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Plants of Canton Island, Phoenix Islands

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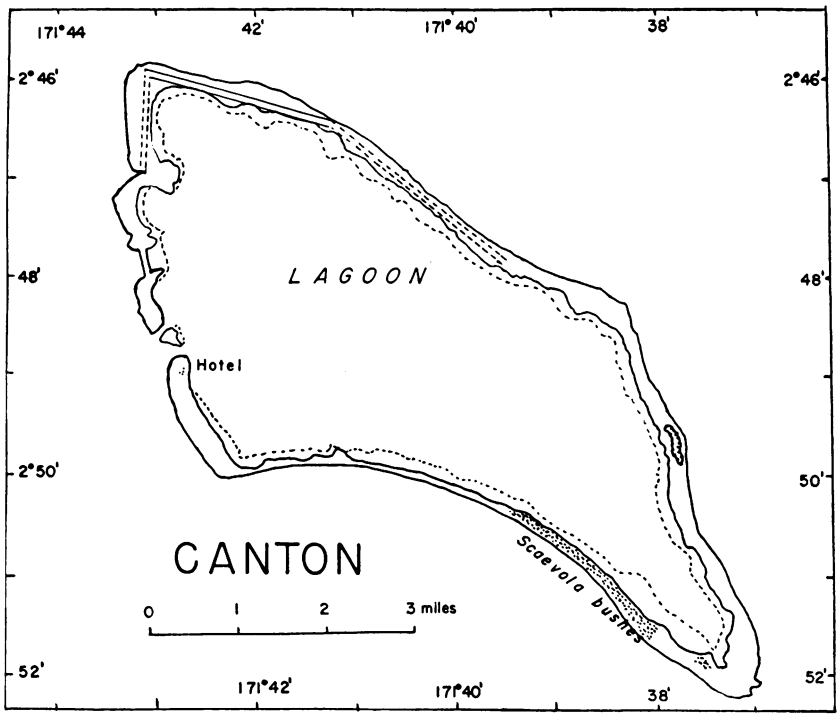
This paper on the plants of Canton Island in the Phoenix Islands was written as the result of 10 days spent on the atoll at the end of 1949 and the beginning of 1950. Specimens of 40 different species were obtained and given to the Bishop Museum, where Marie Neal kindly identified them for me. I am very grateful for her assistance.

The collection at Canton Island was made in the hope of learning, however indirectly, more about the plants of Tabiteuea Island in the Gilbert Islands, where I made an ethnographical survey in 1948, financed by the Viking Fund, and sponsored by the University of Hawaii and Bernice P. Bishop Museum. Both Canton and Tabiteuea, although 810 nautical miles apart, are south Pacific coral atolls with much the same type of environment and vegetation. Gilbertese working on the atoll gave me the native names of some of the Canton Island plants familiar to them, names familiar to me from Tabiteuea, though I had missed getting specimens of all the plants growing, or even seeing all of them. As efforts are being made by Europeans on Canton to increase the number of plants there, this article may have historical value as a description of the island vegetation during a dry spell in 1949.

I wish to express my thanks to W. T. Backus, who was American administrator and CAA station manager on Canton Island when I was there, for his assistance in locating specimens and for providing certain other information used in this paper. I wish also to thank Captain T. H. Miller, at that time associated with the Gilbert and Ellice Islands Colony, for help in collecting and preparing the specimens. Many thanks go to E. H. Bryan, Jr., for drawing the Canton

map (fig. 1) and for providing other aid on this paper. Dr. F. R. Fosberg kindly read the paper, made suggestions, and gave me the names of three plants which he had noted but which I had missed. This paper is one of the studies completed during 1950 as the result of the University of Hawaii freeing part of my time for research.



Little has been written about the plants of Canton Island. A botanical report by the Challenger Expedition lists 23 plants collected for Kew Gardens by J. T. Arundel in the Phoenix and Line Islands; only four are specifically noted for Canton Island (Hemsley, 4, p. 116). E. H. Bryan, Jr., who collected specimens of some of the species in 1924 and 1938 for Bishop Museum, has an article on the native species (1)[1], and has also given a general account of Canton Island (2). R. H. Van Zwaluwenburg (5, 6, 7) has written three accounts about the island which are of special interest because of

[1] Numbers in parentheses refer to Literature Cited, page 174.

data on plant and insect associations, of which I quote only the most striking examples. Both writers have many photographs of the vegetation, as does I. C. Gardner (3). The total bibliography on Canton Island is small, and the articles by Bryan and Van Zwaluwenburg are the only ones which describe the vegetation in any detail.

