





LAND PLANTS  
COLLECTED BY THE ALLAN HANCOCK  
ATLANTIC EXPEDITION OF 1939

(PLATES 1, 2)

*By* HOWARD SCOTT GENTRY



THE UNIVERSITY OF SOUTHERN CALIFORNIA PUBLICATIONS  
ALLAN HANCOCK ATLANTIC EXPEDITION  
REPORT NUMBER 6  
ISSUED JUNE 30, 1948

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THE UNIVERSITY OF SOUTHERN CALIFORNIA PRESS  
LOS ANGELES, CALIFORNIA

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In 1939 the cruiser, *Velero III*, of the Allan Hancock Foundation voyaged from Panama to Trinidad and returned. Aboard was a staff of natural history scientists and technicians. The party traveled off the Venezuelan coast and visited several islands of the Dutch West Indies and the British West Indies. They left Panama on the seventh of April and were back at Barro Colorado in the Panama Canal Zone on May first. The exact course and further details of this voyage are given in Garth's account (1945). Most of the staff were concerned with marine biology and dredgings were made at likely places near the lands. Mr. Francis H. Elmore accompanied the expedition to collect land plants and went ashore whenever opportunity afforded. He was sometimes accompanied by Dr. W. R. Taylor, phycologist, and Elmore in his notes attributes some of the land plant collections to Taylor. All collections, however, are cited below under Elmore's collection numbers. Although the trip was made during the dry season, collectable material of 120 south Caribbean plants was obtained.

The most notable locality visited was Cubagua Island, which lies off the Venezuelan coast about six miles inward from the larger island of Margarita. The flora of Margarita and one of its smaller companion islands, Coche, was reported by Johnston (1909). So far as I can determine, Elmore was the first to collect on Cubagua. Urban (1902) does not list the island among those visited by collectors. Later works, as those of Boldingh (1913, 1914), Trelease (1913), Sandwith (1938), and Pulle (1932-39), and numerous authors of many papers including plants of the region, all fail to report any collections from Cubagua Island. Although it is possible that I have overlooked some citations of plants from Cubagua Island, I regard the enumerated 15 plants below as the first to have been collected on Cubagua.

Cubagua is a small island about 5 miles long,  $2\frac{1}{2}$  miles wide, and 200 feet high. Johnston refers to it as a desert island, like Coche. Of Coche he wrote, (l. c. pp. 288, 289). "The island of Coche is a typical desert island and, so far as reported, had never been visited by a botanist. . . . No mention of rain on the island has been made because the existence of any at any time was not apparent. The natives claimed there never was any. As a matter of fact at the time of this visit there was a slight mist in the after-

noon during the passing of a heavy thunder-storm on the coast of the mainland. This mist was barely perceptible and of course not sufficient to furnish water in any quantity. No streams or springs exist on the island. The unweathered condition of the rocks suggests the great lack of rain, while the presence of the sand in the hollows rather than on the hilltops may be accounted for by the wind movements. The rounded hills are wind worn, and there are no gullies due to rushing water."

Since Cubagua is less than ten miles off from Coche and is even smaller, we can surmise that in climate and flora it is similar to Coche. Johnston collected 21 families in 33 genera and in 37 species on Coche. Two of the species were described as endemic. Doubtless Cubagua shares endemic plants with Coche, but that is not at present determinable with our limited knowledge and the material at hand. Figure 1 shows a view of the interior of the island. Judging from this, the dispersed but spotted groupings of the arborescent plants, the mixture of mesophyllous shrubs, the thick-stemmed dwarf tree, and the succulent element, the vegetation, perhaps, should be classed as thorn forest, but the physiognomy also suggests desert shrub.

Of the other islands visited, Trinidad and Tobago are the best known. Collections here reported from Trinidad were obtained mostly at the Royal Botanic Gardens at Port of Spain. Many of them represent useful or ornamental plants from other countries.

Curaçao has been better collected than other islands off the Venezuelan coast. The floras of Tortuga and Aruba remained little known until Boldingh published his work on them in 1913 and 1914. Urban (1902) reports A. Ernst as having collected on Tortuga in 1874, Jacquin and Suringer on Aruba, the former between 1755 and 1757, the latter in 1885. The environmental relations of the native plants of these islands are still scarcely known.

One hundred and fifty numbers were secured in Panama. Of the localities visited, Bahia Honda and Taboga Island are on the Pacific coast. These were actually visited during the 1939 Pacific voyage, the plant collections of which are to be enumerated in a report now in preparation. In order to avoid duplication of citations and geographical unity, the Pacific collections from Panama are reported here with the rest of the Panama material. Bahia Honda has rarely been visited by botanists and several discoveries there provide new distribution records. Figures 2 and 3 show some of the vegetation in Bahia Honda.

TABLE I  
ITINERARY OF COLLECTIONS

<i>Localities</i>	<i>Date</i>	<i>Collectors' numbers</i>
PANAMA		
Bahia Honda .....	March 28	H1-H51
Roadside near Gamboa .....	March 31	I1-I4
Nature Trail at Camp No. 1 on Madden Dam Highway .....	April 1	J1-J15
Near Bat Cave on Madden Dam Highway .....	April 1	K1-K2
Caledonia Harbor, Mt. Vernon .....	April 3, 4, 26	L1-L47
NETHERLANDS WEST INDIES		
Vicinity of San Nicolaas, Aruba Island .....	April 8, 9	N1-N11
VENEZUELA		
Tortuga Island .....	April 13	P1-P12
Cubagua Island .....	April 14, 15	Q1-Q15
BRITISH WEST INDIES		
Royal Botanic Gardens, Port of Spain, Trinidad .....	April 18	R1-R31
Pitch Lake, Trinidad .....	April 17	S1-S3
Scarborough, Tobago .....	April 19	U1-U7
Buccoo Bay, Tobago .....	April 20	V1-V26
NETHERLANDS WEST INDIES		
Fort Nassau, Schottegat Bay, Willemstad, Curaçao .....	April 23	W1-W15
PANAMA		
Barro Colorado Island .....	May 1	X1-X20
Frijoles, Canal Zone .....	May 1	Y1-Y8
Taboga Island .....	May 2	Z1-Z3

The localities visited by the expedition and the number of land plants collected at each are given in the accompanying table. Following this is a catalogue of the species obtained with the collector's notes following the citation of his collection number. The families of the spermatophytes are listed according to the sequence of the Engler and Prantl system. The genera and species are arranged alphabetically under their respective families. Acknowledgments are due the following botanists, whose cooperation in naming special groups of plants is highly appreciated.

S. F. Blake	National Arboretum	Compositae
E. U. Clover	University of Michigan	Cactaceae
L. Croizat	Arnold Arboretum	Euphorbiaceae
L. H. Harvey	Montana State University	Gramineae
I. M. Johnston	Arnold Arboretum	Boraginaceae, Hydrophyllaceae
E. C. Leonard	National Arboretum	Acanthaceae
C. V. Morton	National Herbarium	Pteridophytes
H. O'Neill	Catholic University	Cyperaceae
C. Schweinfurth	Botanical Museum of Harvard	Orchidaceae
P. C. Standley	Chicago Museum	Miscellaneous
L. C. Wheeler	Univ. So. Calif.	Euphorbiaceae
I. L. Wiggins	Stanford University	Malvaceae

Without the responsive help of those listed above, the writer could not pretend to handle adequately the elements of a flora with which he has only a nodding acquaintance. To Captain Hancock goes the writer's special appreciation for the opportunity to study the Allan Hancock Foundation collections.

## ARUBA ISLAND, NETHERLANDS WEST INDIES AIZOACEAE

### SESUVIUM PORTULACASTRUM L.

Vicinity of San Nicolaas, April 9, *Elmore N5*, in blackish marsh of upper beach.

Distribution: Littoral of tropical America.

## EUPHORBIACEAE

### CNIDOSCUSULUS URENS (L.) Arthur vel aff.

Vicinity of San Nicolaas, April 8-9, *Elmore N2*; with white flowers, in semi-desert among rocks.

Distribution: Widely distributed in the American tropics.

The collection is atypical in the woody nature of the main branches and the extremely dense spinescence. McVaugh, who named the specimen and who is giving the genus careful study, states that the complex of *C. urens* is in need of intense study, the specific and varietal limits not yet having been well defined.

### EUPHORBIA BUXIFOLIA Lam.

Vicinity of San Nicolaas, April 8-9, *Elmore N8*.

Distribution: West Indies.

### JATROPHA GOSSYPIIFOLIA L.



San Nicolaas, April 8, *Elmore N6*; in dry hot rocky semi-desert.

Distribution: Widely distributed in the tropics of the New World, also in western Africa.

### CACTACEAE

CACTUS INTORTUS Miller ?

Vicinity of San Nicolaas, April 8-9, *Elmore N11*.

The material is too fragmentary for certain identification.

OPUNTIA TUNA (L.) Mill.

San Nicolaas, April 8-9, *Elmore N10*; in dry hot boulders at 25 feet elevation.

Distribution: Widely distributed in the West Indies, type from Jamaica.

The small joints and long porrect spines appear to reflect the arid environment. It agrees with Brit. & Rose's description of the species, (Carn. Inst. Publ. 248, 1: 114) except for the petals which are tipped with a small bristle.

### ASCLEPIADACEAE

CALOTROPIS PROCERA (Ait.) R. Br.

Vicinity of San Nicolaas, April 8, *Elmore N1*; on coralline rock.

Distribution: West Indies.

Elmore reports that they form large shrubs or small trees 3 to 30 feet high; flowers white and purple.

### BORAGINACEAE

MESSERSCHMIDIA GNAPHALODES (L.) Jtn.

*Tournefortia gnaphalodes* R. Br. Prod. 496. 1810.

Vicinity of San Nicolaas, April 9, *Elmore N4*; in sand of the upper beach; flowers white.

Distribution: Florida and the West Indies.

### SCROPHULARIACEAE

SCOPARIA DULCIS L.

Vicinity of San Nicolaas, April 9, *Elmore N3*.

Distribution: Widely distributed in tropical America.

