

SMITHSONIAN MISCELLANEOUS COLLECTIONS

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REPUBLIC OF PANAMÁ

(WITH TWO PLATES)

BY

C. O. ERLANSON

U. S. Department of Agriculture



(PUBLICATION 3846)

CITY OF WASHINGTON
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San José is the farthest west of a group of small islands lying in the Bay of Panamá which have been called the *Islas del Rey* (King Islands) or *Islas de las Perlas* (Pearl Islands) by mariners who have visited them during the past several centuries. In all, they are said to cover an area of approximately 400 square miles. The three largest islands are *Isla del Rey* (Rey Island), 17 miles long by 10 wide; San José, less than half as large; and Pedro González, still smaller. The rest are small islets, some of them hardly more than protruding rocks. All are volcanic in origin, heavily eroded and rounded to low-lying, rolling tableland. Probably the highest points above sea level are on Rey Island, where elevations between 600 and 700 feet are reported.

Apparently the islands have always been sparsely populated. Rey Island at present has the largest population, and on its northern side is situated a small village, San Miguel, which has been in existence since Spanish Colonial days and is the seat of the local government of the islands. It was the center of what was once a flourishing pearl-fishing industry, now all but discontinued. The livelihood of the people, living on hardly more than a subsistence basis, depends largely on fishing during the dry season and on migratory agriculture during the rainy season. Inquiries made at San Miguel indicate that some 300 hectares of land are at present cleared for crops, which consist mostly of manioc, maize, rice, bananas, and plantains. The agriculture practiced is of the crudest type. Small patches of forest land are cleared by cutting and burning, and crops are planted without further cultivation. After two or three crops the land is abandoned to the inevitable scrub jungle that encroaches upon it, and new land is cleared. Since access to new land is much easier by water than through the forest, the coastal areas are largely denuded of virgin growth no matter how steep the terrain. The island of Pedro González has probably only a handful of people

residing there permanently. The villages observed consisted of only 5 to 10 crude huts built of the native cane (*Gynerium*) and thatched with coconut-palm leaves. Around the huts were a few trees of mango, calabash gourd, bananas, and plantains, as well as chickens and pigs. Fishing appeared to be the principal means of livelihood. The island of San José has not been occupied for about 80 years, although there is evidence that much of the coastal region has been denuded of its virgin growth by migratory agriculture in past centuries.

San José lies between longitudes $79^{\circ}4'$ and $79^{\circ}9'$ and latitudes $8^{\circ}12'$ to $8^{\circ}19'$ N. It is approximately 7 miles long and 3 miles wide, being constricted in the center to a neck hardly more than a mile in width. The coast line is very irregular for the most part, rising steeply from the sea as rocky bluffs 30 to 50 feet high. The largest sand beach is Playa Grande, bordering a large bay and 2 miles long, on the eastern side of the island. Other sandy beaches are very small, usually marking a valley through which a stream flows to the sea. The interior is gently rolling with an average elevation between 100 and 200 feet, the highest hills being around 350 feet. There are no lakes or ponds, and the very few streams which flow throughout the year arise as springs. The largest of the perennial streams is the Río Marina, which arises in the northern half of the island and enters the sea in the Ensenada Playa Grande on the eastern side of the island. Another stream, the Río Mata Puerco, flows northward from the southern half of the island and empties into the sea on the western side of the island. None of the streams can be described as anything more than a brook. There are many ravines and small gullies which carry water only during the rainy season, and then only after heavy rains.

There are insufficient data to draw any reliable conclusions as to the average annual rainfall, but it probably approximates that of the region about Panamá City, about 71 inches a year. Judging from the island's location and low elevation it will probably prove to be less than on the immediately adjacent mainland. The effect of the precipitation on the plant life cannot be judged by the total amount of rainfall per year, but depends rather on its seasonal distribution and the manner in which it falls. The rainy season begins in April, apparently becoming heaviest in July and August and diminishing in October. The dry season extends from the latter part of November through March, and during this period the relative humidity is high. Much of the rain that falls during the wet season is torrential in nature and the run-off is severe.

