb, 4-8 inches high, having opposite, rarely alternate, obtuse or acute leaves. Leaf blade mostly elliptical, less commonly obovate, 0.75 inch long, 0.5 inch broad; petiole short. Flowers minute, on a terminal spike. Fruit small.

This plant confines itself to damp, dark woods, growing on trees and rocks. Native names, *pape mato*, *tia papa*.

ULMACEAE

***Celtis paniculata* Endlicher.**

Small tree, 15-20 feet high. Leaves alternate, entire, acuminate, glabrous; blade 2-2.75 inches long, 0.75-1.25 inches broad, bright, shiny green, margins wavy; petiole 0.25 inch long. Flowers axillary, in a panicle. Fruit globose, 0.25 inch in diameter, having a persistent calyx, consisting of two projecting points covered with minute yellow hairs.

Common tree in the woods, along the paths in the village of Vaitepaua, and among coral rocks.

MORACEAE

***Artocarpus communis* Forster.**

Tree, 20-30 feet high, having alternate, broadly lobed leaves. It bears two kinds of flowers, which generally appear at the same time. Pistillate flowers form a globular head, which eventually becomes the fruit. Staminate flowers form an oblong catkin.

Paea and *maohi* are varieties that are cultivated, growing readily in pockets in coral rock, if treated with phosphate, bearing fruit 6-10 inches in diameter. A few trees were seen in the woods. At Maumu was a variety called *pi-ia* with foliage about the same as that of *maohi* but with smaller fruits, only the size of oranges. Another native name is *uru*.

***Cecropia palmata* Willdenow.**

Large tree, having alternate, peltate leaves. Leaf blade rounded in outline, having 7-11 segments. Flowers very small. Fruit a collection of fleshy spikes resembling the hand and fingers.

A cultivated tree in the village of Vaitepaua.

***Ficus prolixa* Forster.**

Large tree, 25-50 feet high, having alternate, entire, acuminate leaves. Leaf blade 3.5-6 inches long, 2.5-3.5 inches broad; petiole short. Fruit at axils of leaves, 0.25 inch in diameter.

This tree comprises a large part of the native trees of the island. It has aerial roots which descend from the branches, enter crevices and cracks of coral rocks, become established, and support the tree. The great quantity of such roots presents a very interesting sight. The natives use them to tie thatch on their houses and in other ways as a substitute for rope or string. Native names, *otua*, *ro'a*, *ora*.

URTICACEAE

***Pipturus velutinus* Weddell.**

Small, spreading tree, 5-10 feet high, the young branches and stems gray tomentose.

Leaves alternate, acute, ovate, crenate, upper surface smooth, under side silvery tomentose. Flowers sessile, in close heads.

Common, pantropic tree, in woods and open places, growing in crevices of coral rocks or hanging to cliffs above the sea on the eastern side of the island. The bark of this plant was formerly made into twine. Native names, *roa*, *romaha*.

Procris pedunculata (Forster) Weddell.

Small, erect-growing, succulent herb, 2-4 feet high. Leaves alternate, entire, narrow, acuminate, the margins wavy; petiole short. Staminate flowers white, small, in a corymbose head, supported on a slender peduncle. Fruit 0.5 inch in diameter, at the axils of the leaves, bright red when ripe, resembling a strawberry, edible.

Growing among coral rocks and in pockets of phosphate sand. Native names, *arei fa'a*, *araiha*.

Fleurya ruderalis Gaudichaud.

Small herb of erect habit. Leaves alternate, lanceolate, acute, serrate; blade 0.5-1.25 inches long, 0.5-0.75 inch broad, purplish green; petiole as long as the blade. Flowers in axillary, terminal racemes.

Native names, *iriaeo*, *waiamanu*.

LORANTHACEAE

Viscum articulatum Burmann.

Leafless, much-branched parasite, having opposite, green, thick, fleshy, flattened joints, broader at the ends rather than at the base. Flowers at the nodes, minute, sessile.

Common on native trees, especially on *Canthium barbatum*.

POLYGONACEAE

Antigonon leptopus Hooker and Arnott.

Tuberous-rooted, slender tendrill climber. Leaves alternate, entire, glabrous, cordate, acuminate; blade 3-5 inches long. Flowers rose-pink, in long racemes, having terminal tendrils, sepals 5. Fruit a small, brown 3-angled achene, which contains the seed.

Common in cultivated gardens.

Coccoloba uvifera Linnaeus.

Small, glabrous tree, having spreading branches. Leaves alternate, entire, glossy, leathery in texture, heart-shaped; blade 3-5 inches long, 5-7 inches broad, revolute, margins wavy. Flowers small, in a raceme, erect or pendent, fragrant. Fruit a small edible berry in large bunches, having an acid flavor.

Several trees seen about the village of Vaitepaua. Introduced from Tahiti. Known as "sea grape."

AMARANTACEAE

Achyranthes aspera Linnaeus.

Erect herb, 2 feet high; stems hairy, swollen at the nodes. Leaves opposite, elliptic-oblong, acuminate at both ends; blade 2.5-3 inches long, 1.25-1.5 inches broad, chartaceous when dry, under surface pubescent. Flowers on a terminal spike, small, petals pale lavender, having 5 stigmas. Fruit or seeds awnlike, adhering to clothing.

Common among coral rocks and along the roadways on the northern side of the island. Native name, *arofae* or *arofai*.

Alternanthera versicolor Regel.

Small, spreading, glabrous herb. Leaves opposite, entire, spatulate, acuminate at both ends, apex slightly mucronate; blade 0.5-1 inch long, blotched with red and green. Flowers small, in an axillary, compact head.

Used as a border plant. Escaped from cultivation. Along the paths and walks about the village of Vaitepaua.

Amarantus spinosa Linnaeus.

Small, erect herb, having fleshy stems armed with stout pricklers 1 inch long at the axils of the leaves. Leaves alternate, entire; blade 1.25-1.5 inches long, 0.75-1 inch broad. Flowers green, sessile, arranged on a long spike.

Common pantropic weed along roadways and in pastures.

NYCTAGINACEAE

Boerhaavia diffusa Linnaeus.

Perennial spreading herb, branches 1-2 feet long. Leaves opposite, ovate, or ovate-lanceolate, acute, glabrous; blade 0.125-0.25 inch long, narrow; petiole short. Flowers paniculate. Fruit small, covered with a sticky substance.

Common on roadways and in open fields. The roots are used as medicine by the natives.

Boerhaavia tetrandra Forster.

Herb with a stout stem, 1-2 feet long. Leaves opposite, broadly ovate, thick, obtuse; blade 0.5-1 inch long, 0.5-0.75 inch broad. Flowers pinkish, axillary on long peduncles. Fruit, small nutlets, covered with a sticky substance.

Common weed in pastures.

Bougainvillea glabra Choisy.

Glabrous vine, climbing tall trees and trained over trellises. Leaves alternate, entire, acuminate, ovate, bright green. Flowers small, enclosed in a 3-leaved, rose-red combination of bracts.

Introduced.

Ceodes umbraculifera Forster.

Large tree, having supporting buttresses and spreading branches. Leaves opposite, oblong, elliptical or ovate, acuminate or obtuse, slightly repand, light green, in whorls at ends of branches; blade 2.5-6 inches long, 1.25-3 inches broad, midrib prominent; petiole 1 inch long. Flowers dioecious, small, whitish green, in a terminal cluster. Fruit not in season.

One of the common trees growing in rocks and on cliffs above Terao and back of Maumu village. Native name, *puatea*.

Mirabilis Jalapa Linnaeus.

Cultivated, quick-growing, annual herb, having ovate-lanceolate, entire, acuminate leaves on short petioles. Flowers funnel-shaped, fragrant, opening in the afternoon, several colors seen about private gardens. Fruit a hard, black-ribbed, single seed.

PORTULACACEAE

Portulaca lutea Forster.

Erect, pantropic, glabrous herb, having fleshy, spathulate or opposite, obovate leaves scattered along the branches. Flowers axillary, petals 5, yellow. Fruit a fleshy capsule containing small seeds.

Common plant along pathways and in damp places.

Portulaca oleracea Linnaeus.

Prostrate weed. Leaves opposite, thick, spathulate, dull reddish green. Flowers small, yellow, open only during the daytime.

Common in damp, sandy places.

ANNONACEAE

Annona muricata Linnaeus.

Evergreen, small, bushy tree, having alternate, entire, acuminate, oblong-obovate leaves. Leaf blade 4-7 inches long, 1.5-2.75 inches broad; petiole 0.25 inch long. Flowers large; exterior petals greenish yellow, rigid; inner petals smaller, whitish green. Fruit large, fleshy, ovate, dark green; skin bearing soft, fleshy spines; pulp white, cotton-like, juicy, slightly acid, having numerous brown, oblong seeds 0.5 inch long.

Cultivated plant, not very common.

Annona reticulata Linnaeus.

Small deciduous tree, 6-10 feet high, having alternate, entire, acute leaves. Leaf blade 1.75-5 inches long, 1-1.75 inches broad; petiole stout, 0.5 inch long. Flowers axillary, having green, oblong, linear petals. Fruit 2.5-4 inches in diameter, surface divided into many hexagonal areoles.

Extensively grown about habitations, also escaped from cultivation. Native name, *taputapu*.

Annona squamosa Linnaeus.