## RUBIACEAE

## MORINDA ROYOC L.

Vicinity of San Nicolaas, April 9, *Elmore N7*; "in dry rocky semi-desert. Flowers white, fruit green."

Distribution: Central America, West Indies.

CURAÇAO ISLAND, NETHERLANDS WEST INDIES  
GRAMINEAE

## ARISTIDA SETIFOLIA HBK.

Fort Nassau, Schottegat Bay, Willemstad, April 23, *Elmore W7*; coralline.

Distribution: Venezuela, Brazil, Colombia, Peru; described originally from Venezuela.

## AMARYLLIDACEAE

## AGAVE BOLDINGHIANA Trel.

Fort Nassau, Schottegat Bay, Willemstad, April 23, *Elmore W6*.

Distribution: Known only from Bonaire and Curaçao of the Leeward Islands; the type from Curaçao.

This is a member of the section *Viviparae* and like other members of that group produces plantlets, also technically known as bulbils, in the inflorescence.

## NYCTAGINACEAE

## COMMICARPUS SCANDENS (L.) Standl.

Fort Nassau, Schottegat Bay, Willemstad, April 23, *Elmore W4*; sandy soil in the shade.

Distribution: Warmer parts of the New World from Arizona and Texas south; type from Jamaica.

## LEGUMINOSAE

## ACACIA FARNESIANA Willd.

Fort Nassau, Schottegat Bay, Willemstad, April 23, *Elmore W2*.

Distribution: Widely distributed in the tropics and subtropics of both hemispheres; type from Santo Domingo.

Shrub or small tree with highly sweet-odorous flowers, from which a perfume is manufactured. It is known in trade as cassie.

## PROSOPIS JULIFLORA (Sw.) DC.

Fort Nassau, Schottegat Bay, Willemstad, April 23, *Elmore W12*; flowers yellow, on exposed coralline rock at 10 feet elevation.

Distribution: West Indies and perhaps elsewhere; the type from Jamaica.

### EUPHORBIACEAE

#### CROTON RHAMNIFOLIUS HBK.

Fort Nassau, Schottegat Bay, Willemstad, April 23, *Elmore W5*.

Distribution: Widely distributed in the coastal littoral of the Caribbean region.

Shrub with white flowers on sandy coralline.

#### JATROPHA GOSSYPIFOLIA L.

Fort Nassau, Schottegat Bay, Willemstad, April 23, *Elmore W14*; in crevices of uplifted coral reef.

Distribution: Widely distributed in tropical America; western Africa.

A hardy subsucculent shrub with palmately lobed serrate leaves and red flowers.

### CONVOLVULACEAE

#### IPOMOEA RUBRA (Vahl) Millsp.

Fort Nassau, Schottegat Bay, Willemstad, April 23, *Elmore W1*; on uplifted coral reef, flowers purple.

Distribution: Central and South America, West Indies, also in Africa.

Twining vine with slender stems, entire cordate glabrous leaves, minutely aristate sepals, and purple corollas.

### BORAGINACEAE

#### HELIOTROPIMUM ANGIOSPERMUM Murr.

Fort Nassau, Schottegat Bay, Willemstad, April 23, *Elmore W3*; coralline sand from uplifted reef, flowers white.

Distribution: Widely distributed in tierra caliente of the American tropics and subtropics.

### RUBIACEAE

#### ERITHALIS FRUCTICOSA L.

Fort Nassau, Schottegat Bay, Willemstad, April 23, *Elmore W13*.

Distribution: West Indies.

Shrub with white flowers collected in shaded, hot, sandy, coralline soil.

## COMPOSITAE

GUNDLACHIA CORYMBOSA (Urban) Brit.

Fort Nassau, Schottegat Bay, Willemstad, April 23, *Elmore W11*; in dry, sandy, coralline soil.

Distribution: Curaçao, the type locality, and vicinity.

ISOCARPHA OPPOSITIFOLIA (L.) R. Br.

Fort Nassau, Schottegat Bay, Willemstad, April 23, *Elmore W10*; shaded in sandy, coralline soil. Flowers white.

Distribution: Widely dispersed in the American tropics from Texas to South America and the West Indies.

## TORTUGA ISLAND, VENEZUELA

## GRAMINEAE

SPOROBOLUS PYRAMIDATUS (Lam.) Hitchc.

Tortuga Island, April 13, *Elmore P6*; on dry, flat, coralline rock.

Distribution: South America.

## AIZOACEAE

SESUVIUM PORTULACASTRUM L.

Tortuga Island, April 14-15, *Elmore P10*.

Distribution: Littoral, nearly throughout tropical America.

## SIMAROUBACEAE

CASTELA NICHOLSONI Hook.

Tortuga Island, April 14-15, *Elmore P7*. A few shrubs observed on dry rocky sandy level of the coralline atoll.

Distribution: West Indies, Antigua, St. Croix, Cubagua, and Tortuga; the type from Antigua.

## ANACARDIACEAE

SPONDIAS PURPUREA L.

Tortuga Island, April 13, *Elmore P6*; dry sandy soil of coralline atoll.

Distribution: Widely distributed in well-drained soils from Mexico to South America and the West Indies.

## MALVACEAE

GOSSYPIUM BARBADENSE L.?

Tortuga Island, April 13, *Elmore P3*; on coralline rocks.

Distribution: Many forms of this common cotton are cultivated in the warmer parts of the world. It has escaped cultivation in many places and the collection, which cannot be identified certainly because of insufficient material, is probably one of the local insular forms.

## CACTACEAE

## CACTUS INTORTUS Miller ?

Tortuga Island, April 14-15, *Elmore P4*.

Insufficient material for certain identification.

## COMBRETACEAE

## CONOCARPUS ERECTUS L.

Tortuga Island, April 14-15, *Elmore P9*.

Distribution: Littoral of tropical America and west Africa.

## THEOPHRASTACEAE

## JACQUINEA BARBASCO (Loeff.) Mez.

Tortuga Island, April 14-15, *Elmore P8*.

Distribution: Islands of the southern Caribbean.

Collections made from a few plants growing in the sandy soil over the coralline rock.

## BORAGINACEAE

## HELIOTROPIUM ANGIOSPERMUM Murr.

Tortuga Island, April 13, *Elmore P2*; among dry grass on coral atoll.

Distribution: Widely distributed in the tierra caliente of tropical America.

## RUBIACEAE

## ERITHALIS FRUCTICOSA L.

Tortuga Island, April 13, *Elmore P1*; on coral rocks of the upper beach.

Distribution: West Indies.

This collection marks an extension of range for the species and adds a new genus to the flora of South America.

## CUBAGUA ISLAND, VENEZUELA

## GRAMINEAE

## CENCHRUS PILOSUS HBK.

Cubagua Island, April 13-14, *Elmore Q4*.

Distribution: Mexico to Colombia and Venezuela; type from Venezuela.

## LEPTOTHRIUM RIGIDUM Kunth.

Cubagua Island, April 13-14, *Elmore Q5*. Boulders in dry, hot wash; few plants.

Distribution: Littoral, Jamaica to Colombia; type from "America calidor."

*SPOROBOLUS PYRAMIDATUS* (Lam.) Hitchc.

Cubagua Island, April 14, *Elmore Q6*. Dry coralline rock and sand; few.

#### AMARANTACEAE

*ALTERNANTHERA CANESCENS* HBK.

Cubagua Island, April 15, *Elmore Q11*; a few plants on the dry sandy upper beach.

Distribution: Widely distributed in the arid tropics.

#### CHENOPODIACEAE

*ATRIPLEX PENTANDRA* (Jacq.) Standl.

Cubagua Island, April 15, *Elmore Q12*; dry sandy soil on the upper beach.

Distribution: Florida through West Indies to northern South America, type from sea shores of Cuba.

#### NYCTAGINACEAE

*ALLIONIA INCARNATA* L.

Cubagua Island, April 13-14, *Elmore Q10*; sandy soil on the upper beach.

Distribution: Widespread in arid regions from southwestern United States to South America.

#### AIZOACEAE

*TRIANTHEMA PORTULACASTRUM* L.

Cubagua Island, April 15, *Elmore Q15*; sandy soil on the upper beach.

Distribution: Widely distributed in tropical America, Asia, Africa.

#### ZYGOPHYLLACEAE

*TRIBULUS TERRESTRIS* L.

Cubagua Island, April 15, *Elmore Q14*; dry upper beach.

Distribution: Widespread in the tropics of the New World.

#### SIMAROUBACEAE

*CASTELA NICHOLSONI* Hook.

Cubagua Island, April 14, *Elmore Q3*.

Distribution: West Indies, the type from Antigua.

Elmore noted a few shrubs in grassland on level dry clay soil. Johnston collected it on both Margarita and Coche.

## EUPHORBIACEAE

## JATROPHA GOSSYPIIFOLIA L.

Cubagua Island, April 14, *Elmore Q7*; in grassland with coralline boulders and clay. Flowers red.

Distribution: Widely distributed in tropical America; also in western Africa.

## CACTACEAE

## OPUNTIA TUNA (L.) Mill var. CUBAGUENSIS var. nov.

Articuli parvi, 6—13 cm longi, 5—9, cm lati, autem plerumque 9—10 cm longi et 7—9 cm lati, suborbiculati, tenues, pallidi-glaucoscentes; areolae 2—3 cm distantes, orbiculares, prominentes, ad 4—5 mm elevatae; aculei 2—4, ad 4—5 cm longi, grisei flavi; corollae lutea, emarginata, apice mucronata. Specimen typicum *Elmore Q1*, Cubagua Island, Venezuela, April 14, 1939, in Allan Hancock Foundation Herbarium. Duplum in herbarium, University of Michigan.

The variety differs from typical *Opuntia Tuna* in the smaller, thinner, suborbicular joints, the longer porrect spines, and the emarginate prickle-tipped petals. The collector reports it growing in clay soil in level dry grassland.

## CONVOLVULACEAE

## EVOLVULUS ALSINOIDES L.

Cubagua Island, April 15, *Elmore Q9*.