Around the first of April, at the end of the dry season, the deciduous trees are bare of leaves, and even some of the evergreen types have withered foliage owing to the dryness. The grasses and other herbaceous vegetation have either disappeared or dried to brittle stiffness. During April, even before the rains begin, there is a marked change in the growth rhythm of the vegetation. Trees and shrubs begin to send out new shoots of growth, and the bare deciduous trees start putting out new leaves, anticipating the rains to come. In 1945 the rainy season apparently was late in arriving, and much of the new growth again withered and died for lack of water. With the first rains a great surge of flowering took place lasting through the early part of May, followed by lush growth. Ferns, liverworts, mosses, grasses, and other herbaceous material had largely matured new growth and begun to fruit by the middle of July.

The island is volcanic in origin, being composed of dark igneous rock and tufa, with occasional dikes of basalt protruding through it. The soils are reddish-brown, here and there taking on a purplish tinge, and in the richer forested valleys becoming a dark chocolate in color. They are very friable, absorb moisture rapidly, and tend to fissure quickly on drying. Over much of the island the soils are thin, and outcrops of the basic rock or large angular boulders are frequent. Stream beds are usually free of soil or sand and generally have a pavement of stone on which are scattered erratic boulders worn and pocked by the action of water.

The plant life of the Pearl Islands has been practically unknown. Aside from a few collections made by naturalists aboard various ships which have stopped at the islands for water, and collections recently made from short visits by Panamanian botanists to Rey and Pedro González Islands, no material was available for study. The main difficulties have been the lack of transportation to the islands and subsistence problems which arise in an extended stay.

Early in 1944 the United States Army established an outpost on San José, built roads and trails to all parts of the island, and thus made available for study an area uninhabited for at least 80 years, and probably never occupied by more than a handful of people at any time. This we may construe from the general absence of the common tropical weeds which follow man wherever he settles for any length of time. In one location on the western side of the island potsherds have been found which the Smithsonian Institution has reported as belonging to the Spanish Colonial period. In other spots on both eastern and western sides of the island, a few sour oranges, mangos, and plantains have been found. The considerable areas of

scrub jungle which occur near the coast, especially in the northern half of the island, are probably at least in part the result of migratory agriculture. Here and there straight lines of demarcation between scrub and forest can be explained only as the result of clearing by man. But probably the whole interior of the island had remained, until a year and a half ago when the Army moved in, completely unaltered by man.

Dr. Ivan Johnston, of the Arnold Arboretum of Harvard University, made extensive plant collections on the island during 1944 and 1945. From April through August of 1945, while on assignment to the War Department through the Smithsonian Institution, the writer was based on San José and engaged in making certain plant investigations for the United States Army. During this time he was able to make an additional series of collections which have been identified for the most part by Dr. Johnston. The writer is indebted to him for such technical names as appear in this paper.

The map (fig. 1) shows the distribution of the canopied forest in relation to open scrub. Although the forest is now generally confined to the interior depressions and shallow valleys, there is evidence that it once had a wider spread over most of the island. Shrubs and small trees normally found only in the shade of the forest canopy still survive in what is now low scrub jungle exposed to the sun. The forests of the island belong to the type which may be called semi-evergreen seasonal forest. Many of the trees normally drop their leaves during the long dry season, and others which usually remain evergreen are capable of dropping their leaves if the drought is exceptionally severe. At the end of the dry season they flower and send out new shoots and leaves with the rains, much as in early spring in temperate regions.

The forest canopy is on the average between 35 and 60 feet above the ground, depending on the dominant species which form it. It is sufficiently dense to allow little or no sunlight to reach the ground and, where it is best developed, the undershrubs and small trees are sparse, allowing visibility at the ground level for 75 to 100 feet. Except in ravines or other protected areas where conditions of moisture and humidity are higher, there are few mosses or other epiphytes on the tree trunks, which are mostly smooth and gray in color. Trunk diameters of trees forming the canopy are from 6 to 20 inches, but the majority are 10 or 12 inches. Rising above the canopy are occasional giant trees reaching about 100 feet in height with trunk diameters up to 3 feet. The three commonest are *Bombax ceiba*, *Bombax sessilis*, and *Didymopanax morototoni*; others less frequent are *Ana-*

