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Yale University School of Forestry

# TROPICAL WOODS

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# TROPICAL WOODS

NUMBER 21 March 1, 1930

*A technical journal devoted to the furtherance of knowledge of tropical woods and forests and to the promotion of forestry in the Tropics.*

*The editor of this publication and the writer of any articles therein, the authorship of which is not otherwise indicated, is* SAMUEL J. RECORD, *Professor of Forest Products, Yale University.*

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## COMMERCIAL MAHOGANIES OF FRENCH CAMEROON

*By* L. HÉDIN, *Ingénieur Agronome*

*Chargé de Mission au Cameroun*

The exploitation of the Cameroon forests for their valuable timbers, particularly Mahogany, has not progressed nearly as far as in Ivory Coast where the cutting of Mahogany has been excessive. The Germans had scarcely begun to operate before 1911 and, while the exports of Mahogany amounted to 8000 tons in 1912, the total levy on the Cameroon forest before the war was relatively insignificant. With the country under French mandate the timber business is increasing and the exports in 1928 exceeded 50,000 tons, about a fifth of which was Mahogany.

Under the designation of Mahogany are included the timbers of various species of *Khaya* and *Entandrophragma*. The names under which these are known to the trade are as follows:

| | |
|---|---|
| Red Mahogany | *Khaya Klainei* Pierre |
| Acajou Mangona | *Khaya anthotheca* C. DC. |
| Assié | *Entandrophragma utile* Sprague |
| Sapeli | *Entandrophragma cylindrica* Sprague |
| Acajou blanc | *Entandrophragma* spp. |

Figured Mahogany (Acajou pommelé) occurs in all species, but is more common in Assié and Sapeli. Such logs often are hollow and the sapwood is generally fissured. A log that is beautifully figured throughout is a rarity and may fetch a price of two or three thousand dollars or more.

The Mahoganies are trees of the largest size in the forest and are of chief interest to the lumberman. The woods of the various species of *Entandrophragma* are usually harder and heavier than those of *Khaya*. The principal anatomical distinction is found in the parenchyma, which is more abundantly developed in *Entandrophragma*, where it is circummedullary and often aliform as well. Woods of both genera are characterized by deposits of blood-red resin in the vessels.

The following notes on the trees and woods of two species of *Khaya*[1] and five species of *Entandrophragma* are based upon personal knowledge. Herbarium material and wood specimens obtained by the Mission du Cameroun are in the collections of the Laboratoire d'Agronomie Coloniale of the Muséum d'Histoire Naturelle de Paris.

**Khaya anthotheca** C. DC. MANGONA (Douala); ACAJOU MANGONA (trade). A tree 95 to 130 feet high, with a trunk 32 to 48 inches in diameter above the heavy buttresses. The ashy gray bark is very rough and deeply fissured, scaling off in large plates; slash reddish brown, with exudations of gum-resin.

[1] Another species, *Khaya grandifolia* C. DC., not described here, attains very large size in Cameroon. Its trunk attains a length of 65 feet and a diameter of 6 feet or more above the heavy buttresses.



Heartwood pinkish; thin sapwood lighter-colored. Growth rings poorly defined. Pores of medium size, rather few, occurring singly or in pairs or in groups of 3 or 4. Vessel lines undulating. Parenchyma sparingly developed or apparently absent. Rays fairly numerous, readily visible to the naked eye; height 0.33 mm. (tang.); cells filled with resinous material. Grain irregular. Sp. gr. 0.56.

Acajou Mangona is one of the Mahoganies most readily available for export from Cameroon. It is common in the forest along the Northern Railway (Chemin de Fer du Nord).

**Khaya Klainei** Pierre (= *K. ivorensis* A. Chev.). NGOLLO (Youndé); HOUNGO (Bakoko); ACAJOU ROUGE or RED MAHOGANY (trade). A tree 115 to 130 feet tall, with a trunk more than 40 inches in diameter above the heavy buttresses. Certain individuals have a trunk 13 feet through, but the average size of the trees felled is a little less than 4 feet. The bark is grayish. The leaves are clustered at the ends of the branches.

Heartwood pinkish; sapwood a little lighter. Growth rings poorly defined. Pores distinct, irregularly distributed, occurring singly or more often in groups of 3 or 4. Vessel lines distinct, somewhat wavy; resinous deposits common. Parenchyma sparingly and irregularly developed about pore groups; not distinct. Rays numerous, fine, inconspicuous; height 0.20 mm. (tang.). Grain irregular both radially and tangentially. Sp. gr. 0.56.