Distribution: Widely distributed in tropics and subtropics of the Old and New Worlds, usually in well aerated soils.

## BORAGINACEAE

## HELIOTROPIUM CURASSAVICUM L.

Cubagua Island, April 15, *Elmore Q13*, sandy upper beach.

Distribution: Widely distributed in tropical and subtropical America, often in alkaline soils of the lowlands.

## TRINIDAD, BRITISH WEST INDIES

## POLYPODIACEAE

## ADIANTUM BESSONIAE Jenm.

Royal Botanic Gardens, Port of Spain, April 18, *Elmore R16*.

Distribution: Trinidad.

## CYRTOMIUM FALCATUM (L. F.) Presl.

Royal Botanic Gardens, Port of Spain, April 18, *Elmore R18*.

Distribution: Native of tropical and subtropical Asia.

**DRYOPTERIS AMPLA** (Willd.) Kuntze

Royal Botanic Gardens, Port of Spain, April 18, *Elmore R26*.

Distribution: Yucatan to Ecuador and the West Indies.

**HYPODERRIS BROWNII** J. Sm.

Royal Botanic Gardens, Port of Spain, April 18, *Elmore R26*.

Distribution: West Indies.

**POLYPODIUM PHYLLITIDIS** L.

Royal Botanic Gardens, Port of Spain, April 18, *Elmore R14*.

Distribution: Mexico to Argentina and the West Indies, Florida.

GRAMINEAE

**PHARUS LATIFOLIUS** L.

Royal Botanic Gardens, Port of Spain, Trinidad, April 18, *Elmore R23*.

Distribution: Guatemala and West Indies to Brazil.

CYPERACEAE

**CYPERUS POLYSTACHYOS** Rottb.

Pitch Lake, April 17, *Elmore S3*; in crevices of asphalt.

Distribution: Widely distributed in tropical regions.

ARACEAE

**ANTHURIUM** CF. **BAKERI** Hook.

Royal Botanic Gardens, Port of Spain, April 18, *Elmore R15*.

Distribution: Native of Costa Rica, described from cultivated introduction in the Kew Gardens.

**ANTHURIUM** **HOOKERI** Kunth

Royal Botanic Gardens, Port of Spain, April 18, *Elmore R4*.

Distribution: British Guiana, West Indies.

**SPATHIPHYLLUM CANNIFOLIUM** (Dryand) Schott.

Royal Botanic Gardens, Port of Spain, April 18, *Elmore R25*.

Distribution: Northern South America, Trinidad.

ORCHIDACEAE

**EPIDENDRUM FRAGRANS** Swartz

Royal Botanic Gardens, Port of Spain, April 18, *Elmore R27*.

Distribution: Guatemala and Peru to the West Indies.



## PALMAE

## PHYTELEPHAS MACROCARPA Ruiz &amp; Pav. ?

Royal Botanic Gardens, Port of Spain, April 18, *Elmore R3*.

Distribution: Tropical America.

## COMMELINIACEAE

## ZEBRINA PENDULA Schnizl.

Royal Botanic Gardens, Port of Spain, April 18, *Elmore R7*.

Distribution: Mexico, Central America, and West Indies.

## ARISTOLOCHIACEAE

## ARISTOLOCHIA ELEGANS Mart. ?

Royal Botanic Gardens, Port of Spain, April 18, *Elmore R28*.

Distribution: Brazil.

## POLYGONACEAE

## TRIPLARIS SURINAMENSIS Cham.

Royal Botanic Gardens, Port of Spain, April 18, *Elmore R8*.

Distribution: Guianas.

## MYRISTICACEAE

## MYRISTICA FRAGRANS Houtt.

Royal Botanic Gardens, Port of Spain, April 18, *Elmore R1*.

Distribution: West Indies. Native to Molucca Island, India.

This is the Nutmeg tree.

## LEGUMINOSAE

## AMHERSTIA NOBILIS Wall.

Royal Botanic Gardens, Port of Spain, April 18, *Elmore R29*.

Distribution: Southeastern Asia.

## CASSIA FISTULA L.

Royal Botanic Gardens, Port of Spain, April 18, *Elmore R2*.

Distribution: Native of Asia, but widely cultivated as an ornamental in tropical America.

## MALVACEAE

## SIDA ACUTA Burm.

Pitch Lake, April 17, *Elmore S2*; in crevices of rock along Pitch Lake.

Distribution: A weed widely dispersed in tropical and subtropical Americas.

## COCHLOSPERMACEAE

COCHLOSPERMUM VITIFOLIUM (Willd.) Spreng.

Royal Botanic Gardens, Port of Spain, April 18, *Elmore R10*.

Distribution: Mexico to South America, cultivated in the West Indies.

## VERBENACEAE

CLERODENDRON FRAGRANS Vent.

Royal Botanic Gardens, Port of Spain, April 18, *Elmore R22*.

Distribution: Native of southeast Asia, cultivated and naturalized in tropical America.

## SOLANACEAE

SOLANUM SEAFORTHIANUM Andr.

Royal Botanic Gardens, Port of Spain, April 18, *Elmore R21*. A scandent shrub with violaceous flowers.

Distribution: Widely distributed in tropical America; introduced into cultivation as an ornamental in many localities.

## GESNERIACEAE

TUSSACIA PULCHELLA Reichb.

Royal Botanic Gardens, Port of Spain, April 18, *Elmore R11*.

Distribution: Panama.

## ACANTHACEAE

THUNBERGIA ALATA Bojer

Royal Botanic Gardens, Port of Spain, April 18, *Elmore R24*.

Distribution: Widely distributed in the West Indies and northern South America.

## RUBIACEAE

BORRERIA VERTICILLATA (L.) Meyer

Pitch Lake, April 17, *Elmore S1*; growing out of rock crevices in Pitch Lake.

Distribution: Widely distributed in the tropics of the Americas.

## CAMPANULACEAE

HIPPOBROMA LONGIFLORA (L.) G. Don

Royal Botanic Gardens, Port of Spain, April 18, *Elmore R9*.

Distribution: Nearly pan-tropical, native of the New World, the type from Jamaica. Adventive in Old World.

TOBAGO, BRITISH WEST INDIES  
GRAMINEAE

CHUSQUEA CF. SCANDENS Kunth.

Buccoo Bay, April 20, *Elmore V10*; edge of brackish lagoon back from beach.

This collection also shows affinity with *Chusquea Pittieri* Hack., described from Costa Rica. The material is sterile and cannot be determined certainly.

SPOROBOLUS POIRETTII (R. & S.) Hitchc.

Buccoo Bay, April 20, *Elmore V16*.

Distribution: Open ground and waste places in tropical and subtropical America. Introduced from Asia.

CYPERACEAE

CYPERUS LIGULARIS L.

Buccoo Bay, April 20, *Elmore V8*; shaded in moist sandy soil of the upper beach.

Distribution: Generally distributed in tropical America.

DICHROMENA CILIATA Vahl

Scarborough, April 19, *Elmore U7*; under a running faucet.

Distribution: Widely distributed in tropical America.

ELEOCHARIS MUTATA (L.) R. & S.

Buccoo Bay, April 20, *Elmore V10*; edge of brackish lagoon back of beach.

Distribution: Widely distributed in tropical America.

FIMBRISTYLIS FERRUGINEA (L.) Vahl

Buccoo Bay, April 20, *Elmore V13*; in dry mud of the grassland.

Distribution: Central America and the West Indies.

POLYGONACEAE

COCCOLOBA UVIFERA L.

Buccoo Bay, April 20, *Elmore V4*; sandy soil of the upper beach.

Distribution: Littoral of tropical America.

LEGUMINOSAE

ACACIA TORTUOSA (L.) Willd.

Buccoo Bay, April 20, *Elmore V14*.

Distribution: Mexico to the Caribbean.

PITHECOLOBIUM DULCE (Roxb.) Benth.

Buccoo Bay, April 20, *Elmore V1*.

Distribution: Tropical regions of the Americas, type from Coromandel, and naturalized in the tropics of the Old World. It occurs widely in the warmer regions of the New World both wild and cultivated. It has been introduced into California and Florida. The sweetish pulpy arils of the seeds are eaten by the native peoples in the spring; dried, they are sold in the markets.

### ERYTHROXYLACEAE

#### ERYTHROXYLON CUMANENSE HBK.

Buccoo Bay, April 20, *Elmore V3*; dry sandy soil of the upper beach.

Distribution: Northern South America and Tobago.

A small tree or shrub with stiff branches and white flowers, characterized by the unarmed approximately horizontal branchlets and the short pedicels of the flowers. The above specimen is nearly leafless, bearing only a few immature leaves on the outer twigs. I have followed Sandwith (Kew Bul. 1938: 357) in assigning this collection to this species. However, it also shows relationship to Venezuelan material in the herbarium of the Chicago Natural History Museum labeled as *E. carthagenense* Jacq.

### ANACARDIACEAE

#### ANACARDIUM OCCIDENTALE L.

Scarborough, April 19, *Elmore U6*; botanic garden.

Distribution: Tropics of the New World, naturalized in the Old World tropics.

### EUPHORBIACEAE

#### EUPHORBIA GLOMERIFERA (Millsp.) Wh.

Scarborough, April 19, *Elmore U3*; roadside in clay soil, flowers white.

Buccoo Bay, April 20, *Elmore V19*, roadside.

Distribution: American tropics.

#### HIPPOMANE MANCINELLA L.

Buccoo Bay, April 20, *Elmore V2*; on dry shaded upper beach.

Distribution: Mostly littoral from Jalisco to Brazil, West Indies, and Florida.

A low spreading tree with thick caustic latex and poisonous fruit. Both the gum and the fruit are employed locally by the natives for medicine and were formerly used for poisoning arrows. It is the manchineel tree. Standley in the "Trees and Shrubs of Mexico" (C. N. H. 23: 650. 1923) gives an interesting account of this tree.

## SAPINDACEAE

## DODONEA VISCOSA Jacq.

Buccoo Bay, April 20, *Elmore V6*; on sandy upper beach.