Small, bushy tree, having spreading branches. Leaves alternate, acute, lanceolate, entire, pale green; blade 3-7 inches long, 1-1.25 inches broad. Flowers pale greenish yellow, in clusters at axils of leaves. One flower becomes fertilized and forms a heart-shaped fruit 3-4 inches long. Fruit with yellowish-pink skin covered with a glaucous bloom; pulp yellowish white, having a custardlike flavor, many oblong seeds.

Cultivated, also growing wild in the woods, among rocks and in crevices. Native name, *taputapu*.

LAURACEAE

Cassytha filiformis Linnaeus.

Twining herb, parasitical. Leaves and stems bright yellow, the leaves reduced to minute scales. Flowers small axillary. Fruit yellow, 0.25 inch in diameter, globose.

Common near the sea coast. Native name, *ainoa*.

Persea americana Miller.

Large tree under cultivation. Leaves alternate, entire, oval or elliptical, acuminate; blade 4-9 inches long, 2.25-6 inches broad; petiole 1-1.5 inches long. Flowers in an axillary panicle, appearing in October.

Several fine specimens were seen, fruit of indifferent quality. Native name, *apoka*.

HERNANDIACEAE

Hernandia ovigera Linnaeus.

Large tree, having alternate, peltate, acute, entire, ovate leaves on long petioles. Midrib prominent, nerves feather-veined. Flowers unisexual, in panicles clustered at the ends of the branches. Fruit a single black seed, hanging within a loose, balloonlike, fleshy sac, which is open at its lower end and tinted with red.

A few trees growing at Maumu near the sea. Not common. Native name, *tianina*.

CRUCIFERAE

Cardamine sarmentosa Forster.

Glabrous wayside annual, 6-12 inches high, having pinnate leaves on long petioles. Flowers small, white. Fruit an erect linear pod, containing many small seeds.

Common in cultivated gardens and damp places. Native name, *patoa puararahi*.

Lepidium piscidium Forster.

Small hollow-stemmed, glabrous herb, having alternate, entire, elliptical leaves. Leaf blade 1-1.5 inches long, 0.5-0.75 inch broad, acute at both ends, tapering into a short petiole. Flowers small, white, arranged along a terminal spike. Fruit a flat, small pod, 2-celled, on a slender peduncle.

Common plant near the sea.

CAPPARIDACEAE

Capparis sandwichiana De Candolle.

Sprawling, tender shrub, having alternate, entire oblong leaves, rounded at both ends. Leaf blade 2-3 inches long, 1.5-2.25 inches broad; petiole 1.25 inches long. Flowers axillary, large, white, fragrant, on long peduncles and having many stamens. Fruit an oblong berry, 1-2 inches long, 0.75 inch in diameter, ribbed lengthwise, containing many seeds. Peduncle 4 inches long.

A common plant, growing among coral rocks and hanging from the cliffs above Temao. Native name, *puapilo*.

Polanisia icosandra (Linnaeus) Wight and Arnott.

Erect herb, leaves digitate, stems and petioles prickly. Leaflets covered with a sticky pubescence. Flowers yellow, in a terminal raceme. Fruit linear, 2-3 inches long, covered with a viscid gum.

Common pantropic weed by roadsides and paths. Native name, *piri piri*.

CRASSULACEAE

Bryophyllum pinnatum (Lamarck) Kurz.

Glabrous, succulent herb, 2-3 feet high, having opposite, ovate, crenate leaves. Leaf blade 2.5-3 inches broad; petiole short. Flowers bell-shaped, in a loose, erect panicle; color green, tinged with reddish yellow.

LEGUMINOSAE

Abrus precatorius Linnaeus.

Strong-climbing, tropical vine. Leaves alternate, abruptly pinnate; leaflets entire, oblong, in numerous pairs, 12-20, opposite, sessile, 0.25-0.5 inch long, 0.25 inch broad, pale green. Flowers small, white, in dense racemes. Fruit a pod, containing several bright-red, globose seeds, one third of each covered with a black spot.

Grows wild in many places on the island. Cultivated for the seeds, which are strung into necklaces for personal adornment. Native name, *pitipiti o*.

Adenantha pavonina Linnaeus.

Large tree, having bipinnate leaves. Leaflets 13, ovate, obtuse, glabrous on both sides. Flowers small, in axillary racemes, white and yellow in the same cluster. Fruits numerous, consisting of twisted pods containing hard, red, lens-shaped seeds, 0.25 inch in diameter.

Cultivated about the village of Vaitepaua and at Maumu, also seen growing in the woods, having escaped from cultivation. Seeds strung as ornaments. Native name, *piti o-papaa*.

Bauhinia monandra Kurz.

Small, deciduous tree, having slender, spreading branches. Leaves alternate, 2-lobed; blade 3-4 inches long, having 8-10 nerves. Flowers in a simple, terminal or axillary

raceme; petals 5, rose-colored, one petal variegated, having red and yellow spots. Fruit a brown, smooth, strap-shaped pod, containing several flat seeds.

Cultivated about dwellings for the tender young terminal leaves, which are used for medicine by the natives. Native name, *pini*.

Cassia alata Linnaeus.

Shrub 4-6 feet high, branches stout and brittle, having glabrous, subsessile, abruptly pinnate leaves. Leaflets minutely mucronate. Flowers yellow, venation prominent. Pod or fruit membranous, 3-5 inches long, having a broad wing down the middle of each valve, pod containing 50 or more seeds.

Cultivated for its ornamental blossoms. Not very common.

Cassia occidentalis Linnaeus.

An ill-smelling, glabrous weed, 2-4 feet high. Leaves alternate, abruptly pinnate, having a prominent gland at the base of the petiole; leaflets opposite, in four pairs, ovate-lanceolate, acute, sessile, 1.5-3 inches long, 0.75-1 inch broad. Flowers yellow, 0.75 inch across the corolla, pedicelled at the axils of the leaves. Pod linear, flat, curved, containing many seeds.

The leaves are used medicinally, and a concoction prepared from the roots is used to treat certain skin affections. Common on roadsides and in pastures.

Crotalaria saltiana Andrews.

Erect shrub, 2-3 feet high, with some branches. Leaves alternate, consisting of 3 entire, sessile leaflets; blades obovate, 1.5-3 inches long, 0.75-1.75 inches broad, pale green, thin, smooth on the upper surface, somewhat glaucous beneath; petioles long. Flowers in a long terminal raceme, petals yellow, slightly tinged with red. Fruit a pod 1.25-1.75 inches long, keeled, having a curved beak, containing 15-30 small, gray seeds.

Common along roadways and in pastures.

Delonix regia (Bojer) Rafinesque-Schmaltz.

Introduced and cultivated tree, having spreading branches. Leaves bipinnate, 1-2 feet long, 10-20 pairs of pinnae, each pinna having many small, oval leaflets. Flowers bright scarlet, in large racemes; petals 5, one having yellow stripes. Pod flat, straplike, 8-20 inches long; seeds oblong, 0.5 inch long, marked with gray.

A rare tree seen only in private gardens. It was formerly called *Poinciana regia*.

Desmodium heterocarpum (Linnaeus) De Candolle.

Erect herb, 1-2 feet high. Leaves consisting of 3 broadly ovate, entire, obtuse, emarginate leaflets; terminal blade 0.75-1.5 inches long, 0.75 inch broad; petiole short. Flowers small, pink. Seed pod sessile, the outside covered with a sticky substance.

Common along the roadway to Maumu. Native names, *tia pipi*, *piripiri*.

Dolichos Lablab Linnaeus.

Strong-growing vine, having glabrous, palmately trifoliate leaves. Leaflets acute,

entire, triangular-ovate, 2.5-3.5 inches long, 1.5-1.75 inches broad. Flowers white, on a short pedicel. Fruit a small pod, 2-3 inches long, falciform, smooth; seeds 2-4, edible.

This plant seen only on the northern side of the island. Rare.

Inga edulis von Martius.

Large, spreading tree. Leaves alternate, having 2-5 pairs of opposite leaflets, abruptly pinnate, sessile, a gland between each pair, acute or acuminate, lanceolate, glaucous on the upper surface, the under side light green, midrib and veins prominent. Flowers in axillary racemes, pale green, having many stamens. Fruit a thick pod, 6-15 inches long, 2 inches broad, containing several large seeds covered with a sweet spongy white edible pulp.

A cultivated tree, introduced from Tahiti. Native name, *pakai*.

Tamarindus indica Linnaeus.

Large evergreen tree, having abruptly pinnate leaves. Leaflets 20-40, opposite, entire, obtuse, 0.5-0.75 inch long, pale green. Flowers few in a raceme, pale yellow, veined with red. Fruit a plump, thin-shelled pod, containing several hard, dark-brown seeds, covered with a sticky, firm, acid pulp.

Several fine specimens of trees seen under cultivation in the village of Vaitepaua and at Maumu.

Phaseolus lathyroides Linnaeus.

Small, erect herb, having alternate, lanceolate, trifoliate leaves. Blade of terminal leaflet 1-1.75 inches long, 1 inch broad, acute at both ends; secondary pair of leaflets smaller, sessile; petiole 1-1.75 inches long. Flowers axillary, dark red, on a stiff, pilose raceme, 6-12 inches long. Fruit a linear pod, 2 inches long.

A common wayside weed.

RUTACEAE

Citrus aurantium Linnaeus.