Canton Island is a mid-Pacific coral atoll located at approximately 2° 49′ south latitude and 171° 40′ west longitude from the center of the lagoon. The atoll was unoccupied in pre-European times, except perhaps for occasional castaways and chance callers. The lack of fresh water and edible vegetation accounts for the absence of native settlers. Now, a changing group of about 70 native men, some with their wives, come from the Gilberts, Tonga, Fiji, and the atoll neighbors of Canton settled by Gilbertese to work on the island. An occasional work crew also comes from Honolulu. In 1950 there were approximately 325 Europeans on the atoll.

Now a British-American condominium on the basis of a 50-year agreement reached in 1939, the atoll is jointly administered by the United States through the Department of Interior with aeronautical installations maintained and operated by the Civil Aeronautics Administration (Department of Commerce), and by the British through the Crown Colony of the Gilbert and Ellice Islands which is under the jurisdiction of the Western Pacific High Commission. The CAA station manager acts as the American official representative, whereas the District Officer of the Phoenix District of the Crown Colony represents the British authority.

This peaceful agreement followed British reassertion of a claim to the atoll in 1936 and 1937 and American reassertion in 1938. American and New Zealand eclipse expeditions of 1939 did much to draw the attention of the respective governments to the value of the atoll for both land and sea planes. American claims are based on the visits of American whalers and guano diggers to Canton during the nineteenth century. The British based their claims on commercial companies which had leased the island as early as 1885 and on a visit of H. M. S. *Curacao* in the mid-nineteenth century.

Canton Island is now the stopping place for planes out of Honolulu and Nandi, Fiji. Since 1938, the aeronautical facilities have grown through construction by PAA, USN, USAAF, USED, and currently CAA. They include a hotel with pertinent operating facilities.

The name of the island comes from the epic adventure of the crew of a whaler wrecked on its reef. In 1872, Commander R. W. Meade of the U. S. S. *Narragansett* named the atoll Canton to commemorate the Massachusetts whaling ship, the *Canton,* under Captain Andrew J. Wing, which was wrecked on March 4 or 5, 1854. About a month later, the crew left the island in four 30-foot boats hoping to reach the Gilberts, where they anticipated being rescued by the whalers who often visited that archipelago. Propelled only by oars and a small spritsail and without adequate navigating instruments, the boats missed the Gilberts entirely; and 45 days after leaving Canton they arrived at Tinian in the Marianas, where the Spanish Governor let them have water and coconuts but turned them away, for he did not believe their story. Four days later they ended a 49-day voyage at Guam. The story impressed Meade, who visited Canton while searching for Captain "Bully" Hayes. The earlier names of Mary, Mary Balcout, Balcout, and Swallow are now known only from old records. Canton was probably independently discovered by several ships, many of them American whalers, each of which gave the island a new name.

Other ships than the *Canton* have been wrecked off the island. The 1937 eclipse expedition found a wreck, from which they got timber. In 1940, the *Admiral Day* ran aground and was abandoned. A later wreck, the *President Taylor,* is still visible in the channel.

Whether one approaches Canton from the air or from the sea, the first impression is of a dusty, barren, gray strip of desert. From the sea it looks like a large, irregular heap of dust with its horizons broken by gray ridges and humps which mark either the rim of the atoll or the buildings on it (fig. 1). The rim of land around the fairly shallow central lagoon is about 27 miles in length, and, according to Bryan (2), ranges in width from 50 to 600 yards; in height, from five to 20 feet. This land rim is quite level, except for frequent rather sharp drops to the lagoon or ocean beaches. On the lagoon side are strips of white coral sand, as, for instance, beyond the fighter airstrip on the north end of the island. On the ocean side are heaps of blackened coral rock. Beyond the Air Terminal Building and the landing field are slippery expanses of reef rock along the beach.

The shape of the island, which is nine miles long, has been compared with a hollow porkchop; its width, which is four and a half miles at the widest across the lagoon, narrows to a point toward the

southeast. In 1924, according to Bryan (2), there were four passages into the lagoon, all on the western side, but the northernmost silted in and was closed over artificially. Two other passages have been closed artificially and are now traversed by viaducts. The islet where the landing field is located is connected with the islet where the wharf is. From this wharf, a launch ferries passengers to the Pan American hotel and the British administrative area. The entrance to the turning basin was cut by USED in 1943.

While the comparison to a porkchop may fit the shape, it carries a connotation of juiciness absent from the atoll. The island has only some brackish wells and depends on rain for drinking water. Though Canton is a dry island, the rainfall is extremely variable and seems to show no discernible pattern. Records have been kept only since the fall of 1937. The figures for and since 1938 are given below; some are unreliable and may represent the results of records for better-watered islands in the archipelago.