Distribution: Widely distributed in arid and semi-arid soils of the tropics and subtropics of the Americas.

## MALVACEAE

## MALVASTRUM COROMANDELIANUM (L.) Garcke

Rockley Bay, Scarborough, April 19, *Elmore U1*; roadside, flowers yellow.

Distribution: Widely distributed in tropical and subtropical regions.

## SIDA ACUTA Burm.

Buccoo Bay, April 20, *Elmore V18*; in moist shaded soil by ditch. Flowers orange colored.

Distribution: Widely scattered in tropical and subtropical regions.

## PLUMBAGINACEAE

## PLUMBAGO SCANDENS L.

Buccoo Bay, April 20, *Elmore V26*.

Distribution: Widely distributed in tropical America.

## CONVOLVULACEAE

## IPOMOEA POLYANTHES R. &amp; S.

Buccoo Bay, April 20, *Elmore V25*, shaded in moist clay soil in a ditch.

Distribution: Widely distributed in lowlands of tropical America, type from Martinique, Santo Domingo.

The yellow flowers and congested umbels normally characterize this species. The present collection is atypical in having but 2 to 4 flowers to the umbel.

## OPERCULINA DISSECTA (Jacq.) House

Buccoo Bay, April 20, *Elmore V23*; flowers pink with a dark pink center, collected in moist clay soil in a ditch.

## BORAGINACEAE

## CORDIA MACROSTACHYA (Jacq.) R. &amp; S.

Buccoo Bay, April 20, *Elmore V5*; dry, hot sand of upper beach.

Distribution: Southern Mexico to South America and the West Indies.

## VERBENACEAE

## LANTANA INVOLUCRATA L.

Buccoo Bay, April 20, *Elmore V7*; dry sandy soil.

Distribution: West Indies and Central America.

## STACHYTARPHETA JAMAICENSE (L.) Vahl

Buccoo Bay, April 20, *Elmore V17*; moist shaded roadside.

Distribution: Widely distributed in the tropics of both hemispheres.

A widespread weed with blue flowers on long thick spikes. The flowers are appressed in the grooves of the spike rachis.

## LABIATAE

## OCIMUM MICRANTHUM Willd.

Buccoo Bay, April 20, *Elmore V21*; shaded in moist ditch by the roadside.

Distribution: Mexico to Brazil and the West Indies.

A common widespread annual or short-lived perennial.

## ACANTHACEAE

## APHELANDRA TETRAGONA (Vahl) Nees. sens lat.

Buccoo Bay, April 20, *Elmore V20*; moist shaded roadside.

Distribution: Central America, northern South America, West Indies.

The inflorescence is young and shows a close long tomentum or pilosity and the margins of the bracts are ciliate.

## RUELLIA TUBEROSA L.

Between Buccoo Bay and Scarborough, April 20, *Elmore V15*; roadside in shaded moist forest.

Distribution: Tierra caliente of tropical America, introduced in the Old World. A low perennial herb, the stems angular and sulcate, flowers lavender to purple. The size of the plant and the flowers vary considerably according to environmental conditions.

## CUCURBITACEAE

## MORMORDICA CHARANTIA L.

Buccoo Bay, April 20, *Elmore V24*; shaded, along moist roadside.

Distribution: Widely distributed in the American tropics, Jalisco to Brazil and the West Indies.

## COMPOSITAE

## EUPATORIUM ODORATUM L.

Buccoo Bay, April 20, *Elmore V11*.

Distribution: Widely scattered in mesophytic habitats of tropical America.

## PARTHENIUM HYSTEROPHORUS L.

Scarborough, April 19, *Elmore U2*; roadside.

Distribution: Tropics and subtropics of the New World, adventive in the Old World.

## VERNONIA CINEREA (L.) Less.

Scarborough, April 19, *Elmore U4*; along roadside in dry clay soil, flowers purple. Buccoo Bay, April 20, *Elmore V12*; in dry clay soil of grassland.

Distribution: Native of the Old World Tropics, it has become naturalized in some American localities, as in the Panama Canal Zone where it is a common weed.

PANAMA  
CYATHEACEAE

## HEMITELIA PETIOLATA Hook.

Barro Colorado Island, May 1, *Elmore X3, X1*; in moist shaded jungle.

Distribution: Panama.

## POLYPODIACEAE

## ACROSTICHUM AUREUM L.

Caledonia Harbor, Mt. Vernon, April 3, *Elmore L27*; in dry shaded open forest at 5 feet elevation; April 27, *Elmore L46, L47*.

Distribution: Tropics of Central America, West Indies, and northern South America.

## ADIANTUM LUCIDUM Swartz

Barro Colorado Island, May 1, *Elmore X9, X13, X15*; in moist jungle.

Distribution: Central America, West Indies, and Brazil.

## ADIANTUM PETIOLATUM Desv.

Roadside near Gamboa, March 31, *Elmore I3*; in dry open forest at 400 feet elevation.

Distribution: Central America, from Mexico to Ecuador and Brazil, also in the Australian tropics.

ADIANTUM TETRAPHYLLUM H. B. Willd.

Bahia Honda, March 28, *Elmore H27*; in moist shaded forest, 400 feet elevation.

Distribution: Tropical America, Mexico to the West Indies, and Colombia, and Africa.

ASPLENium PULCHELLUM Raddi.

Roadside near Gamboa, March 31, *Elmore I4*; shaded on slope of dry open forest at 400 feet elevation.

Distribution: Pan-tropics.

BLECHNUM OCCIDENTALE L. forma.

Bahia Honda, March 28, *Elmore H50*. Nature Trail Camp No. 1 on Madden Dam Highway, April 1, *Elmore J5*.

Distribution: Jalisco, Mexico south to Bolivia and east to the West Indies.

CYCLOPELTIS SEMICORDATA (Swartz) J. Smith

Nature Trail Camp No. 1 on Madden Dam Highway, April 1, *Elmore J5a, J6*. Near Bat Cave on Madden Dam Highway, April 1, *Elmore K1*. Barro Colorado Island, May 1, *Elmore X4*; in moist shaded jungle.

Distribution: American tropics.

LOMARIOPSIS (STENOCHLAENA) VESTITA Fourn.

Barro Colorado Island, May 1, *Elmore X17, X19*; clay soil of moist jungle.

Distribution: Central America from Honduras to Panama.

PITYROGRAMMA CALOMELANOS (L.) Link

Bahia Honda, March 28, *Elmore H26*; forest, in moist shaded clay soil. Nature Trail Camp No. 1 on Madden Dam Highway, April 1, *Elmore J14*.

Distribution: Tropical America from southern Mexico to Colombia.

PITYROGRAMMA TARTAREA (Cav.) Maxon

Bahia Honda, March 28, *Elmore H49*.

Distribution: Central America, Nayarit and Vera Cruz south to Panama and the West Indies.

PTERIDIUM AQUILINA CAUDATUM (L.) Sadeb.

Caledonia Harbor, Mt. Vernon, April 27, *Elmore L42*; "over 8 feet high."

Distribution: Panama.

PTERIS GRANDIFOLIA L.

Caledonia Harbor, Mt. Vernon, April 3, *Elmore L9*; in dry, open forest at 10 feet elevation.



Distribution: Central America, West Indies, northern South America, and also in India.

*PTERIS PROPINQUA* Ag.

Barro Colorado Island, May 1, *Elmore X18*; in moist clay soil of the jungle.

Distribution: Mexico to Brazil, West Indies, and Galapagos Islands.

*TECTARIA INCISA* Cav.

Nature Trail Camp No. 1 on Madden Dam Highway, April 1, *Elmore J4*; Barro Colorado Island, May 1, *Elmore X10, X12*; moist shaded jungle.

Distribution: Central America.

A pubescent form of the species.

### SCHIZAEACEAE

*LYGODIUM RADIATUM* Prantl

Barro Colorado Island, May 1, *Elmore X5*; in shade of moist jungle.

Distribution: Known from Guatemala to Colombia.

*LYGODIUM VENUSTUM* Swartz

Roadside near Gamboa, March 31, *Elmore I1*; in shade of open forest at 400 feet elevation. Bahia Honda, March 28, *Elmore H18*. Near Bat Cave on Madden Dam Highway, *Elmore K2*.

Distribution: Central America, West Indies, Brazil.

"In dense undergrowth but not under trees; climbing and twining."

### LYCOPODIACEAE

*LYCOPODIUM CERNUM* L.

Roadside near Gamboa, March 31, *Elmore I2*; in shade of open forest at 400 feet elevation.

Distribution: Pan-tropics.

### SELAGINELLACEAE

*SELAGINELLA ARTHRITICA* Alston

Nature Trail Camp No. 1 on Madden Dam Highway, April 1, *Elmore J2*; shaded on moist stream bank. Barro Colorado Island, May 1, *Elmore X16*; in moist, shaded clay soil of the jungle.

Distribution: Central America.

## GRAMINEAE

## ANDROPOGON GLOMERATUS (Walt.) B. P. S.

Caledonia Harbor, Mt. Vernon, April 3-4, *Elmore L4*; coralline and shell in shade on upper beach.

Distribution: Southeastern United States, West Indies, Panama, and Mexico.

## CHLORIS PETREA Swartz

Caledonia Harbor, Mt. Vernon, April 3-4, *Elmore L6*; shaded on level sand of coralline and shell of upper beach.

Distribution: Coastal sandy areas of southeastern United States, eastern Mexico, West Indies, and Panama.

## CHUSQUEA SCANDENS Kunth.?

Nature Trail Camp No. 1 on Madden Dam Highway, April 1, *Elmore J10*; shaded on moist sandy clay stream bank in open forest.

Distribution: Central America and West Indies.

Specimens are sterile and cannot be determined with certainty.

## ELEUSINE INDICA (L.) Gaertn.

Nature Trail Camp No. 1 on Madden Dam Highway, April 1, *Elmore J1*.

Distribution: Common in the warmer regions of both hemispheres.

## MUHLENBERGIA EMERSLEYI Vasey.

Bahia Honda, March 28, *Elmore H33*; shaded on protected clay slope in dry hot forest at 50 feet elevation.