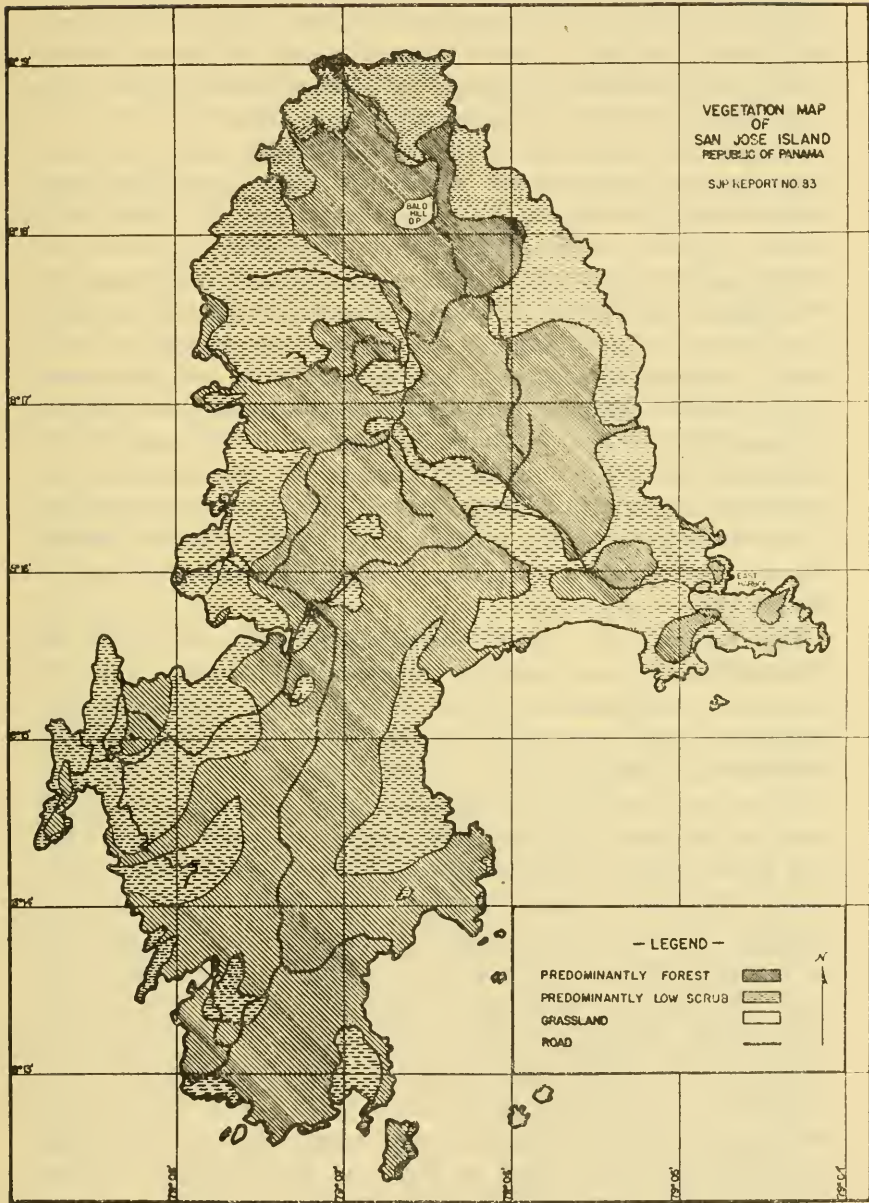


FIG. 1.—Map of San José Island showing distribution of canopied forest in relation to scrub. Prepared July 1945, by C. O. Erlanson.

cardium excelsum, *Manilkara chicle*, and *Ficus*. If the rainfall were more evenly distributed throughout the year and more abundant, these giant trees might become frequent enough to form a canopy, and the forest would then approach the structure of a tropical rain forest such as is found on the Atlantic side of Panamá.

In regard to the dominant trees that form the canopy there are three types of forest on the island. One kind covers the entire southern half of the island up to the valley of the Río Mata Puerco at the narrowest width of the island. Another type covers the northern half of the island, reaching its greatest development in the valley of the Río Marina, and the third and smallest lies immediately below the main camp in the small valley leading to Main Beach. Although the majority of species are found well distributed over the island, there are enough differences between the vegetation of the southern half and that of the northern half to give rise to the belief that earlier in geologic time, as the land rose from the sea, the two parts of the island were separated by a narrow channel of water somewhere in the vicinity of the Río Mata Puerco, causing the two land masses to develop a vegetation with characteristic differences.