This species, which is the same as the Grand Bassam Mahogany, is exploited along the Central Railway (Chemin de Fer du Centre) and at Dehane on the Niong River; abundant at Vimeli. Apparently is not rare along the Northern Railway. It frequently occurs in small groups.

A related species, known as Zoélé (Yaoundé), was met with near Vimeli and certain places along the Central Railway; has also been reported along the Northern Railway as far as Mujuka. It is 80 to 115 feet tall, with a straight trunk, clear of branches for 50 to 65 feet and usually 28 to 32 inches in diameter, though occasionally much larger (max. 5 feet). It has no buttresses, but the roots are stout. The bark is gray, thin, lamellated, scaling off readily; the slash is brick red or roseate.

**Entandrophragma cylindrica** Sprague (= *E. rufa* A. Chev.). SAPELI (trade). A tree 80 to 130 feet tall, with a trunk free of

branches for 50 to 80 feet and of an average size of 40 inches; only slightly buttressed. Bark brown, separating into little plates.

Wood reddish, more deeply colored than *Khaya;* one of its most characteristic features when finished is the fine ribbon grain. Growth rings defined by differences in the abundance of pores. Pores small, numerous, solitary or in radial pairs, disposed irregularly or in concentric bands. Vessel lines generally short and composed of short segments. Parenchyma in broken and anastomosing bands visible under the lens; sparingly developed about pores. Rays numerous, distinct on cross section, in storied arrangement in part and producing local ripple marks visible to unaided eye on tangential surface; height variable from 1 to 2 mm.; visible on radial surface as unequally spaced, short, brown lines. Sp. gr. 0.58.

This wood is very similar to the Aboudikro of Ivory Coast, which is produced by a related species. It is generally sold in logs squared 30 by 30 inches and up, or in the round having a minimum diameter of 28 inches. In the small sizes the sapwood is very thick. The timber is used for veneers, and great lengths are not required.

**Entandrophragma utile** Sprague. Assié (Yaoundé); Koukinjok (Bakòko); Wo (Mabéa); Acajou assié (trade); Scented mahogany (English colonists). A tree 115 to 130 feet tall, with a straight trunk having a clear length of perhaps 80 feet, without buttresses, although the roots are strongly developed. Some trees attain a maximum diameter of 15 feet, but they are hollow. The grayish outer bark breaks off in scales 3 to 4 cm. in diameter; the inner bark is pink and separable into narrow strips.

Heartwood a light mahogany color, beautifully striped; sapwood lighter and not very thick. Growth rings poorly defined. Pores numerous, occurring singly or in radial pairs. Vessel lines distinct, producing a regular pattern on tangential surface. Parenchyma light brown, in irregular, broken lines connecting the pores. Rays fine, numerous, barely visible on cross and tangential sections, and forming short, dark lines on radial surface. Sp. gr. 0.63.

This species, which is the same as the Sipo of Ivory Coast, occurs throughout the forest, preferring slopes and dry sites. It is one of the most readily exploited Mahoganies of Cameroon. The minimum size for squared timbers is 24 by 24 inches; for round logs 24 inches, if not shorter than 19 feet. Since the



timber is manufactured into lumber, long logs, 24 to 33 feet, are preferred; the minimum length is 14 feet.

**Entandrophragma Leplaei** Verm. Timba (Douala); Acajou blanc (trade). A tree 80 to 115 feet tall, with a cylindrical trunk attaining a clear length of 50 feet and a diameter of 40 inches. It is recognizable on account of the fact that its leaflets are subtruncate at the base. Observed near Nlohé.

Wood a light mahogany color, with golden yellow stripes. Growth rings narrow, visible on cross section, and showing as alternate yellow and pink laminations on rotary-cut veneers. Grain roey. Pores numerous, 100 to 200, usually solitary but sometimes in radial pairs; relative abundance fluctuating with season of growth. Parenchyma in anastomosing bands, variable in thickness, which unite the pores and give rise to wavy, brownish veins, distinct on longitudinal surfaces; sparingly developed in portions of the wood. Rays visible on all sections, numerous (about 12 per mm. of circumf.); height 0.10 to 0.20 mm.; appear short (2 or 3 mm.) on radial surface. Sp. gr. 0.73.