Distribution: Mountainous regions of southwestern United States, south through the mountains of Mexico to Panama.

In southeastern United States and northern Mexico the habitat of this species is the rocky mountain slopes with well-drained, well-aerated soils in temperate climates. It seldom occurs below 2,000 feet elevation and in northern Mexico is more common at 4,000 feet elevation. Hence, the Panama tropical collection at nearly sea level suggests a plant with different tolerances for a different habitat. Close study of the Panama population should reveal differences that could be expressed taxonomically.

## PANICUM MILLEFLORUM Hitchc. &amp; Chase

Caledonia Harbor, Mt. Vernon, April 3-4, *Elmore L8*. Nature Trail Camp No. 1 on Madden Dam Highway, April 1, *Elmore J7*; in moist shaded soil of stream bed in open forest.

Distribution: Central America to Brazil.

## PASPALUM PANICULATUM L.

Frijoles, Canal Zone, May 1, *Elmore Y4*; along railroad.

Distribution: Widely distributed in tropical America, the type described from Jamaica.

## CYPERACEAE

## CYPERUS LUZULAE (L.) Retz.

Caledonia Harbor, Mt. Vernon, April 3, *Elmore L7*; shaded in sandy soil of the upper beach. Nature Trail Camp No. 1 on Madden Dam Highway, April 1, *Elmore J13*; shaded in moist sandy soil of a stream bank, open forest.

Distribution: Widely distributed in the lowlands of tropical America.

## CYPERUS ODORATUS L. sens. lat.

Taboga Island, May 2, *Elmore Z2*; in spring water.

Distribution: Panama, common in the Canal Zone.

## FIMBRISTYLIS DICHOTOMA (L.) Vahl

*Fimbristylis annua* (All.) R. & S.

Frijoles, Canal Zone, May 1, *Elmore Y6*; edge of Gatun Lake in mud.

Distribution: From southern Sonora, south through Mexico to Central America. It has not previously been listed in the flora of Panama.

## KILLINGIA PERUVIANA Lam.

Caledonia Harbor, Mt. Vernon, April 26, *Elmore L36*.

Distribution: Common along seashores of Central America and northern South America.

## SCLERIA EGGERSIANA Boekl.

Frijoles, Canal Zone, May 1, *Elmore Y3*; in mud at edge of Gatun Lake.

## ARACEAE

## MONSTERA PERTUSA (L.) DeVriese

Taboga Island, May 2, *Elmore Z1*; in spring.

Distribution: Central America, northern South America, and West Indies.

## PHILODENDRON GRANDIPES Krause

Barro Colorado Island, May 1, *Elmore X20*; shaded in moist clay soil of the jungle.

Distribution: Known only from the Canal Zone.

## PHILODENDRON HOFFMANNII Schott

Bahia Honda, March 28, *Elmore H30*; climbing trees in moist shaded forest at 400 feet elevation.

Distribution: Guatemala to Panama.

## PHILODENDRON RADIATUM Schott

Barro Colorado Island, May 1, *Elmore X14*; growing on fallen tree in moist jungle.

Distribution: Mexico and Central America.

Apparently this species; the specimens are sterile.

## BROMELIACEAE

## TILLANDSIA BULBOSA Hook.

Bahia Honda, March 28, *Elmore H41*; on a tree along the beach.

Distribution: Southern Mexico to northern South America and the West Indies; the type from Trinidad.

## LILIACEAE

## PANCRATIUM LITTORALE Jacq.

*Hymenocallis americana* (L.) Griseb.

Caledonia Harbor, Mt. Vernon, April 3, *Elmore L11*; at sea level, on shaded upper beach.

Distribution: Widely distributed from southeastern United States and through tropical America.

An halophytic bulbous herb with white flowers with an extremely long tube and long, spangle-tipped corolla margin—the "spider lily."

## AMARYLLIDACEAE

## HIPPEASTRUM PUNICEUM (Lam.) Urb.

Bahia Honda, March 28, *Elmore H42*; shaded in moist clay soil in a protected level forest near sea level.

Distribution: Panama and South America, cultivated as an ornamental in Central America and the West Indies.

The large red flowers and deep green leaves make this plant an attractive ornamental.

## MUSACEAE

## HELICONIA LANKESTERI Standl.

Bahia Honda, March 28, *Elmore H29*; on edges and bottom of small ravine at 400 feet elevation.

Distribution: Costa Rica and western Panama.

This is an uncommon plant rarely collected. Elmore reports the flowers as red.

## HELICONIA SUBULATA R. &amp; P.

Caledonia Harbor, Mt. Vernon, April 3, *Elmore L17*; in partial shade of forest opening, elevation 5 feet.

Distribution: Lowlands, from Guatemala and the Antilles to Brazil and Bolivia.

## ZINGIBERACEAE

## COSTUS SPICATUS Jacq.

Caledonia Harbor, Mt. Vernon, April 3, *Elmore L22*; in shaded clay soil of the open forest, flowers yellow.

Distribution: Central America.

## RENEALMIA CERNUA (Swartz) Macbr.

Caledonia Harbor, Mt. Vernon, April 3, *Elmore L18*; shaded in hot open forest.

Distribution: Tropical forests from Costa Rica to Peru.

## ORCHIDACEAE

## BRASSAVOLA NODOSA Lindl.

Bahia Honda, March 28, *Elmore H2*; growing on coconut tree on upper beach, flowers white.

Distribution: From Mexico through Central America to northern South America and the West Indies. This orchid is the national flower of Panama.

## LOCKHARDIA OERSTEDII Richb. f.

Bahia Honda, March 28, *Elmore H23*; Nature Trail Camp No. 1 on Madden Dam Highway, April 1, *Elmore J3*; on moist, shaded, sandy, clay, stream bank.

Distribution: Guatemala to Panama.

## TRIGONIDIUM EGERTONIANUM Batem

Bahia Honda, March 28, *Elmore H48*; in a tree at sea level, flowers greenish yellow tinged with brown.

Distribution: Mexico, British Honduras, Nicaragua, and Panama.

## PIPERACEAE

## PIPER TUBERCULATUM Jacq.

Caledonia Harbor, Mt. Vernon, April 26, *Elmore L32, L33*; in level forest in shaded moist clay soil.

Distribution: Vera Cruz and Nayarit through Central America to South America.

No. *L33* differs from No. *L32* in having glabrous leaves, otherwise the two collections agree and fall within the normal variation of this widespread species.

## OLEACEAE

## XIMENIA AMERICANA L.

Bahia Honda, March 28, *Elmore H39*; at sea level along moist, sandy beach. "Flowers sweet smelling, cream colored." Flowers are distinguished by the dense woolly pubescence on the inner face of the petals.

Distribution: Tropics of both hemispheres and Florida.

## AMARANTACEAE

## GOMPHRENA DISPERSA Standl.

Frijoles, Canal Zone, May 1, *Elmore Y2*; along railroad tracks.

Distribution: Central Mexico to Costa Rica and West Indies, adventive in Florida; type from cultivated field, Sierra de Anafe, Pinar del Rio, Cuba.

## GOMPHRENA GLOBOSA L.

Frijoles, Canal Zone, May 1, *Elmore Y1*; along railroad tracks.

Distribution: Southern Asia and escaped widely in tropical America; type from India.

## CAPPARIDACEAE

## CAPPARIS VERRUCOSA Jacq.

Taboga Island, May 2, *Elmore Z3*; rocky clay soil in dry hot forest.

Distribution: Tierra caliente from Mexico to Venezuela.

## CRASSULACEAE

## BRYOPHYLLUM PINNATUM (Lam.) Kurz.

Bahia Honda, March 28, *Elmore H38*; shaded in clay soil on upper beach.

Distribution: Florida and throughout the West Indies and tropical American mainland. Naturalized from Asia; type from the Molucca Islands.

The succulent leaves are viviparous and either simple or pinnate.

## ROSACEAE

## CHRYSOBALANUS ICACO L.

Caledonia Harbor, Mt. Vernon, April 27, *Elmore L45*.

Distribution: Widely distributed in tropical America from Mexico to South America and the West Indies; type from Jamaica. It is also in Africa.

This is the cocoa-plum or icaco with edible fruit. Standley gives an interesting account of it (*Trees and Shrubs of Mexico*, C. N. H. 23: 345, 1922).

## LEGUMINOSAE

## CAJANUS BICOLOR DC.

Bahia Honda, March 28, *Elmore H12, H24*; in cleared plot of the jungle, flowers yellow, the back of the banner veined in red-brown.

Distribution: Native of Asia, introduced in tropical America where it is widely cultivated for its edible beans. It has escaped in many localities.

## CASSIA GRANDIS L.

Bahia Honda, March 28, *Elmore H1*.

Distribution: Mexico to the Guianas.

It forms a large tree and when in bloom is made showy by its masses of pink flowers.

## PHASEOLUS ADENANTHUS Meyer

Bahia Honda, March 28, *Elmore H5*; on upper beach.

Distribution: Widely distributed through lowlands of tropical America.

A glabrous or puberulent vine with lanceolate leaflets, very unequal calyx lobes (upper broad and rounded, lower lanceolate, acute), bracts strongly 9-10-nerved, pale flowers, and rather straight pods 7-8 x 100 mm. *Elmore* reports the flowers as cream-colored with purple strongly tingeing the keel below and more lightly so above.

## PHASEOLUS GRACILIS Poepp.

Caledonia Harbor, Mt. Vernon, April 3-4, *Elmore L5*; upper beach.

Distribution: Tropical America; the type from Cuba.

## SWARTZIA SIMPLEX (Swartz) Spreng.

Bahia Honda, March 28, *Elmore H40*; shaded on moist beach.

Distribution: Southern Mexico to Panama and the West Indies.

## MALPIGHIACEAE

## BANISTERIA CORNIFOLIA (HBK.) Spreng.

Bahia Honda, March 28, *Elmore H45*; in shaded moist sandy soil on the upper beach.

Distribution: Nicaragua and Costa Rica to Colombia; type from Ibaque, Colombia.