The dominant trees of the forests in the southern half of the island are *Cassipourea podantha*, *Ternstroemia seemannii*, *Pera arborea*, and *Ilex guianensis*, which form a canopy with an average height of hardly more than 40 feet above the ground. Trunk diameters are usually about 10 inches. The bark is smooth, gray in color, and rarely with mosses or other epiphytes. Associated trees are *Eugenia banghamii* and *Xylopia aromatica*, which form part of the canopy, and *Hirtella racemosa*, *Ouratea wrightii*, and *Amaioua corymbosa*, which commonly grow in the shade under the canopy as shrubs or small trees. The common vines hanging from the canopy as lianas are *Conarus panamensis* and *Cnestidium rufescens*. The ground is too shaded to allow much growth of herbs, but several ferns belonging to the genera *Adiantum*, *Dryopteris*, and *Trichomanes* are rather common, as also is the sedge, *Rhynchospora cephalotes*. In the deeper gullies where there is more moisture the black palm, *Bactris balanoides*, may appear together with other moisture-loving shrubs such as *Inga* and *Pithecellobium*. Where trees have fallen, leaving holes in the canopy for sunlight to reach the ground, a tangle of scrub growth soon forms an impenetrable thicket. Often the dominating plant in such openings is the climbing fern, *Dicranopteris pectinata*, or the vicious saw grass, *Scleria secans*.

The forests in the northern half of the island are made up largely of one species, *Tetragastris panamensis*, which forms a uniform canopy 60 to 70 feet in height with trunk diameters running from 10 to 20 inches. With this tree are associated a number of others, but seldom in quantities to form associations of their own. In the deeper valleys the wild cashew, *Anacardium excelsum*, becomes rather common along with the two species of *Bombax*. The giant tree *Zanthoxylum* sp. is sometimes seen with trunk diameters up to 4 feet. Other common trees forming part of the canopy are *Cordia bicolor*, *Zuelania guidonia*, *Ternstroemia seemannii*, *Protium* sp., *Didymopanax morototoni*, and *Manilkara chicle*. Under the shade of which are various evergreen trees and shrubs, the commonest of which are *Eugenia*, *Xylopia*, *Calycolpus*, *Hirtella*, *Amaionia*, and *Miconia*. The black palm is plentiful along streams and dry gullies. In addition to the two common lianas found in the southern half of the island, there appears here as the most common vine a species of *Bauhinia*, locally called monkey-ladder. The shade of the canopy is sufficiently dense to discourage all but the most shade-loving plants, and much of the area can be traversed without the use of a machete.

The third and most limited forest type, lying in the valley above Main Beach, has been separated from the other two extensive types because it contains several species found nowhere else on the island. Dominating a part of the forest are two species of *Guarea*, *G. parva* and *G. culebrana*. Common here also is *Gustavia superba*, a relative of the brazil nut, *Protium* sp., and several other species rather remarkable for the island. In places the canopy reaches a height of 60 feet, and the forest here more closely approaches the rain forests of the mainland than anywhere else on the island. Throughout most of the area the black palm forms an understory layer 10 to 15 feet high, in places so thick that one can hardly squeeze between the slender thorny trunks. The ground is too shaded to support any grasses or other thin-leaved herbs. Only occasionally occurs an evergreen fern of the maidenhair type, *Adiantum*, or some species of *Dryopteris*. On the older tree trunks epiphytes are fairly common, including the orchid *Maxillaria*, the fern *Lygodium*, and various mosses and liverworts.

On the rocky bluffs of the coast and less frequently inland wherever rock outcrops occur, a special association of trees replaces the regular types. The two characteristics that these trees have in common is a very shallow horizontal root system which allows them to take advantage of the thin layer of soil, and the ability to drop their leaves during the dry season when the soil can obtain practically no

subsoil moisture because of the impervious rock. The largest in this series of trees is the cigar-box cedar, *Cedrela fissilis*, which sometimes forms dense stands with a canopy about 75 feet in height. Associated with the cedar, but very rarely in homogeneous stands, is the smooth, brown, curly-barked gunbolicambo, *Bursera simaruba*, the nance, *Byrsonima crassifolia*, and two species of *Luehea*, *L. seemannii* and *L. speciosa*. Almost invariably on the ground beneath these trees may be found the spiny, narrow-leaved wild pineapple, *Ananas magdalenae*.