**Entandrophragma** aff. **Rederi** Harms. Ob assi (Yaoundé), meaning "false Assié." A tree 100 to 130 feet tall, with a cylindrical trunk 32 to 60 inches in diameter and free of branches for 50 to 80 feet; only slightly buttressed. Bark gray, breaking off in small plates. Observed in the forest near Loum.

Wood of a light mahogany color. Growth rings distinct; marked on radial surface by darker striping. Pores numerous, rather small but distinct, occurring singly or sometimes in radial rows of 2 to 4. Parenchyma sparingly developed about the pores; not visible without lens. Rays numerous, but visible on all sections; short and inconspicuous on radial surface. Sp. gr. 0.58.

**Entandrophragma** aff. **choriandrum** Harms. Edoucié (Yaoundé). A tree 80 to 115 feet tall, with a trunk 28 to 36 inches in diameter. Bark brownish gray, thin, adherent. The leaflets, as in *E. choriandrum*, are small, falciform, numerous (8 to 12), inequilateral at the base, but unlike that species, the rhachis is only slightly pubescent. Observed in the forest near Nlohé.

Heartwood mahogany color lightly striped with yellow. Scented like Cedar. Growth rings demarcated by variations in abundance of parenchyma. Pores small, not very numerous, occurring singly or in pairs, irregularly disposed. Vessel lines fine, appearing as brown veins because of parenchyma. Rays numerous (about 22 per mm. of circumf.), fine, not visible without lens on cross and tangential sections, indistinct on radial surface. Parenchyma in numerous, fine, wavy lines (4 or 5 per mm.), joining the pores. Sp. gr. 0.58.

# NOTES ON MEXICAN TREES

*By* PAUL C. STANDLEY
*Field Museum of Natural History*

## The Mahoganies

In 1920 Blake published (Journ. Washington Acad. 10: 286) a revision of the American Mahoganies (genus *Swietenia*), recognizing five species. Three of these—*Swietenia macrophylla* King, or Honduras Mahogany, *S. humilis* Zucc., and *S. cirrhata* Blake—were reported from Mexico and Central America. Honduras Mahogany is an old and easily recognized species which ranges from the Yucatan Peninsula to Panama, and perhaps even farther southward. Very closely related and doubtfully distinct forms extend as far as Peru.

In Mexico and Central America *Swietenia macrophylla* flourishes in wet regions, sometimes in swamps, but often on well-drained slopes which receive abundant rainfall. On the Pacific slope of the same countries Mahogany grows in dry places. I have seen trees overhanging the ocean, but they were rooted in rocks, where little moisture was available.

Blake, although admitting that their ranges overlapped, divided the Pacific Coast Mahoganies into two species, based chiefly upon differences in the size of the leaflets, obviously not a character of great weight in distinguishing specific units. It was suggested, also, that the leaflets of *S. cirrhata* had longer and more slender cusps than those of *S. humilis*. This, I think, is a matter of accident. In the young leaves the cusps are very long, but they are also fragile and soon are broken off by the wind.

Since the publication of the paper cited, two species of Mahogany have been recognized as occurring along the Pacific coast. During this time I have seen Mahogany trees growing at various localities in Central America, and have collected specimens of some of them. Of several specimens brought from Salvador some were determined as *S. humilis* and some as *S. cirrhata* by the author of the latter species.

It is obviously unreasonable to find two closely related species of this small genus occupying the same area. One is forced to the conclusion that only a single species is represented and that we must regard the Mexican and Central American Mahoganies as referable to only two species, *S. macrophylla* of the Atlantic coast, and *S. humilis* of the Pacific slope. This seems to be the logical conclusion, and a wholly satisfactory solution of the systematic problems involved in the matter.



## The "Balche" Tree of Yucatan

In old books dealing with the Yucatan Peninsula there are many references to a tree called in the Maya language *balche*. From its bark, soaked two or three days in water with honey, the Mayas have prepared for centuries a highly intoxicating beverage. With this they were accustomed to intoxicate themselves during the performance of various religious rites in their temples, and it was one of the articles offered to the gods. In modern times *balche* is used more prosaically, merely as a stimulating or inebriating agent, and sugar sirup replaces honey. The Spanish name is *pitorrilla*.

Ethnologists working in Yucatan have called attention to this remarkable intoxicant, but their curiosity and interest were not sufficiently aroused to induce them to undertake the labor of obtaining specimens by which the botanical classification of the tree might be determined; or perhaps they considered this a matter of no importance.