## STIGMATOPHYLLUM ELLIPTICUM (HBK.) Juss.

Caledonia Harbor, Mt. Vernon, April 3, *Elmore L2*; on coralline and shell of the upper beach, vine with yellow flowers.

Distribution: Central America.

## POLYGALACEAE

## SECURIDACA DIVERSIFOLIA (L.) Blake

Bahia Honda, March 28, *Elmore H17*; clay soil in forest clearing at 50 feet elevation, flowers purple.

Distribution: Tamaulipas and Jalisco to Ecuador, and the West Indies.

## EUPHORBIACEAE

## ACALYPHA DIVERSIFOLIA Jacq.

Barro Colorado Island, May 1, *Elmore X7*.

Distribution: Central America and South America.

Croizat, who determined the collection, states that the identity cannot be certain since female flowers are lacking.

## EUPHORBIA GLOMERIFERA (Millsp.) Wh.

Caledonia Harbor, Mt. Vernon, April 3, *Elmore L25*; in shade of dry open forest.

Distribution: General in the American tropics.

## EUPHORBIA HIRTA TYPICA Wh.

Frijoles, Canal Zone, May 1, *Elmore Y7*; along railroad.

Distribution: General in the American tropics.

## MANIHOT ESCULENTA Crantz

Caledonia Harbor, Mt. Vernon, April 3, *Elmore L20*; clay soil of dry, open forest at 5 feet elevation.

Distribution: Native of Brazil, cultivated in moist tropical regions and sometimes escapes locally.

## ANACARDIACEAE

## MANGIFER INDICA L.

Bahia Honda, March 28, *Elmore H13*; a single tree observed on an exposed slope of the forest. The specimen was in flower.

Distribution: Native of Asia but widely cultivated in tropical America where it has escaped locally, as in the present case.

## SPONDIAS PURPUREA L.

Bahia Honda, March 28, *Elmore H47*; shaded in moist clay soil.

Distribution: Widely distributed in the American tropics and subtropics. In Mexico it is generally known as "ciruelo" and the plum-like fruits are used for making preserves. It flowers and fruits in the spring dry season.



## MALVACEAE

## HIBISCUS RORA-SINENSIS L.

Bahia Honda, March 28, *Elmore H36*; shaded in moist sandy soil of the upper beach among the rocks.

Distribution: Apparently native of China but now widely dispersed in the tropics and subtropics of the Old and New Worlds both as cultivates and as escapes.

## HIBISCUS SYRIACUS L.

Bahia Honda, March 28, *Elmore H37*; shaded in moist clay soil along upper beach. Flowers red and white.

Distribution: This is an horticultural form with double corolla. Originally from Asia, the species is not listed in published floras of Central America, but it is common in gardens of the temperate zone.

## HIBISCUS TILIACEUS L.

Bahia Honda, March 28, *Elmore H3*; in moist sandy clay soil of the upper beach.

Distribution: Pan-tropic, probably originating in Asia. It reaches central Sinaloa on the Mexican west coast.

A shrub or small tree with a rather dense foliage of large round cordate leaves. While common on the coastal dunes, it is rarely found inland. *Elmore* reports the flowers as yellow.

## MALVA VISCUS ARBOREUS Cav.

Bahia Honda, March 28, *Elmore H7*; shaded in moist sandy soil on the upper beach.

Distribution: Tropical America from Sinaloa to Colombia; type from Mexico.

## SIDA ACUTA Burm.

Caledonia Harbor, Mt. Vernon, April 3, *Elmore L26*; shaded in open forest in clay soil.

Distribution: Nearly throughout tropical and subtropical Americas.

## URENA LOBATA L.

Bahia Honda, March 28, *Elmore H14*; in moist clay soil in open forest. Flowers pink with a darker pink center.

Distribution: Central America and northern South America. A common tropical weed with fruits like *Triumfetta* and flowers suggesting *Ayenia*.

## STERCULIACEAE

## MELOCHIA LUPULINA Swartz

Nature Trail at Camp No. 1 on Madden Dam Highway, April 1, *Elmore J8*; on moist shaded stream bank in open forest.

Distribution: Widespread in tropical America.

A shrubby herb with accrescent calyces. The petals are white with a yellow spot.

## OCHNACEAE

## OURATIA WRIGHTII (Van Tiegh) Riley

Bahia Honda, March 28, *Elmore H44*; shaded in moist sandy soil of the upper beach.

Distribution: Honduras to Panama.

A shrub or tree up to 5 meters high. The fruits are attached to a fleshy receptacle. *Elmore* reports the receptacle red, the fruits black.

## COCHLOSPERMACEAE

## COCHLOSPERMUM VITIFOLIUM (Willd.) Spreng.

Bahia Honda, March 28, *Elmore H16*; moist clay soil in open forest.

Distribution: From Mexico to South America, cultivated in the West Indies.

This is a widespread tree in the more arid deciduous tropical forests. Its northern limit appears to be in southern Sonora on the Mexican west coast. It is leafless at flowering time in the spring when its large yellow blossoms enhance the light gray bark and make it altogether a striking plant. The seeds bear an aril of glossy fibers similar to that of the kapok trees of the genus *Ceiba*.

## PASSIFLORACEAE

## PASSIFLORA VITIFOLIA HBK.

Caledonia Harbor, Mt. Vernon, April 3, *Elmore L15*; shaded in opening of dry forest, flowers red.

Distribution: Nicaragua to Peru, cultivated in the West Indies; type from along the Magdalena River, near El Peñon, Colombia.

## CACTACEAE

## PERESKIA BLEO (HBK.) DC.

Caledonia Harbor, Mt. Vernon, April 3, *Elmore L34*.

Distribution: Panama to Colombia.

Shrub or tree up to 7 meters high, the branches rather thick and variously spiny.

WITTIA PANAMENSIS Brit. & Rose

Caledonia Harbor, Mt. Vernon, April 26, *Elmore L40*; in forest.

Distribution: Panama to Colombia and Venezuela; type from the mountains above Chepo, Panama.

Epiphytic with flat succulent stems 4-7 cm wide, 20-40 cm long, crenate, unarmed, from a slender elliptic main stem 1-1.5 cm wide.

### LECYTHIDACEAE

GUSTAVEA RHODANTHA Standley

Caledonia Harbor, Mt. Vernon, April 3, *Elmore L23, L28*; shaded in clay soil of open forest at sea level.

Distribution: Panama.

This is a member of the brazil nut family, which is represented by this and several other species in Panama and Costa Rica. The family reaches its greatest development in Brazil.

### MYRTACEAE

EUGENIA JAMBOS L.

Caledonia Harbor, Mt. Vernon, April 3, *Elmore L21*; in light dry open forest at nearly sea level.

Distribution: Native of southeastern Asia, naturalized in many localities in the American tropics.

### MELASTOMACEAE

MICONIA ARGENTEA (Sw.) DC.

Barro Colorado Island, May 1, *Elmore X6*; in moist shady jungle.

Distribution: Southern Mexico to Panama, type from the Mosquito Coast.

### ONAGRACEAE

JUSSIAEA SUFFRUTACOSA L.

Caledonia Harbor, Mt. Vernon, April 3, *Elmore L12*; shaded in moist clay soil of the open forest at 10 feet elevation.

Distribution: Widely distributed in the American tropics and subtropics.

## GENTIANACEAE

## SCHULTESIA LISIANTHOIDES (Griseb.) B. &amp; H.

Bahia Honda, March 28, *Elmore H20*; in dense undergrowth at 100 feet elevation, but not under trees.

Distribution: Guatemala to Venezuela.

An herb with pink flowers resembling species of *Centaurium* and reported as common in wastelands.

## APOCYNACEAE

## ALLAMANDA CATHARTICA L.

Barro Colorado Island, May 1, *Elmore X2*; planted on lawn in front of house. Bahia Honda, March 28, *Elmore H19*; shaded in dry forest undergrowth.

Distribution: Central America and the West Indies; widely cultivated as an ornamental.

## TABERNAEMONTANA CORONARIA R. Br.

Bahia Honda, March 28, *Elmore H46*; shaded in moist clay soil, forest, elevation 5 feet.

Distribution: Widely cultivated in tropical America, escaped locally; native of Asia.

## CONVOLVULACEAE

## IPOMOEA POLYANTHES R. &amp; S.

Bahia Honda, March 28, *Elmore H25*; in jungle clearing, flowers yellow.

Distribution: Widely distributed in tropical America; type from Martinique, Santo Domingo, Jamaica.

## IPOMOEA TRICHOCARPA Ell.

Bahia Honda, March 28, *Elmore H6*; shaded in moist sandy soil on upper beach.

Distribution: Tropical America, southern United States, type from California.

A twining vine with pink flowers.

## JACQUEMONTIA PENTANTHA (Jacq.) Don

Nature Trail Camp No. 1 on Madden Dam Highway, April 1, *Elmore J15*; shaded in moist sandy clay soil on stream bank in open forest.

Distribution: Widely distributed in tropical America.

## MARIPA PANAMENSIS Hemsl.

Caledonia Harbor, Mt. Vernon, April 4, *Elmore L13*; coralline and shell in open forest, flowers pink.

Distribution: Endemic to Panama.

## VERBENACEAE

## PETREA VOLUBILIS L.

Caledonia Harbor, Mt. Vernon, April 3, *Elmore L41*; forest.

Distribution: Widely distributed in tropical America.

## LABIATAE

## SALVIA OCCIDENTALIS Swartz

Bahia Honda, March 28, *Elmore H9*; clay soil in forest clearing.

Distribution: Widespread in the American tropics.

Small erect weedy herb with blue flowers and viscid calyces that adhere to other objects.

## SOLANACEAE

## SOLANUM SCABRUM Vahl

Bahia Honda, March 28, *Elmore H8*; at sea level on the upper beach in moist shaded sandy soil.

Distribution: Tierra caliente of Central America, West Indies, and northern South America. A scandent shrub with light purple flowers common through the lowlands.

## SCROPHULARIACEAE

## SCOPARIA DULCIS L.

Caledonia Harbor, Mt. Vernon, April 3, *Elmore L14*; open forest at 10 feet elevation.