Year	Inches of Rain	Year	Inches of Rain
1938	8.71	1944	20.50
1939	18.47	1945	17.65
1940	69.3	1946	missing
1941	91.0 (incomplete)	1947	8.46
1942	missing	1948	33.17
1943	15.53	1949	11.50

The vegetation now found on the island is linked with the history of the atoll. The few species which may be regarded as indigenous, a term used here in the sense of dating from the pre-European period, were introduced by such natural means as the wind, the sea, and the birds. The few species regarded by Van Zwaluwenburg and Bryan as native number only 17 or 18 and will be listed later. They doubtless represent those best adapted to the environment, for many other species, then as now, probably did not survive their introduction to the atoll. The number of species to be found varies from season to season according to the rainfall and the short-lived plants introduced by settlers.

In European times, human beings have introduced many species, mostly ornamental; but few of them, even those given considerable care, have survived the droughts, insects, hermit crabs, and other enemies, all of which afflict the indigenous plants also. During 1950, British and American residents hopefully undertook a program of

extensive planting in the hope of eliminating some of the dust and glare which some claim dissipate approaching rain clouds.

There are several botanical landmarks on the island which attest to the effect of human settlement on the vegetation. One such landmark is at the old stone pier on the lagoon side of the eastern rim of the atoll, where the residents, accidentally or deliberately, planted trees foreign to the island. The pier was built by the guano diggers of the John T. Arundel Company, a British concern which operated on Canton in 1885 and 1886. Although the lagoon is filled with coral heads and reefs which loom up like walls, the guano was transported across it in shallow draft boats. North of the pier is an abandoned camp where similar plantings were made. Three modern botanical landmarks are at the Pan American hotel, at the Air Terminal Building, and, on the way toward the wharf from the latter building, the residence in 1949 of the CAA manager, where experimental planting was done. No plants remained in 1951 at the abandoned residence. However, foreign plants around the Terminal Building at the present time represent, for the most part, accidental introductions. The Pan American hotel garden represents the most systematic and successful attempt thus far to introduce foreign plants suitable to the island environment.

The general aspect of Canton Island contrasts with that of Tabiteuea, although the two islands have much the same limited range of vegetation. Whereas Tabiteuea has thousands of coconut trees, those on Canton which have flourished sufficiently well to loom even above the *Sida fallax* shrub and startle the skyline can be counted quickly. To anyone who has been to Canton, the welfare and progress of these few coconut palms is the subject of solicitous inquiry. Although Tabiteuea has, on the whole, a greener and fresher look, due perhaps to the contrast of the white coral sand and the green-leaved coconut trees, the scrub on Canton Island grows taller and thicker.

Sida fallax, a stubby, sturdy plant, about six to 12 inches in height on Tabiteuea, is two or three feet high on Canton and branches into a rangy, tumbleweed shape with a peculiar, sparse beauty. When I saw the Canton *Sida* scrub late in 1949, its dry, gray, brittle twigs were thick with yellow flowers and black seeds, but the leaves seemed few in comparison to the number and length of twigs and branches. Van Zwaluwenburg (5, 6), who visited Canton in the summers of 1940 and 1941 after good rains, reports that areas described as

"desert" in the spring of 1939 had a heavy growth of *Sida fallax* and other plants and that the *Sida* was waist high, and even shoulder high, in many places.

Associated with this yellow mallow for "the mile or so of island immediately south of the main channel leading from the lagoon into the sea" was a butterfly (*Hypolimnas bolina*), according to Van Zwaluwenburg (6), who anticipated that "a return to semi-arid conditions, with an attendant reduction of Sida foliage, would probably result in the sharp reduction of this insect's numbers, if not in its complete extinction."

According to W. T. Backus, butterflies were numerous in 1948, but none was to be seen in 1949. A glance at the rainfall chart shows 1948 to have been a wet year and 1949 very dry. Moths were numerous, however, in 1949. Especially associated with bunch grass is a moth, *Petrochroa dimorpha* (Van Zwaluwenburg, 7).

On Tabiteuea, *Sida fallax* (*te kaura* to the Gilbertese, *ilima* to the Hawaiians) grows as a small, isolated herb near the houses. On Canton, however, there is a whole field of it near the 1949 CAA residence on the way from the wharf to the Terminal Building. In the same field are many sour bushes (*Pluchea odorata*), about four feet high, which both smell and look unpleasant. The murky green and downy leaves, about three and a half inches at the longest, droop on thick, stiff stems. The leaves have the habit of turning brown and withering from the bottom of the plant up, leaving the top of each bush green. Clusters of off-white, hard flowers which develop into white fluff grow on the terminus of each branch. The untidiness of this sour bush contrasts with the airy, rounded habit of the *Sida*. The *Pluchea* favors depressions in the ground several yards away from the crest of the lagoon beach.