The late Dr. G. F. Gaumer, to whom we owe most of our present knowledge of the flora of Yucatan, must have been familiar with the preparation and use of *balche* by the Mayas of the present day. At any rate, he obtained several collections of the tree, and this was described by Pittier as *Lonchocarpus longistylus*. For another tree of Yucatan, described by Pittier under the name *Lonchocarpus yucatanensis*, Dr. Gaumer reported the name *balchechi*, which Mr. Ralph L. Roys suggests should probably be rather *balche-cehi*.

It is said that the beverage *balche* was and is prepared in other regions, such as Tabasco and Chiapas, where neither of these species is known to occur. It seems probable, therefore, that other species of *Lonchocarpus* are used for the same purpose, and one would expect that all or most of them would have the same properties.

I know of no other tree of Mexico or Central America whose bark is employed in this manner. In the case of certain species, their leaves or flowers are used for flavoring liquors or their fruits are fermented. In the case of the *Lonchocarpus* species the intoxicating principle seems to exist in the bark.

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## NOTES ON AUSTRALIAN WOODS

Rose Laurel is the name adopted by a New York importer for the so-called Rose Walnut, *Cryptocarya erythroxylon* M. & B., of Queensland. It belongs to the Lauraceae or Laurel Family, and is known locally as Pigeon-berry Ash and White-bark, and the timber is sometimes sold as Southern Maple.

Another recent importation is known in New South Wales as Rosewood and in Queensland as Mahogany. The official trade name of Rose Mahogany has been adopted by the Queensland Forest Service, although according to Swain (*Timbers of Queensland*, p. 153) it "might well have been styled Red Teak." It is *Dysoxylum Fraseranum* Benth., and although a member of the Meliaceae, it is not considered a Mahogany in the commerce of the United States. One New York dealer is using the name Rosamay for this wood.

Warri Wood is an American trade name for the so-called Australian Maple, *Flindersia Brayleyana* F. Muell. The genus *Flindersia* is placed by some botanists in the Meliaceae and by others in the Rutaceae. The woods seem to belong in part to one family and in part to another, the one in question favoring Meliaceae. Bushmen call the tree Red Beech, but Swain (*l. c.*, p. 147) says "the timber should be marketed as Queensland Silkwood."

Yuba Wood is an American trade name for so-called Fiddle-back Oak, a wavy-grained wood produced by some species of *Eucalyptus* of the "Ash" group.

Selano is a trade name for Silky Oak. According to Swain (*l. c.*, p. 90), Silky Oak originally was the product of two southern species, *Grevillea robusta* and *Orites excelsa*, but now it is largely supplied by the north Queensland tree, *Cardwellia sublimis*.



## A SECOND LIST OF THE TREES OF HONDURAS

*By* PAUL C. STANDLEY

*Field Museum of Natural History*

The first published list of the trees of Honduras was prepared by Professor Samuel J. Record, and appeared in *Tropical Woods* 10: 10–47, June 1927. The present enumeration repeats the names of that catalog with additions based chiefly upon collections made by the writer during the winter of 1927–28.

Most of my time was devoted to exploration of the Lancetilla Valley, on the north coast about three miles from the port of Tela. Here is located the Lancetilla Experiment Station of the Tela Railroad Company, under the direction of Wilson Popenoe, to whom, as well as to Alfred F. Butler of the Station, and to many officers and employees of the company, I am indebted for the unstinted assistance which made the season's work so successful.

Collections were made in many parts of the banana-producing area controlled by the Tela Railroad Company, and as far inland as Progreso. Much of the region consists of swamps and low forests, but some of the heavily forested hills on which collections were made rise to 600 meters. The region is one of heavy rainfall, with only a short dry season. Its flora is a rich one, similar to those of the Atlantic coast of the other Central American countries.

After work in the Lancetilla Valley had been almost completed, so far as the available time permitted, I visited the interior of Honduras, nearly crossing the country by railroad and by the automobile roads which pass through Potrerillos to Lake Yojoa, and continue through Siguatepeque and Comayagua to Tegucigalpa.

From Potrerillos to Tegucigalpa most of the innumerable blue mountains are covered with pine forest, with some admixture of hardwood trees, especially oaks. The highest mountains have above the pines a belt of hardwood forest, which, doubtless, is rich in tree species, but the limited time at my disposal and the difficulty of transportation prevented its exploration.

The pine-forested region in general appears to be sterile and unfitted for agriculture. It seems to be best adapted to grazing purposes.