Medium-sized, thorny tree, having alternate, acute, glabrous, entire leaves. Leaf blade 2-3 inches long, 1.5-1.75 inches broad; petiole winged, short. Flowers white, fragrant. Fruit globose, pulp sweet, containing many seeds.

This tree grows wild in the woods. Native name, *anani*.

Citrus hystrix De Candolle.

Large evergreen tree, 10-15 feet high, having many spreading branches. Leaves opposite, coriaceous, decidedly winged, margins crenate, the lower section cuneate, the terminal ovate, obtuse, midrib prominent; petiole short. Small axillary thorns on the young branches. Flowers not seen. Fruit spherical, abundant, 1.75-2.5 inches in diameter; skin thick, surface lumpy, containing many oil glands; contents rather dry, having many seeds.

Cultivated plant, not very common. The skin is grated and used in confectionery.

Citrus aurantifolia (Christmann) Swingle.*(C. limetta, C. medica* variety *acida*, synonyms.)

Small tree, 6-15 feet high, branching from the base, having many stout thorns at the axils of the leaves. Leaves alternate, entire, margins wavy, blade 1.75-2.5 inches long, 1.25-1.75 inches broad. Flowers white, small, fragrant. Fruit oblong, light yellow; skin smooth, having a prominent apical papilla; contents juicy, very acid, containing 15-20 seeds.

Tree is generally cultivated, also seen growing wild in the woods.

SIMARUBACEAE

Suriana maritima Linnaeus.

Small shrub or bushy tree, 3-6 feet high, having opposite, entire, oblong, glaucous, thick, fleshy leaves, crowded at the ends of the branches. Leaf blade 0.5-0.75 inch long, narrow. Flowers axillary, solitary, corolla salver-shaped, petals 5, yellow. Fruit a compressed, compact capsule, having 3-5 golden brown seeds, pointed at one end. Wood hard and durable, of fine grain.

Common along the beach at Maumu, not seen elsewhere on the island. Native name, *ouru*.

EUPHORBIACEAE

Acalypha hispida Burmann.

Garden shrub, having alternate, acuminate, serrate leaves. Leaf blade 4-6 inches long, 3-4.5 inches broad; petiole slender, 2-3 inches long. Flowers numerous, forming a red spike 6 inches-2 feet long at the axils of the leaves.

Common under cultivation.

Acalypha Wilkesiana Mueller of Aargau.

Ornamental shrub, having alternate, acuminate, serrate, ovate leaves. Leaf blade 2-6 inches long, 1.5-4.5 inches broad; petiole 0.5 inch long. Leaves mottled with red and green, upper and lower surfaces pilose. Flowers small, in a spike at the axils of the leaves.

A common cultivated hedge plant.

Aleurites moluccana (Linnaeus) Willdenow.

Spreading softwood tree, having alternate, acute, ovate or rhombo-lanceolate, light-green, leaves, cordate at base, and with under surface tomentose. Leaf blade 3-10 inches long, 4-8 inches broad; petiole longer than the blade. Flowers small, creamy white, in terminal racemes, petals 5. Fruit a 1-seeded nut with a bony shell and a kernel yielding oil. The bark has strong tannic properties.

Cultivated about dwellings, also in the woods growing wild. The natives use the bark to dye their fish nets dark brown. Native names, *tia iri*, *tuitui*.

Breynia nivosa (W. J. Smith) Small.

Small shrub, having alternate, entire, ovate-elliptical, obtuse, leaves. Leaf blade

0.5-1 inch long, dull green, mottled with red, white, and pink; petiole short. Flowers axillary, small, white.

A cultivated hedge plant.

Codiaeum variegatum (Linnaeus) Blume.

Glabrous shrub with variegated foliage. Leaves alternate, entire, pinnately veined. Flowers small, yellowish green, on a long, axillary, pendent spike.

Common under cultivation as an ornamental, many different color forms. Known as "croton."

Euphorbia Chamissonis Boissier.

Erect-growing herb, having opposite, entire, obovate, emarginate leaves. Leaf blade 0.5-1.25 inches long, 0.25-0.75 inch broad. Flowers small, green, in a terminal cyme.

The stems, leaves, and flowers when bruised emit a white fluid, which is poisonous. Native name, *atoto*.

Euphorbia hirta Linnaeus.

Annual, with hairy stems and branches. Leaves opposite, acute, serrate, ovate; blade 0.5-0.75 inch long, 0.25-0.5 inch broad. Flowers and fruit small, axillary, crowded into a compact head.

Common pantropic weed, by roadsides and paths.

Euphorbia prostrata Aiton.

Small, glabrous herb, having opposite, entire, small, oblong leaves. Leaf blade 0.25 inch long, 0.125 inch broad, margins of many wavy. Flowers axillary, small. Fruit a trigonous capsule, composed of 3 cells, 1 seed in each.

Common in the pathways and along the beach in sandy soil. Native name, *moemoe*.

Euphorbia splendens Bojer.

Low-growing plant, branches spreading, armed with stiff spines, having few bright-green leaves on the young growth. Near the ends of the stems small flowers appear, each bearing two bright-red bracts.

Cultivated pot plant. A milky, sticky, poisonous fluid issues from the stem when bruised or broken.

Glochidion ramiflorum Forster.

Medium-sized tree, having alternate, entire, acute, coriaceous, elliptical leaves. Leaf blade 2.5-5 inches long, 1.5-1.75 inches broad; petiole short. Flowers axillary. Fruit a compressed, ribbed capsule with several sections, each containing 2 flat, red seeds, 0.25 inch in diameter.

One of the indigenous trees of Makatea. Common on the strand at Maumu. A hardwood tree, the timber used in the construction of native houses. Native name, *maame*.

Manihot utilisima Pohl.

Cultivated shrub, having 3-5-parted, alternate, glabrous leaves, with lobes 2-6 inches long. Petiole long, slender. Producing tubers.

Cultivated in the village of Vaitepaua and at Maumu for the large tubers, which are grated and macerated in water until a white sediment is precipitated. After a few washings the sediment is dried and becomes like flour, which is edible only when cooked. Native name, *maniota*.

Phyllanthus Niruri Linnaeus.

Small, monoecious annual, 8-12 inches high, having angular stems. Leaves variable in size, oblong, pale green, glaucous on the under surface, tips acute; petiole short and slender. Flowers white, numerous. Stipules linear-lanceolate. Fruit or seed pod globose, depressed, smooth.

The milky juice, which appears when the stems are cut or bruised, is used by the natives as a remedy for skin affections.

Phyllanthus societatis Mueller of Aargau.

Small, monoecious, half-erect shrub, having alternate leaves. Leaflets on each side of branch 20-40, 0.25-1 inch long, sessile, entire, mucronate, cuneate. Staminate flowers numerous, slender stalked, in axillary clusters; sepals 6, oblong-ovate, having 6 alternate glands at the base; stamens 3, filaments united. Pistillate flowers axillary, small, most single; sepals 6, waxy white; ovary 3-lobed subtended by an entire, glandular disc. Fruit small, depressed, 0.125 inch in diameter, composed of 3 sections, each of these 2-seeded.

Common plant among coral rocks.

Ricinus communis Linnaeus.

Erect, glaucous, and glabrous plant, having hollow stems. Leaves alternate, peltate, palmately divided, having 7 broadly lanceolate, serrate lobes. Flowers in a terminal racemelike panicle 4-10 inches long. Fruit an echinate capsule composed of three sections of bony texture, each containing a single, smooth, oblong seed, grooved on one side.

Common weed in open country, growing wild.

ANACARDIACEAE

Mangifera indica Linnaeus.

Large tree, having alternate, entire, lanceolate, acute leaves. Leaf blade 8-10 inches long, 1-1.5 inches broad, bright green, shiny. Flowers with 5 petals, yellowish red, in large terminal panicles. Fruit oblong, of various sizes; skin smooth, greenish yellow to dull red; pulp yellow, rather stringy; seed large, with many fibrous threads attached to it, interior filled with the embryo.

Cultivated and growing in the woods, having escaped from gardens. Native name, *vi papaa*.

SAPINDACEAE

Allophylus ternatus (Forster) Radlkofer.

Tree 15-20 feet high. Leaves alternate, trifoliate, on long petioles; terminal blade serrate, oval or elliptical, acuminate at both ends, 1.25 inches long, 0.75-3.25 inches broad; secondary leaflets smaller, uneven sided, the lower half bulging inward; midrib prominent, veinlets inconspicuous, having at their junction with the midrib a collection of fine hairs. Flowers in an axillary raceme, small, 0.125 inch in diameter, greenish white. Fruit a drupe appearing in pairs, 0.25 inch in diameter.

A hardwood tree, common in the forest.

Dodonaea viscosa (Linnaeus) Jacquin.

Shrub or small tree. Leaves glabrous, entire, linear-lanceolate, sessile, margins revolute; blade viscid, 1-2 inches long. Flowers small, yellowish, on slender, axillary pedicels. Fruit a flat, winged orange-brown capsule, growing in large bunches, each fruit containing a single, small, black seed.

Common plant in open, dry country. Native names, *aeae*, *apiri*.

Melicocca bijuga Linnaeus.

Deciduous, unisexual, glabrous tree. Leaves abruptly pinnate; leaflets in 2 pairs, elliptical, entire, bright shiny green; blade 2.75-4 inches long, 1.5-1.75 inches broad. Flowers small, white, fragrant, in large terminal racemes. Fruit 1 inch long, greenish yellow; skin thick; seed single, surrounded by a juicy, aromatic pulp, having the flavor of grapes.