On the ground toward the beach are extensive patches of white-flowered, delicate-stemmed *Boerhaavia diffusa,* which in Tabiteuea is lavender or purple. An undesirable, unidentified cicadellid leafhopper (perhaps *Nesaloha cantonis*) is associated with the Canton *Boerhaavia,* according to Van Zwaluwenburg (5), but I saw none. W. T. Backus, however, said that in 1949 there were some small "grasshoppers," less than 1.5 inches long.

While clumps of dry brown bunch grasses (*Lepturus repens* and *Digitaria pacifica*) grow among the *Boerhaavia, Pluchea,* and *Sida* on the level area beyond the crest of the beach, they are rare near the

beach. Just above the crest of the beach, the *Boerhaavia* spreads out in patches near an occasional *Sida,* but there is no *Pluchea.* The *Boerhaavia* is also associated with the yellow-flowered purslane (*Portulaca lutea* and *Portulaca oleracea*), the seaside purslane (*Sesuvium portulacastrum*), and the white morning-glory (*Ipomoea tuba*). The *Sesuvium* seems to like to get as close to the beach as possible. A mat of it, which I did not recognize at the time, grows just above the tideline on the lagoon near the 1949 CAA residence. Bryan, who obtained a specimen of it for Bishop Museum, notes that the flower is white; but Miss Neal tells me that in the Hawaiian Islands, at least, the color is ordinarily pink. Fosberg tells me he has seen only white ones on Canton. Bryan notes (1) that the *Sesuvium* he saw had greenish-white or red star-shaped flowers.

Thickets of *Messerschmidia argentea* are common on Canton. However, the tree also occurs as an isolated individual in many places. In fact, almost every isolated tree one sees is a *Messerschmidia,* the one on the fighter strip, for example. The height of this tree heliotrope on Canton astonished me as much as the tumbleweed shape of its *Sida,* for on Tabiteuea, the tree rarely grows more than five feet high and stands out as a separate individual even when planted as a hedge. One of the largest *Messerschmidia* thickets on Canton, with trees 15 feet or more high, is across from the old runway near the Terminal Building. Even here it keeps a bushlike aspect because the branches start so near the ground and spread out. The downy, rather pale-green, slender leaves form clusters at the ends of the branches. The flowers rise on long stalks from the leaf cluster and look like long, twisted strings of white beads. These flowerets develop into brown seeds. At the old camp east of the fighter strip, some of the *Messerschmidia* are 20 to 30 feet high. Van Zwaluwenburg (5) observes that the caterpillars of an undesirable, arctiid moth (*Utetheisa pulchelloides*) make the *Messerschmidia* foliage unsightly by their feeding.

Scaevola frutescens is common. The largest thicket extends about two miles on the southwestern rim on both sides of the road to the water. Many dead branches stick up from the foliage. Across the road from the old stone pier used by the guano workers in 1885-1886 is a smaller stand of *Scaevola,* which was thick with nesting frigate birds when I saw it. *Scaevola* has also been planted as an ornamental hedge at the British Residence near the PAA hotel. Near the medical

building in the British area, is a decorative row of *Scaevola* trained into trees about six feet high. Gardeners have removed the lower branches.

Associated with stands of wild *Scaevola* are scattered specimens of *Triumfetta procumbens,* a prostrate herb with small, thick, downy leaves with crinkled edges. It provides a note of color against the drab ground with its small yellow-orange flowers and its spherical burs, which are often a distinctive reddish brown.

Two other plants form noteworthy thickets, though they are not as extensive or as widely distributed as *Messerschmidia* and *Scaevola.* They are *Cordia subcordata* and *Suriana maritima. Suriana* is a low, wiry shrub with clusters of tiny, thickly growing leaves. A fairly large stand covers a crest above the beach near the road for a few yards on the southern end of the island beyond a large sinkhole. *Suriana* here favors the weather side of the road. It is so dense that it is hard to get through to the beach. No specimens of its tiny yellow flowers were obtained, for it was not in bloom in late December when I saw it. Bryan (2) mentions this particular stand and also a patch in the northwest which I have learned was later removed to make room for the runway. Most of the *Suriana* which I observed were no more than five feet high at the most, but Van Zwaluwenburg (5) states that one clump of *Suriana* was some 10 feet high. Only their skeletons remained in 1949, according to Backus.

The *Cordia* (the Hawaii *kou* and the Gilbertese *te kanawa*) grows, according to Bryan (1), in thickets on the southwestern and northwestern sides of the island and at the old stone pier. The only groves left are those near the pier and in the abandoned camp site (the northwest). *Cordia subcordata* is also planted around the PAA hotel. Many of the wild trees now stand dead and bare of leaves with only a few dry clusters of fruit hanging from the stems, because a caterpillar (*Achaea janata*) is killing them off. Bark-girdling by hermit crabs has also injured the *Cordia* considerably, according to Backus. The *Cordia* trees are 12 to over 20 feet in height, with bright orange, funnel-shaped flowers with wide corollas. Green berries, about five to a cluster, develop into hard, spherical nuts, which turn brown, then gray.