The vegetation of sandy beaches is very characteristic and contains species seldom found elsewhere. The beach at Playa Grande is the best developed on the island and may be used as an example of the other smaller strips found scattered along the island's generally rocky coast line. Just above high tide level on the bare sand may be found clumps of the beach morning-glory, *Ipomoea pes-caprae*, common on most tropical beaches, along with the seagrape, *Coccoloba uvifera*. Farther up on the beach occur colonies of the white spiderlily, *Hymenocallis americana*, and the sand-binding grass, *Uniola pitierti*, which has the power of growing to any length necessary to keep itself from being buried by the shifting sand. Above these pioneer plants usually occurs a low stabilized dune covered by low thicket containing a number of typical beach shrubs and vines. Commonest among the shrubs is the clambering *Dalbergia brownii*, whose branches twist like tendrils to help it climb, and the ubiquitous yellow-flowered wild hibiscus, *Hibiscus tiliaceus*. Other woody plants found in the thicket are *Rourea glabra*, *Caesalpinia crista*, *Dioclea*, *Elacodendron*, *Cissus*, *Davilla*, *Terminalia*, and *Arrabidaea*. Here and there is found a tree of the poisonous manchineel, *Hippomane mancinella*, with its glossy leaves and green, applelike fruits.

Usually coming down to sandy beaches from inland is a small stream, and, if the valley is wide and the gradient gradual, the salt water of high tide passes up into the valley, making estuary swamps. Dominating such swamps is the mangrove, *Rhizophora mangle*, with its yellow-green leaves and twisted, interlaced trunks growing out of the mud. Perched on these trunks are the bromeliad, *Vriecia sanguinolenta*, tillandsia, and one or two species of orchids. Also growing out of the mud are the long-stalked leaves of the dumb cane, *Dieffenbachia*, and the large fern, *Acrostichum aureum*. Near the mouth of the estuary and spreading out on the sand of the beach are white mangrove, *Laguncularia*, the button-mangrove, *Conocarpus*, palo del sal, *Pelliciera*, and usually also a grove of coconut palms, *Cocos nucifera*. The four most extensive mangrove swamps occur

at the mouths of the Río Mata Puerco, Río Marina, at Main Beach, and in the Naval Cove.

Occasionally plants usually found only on the beach invade the slopes of coastal valleys and form definite associations for some distance inland. One such formation is common around the Main Camp area, consisting of *Hibiscus tiliaceus* and the giant cane, *Gynerium sagittatum*, whose plummy inflorescences may be seen for considerable distances waving above the scrub during the rainy season.

On the cliffs of the coast, hanging to the bare rocks and exposed to the salt spray, are three species of cactus, one with 5-angled stems, *Acanthocereus pentagonus*, one with 3-angled stems, *Hylocereus monacanthus*, and the prickly-pear, *Opuntia elatior*. With the cacti there usually may be found an orchid with white and very fragrant flowers, *Brassavola nodosa*. On top of these cliffs where the soil is thin and dry for half the year, the frangipani, *Plumeria acutifolia*, with its white fragrant flower, *Jatropha urens*, with its stinging hairs, and *Apeiba tibourbou*, a small tree with sea-urchin-like fruits, are common. On these cliffs, with the beginning of the rains a number of very small, mostly annual, herbaceous plants belonging to the genera *Polygala*, *Phyllanthus*, *Marsypianthes*, *Borreria*, and others, shoot up rapidly.

Probably the most extensive type of vegetation on the island is scrub jungle, covering most of the slopes that face the sea and occurring inland wherever the canopied forest has disappeared for one reason or another. Once the scrub jungle invades and dominates an area, it may take several hundred years for the forest again to gain a foothold. Undoubtedly large areas of the scrub now found on the island are the direct result of migratory agriculture of the past century. As mentioned above, places can be found where the boundaries between forest and scrub are so artificial and clear-cut that only such an explanation will cover the distribution of the two types of vegetation.