Distribution: Pan-tropic.

## BIGNONIACEAE

## ENALLAGMA CUCURBITINA (L.) Baill.

Caledonia Harbor, Mt. Vernon, April 3, *Elmore L1*; in coralline and shell sand of the upper beach, elevation 3 feet.

Distribution: Panama.

## TABEBUIA PALUSTRIS Hemsl.

Bahia Honda, March 28, *Elmore H43*; edge of the forest in moist sandy soil of the upper beach.

Distribution: Known only from the type locality, "swamps of the Rio Grande," Panama.

Small tree with white flowers. Leaflets two, 10x7.5 cm to 8x4 cm, broadly ovate, acuminate, broadly rounded at base, coarsely white pubescent below, sparsely so above; calyx narrowly campanulate, 8 mm high, the lobes obsolete, coarsely white pubescent; corolla minutely lepidote-scabrous, ca. 4 cm long. Apparently a rare plant.

### ACANTHACEAE

APHELANDRA DEPPEANA Schlecht. & Cham.

Bahia Honda, March 28, *Elmore H15*; in warm moist clay soil of level open forest, elevation 15 feet.

Distribution: New World tropics; type locality, Hacienda de la Laguna, Vera Cruz.

The leaves are non-scabrous above, contrary to what is reported as usual in the species. The young leaves are sparsely strigillose, the older glabrous.

BLECHUM PYRAMIDATUM (Lam.) Urban

Bahia Honda, March 28, *Elmore H11*; Nature Trail Camp No. 1 on Madden Dam Highway, February 1, *Elmore J12*; in clay soil in level forest clearing, and on moist stream bank, flowers blue.

Distribution: From mid-Sinaloa south it is widely distributed in the American tropics.

JUSTICIA PECTORALIS Jacq.

Bahia Honda, March 28, *Elmore H10*; in shaded clay soil in level forest clearing.

Distribution: A wasteland herb of tropical America and the West Indies.

Elmore reports the flowers as lavender. In appearance it closely resembles some of the *Carlowrightia*.

STAUROGYNE REPENS (Nees) Kuntze

Frijoles, Canal Zone, May 1, *Elmore Y8*; along railroad.

Distribution: Nicaragua and Panama.

This number is an annual polypodial herb, viscid pubescent with congested fruiting spikes bearing obovate, shortly acuminate ciliate, reddish purple bracts. It is doubtfully referred to this species.

## RUBIACEAE

## HAMELIA NODOSA Mart. &amp; Gal.

Caledonia Harbor, Mt. Vernon, April 4, *Elmore L10*; sandy soil of coralline and shell, shaded in open forest, flowers red.

Distribution: Mexico to Panama.

## MORINDA ROYOC L.

Caledonia Harbor, Mt. Vernon, April 3, *Elmore L3*; on coralline and shell of the upper beach in shade.

Distribution: Central America.

## COMPOSITAE

## VERNONIA CANESCENS HBK.

Bahia Honda, March 28, *Elmore H34*; in the shade of dry hot forest. Flowers white. Barro Colorado Island, May 1, *Elmore X8*.

Distribution: Mostly in the tierra caliente from southern Mexico south through Central America to northern South America; type from Guanacamba, Peru.

## WEDELIA TRILOBATA (L.) Hitchc.

Bahia Honda, March 28, *Elmore H4*; in shaded moist sandy soil of the upper beach. Caledonia Harbor, Mt. Vernon, April 26, *Elmore L37*.

Distribution: Widely distributed along the seashores of tropical America.

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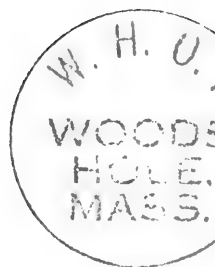
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## PLATE 1

Fig. 1. Interior of Cubagua Island, Venezuela, showing April aspect of the xerophytic vegetation.



## PLATE 2

- Fig. 2. Bahia Honda, Panama. Littoral vegetation still heavy with green leaf in March.
- Fig. 3. Detail of the vegetation in Bahia Honda. In the foreground are arborescent mesophytes with medium to broad leaves; in the background a tall tree (probably *Cochlospermum vitifolium*) nearly leafless with hanging nests of a tropical oriole.



Fig. 2



Fig. 3



## INDEX

Allan Hancock Foundation Publications of The University of Southern California,  
Atlantic Cruise, Report 6. Illustrations face the pages in boldface.

- Acacia Farnesiana*, 6  
     *tortuosa*, 15  
*Acalypha diversifolia*, 28  
 Acanthaceae, 4, 14, 18, 34  
*Acrostichum aureum*, 19  
*Adiantum bessoniae*, 11  
     *lucidum*, 19  
     *petiolatum*, 19  
     *tetrophyllum*, 20  
*Agave Boldinghiana*, 6  
 Aizoaceae, 4, 8, 10  
*Allamanda cathartica*, 32  
*Allionia incarnata*, 10  
*Alternanthera canescens*, 10  
 Amarantaceae, 10, 26  
 Amaryllidaceae, 6, 24  
*Amherstia nobilis*, 13  
 Anacardiaceae, 8, 16, 28  
*Anacardium occidentale*, 16  
*Andropogon glomeratus*, 22  
*Anthurium* cf. *Bakeri*, 12  
     *Hookeri*, 12  
*Aphelandra Deppeana*, 34  
     *tetragona*, 18  
 Apocynaceae, 32  
 Araceae, 12, 23  
*Aristida setifolia*, 6  
 Aristilochiaceae, 13  
*Aristolochia elegans*, 13  
 Asclepiadaceae, 5  
*Asplenium pulchellum*, 20  
*Atriplex pentandra*, 10  
*Ayenia*, 29  
*Banisteria cornifolia*, 27  
 Bignoniaceae, 33  
*Blechnum occidentale*, 20  
     *pyramidatum*, 34  
 Boraginaceae, 4, 5, 7, 9, 11, 17  
*Borreria verticillata*, 14  
*Brassavola nodosa*, 25  
 Bromeliaceae, 24  
*Bryophyllum pinnatum*, 26  
 Cactaceae, 4, 5, 9, 11, 30  
*Cactus intortus*, 5, 9,  
*Cajanus bicolor*, 27  
*Calotropis procera*, 5  
 Campanulaceae, 14  
 Capparidaceae, 26  
*Capparis verrucosa*, 26  
*Carlowrightia*, 34  
*Cassia Fistula*, 13  
     *grandis*, 27  
*Castela Nicholsoni*, 8, 10  
*Ceiba*, 30  
*Cenchrus pilosus*, 9  
 Centaurium, 32  
 Chenopodiaceae, 10  
*Chloris petrea*, 22  
*Chrysobalanus Icaco*, 26  
*Chusquea Pittieri*, 15  
     cf. *scandens*, 15, 22  
*Clerodendron fragrans*, 14  
*Cnidosculus urens*, 4  
*Coccoloba Uvifera*, 15  
 Cochlospermaceae, 14, 30  
*Cochlospermum vitifolium*, 14, 30, 40  
 Combretaceae, 9  
 Commelinaceae, 13  
*Commicarpus scandens*, 6  
 Compositae, 4, 8, 19, 35  
*Conocarpus erectus*, 9  
 Convolvulaceae, 7, 11, 17, 32  
*Cordia macrostachya*, 17  
*Costus spicatus*, 25  
 Crassulaceae, 26  
*Croton rhamnifolius*, 7  
 Cucurbitaceae, 18  
 Cyatheaceae, 19  
*Cyclopeltis semicordata*, 20  
 Cyperaceae, 4, 12, 15, 23  
*Cyperus ligularis*, 15  
     *Luzulae*, 23  
     *odoratus*, 23  
     *polystachyos*, 12  
*Cyrtomium falcatum*, 11  
*Dichromena ciliata*, 15  
*Dodonea viscosa*, 17  
*Dryopteris ampla*, 12  
*Eleocharis mutata*, 15  
*Eleusine indica*, 22  
*Enallagma cucurbitina*, 33  
*Epidendrum fragrans*, 12  
*Erithalis fructicosa*, 7, 9  
 Erythroxylaceae, 16  
*Erythroxylon carthagense*, 16  
     *cumanense*, 16  
*Eugenia jambos*, 31  
*Eupatorium odoratum*, 19  
*Euphorbia buxifolia*, 4  
     *glomerifera*, 16, 28  
     *hirta typica*, 28  
 Euphorbiaceae, 4, 7, 11, 16, 28  
*Evolvulus alsinoides*, 11  
*Fimbristylis annua*, 23  
     *dichotoma*, 23  
     *ferruginea*, 15  
 Gentianaceae, 32