Hidden in the camp among the tall *Messerschmidia* are some half-grown coconut trees planted by former settlers. There is also one specimen of the *Morinda citrifolia* (Hawaiian *noni;* Gilbertese *te non*) in this grove. I did not find it; but L. H. MacDaniels, who

visited Canton soon after I did, located it. Bryan, earlier, had found two specimens; but on his second trip, he found that one had died leaving the one seen by MacDaniels growing on the point west of the stone pier. Bryan suggests (1) that since the *Morinda* fruit is not carried by water, the Canton specimens were probably planted by early visitors. This seems pretty certain in view of the fact that the *Cordia,* also a tree non-indigenous to Canton, appears with the *Morinda,* and that both trees are at the site of the old camp.

The only parasitic plant, *Cassytha filiformis,* is rare, and it requires much searching to locate it. I found it at the southern end of the island growing along the roadside, attached to creepers such as *Ipomoea* and, in only one instance, to *Scaevola.* Bryan (1) had previously noted it.

Bryan (1) and Van Zwaluwenburg (5, 6, 7) mention several plants which I did not find and one which I did not recognize, the seaside purslane (*Sesuvium portulacastrum*). Those which they saw but which I missed were the purple, or goat's foot, morning-glory (*Ipomoea pes-caprae*), *Morinda citrifolia, Thespesia populnea, Nerium oleander,* and *Tribulus cistoides.* MacDaniels found the bristly foxtail (*Setaria verticillata*), the *Morinda,* and the *Sesuvium.* F. R. Fosberg, who collected during the plane stopover on the return trip to Honolulu from the Pacific Science Congress in March 1949, has supplemented my list with three items, *Eleusine indica, Euphorbia hypericifolia,* and *Terminalia samoensis.*

Bryan, who states that the goat's foot morning-glory was scarce when he was on Canton, mentions one conspicuous patch as "being on the lagoon side of the point, just north of the British camp." It has not survived.

Many species now on Canton have been introduced either intentionally or accidentally by European residents since 1936, when the British first formally established a claim to the island. Most of the deliberately introduced plants are cultivated ornamentals, the greater number having been planted since 1939 by the Pan American Airways to form an attractive garden area around its hotel. In December 1949, a few of the trees were nearly leafless and dead as the result of a too strong insecticide. It is ironic that despite the difficulties presented by nature these trees should have flourished until injured by human beings.

One dying tree near the road to the ferry was identified by a Gilbertese as *te uri* (*Guettarda speciosa*). However, the single small leaf cluster, almost the only green on the tree, proved too small a specimen for satisfactory determination. Across the road and inside a fence is a large hau tree (*Hibiscus tiliaceus*) with downy, yellow and orange flowers and many fruiting capsules. The inner part of the large, droopy flower is red. The yellow changes to dull orange and later to dull red during the day. The leaves are rounded heart-shaped.

At the entrance of the path leading to the side door of the hotel as one comes from the ferry are a number of sea grapes (*Coccolobis uvifera*), which make an impressive show with their distinctive, large, round leaves, some of which appear to stand on edge, and drooping spikes of green grapes and fluffy flowers, which residents claim cause hayfever. Just at the side door of the hotel are a few fragrant *Plumeria rubra* trees. One of these gnarled frangipanis has pink flowers; another, white flowers with red centers. At their feet are one or two young vines with yellow flowers, perhaps watermelon vines (*Citrullus vulgaris*).

Standing along the path leading from the front door are *Cordia* trees with large orange-colored flower clusters brightening the thick, green foliage. Both *Cordia subcordata,* which also grows wild, and *Cordia sebestena* are represented, and seem to have suffered less from the overstrong spray than some of the other trees. Near the wall are papaya trees (*Carica papaya*), which are seen around many of the houses, and crinums, perhaps *Crinum asiaticum,* which were not in bloom in December.

Parallel with the road to which the *Cordia*-lined path leads are several tamarisks (*Tamarix aphylla*), with feathery branchlets. The trees look about 20 or 30 feet high. Nearby is another tall tree, the swamp oak (*Casuarina glauca*), used like the tamarisk for a windbreak. This *Casuarina* has clusters of needle-like branchlets as much as 12 inches long.

Three *Terminalia* species are also represented in the area: *T. catappa* with large, leathery, green leaves, many about nine inches long, which turn red; *T. melanocarpa* with distinctive, purple, plum-like fruit; and another species tentatively determined from an immature specimen as *T. littoralis.* It is probably in this area that Fos-

berg found *T. samoensis.* In the same area is the species of tree which Hawaiians call *kamani,* the Gilbertese, *te itai* (*Calophyllum inophyllum*). A sacred tree in both Hawaii and the Gilberts, it has large, shiny, leathery leaves and very fragrant white flowers with yellow stamens. A weed noted in this area is *Euphorbia hirta.* There seemed much less of it in December 1949 than in March of the same year when I stopped briefly at Canton.