A rare tree. A single specimen seen in the village of Vaitepaua.

RHAMNACEAE

Colubrina asiatica Brongniart.

Spreading shrub, climbing over rocks. Leaves alternate, acuminate, cordate, membranous; blade 1.5-2.5 inches long, 1 to 1.5 inches broad; petiole 0.25-1 inch long. Flowers 0.25 inch in diameter, in axillary cymes, petals greenish yellow. Fruit round, 0.25 inch in diameter, in three sections, grooved, brown when ripe, having several black seeds.

Common among the coral rocks and near the edges of the forest. Formerly the stems and leaves were bruised and macerated in water to obtain a substance used as a substitute for soap. Native names, *itere*, *tutu*.

TILIACEAE

Triumfetta procumbens Forster.

Creeping herb, having long, trailing pubescent stems. Leaves alternate, 3-cleft, crenate, tomentose. Flowers yellow, single or in pairs at axils of the leaves. Fruit an echinate bur 0.25-0.5 inch in diameter, having numerous short, soft, pale-yellow bristles.

Common pantropic weed, growing on the beach at Temao and Maumu. The stems contain a tough fiber formerly made into fish lines. Native names, *urio*, *kupili*, *piripiri*.

Triumfetta velutina Vahl.

Erect herb, 2-4 feet high, having alternate, acuminate, serrate, pubescent leaves; petiole 0.25-1 inch long. Flowers pendulous, yellow, each having 5 petals, 2-ranked, at the axils of the leaves. Fruit a small, globose bur, covered with small, stiff hairs.

Common in open country and along paths. Native name, *piripiri*.

MALVACEAE

Gossypium hirsutum Linnaeus variety **religiosa** (Linnaeus) Watt.

Spreading shrub, as much as 6 feet high. Stems, leaves, and petiole dotted with small red specks. Leaves alternate, thick, bluish green, often turning to dull brick red when dry; some leaves cut halfway into 3 acute lobes, others cordate; margins entire; sinus narrow, having a rounded base; blade 1.25-2 inches long, 1.5-2.75 inches broad, upper and lower surfaces smooth; petiole long and slender. Flowers large, axillary, petals 5, pale sulphur yellow, connected at the base. Capsules or bolls ovoid, coriaceous, in 3 sections, each cell holding 1-3 seeds enveloped in an adhering, short, fibrous tawny lint or cotton.

A single specimen of this rare plant was found on the northern end of the island, in flower and fruit, October 1932. Native name, *vavai*.

Hibiscus rosa-sinensis Linnaeus.

Shrub cultivated for its ornamental flowers. Leaves ovate, acuminate, entire at the base, coarsely toothed at the apex. Flowers solitary, occurring at the upper axils of the new growth.

Several hybrids were seen in private gardens. Introduced. Native name, *aute*.

Hibiscus schizopetalus (Masters) J. D. Hooker.

Tall, glabrous shrub, having many slender, drooping branches. Leaves ovate-elliptical. Flowers coral red, on long slender peduncles; petals 5, deeply incised; pistil long, supple, extending several inches beyond the petals.

Introduced as an ornamental.

Hibiscus tiliaceus Linnaeus.

Spreading tree, 10-20 feet high. Leaves entire, acuminate, cordate, crenate, 3-12 inches in diameter, glabrous above, tomentose on the under side; palmately 7-9 nerved, the 3 middle nerves having nectar glands near the blade. Flowers axillary, one or more at the ends of the branches, pale yellow, having a dark center, on fading turning to brick-red, petals 5. Fruit a capsule having 5 cells, each containing several small seeds.

Common along the beach at Maumu and in the forest. Ancient native name, *fau*; modern native names, *burau*, *au*.

Malvastrum coromandelianum (Linnaeus) Garcke.

Erect herb, 18-24 inches high, bearing numerous hairs on stems and branches. Leaves ovate to lanceolate, 1-1.25 inches long, margins serrated; petiole 0.5 inch long.

Flowers at the ends of the branches, numerous, small, yellow. Fruit a compressed capsule containing several seeds.

Common weed in open places and by paths and roadways.

Sida acuta N. L. Burmann.

Erect shrub, having alternate, lanceolate, serrate leaves. Flowers small, yellow, petals 5.

Pantropic weed, common in many places on the island. Branches are tied in bundles and used as brooms. Native name, *porumi*.

Sida rhombifolia Linnaeus.

Low shrub, 2-4 feet high, having rhomboidal, acute leaves. Leaf blade 0.75-1.5 inches long, light green on the upper surface, hairy on the under surface; petiole short. Flowers axillary, pale yellow, petals 5.

Common plant in open country. It is tied in bundles which are used as brooms. Its bark yields a fine fiber. Native name, *porumi*.

Thespesia populnea (Linnaeus) Solander.

Large, spreading tree, 10-15 feet high. Leaves entire or lobed, acuminate, cordate, glabrous; blade 2.5-4 inches in diameter; petiole 2-4 inches long. Flowers yellow, changing to purplish pink on withering. Fruit a globose, compressed capsule, containing numerous seeds.

Native names, *amae*, *miro*.

BOMBACACEAE

Ceiba casearia Medicus.

Large tree, having spreading branches, spiny knobs on the trunk. Leaves digitate, on long, slender petioles; leaflets 5-7, lanceolate, acuminate, upper and under side smooth. Flowers white; petals 5, long and narrow, hairy on the outside. Fruit an oblong capsule, 4-6 inches long; composed of 5 sections, containing many black seeds the size of a pea, to which are attached cottony fibers.

Common about dwellings, cultivated for the fiber, which is used for stuffing pillows and mattresses. Native name, *va vai papaa*.

STERCULIACEAE

Waltheria americana Linnaeus.

Erect, glaucous shrub, having alternate, ovate, serrate, obtuse leaves. Leaf blade 1.75-2 inches long, 1-1.75 inches broad, pale green. Flowers axillary, sessile, in a compact cyme.

A pantropic weed, seen only near the top of the cliffs by the office of the Makatea Phosphate Company.

Melochia odorata Linnaeus.

Small, glaucous tree, having spreading branches. Leaves alternate, acuminate, crenate, ovate; blade 3-7 inches long, 2.5-5 inches broad, obtuse at the base, midrib prominent; petiole equalling the blade in length. Flowers in an axillary cyme; petals 5, yellowish-white. Fruit a hairy capsule, cone-shaped, in 5 sections, each containing a single brown seed.

Common in the open country. Native name, *ma'o*.

GUTTIFERAE

Calophyllum inophyllum Linnaeus.

Large tree, 15-25 feet high, having glabrous, spreading branches. Leaves opposite, entire, acuminate, coriaceous, shiny; blade 4-8 inches long, 3-5 inches broad, emarginate, veins parallel; petiole short. Flowers small, fragrant, sessile, on axillary racemes, having 4 petals and many yellow stamens. Fruit globose, 1.5-2 inches in diameter containing a fleshy kernel, which is the seed.

Not a common tree, a few specimens growing on the north end of the island. Native names, *ati*, *tamanu*.

FLACOURTIACEAE

Homalium acuminatum Cheeseman.

Large, evergreen tree. Leaves opposite, elliptical, crenate, acute at both ends, margins wavy; blade 2-5 inches long, 1.75-2.5 inches broad, veins prominent; petiole short. Flowers numerous, in a pendent raceme. Fruit not seen.

A hardwood tree, common about the island, well known to the natives, who consider it indigenous. Native name, *mouo*.

Xylosma suaveolens Forster.

Medium-sized, upright tree, having alternate, elliptical, crenate, coriaceous leaves. Leaf blade 1-1.75 inches long, 0.75-1.75 inches broad; midrib and veins prominent; petiole short. Flowers in axillary corymbs, having 5 petals, the edges fringed with minute hairs, stigmas numerous. Fruit a small berry, 0.25 inch in diameter, peduncle short.

This species is one of the prominent trees of Makatea, useful on account of its hard wood, from which charcoal is made. Native name, *rama tia*.

PASSIFLORACEAE

Passiflora foetida Linnaeus.

Strong-growing, perennial vine. Leaves alternate, acute, cordate; blade 2-3.5 inches long, 2.5-3 inches broad, margins irregularly sinuous, the under side beset with numerous small, sticky specks; petiole 1-1.5 inches long, clasping the stem. Flowers axillary, petals purple, fugaceous. Fruit ovoid, 0.75 inch thick, light green, surrounded by 3 lace-like bracts which are covered with an offensive-smelling gum; pulp soft and containing many seeds.

Common plant, climbing over rocks and low bushes, especially in dry, sunny sections of open country.

CARICACEAE

Carica Papaya Linnaeus.

Plant having a straight, hollow trunk, 4-10 feet high. Leaves palmately 7-lobed; petiole hollow, 3-4 feet long. Staminate and pistillate flowers on separate trees, the fruit-bearing or pistillate being axillary, composed of 5 lanceolate petals curving backward and exposing the pericarp. Fruit variable in size and shape on the same tree. At the terminal end of the fruit are 5 pistils having several spreading tips or points; interior of fruit hollow, containing numerous seeds.

Commonly grown under cultivation in the village of Vaitepaua, also growing in a wild state in woods and open country. Native name, *iita*.