One of the most interesting portions of the interior is the Comayagua Valley, through which I passed by automobile. Here semidesert conditions prevail. Cactuses and agaves abound. There are only small trees, for the most part, but these form extensive forests or thickets, brown and parched when I saw them, but evidently composed of a large variety of species.

In the list here presented there are enumerated about 480 species of trees, some of them, it is true, to be classed rather as shrubs than trees, although practically all at some time or other attain tree-like size or habit. I have no doubt that ultimately the list will be increased by at least 200 and probably even a greater number of species.

The names printed in heavy-face type are additions to Professor Record's list. Unless otherwise indicated, they were collected in the region of Lancetilla Valley and Tela.

### ACTINIDIACEAE

**Saurauia Englesingii** Standl. A tree 7.5 m. high, with showy white flowers.

**Saurauia pauciserrata** Hemsl. A tree of 4.5–7.5 m.

*Saurauia villosa* DC. SAPOCILLO (probably a corruption of the following name), ZAPOTILLO.

### ANACARDIACEAE (Sumac Family)

*Anacardium occidentale* L. MARAÑÓN, JOCOTE MARAÑÓN, CASHEW.

*Astronium graveolens* Jacq. CIRUELILLO, RONRÓN, PALO OBERO, MASICARÁN.

**Mangifera indica** L. MANGO. Grown commonly in most parts of Honduras, and often found wild.

**Mauria sessiliflora** Standl., ined. A tree 9–12 m. high, collected at Siguatepeque.

*Spondias Mombin* L. JOBO, JOCOTE, HOGPLUM.

*Spondias purpurea* L. CIRUELA, JOCOTE, SPANISH PLUM.

### ANNONACEAE (Custard-apple Family)

**Annona Cherimola** Mill. ANONA. A shrub or small tree, rarely exceeding 7.5 m. in height. Cultivated commonly in central Honduras and also found wild.

**Annona glabra** L. ANONA. A shrub or small tree of coastal thickets, sometimes as much as 6 m. high. The fruit is edible but of very poor quality.



**Annona muricata** L. GUANÁBANA, SOURSOP. Cultivated for its large spiny fruits, and sometimes found about the sites of former dwellings.

**Annona purpurea** Moc. & Sessé. SENCUYA. A medium-sized tree, the fruit edible, but of poor quality. Native and sometimes cultivated on the Pacific slope.

*Annona reticulata* L. ANONA DE REDECILLA.

*Annona testudinea* Safford.

**Guatteria amplifolia** Tr. & Pl. A tree 4.5–9 m. high, rather rare in the Tela region.

**Guatteria depressa** (Baill.) Safford (*Duguetia leiophylla* Donn. Smith). A tree of 4.5–7.5 m.

**Guatteria grandiflora** Donn. Smith? A tree of 6 m.

**Rollina Jimenezii** Safford? ANONA. A tree 6 m. high.

**Sapranthus campechianus** (H. B. K.) Standl. PALANCO. A shrub or small tree of the coastal thickets.

**Sapranthus nicaraguensis** (Seem.) Standl. A small or medium-sized tree, noted as abundant on the hills about the Comayagua Valley.

**Sapranthus microcarpus** (Donn. Smith) Fries. A tree of 6 m., with small brown-red flowers. Growing about Siguatepeque.

**Unonopsis** sp. A tree of 12 m., growing at Lancetilla. Only sterile material was obtainable.

*Xylopia frutescens* Aubl. PALANCO.

### APOCYNACEAE (Dogbane Family)

**Aspidosperma megalocarpon** Muell. Arg. CHAPERNO. A large tree with broad compressed woody fruits and very large, winged seeds.

*Malouetia guatemalensis* (Muell. Arg.) Standl. (*M. panamensis* H. & M.). A tree 6–9 m. high, with milky sap and with small white flowers.

*Plumeria acutifolia* Poir. Noted by the writer in the region of Tegucigalpa.

**Stemmadenia Donnell-Smithii** (Rose) Woodson. COJÓN DE MICO, COJÓN DE BURRO. A shrub or tree of 3–9 m. with large buff flowers. Sap milky, abundant, and very sticky.

*Tabernaemontana amygdalifolia* Jacq. COJÓN DE MICO.

*Tabernaemontana citrifolia* L. COJÓN DE MICO, CHANCHITO.

**Thevetia nitida** (H. B. K.) A. DC. A glabrous shrub or tree 2–8 m. high, with copious milky sap and large yellow flowers; fruit bright red or purple.