Specimens from the British Residency garden included what seems to be a young, immature pandanus; a crinum, popularly called spider lily, not in bloom, perhaps *Crinum asiaticum*; the false koa (*Leucaena glauca*) with long, drooping seed pods; and an unidentified plant, not in bloom, which occurs in Tabiteuea, where Gilbertese call it *te robu* and which may be an aloe. At the step of the British office and trading store I noted the only specimen of poor man's poinsettia (*Euphorbia heterophylla*) that I saw on Canton.

All the coconuts (*Cocos nucifera*) now growing on Canton have been planted. The tallest ones were, according to Bryan (2), probably planted in 1916 by Captain Allen of the Samoan Shipping and Trading Company, which had leased the island. Others have been planted since. Several small ones have been planted within the last two years near the now abandoned CAA residence on the north side. Some half-grown coconuts are hidden among the *Cordia* on the north side of the island.

Fimbristylis cymosa grows on the old runway between the 1949 CAA residence and the Air Terminal Building and has spread from there. The long, regular rows, with even spaces between the plants except where some have died out, seemed to me to indicate that they might have been mechanically seeded on the strip, probably to hold down the soil. However, I have no information about this.

Panax (*Polyscias guilfoylei*) and ironwood (*Casuarina equisetifolia*) brought from Honolulu had been planted recently near the 1949 CAA residence. The panax later died, but the ironwood was doing reasonably well with brackish ground water until it was replanted in another part of the island in 1951.

I did not see any crown flowers (*Calotropis gigantea*), which Van Zwaluwenburg (6) states were introduced as cultivated plants. Nor did I see any of the banana plants set out in 1937, according to Bryan (1). It is doubtful whether they have survived. However, there are

many crown flowers, according to Backus, on the south side near the hotel, from cuttings of prolific bushes at an old stone house north of the Coast Guard area.

Plants accidentally introduced since European times are those whose seeds were in the soil with ornamentals, or were in soil imported from Oahu. According to Van Zwaluwenburg (5), soil from Oahu "resulted in the recent establishment on Canton of several weeds such as *Emilia sonchifolia,* three species of *Euphorbia, Leucaena glauca,* nutgrass and amaranth. A few grasses, including bermuda grass, have also gained a foothold in the same way."

I did not see any *Emilia sonchifolia,* a fragile weed called Flora's paint brush, with tiny purple or red flower heads. The only specimen of the false koa (*Leucaena glauca*) observed was an ornamental in the British garden. It was planted at the former CAA residence, but died; and it is none too prosperous on the south side either. *Euphorbia* grows only near the PAA hotel and the Terminal Building, which indicates how recently it has been introduced. Specimens of nutgrass, Bermuda grass, and amaranth were not obtained; if they still grow on Canton, I missed them.

Four different species of *Euphorbia* have been reported from Canton; three which I collected—*E. heterophylla, E. hirta,* and *E. prostrata*—and a fourth which Fosberg has told me about, *E. hypericifolia.*

It is interesting that the only *Euphorbia prostrata* I saw was growing next to a building in the terminal area. It was in the gutter under the eaves and under some young papaya trees, where it was moist and shady. The same association between this species of *Euphorbia* and papaya occurred in Tabiteuea, and again both were in the slight dip near the side of a house. Growing with the two in Canton were vines with yellow flowers, perhaps cucumbers (*Cucumis sativus*). The *Euphorbia* specimen selected for identification was about 6 inches high. As in Tabiteuea, when conditions favor this herb it loses its prostrate habit and the threadlike stems stand upright from the root in a cluster instead of forming the usual flat, prostrate rosette. The species name, *prostrata,* if such it is, ill fits it in rainy weather. Nearby were a few specimens of *Euphorbia hirta,* the hairy spurge. There is much bur grass (*Cenchrus echinatus*) here and there around the Terminal Building.

No drift seeds were found. However, Van Zwaluwenburg (6) lists several seeds brought with unidentified drift wood by the unusual westerly gales of 1941 which reached a velocity of 55 knots per hour, a contrast to the customary gentle prevailing winds from the east-southeast. Four species which he found belonged to the legume family. They were *Entada scandens* [*phaseoloides*]; *Inocarpus edulis; Mucuna* spp.; and *Caesalpinia crista.* Examples of *Myristica, Canarium, Barringtonia speciosa, Terminalia catappa,* and *Cerbera odollam* [*manghas*], as well as coconuts, kukui nuts (*Aleurites moluccana*), and pandanus keys. Only the coconut, pandanus, and *Terminalia* now grow on Canton, but they were all planted by Europeans. Van Zwaluwenburg remarks on the hazards any drift seeds face, even if they sprout after landing on the beach. Salt water, drought, and hermit crabs (*Coenobita olivieri*) may cut their existence short.