CACTACEAE

Nopalea coccinellifera Salm-Dyck.

Thornless, arborescent, much-branched cactus, having flat, obovate stems on a stout stalk. Jointed stems 6-10 inches long, 3-5 inches broad. Flowers solitary. Fruit a berry 2 inches long, scarlet when ripe, containing numerous, small, flat seeds imbedded in translucent, soft pulp.

Introduced from Tahiti. The expressed juice from the blades is applied as a remedy to swollen joints afflicted with filaria.

LYTHRACEAE

Pemphis acidula Forster.

Small, spreading shrub, 2-4 feet high, having opposite, entire, acute, obovate leaves, acuminate at the base. Leaf blade glaucous, 0.5-0.75 inch long, 0.25-0.5 inch broad. Flowers axillary, single, having 6 white petals, peduncle twice the length of the tube. Fruit a small capsule, which contains a number of small seeds.

A common plant on the beach at Maumu and a few specimens seen at Temao. The wood is exceedingly hard and is used for handles on domestic implements; the angular branches are made into peculiar wooden fishhooks. Native names, *mikimiki*, *aie*.

LECYTHIDACEAE

Barringtonia asiatica (Linnaeus) Kurz.

Large, spreading tree, having alternate, entire, obtuse, coriaceous leaves. Leaf blade 6-15 inches long, 7-12 inches broad. Flowers large; petals 4, white; stamens many, resembling a brush. Fruit a 4-sided pyramid, 3 inches in diameter, having a persistent calyx; a single large seed within the parchmentlike covering.

A few trees are scattered around the edge of the forests, and some fine specimens grow along the north end of the island. Native names, *hotu*, *hutu*.

COMBRETACEAE

Terminalia Catappa Linnaeus.

Medium-sized shade tree, with branches in horizontal whorls. Leaves alternate, entire, obovate, glaucous when young, clustered at the ends of the branches; blade 6-8 inches long, base caudate; petiole short. Flowers small, axillary, spicate. Fruit an

ellipsoid, 1.25 inches long, compressed; endocarp hard, enclosing an oblong, edible seed, having the flavor of walnuts.

Several specimens seen out in the open country. Native names, *autaraa*, *aua*.

Terminalia littoralis Seemann.

Small tree, branches spreading, having alternate, entire, spatulate leaves, crowded at the ends of the branches. Leaf blade glaucous, 2.5-4.5 inches long, 2-2.5 inches broad, midrib prominent; petiole 0.5-0.75 inch long. Flowers small, in a terminal raceme. Fruit oblong, sessile, 0.75 inch long, keeled, bright red when ripe; the epicarp thin, fleshy; seed contained in the woody, fibrous part of the fruit.

A rare tree seen only on the beach at Maumu. Native name, *taraire*.

MYRTACEAE

Eugenia Jambolana Lamarck.

Leaves opposite, entire, oblong, coriaceous, acuminate; blade 2.5-6 inches long, 1-2.5 inches broad. Flowers white, fragrant, having numerous stamens. Fruit a drupe, dark purple when ripe, having a thin skin; pulp edible, but tart and puckery, surrounding a single, large, oblong seed.

An introduced tree seen in the forest near Maumu, escaped from cultivation. Native name, *kahika papaa*.

Eugenia Jambos Linnaeus.

Evergreen tree, 15-25 feet high. Leaves opposite, acuminate, lanceolate, glabrous, coriaceous; blade 5-8 inches long, 1-2 inches broad. Flowers composed of many greenish-white stamens. Fruit pyriform, 1.5-2 inches in diameter, interior cavity containing a single large unattached seed; flesh firm, crisp, edible, 0.25 inch thick, creamy pink, having the flavor of roses.

Not a common tree. Native name, *kahika*.

Eugenia malaccensis Linnaeus.

Large pantropic forest tree. Leaves opposite, entire, elliptical, glabrous, attenuate at both ends; petiole short. Flowers borne on old wood in dense axillary cymes, having numerous bright scarlet stamens. Fruit globose, crowned by the scar of the calyx lobes; pulp edible, sweet, watery, containing a single large seed.

Common in the wet forest on the northern side of the island. Native name, *kahiki*.

Eugenia uniflora Linnaeus.

Shrub or small bush, having opposite, entire, ovate-lanceolate leaves. Leaf blade 1-2 inches long, 0.5-0.75 inch broad, upper and lower surface glossy; petiole short. Flowers in an axillary cyme, white, fragrant, having numerous yellowish-green stamens. Fruit a berry 0.75 inch in diameter, ribbed longitudinally, scarlet when ripe; pulp edible, surrounding a single large seed.

Commonly cultivated, also escaped from gardens, seen growing wild among rocks.

Psidium Cattleianum Sabine.

Small spreading, bushy tree, having opposite, entire, obovate-elliptical, coriaceous, glabrous leaves, acute at the apex, tapering to acuminate at the base. Leaf blade 2-3 inches long, 1-1.25 inches broad, light green; petiole short. Flowers with 5 petals, white, stamens numerous, fragrant. Fruit obovate, 1.5 inches in diameter; skin thin, when ripe reddish purple, containing a tart, aromatic pulp having numerous hard, small, round seeds.

Not a common plant. Seen only under cultivation in the village of Vaitepaua. Native name, *tuava papaa*.

Psidium Guajava Linnaeus.

Shrub or small tree, having opposite elliptical, entire, obtuse leaves. Leaf blade 2.5-4 inches long, 1.25-2 inches broad, light green, midrib and veins prominent; petiole short. Flowers axillary, petals 5, white, fragrant, having numerous stamens.

A common plant, found in many places on the island. Native name, *tuava*.

ARALIACEAE

Polyscias filicifolia (C. Moore) L. H. Bailey.

Erect-growing shrub. Leaves alternate, pinnately 3-compound, serrate, bright green splashed with white; petiole 3-4 inches long, clasping the stem at the base. Neither flowers nor fruit seen.

Common plant under cultivation as an ornamental. Introduced from Tahiti.

Polyscias Guilfoylei (Bull) L. H. Bailey.

Erect shrub. Leaves regularly pinnate; leaflets ovate or ovate-elliptic, on short, stout petiolules; blade bright green, margins having acuminate teeth bordered with white; petiole expanded and clasping the stem at the base. Flowers in a terminal, lax raceme, rare. Fruit not seen.

MYRSINACEAE

Rapanea ovalis (Nadeaud) Mez variety.

Small, spreading tree, having alternate, acute, obovate, obtuse, entire leaves. Leaf blade 1.5-2 inches long, 1.25-1.5 inches broad; midrib prominent, veins inconspicuous. Flowers minute, in clusters on branches. Fruit globose, 0.25 inch in diameter, containing a single seed. Wood finely grained, hard, reddish.

One of the principal species of trees found on the island.

SAPOTACEAE

Achras sapota Linnaeus.

Large evergreen tree, 60 feet high, having alternate, entire, ovate-elliptical leaves, acute at both ends. Leaf blade 2-5 inches long, 1-1.75 inches broad; midrib prominent, veins inconspicuous; petiole 0.5 inch long. Flowers axillary, small near the ends of branches. Fruit oblong, 1.25-2 inches in diameter; skin a dark brown when ripe; pulp firm, containing several flat seeds 0.75 inch long.

A single specimen of this tree grows on Makatea, in the village of Vaitepaua.

Planchonella Grayana St. John, new name.

Sapota ? *Vitiensis* Gray, Am. Acad. Arts Sci., Proc., vol. 5, p. 328, 1862.

Sideroxylon vitiense (Gray) Burkill, Linn. Soc. London, Bot., Jour., vol. 35, p. 44, 1901.

Lucuma vitiensis (Gray) Gillespie, B. P. Bishop Mus., Bull. 74, pp. 12-13, fig. 14, 1930; not *Planchonella vitiensis* Gillespie, B. P. Bishop Mus., Bull. 74, pp. 11-12, fig. 12, 1930.

Sideroxylon species. Wilder, B. P. Bishop Mus., Bull. 86, p. 87, 1931.

Tree 3-10 meters (10-30 feet) high, as much as 45 cm. (18 inches) in diameter, the bark gray, and the heartwood white. Branchlets with appressed, reddish, woolly hairs, finally glabrate. Leaves alternate. Blade oval to obovate-oblong, firm, dark shiny green above, paler green beneath, when young softly appressed hairy, soon glabrate, 4.5-16 cm. (1.75-6.5 inches) long, 4-9.5 cm. (1.5-3.75 inches) wide, or on sprout shoots as much as 25 cm. (10.75 inches) long, and 12.3 cm. (4.75 inches) wide, the midribs, lateral veins, and reticulations prominent. Petiole 12-37 mm. (0.5-1.37 inches) long, or on sprout shoots as much as 5 cm. (2 inches) long.

Flowers perfect, 2-8 in the axils, the pedicels softly, rusty, appressed hairy, 2-6 mm. (0.06-0.19 inch) long. Calyx deeply 4-5 lobed, in two series, the lobes rusty hairy, at least on the middle, 1-2 mm. (0.03-0.06 inch) long. Corolla depressed, globose, open, whitish, the tube 1.5 mm. (0.06 inch) long, the 5 or 6 deltoid-ovate lobes 2 mm. (0.12 inch) long. Perfect stamens opposite, of the same number as the corolla lobes, attached on the base of the corolla, nearly as long as the corolla, anthers cordate, 0.8 mm. (0.03 inch) long. Staminodia fused with the corolla tube, the tips subulate, alternating with the corolla lobes, projecting one third to one half the length of the corolla lobes. Ovary depressed, pilose, 5-celled, stigma capitate.