- Gesneriaceae, 14  
 Gomphrena dispersa, 26  
     globosa, 26  
 Gossypium barbadense, 8  
 Gramineae, 4, 6, 8, 9, 12, 15, 22  
 Gundlachia corymbosa, 8  
 Gustavea rhodantha, 31  
 Hamelia nodosa, 35  
 Heliconia Lankesteri, 24  
     subulata, 24  
 Heliotropium angiospermum, 7, 9  
     curassavicum, 11  
 Hemitelia petiolata, 19  
 Hibiscus rora-sinensis, 29  
     syriacus, 29  
     tiliaceus, 29  
 Hippobroma longiflora, 14  
 Hippeastrum puniceum, 24  
 Hippomona Mancinella, 16  
 Hymenocallis americana, 24  
 Hypoderris brownii, 12  
 Hydrophyllaceae, 4  
 Hymenocallis americana, 24  
 Ipomoea polyanthes, 17, 32  
     rubra, 7  
     trichocarpa, 32  
 Isocarpha oppositifolia, 8  
 Jacquemontia pentantha, 32  
 Jacquinia barbasco, 9  
 Jatropha gossypifolia, 4, 7, 11  
 Justicia pectoralis, 34  
 Jussiaea suffrutacosa, 31  
 Killingia peruviana, 23  
 Labiatae, 18, 33  
 Lantana involucrata, 18  
 Lecythidaceae, 31  
 Leguminosae, 6, 13, 15, 27  
 Leptothrium rigidum, 9  
 Liliaceae, 24  
 Lockhardia Oerstedii, 25  
 Lomariopsis (Stenochlaena) vestita, 20  
 Lycopodiaceae, 21  
 Lycopodium cernuum, 21  
 Lygodium radiatum, 31  
     venustum, 21  
 Malpighiaceae, 27  
 Malvaceae, 4, 8, 13, 17, 29  
 Malvaviscus arboreus, 29  
 Malvastrum coromandelianum, 17  
 Manihot esculenta, 28  
 Mangifer indica, 28  
 Maripa panamensis, 33  
 Melastomaceae, 31  
 Melochia lupulina, 30  
 Messerschmidia gnaphalodes, 5  
 Miconia argentea, 31  
 Monstera pertusa, 23  
 Morinda Royoc, 6, 35  
 Mormordica Charantia, 18  
 Muhlenbergia Emersleyi, 22  
 Musaceae, 24  
 Myristicaceae, 13  
 Myristica fragrans, 13  
 Myrtaceae, 31  
 Nyctaginaceae, 6, 10  
 Ochnaceae, 30  
 Ocimum micranthum, 18  
 Oleaceae, 26  
 Onagraceae, 31  
 Operculina dissecta, 17  
 Opuntia Tuna, 5, 11  
     var. cubaguensis, 11  
 Orchidaceae, 4, 12, 25  
 Ouratia Wrightii, 30  
 Palmae, 13  
 Panicum milleflorum, 22  
 Pancratium littorale, 24  
 Parthenium hysterophorus, 19  
 Paspalum paniculatum, 22  
 Passiflora vitifolia, 30  
 Passifloraceae, 30  
 Pereskia Bleo, 30  
 Petrea volubilis, 33  
 Pharus latifolius, 12  
 Phaseolus adenanthus, 27  
     gracilis, 27  
 Philodendron grandipes, 23  
     Hoffmannii, 23  
     radiatum, 23  
 Phytelephas macrocarpa, 13  
 Piperaceae, 25  
 Piper tuberculatum, 25  
 Pithecolobium dulce, 15  
 Pityrogramma calomelanos, 20  
     tartarea, 20  
 Plumbaginaceae, 17  
 Plumbago scandens, 17  
 Polygalaceae, 28  
 Polygonaceae, 13, 15  
 Polypodiaceae, 11, 19  
 Polypodium phyllitidis, 12  
 Prosopis juliflora, 6  
 Pteridium aquilina caudatum, 20  
 Pteridophytes, 4  
 Pteris grandifolia, 20  
     propinqua, 21  
 Renealmia cernua, 25  
 Rosaceae, 26  
 Rubiaceae, 6, 7, 9, 14, 35  
 Ruellia tuberosa, 18  
 Salvia occidentalis, 33  
 Sapindaceae, 17  
 Schizaeaceae, 21  
 Schultesia lisianthoides, 32  
 Scleria eggersiana, 23  
 Scoparia dulcis, 5, 33



- Scrophulariaceae, 5, 33  
 Securidaca diversifolia, 28  
 Selaginellaceae, 21  
 Selaginella arthritica, 21  
 Sesuvium portulacastrum, 4, 8  
 Sida acuta, 13, 17, 29  
 Simaroubaceae, 8, 10  
 Solanaceae, 14, 33  
 Solanum scabrum, 33  
     seaforthianum, 14  
 Spathiphyllum cannifolium, 12  
 Spondias purpurea, 8, 28  
 Sporobolus Poiretii, 15  
     pyramidatus, 8, 10  
 Stachytarpheta jamaicense, 18  
 Staurogyne repens, 34  
 Sterculiaceae, 30  
 Stigmatophyllum ellipticum, 27  
 Swartzia simplex, 27  
 Tabebuia palustris, 33  
 Tabernaemontana coronaria, 32  
 Tectaria incisa, 21  
 Theophrastaceae, 9  
 Thunbergia alata, 14  
 Tillandsia bulbosa, 24  
 Tournefortia gnaphalodes, 5  
 Trianthema portulacastrum, 10  
 Tribulus terrestris, 10  
 Trigonidium Egertonianum, 25  
 Triumphetta, 29  
 Triplaris surinamensis, 13  
 Tussacia pulchella, 14  
 Urena Lobata, 29  
 Verbenaceae, 14, 18, 33  
 Vernonia canescens, 35  
     cinerea, 19  
 Viviparae, 6  
 Wedelia trilobata, 35  
 Wittia panamensis, 31  
 Ximenia americana, 26  
 Zebrina pendula, 13  
 Zingiberaceae, 25  
 Zygophyllaceae, 10

## GEOGRAPHICAL INDEX

- Africa, 5, 7, 9, 10, 11, 20, 26  
 America, 4, 5, 7, 8, 9, 10, 11, 13, 14, 15,  
     16, 17, 18, 19, 20, 21, 22, 23, 24, 26,  
     27, 28, 29, 30, 31, 32, 33, 34, 35,  
 Antigua, 8, 10  
 Antilles, 24  
 Argentina, 12  
 Asia, 10, 12, 13, 14, 15, 26, 27, 28, 29, 31,  
     32  
 Arizona, 6  
 Aruba Island, 2, 3, 4  
 Australia, 19  
 Bahia Honda, 2, 3, 20, 21, 22, 23, 24, 25,  
     26, 27, 28, 29, 30, 32, 33, 34, 35, 40  
 Barro Colorado, 1, 3, 19, 20, 21, 23, 28,  
     31, 32, 35  
 Bolivia, 20, 24  
 Bonaire, 6  
 Brazil, 6, 12, 13, 16, 18, 19, 21, 22, 24,  
     28, 31  
 British Guiana, 12  
 British Honduras, 25  
 British West Indies, 1, 3, 11, 15  
 Buccoo Bay, 3, 15, 16, 17, 18, 19  
 Caledonia Harbor, 3, 19, 20, 22, 23, 24,  
     25, 26, 27, 28, 29, 30, 31, 33, 35  
 California, 16, 32  
 Canal Zone, 3, 22, 23, 26, 28, 34  
 Caribbean, 1, 7, 9, 15  
 Central America, 6, 7, 13, 15, 18, 19, 20,  
     21, 22, 23, 24, 25, 27, 28, 29, 32, 33,  
     35  
 Chepo, 31  
 China, 29  
 Coche, 1, 2, 10  
 Colombia, 6, 9, 10, 20, 21, 27, 29, 30, 31  
 Coramandel, 16  
 Costa Rica, 12, 15, 24, 25, 26, 27, 31,  
 Cuba, 10, 26, 27  
 Cubagua Island, 1, 2, 3, 8, 9, 10, 11, 38  
 Curaçao, 2, 3, 6, 8  
 Dutch West Indies, 1  
 Ecuador, 12, 19, 28  
 El Peñon, 30  
 Florida, 5, 10, 12, 16, 26  
 Fort Nassau, 3, 6, 7, 8  
 Frijoles, 3, 22, 23, 26, 28, 34  
 Galapagos Islands, 21  
 Gamboa, 3, 19, 20, 21  
 Gatun Lake, 23  
 Guanacamba, 35  
 Guatemala, 12, 21, 23, 24, 25, 32  
 Guianas, 13, 27  
 Honduras, 20, 30  
 Ibaque, 27  
 India, 13, 21, 26  
 Jalisco, 16, 18, 20, 28  
 Jamaica, 5, 6, 7, 10, 14, 22, 26, 32  
 Leeward Islands, 6  
 Madden Dam, 3, 20, 21, 22, 23, 25, 30,  
     32, 34  
 Magdalena, 30  
 Martinique, 17, 32  
 Margarita, 1, 10

- Mexico, 8, 9, 12, 13, 14, 15, 16, 17, 18,  
 19, 20, 21, 22, 23, 24, 25, 26, 27, 28,  
 29, 30, 31, 35  
 Molucca Islands, 13, 26  
 Mosquito Coast, 31  
 Mt. Vernon, 3, 19, 20, 22, 23, 24, 25, 26,  
 27, 28, 29, 30, 31, 33, 35  
 Nayarit, 20, 25  
 Netherlands West Indies, 3, 4, 6  
 Nicaragua, 25, 27, 30, 34  
 Panama, 1, 2, 3, 14, 19, 20, 22, 23, 24,  
 25, 27, 30, 31, 33, 34, 35  
 Panama Canal Zone, 1, 19, 23  
 Pitch Lake, 3, 12, 13, 14  
 Peru, 6, 12, 25, 30, 35  
 Pinar del Rio, 26  
 Port of Spain, 2, 3, 11, 12, 13, 14  
 Rio Grande, 34  
 Rockley Bay, 17  
 St. Croix, 8  
 San Nicolaas, 3, 4, 5, 6  
 Santo Domingo, 6, 17, 32  
 Scarborough, 3, 15, 16, 17, 18, 19  
 Schottegat Bay, 3, 6, 7, 8  
 Sierra de Anafe, 26  
 Sinaloa, 29, 34  
 Sonora, 23, 30  
 South America, 7, 8, 9, 10, 12, 14, 16,  
 17, 18, 19, 21, 23, 24, 25, 28, 29, 30,  
 33, 35  
 Taboga Island, 2, 3, 23, 26  
 Tamaulipas, 28  
 Texas, 6, 8  
 Tobago Island, 2, 3, 15, 16  
 Tortuga Island, 2, 3, 8, 9  
 Trinidad, 1, 2, 3, 11, 12, 24  
 United States, 10, 22, 32  
 Venezuela, 1, 2, 3, 6, 8, 9, 11, 16, 26, 31,  
 32, 38  
 Vera Cruz, 20, 25, 34  
 West Indies, 4, 5, 6, 7, 8, 9, 10, 12, 13,  
 14, 15, 16, 17, 18, 19, 20, 21, 22, 23,  
 24, 25, 26, 27, 28, 30, 32, 33, 34  
 Willemstad, 3, 6, 7, 8  
 Yucatan, 12