No mosses were seen.

SUMMARY

Altogether, 58 species of plants have been mentioned as growing on Canton. These, plus one seaweed found on the lagoon shore near the former CAA residence, are listed in the checklist below. Not all items listed still grow on Canton. Some planted as experiments for food or landscaping have died out entirely.

My collection made late in 1949 and early in 1950 totals 40 different plant species growing on land. To these should be added *Setaria verticillata, Morinda citrifolia,* and *Sesuvium portulacastrum* all observed by MacDaniels, and also the coconut and the crown flower. Fosberg has added three to the list as stated earlier. This brings the total of different plant species definitely known, except for six with tentative identifications, to have been growing on Canton in 1949-1950 to 48. The six in this 48 which require fruits or flowers for satisfactory identification are the *Crinum, Guettarda speciosa, Terminalia littoralis, Citrullus vulgaris, Cucumis sativus,* and the plant which Gilbertese call *te robu* (the rope).

Of the 58 listed land species, the remaining 10 to be accounted for include the banana, oleander, and *Thespesia,* introduced cultivated plants which seem to have died out. Four introduced weeds, for which specimens were not obtained or noted, are the amaranth, the

nut grass, Bermuda grass, and *Emilia sonchifolia.* Three for which I neither got specimens nor observed nor otherwise verified their continued existence are included in the 18 species regarded as native to Canton by Van Zwaluwenburg (5). They are *Tribulus, Eragrostis,* and *Ipomoea pes-caprae.* For the last quarter of the nineteenth century, J. T. Arundel (Hemsley, 4, p. 116) mentions for Canton the presence of *Triumfetta procumbens, Sida fallax, Ipomoea grandiflora,* and *Boerhaavia tetandra.*

Bryan (1) lists 17 plants as native to Canton and names the same species as those given by Van Zwaluwenburg but leaves out the *Tribulus.* Both writers appear to mean by the term native those plants which were on Canton before the arrival of Europeans. However, both include the coconut as native. Yet all existing specimens have been planted under European direction. Whether it grew on the atoll in pre-European times is not known. *Morinda citrifolia* is also classed as native, although Bryan regarded it as having been planted on Canton; and its location in a grove with *Cordia* in an area where Europeans lived suggests that it was planted in European times. At any rate, whatever is meant by the term native, the following are the 18 species classified in that way.

Digitaria pacifica
Eragrostis whitneyi
Lepturus repens
Cocos nucifera
Boerhaavia diffusa
Sesuvium portulacastrum
Portulaca lutea
Cassytha filiformis
Tribulus cistoides
Suriana maritima
Triumfetta procumbens
Sida fallax
Ipomoea pes-caprae
Ipomoea grandiflora [I. tuba]
Cordia subcordata
Tournefortia argentea [Messerschmidia argentea]
Morinda citrifolia
Scaevola frutescens

CHECK LIST OF PLANTS ON CANTON ISLAND

If I obtained a specimen, the collection number is given in parentheses. The common name of the plant is followed by the Gilbertese name. As the atoll was uninhabited at the time of discovery, there naturally are no old, native names peculiar to Canton Island.

Fucaceae

1. **Turbinaria ornata** J. Agardh (coll. no. 33); brown seaweed.

Pandanaceae

2. **Pandanus** (coll. no. 25); *te kaina.*

GRAMINEAE

3. **Cenchrus echinatus** L. (coll. nos. 9, 38); bur grass, *te uteute ae kateketeke.*
4. **Chloris inflata** Link (coll. no. 40); swollen finger grass.
5. **Cynodon dactylon** (L.) Persoon; Bermuda grass.
6. **Digitaria pacifica** Stapf (coll. nos. 5, 39, 41); Pacific crab grass.
7. **Eleusine indica** (L.) Gaertner.
8. **Eragrostis whitneyi** Fosberg var. **typica** Fosberg.
9. **Lepturus repens** (Forster) R. Brown (coll. no. 8); thin tail, bunch grass, *te uteute.*
10. **Setaria verticillata** (L.) Beauvois; bristly foxtail.