Fruit globose to ovoid or obovoid, green with a white bloom (*vide* Gillespie), round or flattened in cross section, depending on the abortion of often as many as three of the carpels. Seeds one in each cell, mottled brown, shining, narrowly ellipsoid, laterally flattened, the hilum side nearly straight, 10-18 mm. (0.37-0.75 inch) long, 5-10 mm. (0.19-0.37 inch) wide.

Native name, *moto*.

More than half a century has been required to assemble complete material of this plant. The United States Exploring (or Wilkes) Expedition first collected fruiting material at "Ovolau, Feejee Islands, on the coast." Dr. Gray described it as new and placed it doubtfully in the genus *Sapota*.

Nearly forty years later Burkill studied flowering material from Tonga, described the structure of the flowers, and transferred the species to *Sideroxylon*. In Tonga it is called by the natives *tangerene* and has orange fruit (*vide* Lister in Burkill, p. 44). This suggests a possible difference in the fruit, but I have not seen the material from Tonga and hence prefer for the time being to leave it as conspecific with the plants of Fiji, Rarotonga, and Makatea.

In 1930 Gillespie reported on his collections from Fiji containing both flowering and fruiting material. He placed the species in *Lucuma*. However, his fruiting specimens and his illustration both show empty, sterile seeds,

though the fruit appears well developed and the testas are well formed and rigid.

Mr. Wilder's several collections, which are cited below, include flowers (both dried and pickled) and fruit. The fruits are mostly smaller and flatter owing to the partial abortion of three of the carpels; but two are well developed. These have good seeds, which show the hilum to be linear, lateral, and as long as the seed itself. The seeds are well-developed and fertile. Between the two thick layers of endosperm is the embryo. Its cotyledons are thin (each about 0.3 mm. or 0.12 inch thick), and the radicle is straight and exserted and 1.5 mm. (0.06 inch) long. There is still some question as to the validity of the many segregate genera split off from *Sideroxylon*, but *Planchonella* seems to have adequate characters and it has been accepted in several recent critical studies. Because the specific name *vitiensis* is pre-occupied in *Planchonella*, it is necessary to select a new specific epithet. That chosen is in honor of Dr. Asa Gray, who signally advanced the knowledge of the flora of Polynesia, as he did that of so many other parts of the world.

The following list is of specimens in Bernice P. Bishop Museum:

Fiji, Ovalau, altitude 400 meters, J. W. Gillespie nos. 4487, 4494, 4559.

Tonga (*vide* Burkill, p. 44), Eua, near summits, Lister, Vavau, Crosby nos. 99, 100.

Cook Islands, Rarotonga, dry forest, hilly, rocky, altitude 300-900 feet, Mount Tereora, June 19, 1929, G. P. Wilder no. 777; same locality, May, June, and July, 1929, H. E. and S. T. Parks no. 22361; same locality, January 1932, Bouchier.

Tuamotu Islands, Makatea, edge of woods, elevation 350 feet, August 8, 1929, G. P. Wilder no. 950; in coral and sand pockets, September 17, 1932, G. P. Wilder no. 1115.

OLEACEAE

***Jasminum didymum* Forster.**

Strong-growing vine, having stiff, wiry stems. Leaves opposite, trisected, entire, glabrous, dark green; terminal blade 2 inches long, 1 inch broad, acuminate, base obtuse; secondary pair of leaves smaller; petiole 0.375 inch long. Flowers in axillary, terminal racemes, corolla 0.625 inch long, salver-shaped, petals whitish yellow, fragrant. Fruit a fleshy drupe, 0.375 inch in diameter, single or in pairs; skin smooth, black when mature, containing a single large seed.

Seen in many places in the woods, climbing over rocks and shrubbery. The strong stems were formerly used to tie the thatch on native houses. Native names, *tafifi*, *pitateofai*, *pitate ovile*.

APOCYNACEAE

Alyxia scandens (Forster) Roemer and Schultes.

Evergreen tree or small shrub sprawling over rocks. Leaves opposite, entire, acuminate; blade 0.75-1 inch long, 0.5-0.75 inch broad, coriaceous, glossy, rugose. Flowers axillary, small, yellow. Fruit a single fleshy, oblong drupe, black when ripe, containing a single large seed.

The leaves are fragrant. The bark contains a fragrant oil when dried, and this is mixed with coconut oil to impart a fragrance. Much used by the natives. Known as *monoi maile*.

Nerium indicum Miller.

Glabrous, evergreen shrub, having narrow, entire, acuminate, lanceolate, leathery leaves. Leaf blade 4-8 inches long, 0.5-0.75 inch broad; midrib prominent, transversely feather-veined. Flowers 5-lobed, in a terminal cyme.

A cultivated plant, several colors seen.

Plumeria acutifolia Poiret.

Small, much-branched, spreading tree, having alternate, entire, acuminate leaves. Leaf blade 8-20 inches long, 2-3 inches broad, tomentose on the under side; midrib and veins prominent. Flowers white, fragrant, petals 5. Fruit rare, only produced after fertilization by insects of a perfect flower, a 2-winged pod, 4-8 inches long, each pod containing 25-40 flat seeds.

Native name, *tipani*.

Tabernaemontana divaricata (Linnaeus) R. Brown.

Introduced shrub or small, spreading bush, 4-8 feet high, having opposite, acuminate, entire, oblong leaves. Leaf blade 3-5 inches long, 1.5-2 inches broad; midrib and veins prominent; margins of the leaf wavy; petiole short. Flowers white, slightly fragrant.

Native name, *tiare moorea*.

Tabernaemontana orientalis R. Brown.

Small, spreading bush or shrub. Stems when cut or broken emit a sticky, white fluid. Leaves entire, oval, acuminate at both ends; blade 3-5 inches long, 1.75-3 inches broad; midrib and veins very prominent; petiole 0.75 inch long. Flowers not seen. Fruit terminal, 1 inch long, 0.5 inch thick, in pairs, sessile, keeled, on long slender peduncles.

Tree rare, seen only in the forest near *Eupritchardia* palms. Native name, *faiate*.

Lochnera rosea (Linnaeus) Reichenbach.

Erect, tender shrub, 2 feet high, having opposite, entire, shiny, oblong leaves. Flowers axillary, having 5 petals. Fruit a linear, tapering pod, 1 inch long, containing 15-25 seeds.

Both white and pink flowers seen. This plant has escaped from cultivation and grows wild along the paths and roadways.

CONVOLVULACEAE

***Ipomoea gracilis* R. Brown.**

Small-stemmed creeper or climber. Leaves alternate, acute, sagittate; blade 1-1.75 inches long, 0.75-1.75 inches broad; petiole 3 inches long. Flowers axillary, 1.25 inches across the corolla, color pale rose.

Common vine over rocks and coral in open, dry country. Native name, *papati*.

***Calonyction album* (Linnaeus) House.**

Strong-growing vine, climbing trees, having alternate, acute, cordate leaves. Leaf blade 2-3.5 inches long, 2-4.5 inches broad; auricles rounded; midrib prominent, veins radiating. Flowers axillary, 3 inches across the corolla, white, nocturnal. Fruit a tomentose capsule containing several seeds.

Native name, *pohue*.

BORAGINACEAE

***Cordia subcordata* Lamarck.**

Large, spreading tree, 20-30 feet high, having alternate, entire, spatulate leaves. Flowers orange-red, in a short terminal cyme. Fruit an ovoid drupe, 1-1.25 inches in diameter, white when mature, containing a single seed.

Several trees in the village of Vaitepaua and some fine specimens on the beach at Maumu. The wood is durable and is used for making domestic utensils. Native name, *ton*.

***Heliotropium anomalum* Hooker and Arnott.**

Decumbent herb, having entire, spatulate, thick leaves covered with soft, silky hairs. Flowers small, in a terminal raceme, corolla funnel-shaped, fragrant, pale blue.

Common along the sandy beach at Temao and at Maumu.

***Tournefortia argentea* Linnaeus, the son.**

Small tree of spreading habit, stems and leaves pubescent, leaves crowded at the ends of the branches. Leaves alternate, simple, obovate-oval, acuminate at the base, rounded at the apex. Flowers white, in a large terminal cyme, fragrant, sessile, having numerous globose buds. Fruit the size of a small pea.

Common pantropic tree, growing along the beach at Temao and at Maumu. Native names, *parahirahi*, *tahinu*, *tahanu*.

VERBENACEAE

***Clerodendron Buchananii* (Roxburgh) Walpers.**

Erect-growing, ornamental shrub, 2-4 feet high, having 4-sided stems. Leaves opposite, entire, cordate-ovate; blade 6-8 inches long, 4-6 inches broad; petiole stout. Flowers scarlet, on an erect, terminal cyme.

An introduced species; now escaped from cultivation, it may become a troublesome weed.

Clerodendron fragrans Ventenat.

Hardy shrub, 2-4 feet high. Leaves opposite, acuminate, ovate, cordate at the base, hispid on the upper surface, pubescent beneath; leaf margins coarsely toothed. Flowers pale and roseate in color, double, 1 inch in diameter, in a terminal subsessile cyme, calyx 5-cleft.