**Thevetia peruviana** (Pers.) Schum. CHILCA. A small tree with bright yellow flowers. Planted for ornament at Siguatepeque and elsewhere in central Honduras.

### AQUIFOLIACEAE (Holly Family)

**Ilex panamensis** Standl. A glabrous tree 6 m. high.

### ARALIACEAE (Ginseng Family)

**Gilibertia Smithiana** I. M. Johnston. A shrub or tree 3–9 m. high with small green flowers in umbels, and with black berries. Here probably belongs the *G. arborea* of the earlier list.

*Gilibertia stenocarpa* Donn. Smith. PALO DE AGUA.

**Oreopanax Salvinii** Hemsl. MANO DE LEÓN. A tree 4.5 m. high with very large, deeply lobed leaves, which are used for wrapping soap. In the high mountains above Siguatepeque.

BETULACEAE (Birch Family)

*Carpinus caroliniana* Walt.

**Ostrya virginiana** var. **guatemalensis** (Winkl.) Macbride. A large or medium-sized tree, in the higher mountains above Siguatepeque. A form of the Hop Hornbeam of the United States.

BIGNONIACEAE (Catalpa Family)

**Crescentia alata** H. B. K. A small tree, common on the hills of the Tegucigalpa region.

*Crescentia Cujete* L. MORRO, JÍCARO, CALABASH TREE.

*Enallagma cucurbitina* (L.) Baill. (*E. latifolia* Small). BLACK CALABASH. A large shrub or small tree with large green flowers.

*Tabebuia chrysantha* (Jacq.) Nichols. (*Tecoma chrysantha* DC.). CORTEZ, QUEBRACHO, MASICARÁN.

*Tabebuia Donnell-Smithii* Rose. SAN JUAN; called CORTEZ about Tela.

*Tabebuia pentaphylla* (L.) Hemsl. (*Tecoma pentaphylla* Juss.). MACUELIZO, ROBLE BLANCO.

*Tecoma stans* (L.) H. B. K. SARDINILLO.

BIXACEAE (Anatto Family)

*Bixa Orellana* L. ACHIOTE, ANATTO.

BOMBACACEAE (Cotton-tree Family)

**Bernoullia flammea** Oliver. Collected near Progreso by W. D. Hottle.

*Bombacopsis Fendleri* (Seem.) Pittier. CEDRO ESPINO.

*Ceiba pentandra* (L.) Gaertn. CEIBA, COTTON-TREE.

*Hampea stipitata* Wats. (including *H. integerrima* of the former list). MAJAO COLORADO; called simply MAJAO about Lancetilla.

*Ochroma limonensis* Rowlee (The *O. bicolor* and *O. concolor* of the former list probably represent the same species). BALSA; called GUANO about Tela.

*Pachira aquatica* Aubl. ZAPOTÓN, PROVISION TREE.

**Quararibea Fieldii** Millsp. (probably including the *Q. funebris* of the former list). COCO MAMÁ. A tree 9–12 m. high with radiate branches.

BORAGINACEAE (Borage Family)

*Cordia alba* (Jacq.) R. & S. TIGÜILOTE; called CHACHALACO at Progreso.

*Cordia alliodora* (R. & P.) Cham. LAUREL, LAUREL BLANCO, LAUREL NEGRO.

*Cordia diversifolia* Pav. CHACHALACO; called TIGÜILOTE at Tela.

*Cordia ferruginea* (Lam.) R. & S. BEJUCO NEGRO; known at Tela as CARNE ASADA. This species probably never attains the size of a tree in Central America.

**Cordia gerascanthus** L. LAUREL NEGRO. A large tree with fragrant white flowers; yielding a handsome wood.



**Cordia nitida** Vahl. SOMBRA DE TERNERO. A small or medium-sized tree with white flowers and fruits.

BURSERACEAE (Torchwood Family)

*Bursera Simaruba* (L.) Sarg. (*B. gummifera* L.). CHINACUITE, INDIO DESNUDO, CHINO, PALO CHINO, COPÓN, PALO MULATO, JIOTE.

**Protium sessiliflorum** (Rose) Standl. A large or medium-sized forest tree. Here perhaps belong the wood samples of the former list, with the vernacular names COPAL, FONTOLO, FROTÓN, and JOCOMICO (?).

**Tetragastris Stevensonii** Standl. A large glabrous tree with pinnate leaves. Called Carbón in British Honduras.

CACTACEAE (Cactus Family)

**Opuntia** sp. One of the common trees of the Comayagua Valley is a prickly-pear of this genus, which grows to a height of 7.5 m., with a dense rounded crown, and with a rather tall clean trunk. Some of the *Cereus* species of the same region perhaps deserve rank as trees.