No particular species dominate the scrub jungle, but rather it is a conglomeration of all available shrubs and vines that thrive in open sunlight, the whole matted down into an impenetrable thicket by the preponderance of woody vines which grow so much more rapidly than the shrubs or trees, and are represented by so many different species, that other types of vegetation cannot compete against them. The scrub varies in height from 4 to 20 feet, depending upon the shrubs and small trees that act as foundational support for the vines. Shooting up through this jungle are scattered trees about 40 feet in height, soft-wooded and short-lived, which have managed

to grow fast enough to escape being swamped by the vines. The commonest of these are the guarumo, *Cecropia arachnoidea*, *Cordia alliodora*, *Cordia bicolor*, and *Zuelania guidonia*. In depressions the black palm is often found with the shrubs, and associated with it is *Costus villosissimus*, a member of the ginger family growing to a height of more than 9 feet. The commonest of the shrubs are *Callicarpa acuminata*, *Solanum extensum*, *Miconia*, and *Hirtella americana*. Of the vines, those belonging to the bignonia family are by far the most frequent and make a wonderful display of bloom with their large trumpet-shaped flowers, white, yellow, pink, or purple. Some of the genera of this large family commonly occurring here are *Phryganocydia*, *Anemopaegma*, *Amphilophium*, *Arrabidaea*, *Adenocalymna*, and *Cydista*. Other common vines are *Gouania polygama*, *Tetracera oblongata*, *Davilla lucida*, *Bauhinia*, *Connarus*, *Rhodospathe*, *Serjania*, *Caesalpinia*, *Dioclea*, and *Cnestidium*.

A study of the invading plants on areas bulldozed clear of all vegetation and along the edges of roads made during the past 18 months gives some idea as to the species which first pioneer the area and lead to the ultimate formation of scrub thickets. The first plants to come in are seedling trees—not trees which ultimately make up the canopied forest, but weedy, short-lived species. The two commonest are *Cecropia arachnoidea* and *Trema micrantha*, which grow so rapidly and thickly that at first nothing else gets a chance to survive in many places. Of these two, *Cecropia* is the faster grower, becoming 12 to 15 feet in height during one rainy season, as compared with *Trema*, which attains about 8 feet. Here and there along the roads the very fast-growing balsa, *Ochroma lagopus*, has come in, being seeded from two old trees growing in the valley of the Río Mata Puerco. Balsas measured in April have grown as much as 10 feet by the end of June. Other slower-growing seedling trees coming in under the shade of *Cecropia*, *Trema*, and *Ochroma* are *Zanthoxylum*, *Byrsonima*, *Eugenia*, and *Pithecellobium*. As these trees get a slow start, vines begin to appear between the seedlings, the commonest being *Phryganocydia*, *Gouania*, *Tetracera*, *Davilla*, *Anemopaegma*, and *Arrabidaea*, as well as the shrubs *Callicarpa*, *Hirtella*, and *Solanum extensum*. In a year's time the vines have begun to get the upper hand, climbing up into the branches of the young trees which have slowed down their growth owing to competition with one another, and by the end of the second rainy season the trees are heavily matted down, only an occasional *Cecropia* showing its head above the tangled thicket with vines dangling from its trunk. Apparently the trees such as *Trema* and *Ochroma* eventually disappear

entirely and are replaced by other kinds such as *Cordia alliodora*, *Cordia bicolor*, and *Zuelania guidonia*, some of which manage to break through the scrub to grow into isolated trees 30 to 50 feet high, but I have seen little evidence of the scrub allowing trees of the canopied forest to gain a foothold.

In the north-central part of the island, at Bald Hill, is a small area of perhaps 10 or 15 acres in extent which is devoid of either forest or scrub but is entirely covered by erect bunch grasses, mostly *Trachypogon*. A similar area was seen by the writer on adjacent Rey Island near the village of San Miguel. During the dry season the grasses were crisp and withered and the soil between the clumps was bare. With the rains the clumps soon became green, and between the clumps appeared herbs such as *Spiranthes orchioides*, *Habenaria pauciflora*, *Hyptis lantanifolia*, *Curculigo scorzoneraefolia*, *Crotalaria pilosa*, sedges, and grasses not seen elsewhere on the island. Around the edges of the bald occur the usual trees and shrubs of sunny places, with certain rarities such as *Clidemia rubra* and *Cornutia grandifolia*. This area of dominant grassland may be due to the soil, which appears to be different in color and texture from that found elsewhere.