This plant will not thrive near the sea. Common in abandoned places along roadways. Native name, *pitate mamao*.

Clerodendron Thomsonae Balfour.

A shrubby vine. Leaves opposite, entire, oblong-ovate, acute or acuminate; petiole short. Flowers axillary, white, tinged with green, corolla red, calyx 5-angled.

Lantana Camara Linnaeus.

Spreading shrub, 4-6 feet high. Stems and branches armed with recurved prickles. Leaves opposite, acuminate, crenate, ovate or slightly cordate, 1-2 inches long, 0.5-1.25 inches broad, surface rough and wrinkled. Flowers small, in axillary heads, yellow or orange. Fruit consists of numerous small, fleshy drupes on a compact receptacle.

Premna taitensis Schauer.

Small bush or climbing shrub, having light-green foliage. Leaves opposite, entire, ovate or ovate-elliptic, obtuse, acute, or acuminate, the margins wavy; blade 2-3.75 inches long, 1.25-2.5 inches broad; midrib and veins prominent; petiole 1 inch long. Flowers in a large terminal panicle. Fruit a berry 0.375 inch in diameter, black when ripe, containing a single seed.

Native name, *avaro*.

Stachytarpheta jamaicensis (Linnaeus) Vahl.

Herb 2 feet high, having quadrangular stems. Leaves and branches pubescent. Leaves opposite, acuminate, crenate-serrate; petiole short. Flowers small, deep blue, the flower tube sunk deep into a spike or stem in which later appear the linear fruits.

Common pantropic weed, in pastures and along paths. Native name, *itere*.

LABIATAE

Coleus Blumei Bentham.

Small herb, having opposite, ovate, dentate leaves with wavy margins.

Cultivated on account of its variegated foliage. Common about the village of Vaitepaua.

Ocimum basilicum variety *minima* Linnaeus.

Branching, annual shrub, 15 inches high. Stems hairy. Leaves opposite, ovate, glaucous, entire or toothed on the margins; blade 0.25 inch long, 0.125 inch broad; petiole short. Flowers in dense racemes.

This plant has small leaves and may be a dwarfed variety. Leaves and

stems are fragrant and are strung together with flowers in wreaths for personal adornment. Cultivated by the natives. Native name, *miri*.

Ocimum gratissimum Linnaeus.

Strong-growing herb of erect habit, 2-5 feet high, having opposite, acute, lanceolate, crenate, pubescent leaves. Leaf blade 1.5-5 inches long, 0.75-1.5 inches broad. Flowers white, small, on a terminal spike.

A troublesome pantropic weed by the roadside and also in cultivated places in the village of Vaitepaua, at Maumu, and in open, dry country. Native name, *miri papaa*.

Salvia occidentalis Swartz.

Spreading weed, having a very pungent odor when bruised. Leaves opposite, glaucous, acute, crenate or serrate, broadly ovate; midrib and veins prominent; petiole 0.5 inch long. Flowers pale blue, small, on long axillary racemes, covered with sticky hairs which give the peculiar odor.

Common pantropic weed, growing in damp places.

SOLANACEAE

Capsicum frutescens Linnaeus.

A cultivated shrubby perennial, 2-4 feet high, having acuminate, ovate, entire leaves. Flowers axillary, small. Fruit lanceolate, 1-1.5 inches long, the loose outer skin red when mature; inside are numerous flat seeds, which contain the peppery qualities of the plant.

Common about native dwellings and also seen growing wild in the woods.

Datura chlorantha Hooker.

A cultivated herbaceous annual, 1-2 feet high, having lanceolate, acuminate, glabrous leaves, the margins wavy. Leaf blade 4-6 inches long, 3.5-5 inches broad, bright green; petiole short. Flowers solitary, double, white, fragrant. Fruit not seen.

SCROPHULARIACEAE

Russelia equisetiformis Schlechtendahl and Chamisso.

Spreading shrub, having slender stems composed of several jointed sections. At each node or whorl are 5 slender stems. Flowers tubular, generally in pairs, terminal, in a lax cyme; calyx red, deeply 5-cleft.

Common on rocks in the village of Vaitepaua, escaped from cultivation.

Torenia Fournieri Linden.

Small ornamental shrub, having 4-sided stems. Leaves opposite, acute, ovate, serrate; blade 1-1.5 inches long, 0.75-1 inch broad; petiole short. Flowers axillary, terminal; corolla tubular, 1 inch across, lips violet, throat yellow.

Cultivated, not very common.

BIGNONIACEAE

Stenolobium stans (Linnaeus) D. Don.

Small tree, having opposite, odd-pinnate leaves. Leaflets 5-7, lanceolate, acuminate, serrate. Flowers tubular, yellow, fragrant, in a terminal panicle. Fruit a linear pod, containing numerous winged, small, flat seeds.

Introduced.

ACANTHACEAE

Graptophyllum hortense Nees von Esenbeck.

Small, spreading shrub, having opposite, entire acuminate, elliptical leaves. Leaf blade 4-6 inches long, 2-2.5 inches broad, irregularly marked with yellow, green, and dark red. Flowers with 5 petals, crimson, in a terminal panicle.

An introduced ornamental, not very common.

RUBIACEAE

Canthium barbatum Seemann.

Small, unarmed, glabrous shrub or tree, having opposite, entire, acuminate leaves. Leaf blade 2.5 inches long, 1.5 inches broad, light green; petiole short. Flowers axillary, small, fragrant; corolla salver-shaped, petals 5, yellow. Fruit a fleshy drupe, 0.375 inch in diameter, having either 1 or 2 large, bony seeds.

One of the common trees of Makatea. The wood is hard, durable, and from it a fine quality of charcoal can be made. Native name, *toro e'a*.

Gardenia taitensis De Candolle.

Shrub 3-5 feet high, having opposite, acute, lanceolate, entire leaves. Leaf blade 2.25-4 inches long, 1-2.25 inches broad; petiole 0.25 inch long. Flowers white, fragrant, salver-shaped, petals 5, corolla 2 inches across.

Common under cultivation near the seacoast at Maumu, on the north side of the island. Native name, *tiare tahiti*.

Guettarda speciosa Linnaeus.

Beautiful evergreen tree, 25 feet high, having opposite, entire, broad oval acuminate or acute leaves. Leaf blade 5-10 inches long, 4-6 inches broad, eared at the base; petiole 2 inches long. Flowers polygamous, 4-8 petals, white, fragrant. Fruit 0.75 inch in diameter, depressed, outer coating white when mature, seed enclosed in a tough, fibrous mass.

Ixora triflora (Forster) Seemann.

Small tree, having opposite, acute, thick, glabrous leaves. Leaf blade 2-5 inches long, 1-3 inches broad; petiole short. Flowers axillary, in twos or threes, white, fragrant, petals 4. Fruit 0.5 inch long.

Common in the damp woods, especially about the road to Aetia hill. Native names, *hitoa*, *aitoa*.

***Ixora odorata* Hooker.**

Cultivated shrub, having opposite, acute, obovate-lanceolate, thick leaves. Leaf blade 6 to 10 inches in length, 1 to 1.5 inches in width. Flowers in an open panicle, much divided; corolla tube 3 to 5 inches long, white turning to pink, fragrant, stamens protruding. Fruit a 2-seeded berry.

***Morinda citrifolia* Linnaeus.**

Small tree, having 4-sided stem and branches. Leaves opposite, acute, broadly elliptical, shiny, entire; blade 6-10 inches long, 3-4 inches broad. Flowers small, white, corolla 5-lobed, on an aggregate head at the axils of the leaves. Fruit fleshy, yellow, when ripe emitting a strong, unpleasant odor.

Wood and bark are yellow, and both are used as dyes. Parts of the fruit and flowers are used medicinally. When properly cooked the fruit may be eaten. Native name, *nonu*.

***Morinda Forsteri* Seemann.**

Small, spreading herb, some plants climbing. Leaves opposite, entire, ovate, acuminate; blade 2-2.5 inches long, 0.75-2 inches broad; petiole 0.125 inch long. Flowers small, 6-18, each having 4 white petals, growing in pairs and appearing on terminal aggregate heads 0.5 inch in diameter supported by slender peduncles. Fruit composed of several sections, each containing several seeds.

Common along paths, growing over rocks and bushes.

***Pentas lanceolata* (Forskål) K. Schumacher.**

Small, cultivated plant, having hairy stems. Leaves opposite, acute at both ends, entire, margins wavy, upper and lower surface pilose; blade 1-3 inches long, 0.5-1.5 inches broad; petiole 0.5-1 inch long. Flowers in a panicle; petals 5, small, pale lavender.

***Tarena sambucina* (G. Forster) Durand.**

Small tree, having quadrangular stems and branches. Leaves opposite, entire, lanceolate, glabrous, acuminate at both ends; blade 2.5-6 inches long, 0.5-2 inches broad; midrib prominent; petiole 1 inch long. Flowers whitish green, 0.125 inch in diameter, in a terminal cyme. Fruit a berry, 0.25 inch in diameter, black when ripe, containing 10 small seeds.

The hard and durable wood, immune to the ravages of insects, is used in the construction of native houses. Especially fine specimens of this tree are seen on the flat land about Maumu. Native name, *manono*.