CYPERACEAE

11. **Cyperus rotundus** L.; nutgrass.
12. **Fimbristylis cymosa** R. Brown var. **microcephala** (coll. no. 36); button fimbristylis, *te uteute-te-mane.*

PALMAE

13. **Cocos nucifera** L.; coconut, *te ni.*

LILIACEAE

14. **Unidentified** (coll. no. 6); *te robu.*

MUSACEAE

15. **Musa** sp.; *te banana, te touru.*

AMARYLLIDACEAE

16. **Crinum asiaticum** L.? (coll. no. 4); crinum, *te kiebu.*

CASUARINACEAE

17. **Casuarina glauca** Sieber (coll. no. 37); swamp oak.
18. **Casuarina equisetifolia** L. (coll. no. 44); common ironwood.

POLYGONACEAE

19. **Coccolobis uvifera** (L.) Jacquin (coll. no. 26); sea grape, *te ukin.*

AMARANTHACEAE

20. **Amaranthus.**

NYCTAGINACEAE

21. **Boerhaavia diffusa** L. (coll. no. 35); boerhaavia, *te wao.*

AIZOACEAE

22. **Sesuvium portulacastrum** L.; seaside purslane.

PORTULACACEAE

23. **Portulaca lutea** Solander (coll. no. 10); pigweed, purslane, *te boi.*
24. **Portulaca oleracea** L. (coll. no. 30); pigweed, purslane, *te mtea?*

LAURACEAE

25. **Cassytha filiformis** L. (coll. no. 31); laurel dodder, *te ntanini.*

LEGUMINOSAE

26. **Leucaena glauca** (Willdenow) Bentham (coll. no. 3); false koa.

ZYGOPHYLLACEAE

27. **Tribulus cistoides** L.

SIMARUBACEAE

28. **Suriana maritima** L. (coll. no. 14); *te marou.*

EUPHORBIACEAE

29. **Euphorbia heterophylla** L. var **cyathophora** (Murray) Grisebach (coll. no. 24); Mexican fire plant, *te kabekau.*
30. **Euphorbia hirta** L. (coll. no. 17); hairy spurge, *te tarai kusaie.*
31. **Euphorbia hypericifolia** L.
32. **Euphorbia prostrata** Aiton (coll. no. 29); prostrate spurge, *te tarai.*

TILIACEAE

33. **Triumfetta procumbens** Forster (coll. no. 32); burbush, *te kiaou.*

MALVACEAE

34. **Hibiscus tiliaceus** L. (coll. no. 45); Hawaiian hau.
35. **Sida fallax** Walpers (coll. no. 34); *te kaura.*
36. **Thespesia populnea** (L.) Solander; Hawaiian milo.

GUTTIFERAE

37. **Calophyllum inophyllum** L. (coll. no. 18); *te itai.*

TAMARICACEAE

38. **Tamarix aphylla** Karsten (coll. no. 23); Athel tamarisk.

CARICACEAE

39. **Carica papaya** L. (coll. no. 15); papaya, *te mwemweara, te papaw.*

COMBRETACEAE

40. **Terminalia melanocarpa** F. v. Mueller (coll. no. 22); terminalia.
41. **Terminalia littoralis** Seemann? (coll. no. 19a); terminalia.
42. **Terminalia catappa** L. (coll. no. 2); false kamani, *te kunikun?*
43. **Terminalia samoensis** Rechinger.

ARALIACEAE

44. **Polyscias guilfoylei** (Cogniaux and Marchal) Bailey (coll. no. 7); panax, *te kaimamara.*

APOCYNACEAE

45. **Plumeria rubra** Aiton (coll. no. 21); plumeria, *te meria.*
46. **Nerium oleander** L.

ASCLEPIADACEAE

47. **Calotropis gigantea** (L.) Aiton; crownflower.

CONVOLVULACEAE

48. **Ipomoea tuba** (Schlectendal) Don; synonym *I. grandiflora* (Choisy) Hallier (coll. nos. 42, 43); morning-glory, *te ruku.*
49. **Ipomoea pes-caprae** (L.) Sweet; beach or goat's foot morning-glory.

BORAGINACEAE

50. **Cordia sebestena** L. (coll. no. 16); foreign *kou.*
51. **Cordia subcordata** Lamarck (coll. no. 1, no. 11?); *te kanawa.*
52. **Messerschmidia argentea** (L. f.) Johnston (coll. no. 13); tree heliotrope, *te ren.*

RUBIACEAE

53. **Morinda citrifolia** L.; Indian mulberry, *te non.*
54. **Guettarda speciosa** L.? (coll. no. 19); *te uri.*

CUCURBITACEAE

55. **Citrullus vulgaris** Schrader? (coll. no. 20); watermelon?
56. **Cucumis sativus** L.? (coll. no. 28); cucumber?

GOODENIACEAE

57. **Scaevola frutescens** (Miller) Krause (coll. no. 12); beach naupaka, *te mao.*

COMPOSITAE

58. **Pluchea odorata** (L.) Cassini (coll. no. 27); sour bush.
59. **Emilia sonchifolia** (L.) De Candolle; Flora's paint brush.

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