It has been interesting to note to what extent the common cosmopolitan weeds have been able to invade the island during the 2-year period that it has been occupied. Weeds usually invade new territory by means of seed that arrive as contaminations in the seed of agricultural crops brought in for planting, but since the island's occupation was not for the purpose of agriculture and little seed of any kind has been deliberately introduced, it is to be expected that the weed flora would be relatively small. Most weeds are annuals producing seed abundantly and, given a cleared area in which to establish themselves without competition, will spread very rapidly. Only about 35 species of weeds have been noted as probably introduced during the past 2 years, and the greater proportion of these have as their focal point the naval station on the southern shore of the island. Since few supplies are brought in at that point, the presence of so many weeds there would be surprising except that the Navy made an attempt to beautify the grounds about the buildings by sowing imported grass and other seed, which is never free from weed-seed contamination. The second greatest concentration of weeds is around the main beach, which was to be expected, the seeds probably arriving on the clothing of incoming personnel. On the bluffs at East Harbor occur a few weeds not seen elsewhere, and because they are so well established,

it is probable that they are relics of the weed flora brought in at a much earlier period by settlers.

Only two of the introduced weeds are likely to become a nuisance to the personnel of the island. *Solanum scabrum*, with its curved thorns and clambering growth, will tear clothing and rip the skin of anyone trying to pass through it. *Cenchrus viridis* is a grass producing very sharp-thorned burrs which, when ripe, fall on the ground and become a hazard to bare feet. The affinity of this grass for sandy beaches makes it all the more hazardous because of the presence there of bathers. It would not be difficult to eradicate these plants now, but given a few years to spread, they will constitute a much greater problem.

The native sedge, called cut-grass or cortadera, *Scleria secans*, finds disturbed sections along roads and trails ideal for its growth and in some places covers considerable areas, growing to a height of 15 feet in roadside thickets. It is a very objectionable weed because its rough three-cornered stem easily cuts the skin, making painful sores. Probably the two weed trees *Ochroma lagopus* (balsa) and *Trema micrantha*, so common along the roads, were brought in, but at some time previous to the Army's occupation.

One cannot help but speculate as to what prospects the island would have agriculturally if the land were properly handled. Under the economy practiced on Rey Island, a mixed fishing and migratory agriculture economy, perhaps as many as 100 families could maintain themselves on a subsistence level. Any attempt to grow produce beyond the subsistence level brings in the problem of transportation to markets on the mainland, a considerable obstacle for an island in San José's position. The product would have to obtain a high price to cover the cost of its transportation. The friable nature of the soil and its tendency to erode badly would necessitate extensive terracing to make much of the rolling land available to intensive agriculture. The writer can think of no crop in the ordinary sense of the word that could be expected to bring in an adequate income under the circumstances. What could bring in a fairly comfortable income, if not to the present owners then to their descendants, would be the growing of tree crops—in other words, a well-balanced forestry program. It has been demonstrated that teak, mahogany, and African mahogany, to mention only three valuable woods, will thrive under conditions such as occur here. Aside from keeping the scrub growth from strangling the trees during their seedling stage, such plantations require a minimum of care and would eventually supply a steady annual income in valuable timber.



1. A VIEW OF THE GRASS-DOMINATED BALD HILL AREA



2. A COLONY OF SPIDERLILY, *HYMENOCALLIS AMERICANA*, GROWING UNDER COCONUT PALMS ON A SMALL SANDY BEACH



1. SEEDLINGS OF BALSA, *OCHROMA LAGOPUS*. COMING IN ALONG ROAD BUILT ABOUT 6 MONTHS PREVIOUSLY



2. GRASSY COASTAL BLUFFS WITH FRANGIPANI, *PLUMERIA ACUTIFOLIA*, IN THE BACKGROUND