***Timonius Forsteri* De Candolle.**

Low-growing bush, of spreading habit, having entire, opposite, obovate or elliptical leaves, in whorls of three or four. Leaf blade 1.5-2 inches long, 0.75-1.25 inches broad, smooth, glossy green; petiole short. Flowers axillary, single or several together, fragrant, petals 4; peduncle slender, 0.5 inch long. Fruit a globose berry, having a persistent calyx, black when ripe, containing several small, brown, oblong seeds.

Native name, *papai rau*.

GOODENIACEAE

Scaevola frutescens (Miller) Krause.

Low, spreading shrub. Leaves alternate, spatulate, entire, bright green. Flowers axillary, corolla strap-shaped, petals 6, white, pistil prominent. Fruit a globose drupe, white when ripe, containing a single 2-celled seed.

Common along the seashore at Maumu, also on the sandy beach at Temao, and inland in the open country near the northern end of the island. Native name, *apata*.

CUCURBITACEAE

Mormordica balsamina Linnaeus.

A small, glabrous, herbaceous vine, having alternate, cordate-orbicular, 5-lobed, bright-green leaves, the margins scalloped; petiole half the length of the middle lobe. Flowers axillary, solitary, orange-yellow, on a long peduncle. Fruit an ovoid berry, 2 inches long, the surface tuberculate; the interior containing a red pulp and a number of flat, brown seeds.

A common introduced plant, found growing wild, climbing over trees and shrubbery.

COMPOSITAE

Ageratum conyzoides Linnaeus.

Small, erect annual, having opposite, ovate, obtuse, crenate leaves. Leaf blade 2.5 inches long, 2-2.25 inches broad. Flowers in a dense terminal cyme, florets numerous, pale blue.

Common pantropic weed, seen along paths and in open country.

Bidens pilosa Linnaeus.

Small, pantropic weed, 2 feet high, having opposite, acuminate, ovate, serrate leaves. Leaf blade 1-2 inches long; petiole 0.5 inch long. Flowers yellow, in a radiating head. Seeds 4-angled, having sharp, strong barbs which adhere to all objects coming in contact with them.

Coreopsis lanceolata Linnaeus.

Low-growing, perennial herb, having entire, oblong or linear, acute leaves. Flower heads radiating, 1.5-2 inches across the corolla, petals orange-yellow.

Grown as an ornamental. Now escaped from cultivation and growing wild in the open.

Emilia sonchifolia (Linnaeus) De Candolle.

Spreading, pantropic weed, 1-2 feet high, having alternate, acuminate, obtuse, oblanceolate leaves. Stems and foliage pilose. Petiole short. Flowers in a raceme, having numerous petals and stamens.

Common roadside plant.

Synedrella nodiflora Gaertner.

Small, erect shrub, having opposite, ovate, acute, serrate leaves. Leaf blade 1-2 inches long, 0.5-1.25 inches broad, triple nerved, both surfaces rough; petiole short. Flowers axillary, yellow. Fruit consisting of a collection of small, flat seeds.

Common pantropic weed.

Tithonia diversifolia (Hemsley) A. Gray.

Annual roadside weed, 6-10 feet high, having alternate 3-lobed, acuminate, crenate, membranous leaves, upper and lower surface rough. Petiole slender. Flower heads on a long hollow peduncle, petals yellow. Fruit numerous, 4-angled, pilose, seeds 0.25 inch long.

Common plant by the roadsides.

Vernonia cinerea (Linnaeus) Lessing.

Small, erect herb, having alternate leaves. Flower heads terminal in the upper axils of the leaves.

Xanthium species.

Erect herb, having alternate, acute, dentate, palmately 3-lobed leaves, upper and lower surface of the blade rough. Petiole 2-4 inches long. Fruit an oblong bur 0.75 inch long, having many spines terminating in a short hook.

Common in the village of Vaitepaua and in Maumu. Native name, *piri piri papaa*.

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19	<i>Casuarina equisetifolia</i>			
20	<i>Cecropia palmata</i>			
33	<i>Ceiba casearia</i>			
20	<i>Celtis paniculata</i>			
11	<i>Cenchrus calyculatus</i>			
11	<i>Cenchrus echinatus</i>			
11	<i>Centotheca lappacea</i>			
23	<i>Ceodes umbraculifera</i>			

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	<i>Phyllanthus societatis</i>	30	<i>Scaevola frutescens</i>	46	<i>Thespesia populnea</i>	33
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	<i>Psilotum nudum</i>	10	<i>Tabernaemontana</i>		<i>Xanthosoma atrovirens</i>	15
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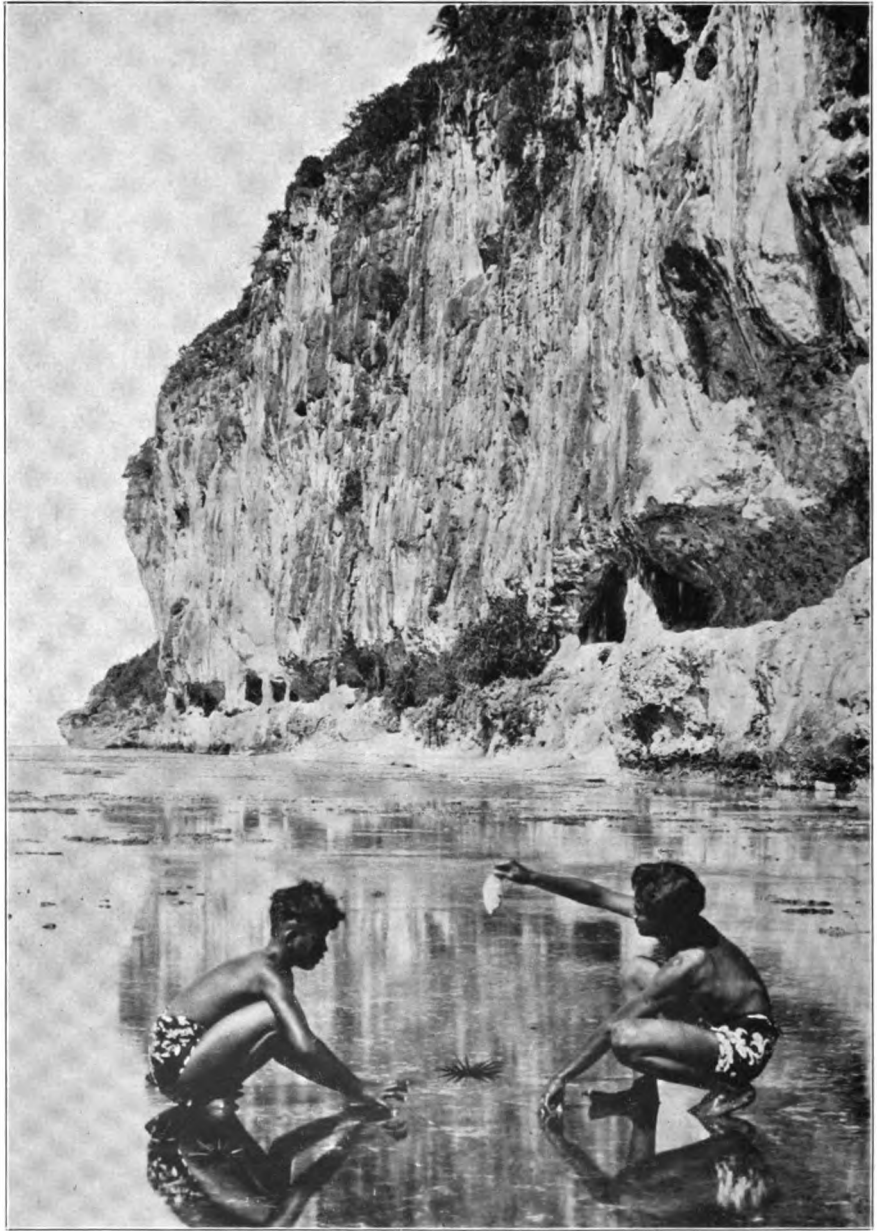


A



B

SHORE FEATURES: *A*, EQUIPMENT FOR TRANSPORTING PHOSPHATE FROM PLATEAU SURFACE TO CARGO SHIPS AT TEMAO; *B*, SOUTHWEST SIDE OF ISLAND AS VIEWED FROM A WAVE-CUT GROTTTO NEAR MAUMU.



CLIFFED FACE OF MAKATEA AT WEST EDGE OF TEMAO, SHOWING WAVE-CUT GROTTOES NEAR THE BASE; FOREGROUND IS A WAVE-CUT ROCK BENCH.

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A



B

PHOSPHATE: *A*, SURFACE OF PLATEAU SHOWING NATURAL PHOSPHATE PITS
IN THE LIMESTONE; *B*, ANAMITE LABORERS MINING PHOSPHATE.



B



A

VEGETATION: *A*, PANDANUS ON OUTER EDGE OF PLATEAU; *B*, VIEW OF JUNGLE ON PLATEAU SURFACE IN MIDST OF LIMESTONE PINNACLES AND PITS.



A



B



C

PLATEAU: A, TUAMOTUAN FAMILY ON THE PLATEAU, WEAVING THATCH; B, LEAF OF *EUPRITCHARDIA VUYLSTEKEANA* ON EDGE OF PLATEAU; C, STAIRWAY OF 600 STEPS LEADING FROM PLATEAU SURFACE TO SHORE SHELF AT MAUMU.