CAPPARIDACEAE (Caper Family)

*Capparis* sp. AZAHARILLO, OLIVO.

*Crataeva Tapia* L.

CAPRIFOLIACEAE (Honeysuckle Family)

**Sambucus mexicana** Presl. SAUCO. A shrub or small tree, similar to the common Elder of the United States. Cultivated in central Honduras.

CARICACEAE (Papaya Family)

*Carica Papaya* L. PAPAYA.

CELASTRACEAE (Bittersweet Family)

**Myginda eucymosa** Loes. & Pitt. A glabrous shrub or small tree, sometimes 6 m. high; fruit red, plum-like, 1–2 cm. long.

CLETHRACEAE (Clethra Family)

**Clethra hondurensis** Britton. A tree 4.5–7.5 m. high, at Siguatepeque.

*Clethra lanata* Mart. & Gal.

COCHLOSPERMACEAE

*Cochlospermum vitifolium* (Willd.) Spreng. JICARILLO.

CASUARINACEAE (Beefwood Family)

**Casuarina equisetifolia** L. PINO. Cultivated commonly as a shade tree in many parts of Honduras. One of the favorite trees for parks.

COMBRETACEAE (White Mangrove Family)

**Bucida Buceras** L. A spiny tree about 6 m. high, in coastal swamps. Called Bullet Tree in British Honduras.

*Conocarpus erecta* L. BUTTON MANGROVE.

*Laguncularia racemosa* (L.) Gaertn. MANGLE BLANCO.

*Terminalia Hayesii* Pittier? (Including *T. obovata* of the former list). GUAYABO, ALMENDRO, MEMBRILLO.

**Terminalia Catappa** L. ALMENDRO, INDIAN ALMOND. Planted for shade in many parts of Honduras, especially along seashores, and often naturalized.

COMPOSITAE (Aster Family)

**Eupatorium albicaule** Sch. Bip. TIÑE CORDEL, PUTUNÍN. A slender shrub or tree 2.5–4.5 m. high, frequent in the region of Tela and Progreso. The leaves are employed to impart a green color to cord, cloth, and other articles.

**Eupatorium daleoides** (DC.) Hemsl. A tree of 4.5–7.5 m., growing in the region of Siguatepeque.

**Eupatorium micranthum** Less. A small slender tree about 4.5 m. high, growing on the mountains above Siguatepeque.

**Eupatorium morifolium** Mill. Usually a shrub, but occasionally with the size and habit of a small tree, probably not exceeding 5 m. in height; often growing in dense clumps.

*Eupatorium Pittieri* Klatt. TIÑE ANZUELO.

*Montanoa subtruncata* Gray.

*Perymenium strigillosum* (Rob. & Greenm.) Greenm. CON (?). I found this species frequent in the vicinity of Siguatepeque, where it grows as a tree about 7.5 m. high, with whitish shredded bark.

**Senecio arborescens** Steetz. A stout shrub or tree, 2–6 m. high, with few branches; often forming small groves along streams. Collected at Siguatepeque.

**Senecio cobanensis** Coulter. A shrub or small tree 2–4.5 m. high, with yellow flower heads. Collected at Siguatepeque.

**Vernonia Deppeana** Less. A coarse shrub or small tree 2–6 m. high, common about Siguatepeque. Flowers pinkish.

CONVOLVULACEAE (Morning-glory Family)

**Ipomoea arborescens** (H. & B.) Don. Trees presumably belonging to this species were observed as common in the Comayagua Valley.

CORNACEAE (Dogwood Family)

**Cornus excelsa** H. B. K. A shrub or tree 6 m. high or less, in the mountains about Siguatepeque.

DILLENIACEAE (Dillenia Family)

*Curatella americana* L. Called CHAPARRO in some parts of Honduras. Not observed about Tela.

ELÆOCARPACEAE

**Dicraspidia Donnell-Smithii** Standl. A tree 5.5 m. high, collected near Progreso by W. D. Hottle.



*Muntingia Calabura* L. Common about Progreso.

**Sloanea** sp. Sterile material of one or perhaps two species of this genus was collected about Tela and Lancetilla.

ERICACEAE (Heath Family)

**Andromeda mexicana** Hemsl. A tree 4.5–7.5 m. high with rough gray bark and of very irregular growth. Common on hilltops about Siguatepeque.

**Arbutus xalapensis** H. B. K. INDIO DESNUDO. A tree 4.5–6 m. high, in the high mountains above Siguatepeque. The bark peels off in irregular thin brown sheets.

EUPHORBIACEAE (Spurge Family)

*Acalypha diversifolia* Jacq. COSTILLA DE DANTO.

**Acalypha leptopoda** Muell. Arg., var. **mollis** Muell. Arg. A shrub or small tree 2.5–5.5 m. high, at Siguatepeque.

*Adelia triloba* (Muell. Arg.) Hemsl. AGAJO, ESCAMBRÓN.

*Alchornea latifolia* Sw. CANELITO.

*Croton glabellus* L. BARENILLO; called CASCARILIÁN and LIÁN about Tela.

*Croton panamensis* (Klotzsch) Muell. Arg.

**Croton pyramidalis** Donn. Smith. A shrub or tree 4.5–6 m. high.

*Croton* sp. PELA NARIZ.

**Euphorbia pulcherrima** Willd. PASCUA, POINSETTIA. A shrub or small tree with large, leaflike, bright red bracts, common in cultivation in central Honduras.

**Hieronyma alchorneoides** Allem. CURTIDOR. A large forest tree with conspicuous buttresses, often 30 m. high or more. Wood used about Tela for tanning.

**Hura crepitans** L. SANDBOX. A large tree, common in the Comayagua Valley and probably throughout Pacific Honduras. Used in the Comayagua Valley as a fish poison.

**Jatropha Curcas** L. PIÑÓN. A shrub or small tree. Rare about Tela, but doubtless common in all the drier regions of Honduras.

**Omphalea diandra** L. A shrub or tree 3–7.5 m. high, usually with long trailing branches. Common in coastal swamps.

**Phyllanthus Conami** Sw. A slender shrub or tree up to 7.5 m. high, with distichous leaves.

**Sapium jamaicense** Sw. A small tree, usually about 6 m. high, with copious milky sap.

**Tetrorchidium rotundatum** Standl. MANTECA. A large tree, sometimes 30 m. high, with rounded crown; sap milky. Wood creamy white and odorless.

FAGACEAE (Beech Family)

*Quercus brachystachys* Benth. ENCINO.

**Quercus callosa** Benth. Reported as collected between Comayagua and Santa Rosa.

*Quercus citrifolia* Liebm. ENCINO NEGRO.

**Quercus comayaguana** Trel. A small tree up to 9 m. high, about Siguatepeque.

**Quercus hondurensis** Trel. ENCINO. A tree 6–12 m. high, common on the hills above Siguatepeque. The type was collected in the region of San Pedro Sula.

*Quercus oleoides* C. & S. ROBLE.

**Quercus segoviensis** Liebm. ROBLE. Common about Siguatepeque. A small tree, or often shrubby and forming low dense thickets.

**Quercus siguatepequeana** Trel. ENCINO. A tree about 9 m. high, at Siguatepeque.

## FLACOURTIACEAE (Flacourtia Family)

**Carpotroche platyptera** Pittier. A shrub or small tree 2–5 m. high, with few branches, the flowers borne along the trunk and larger branches.

**Casearia aculeata** Jacq. ESCAMBRÓN. Shrub or tree 3–12 m. high, the branchlets often thornlike.

**Casearia arborea** (L. Rich.) Urban. A shrub or tree sometimes 6 m. high with red fruits.

*Casearia arguta* H. B. K.

*Casearia javitensis* H. B. K.

*Casearia nitida* (L.) Jacq. COMIDA DE CULEBRA. Probably only a shrub.

*Casearia ramiflora* Vahl.

*Casearia sylvestris* Sw. SOMBRA DE ARMADO.

*Hasseltia mexicana* (Gray) Standl. GUATUSO.

*Hasseltia pyramidalis* Hemsl.

**Lunania piperoides** Standl. A tree of 6–9 m. with slender racemes of greenish white flowers.

**Oncoba laurina** (Presl) Warb. A tree 6–9 m. high with large ovate leaves and small hard spiny fruits.

*Prockia crucis* L.

*Xylosma Hemsleyana* Standl. (*X. elliptica* Clos).

**Xylosma sylvicola** Standl. A slender shrub or tree, up to 6 m. high, frequent in the hills above Lancetilla.

**Zuelania Roussoviae** Pittier. SANGRE DE PLAYA, PALACIO. A shrub or small tree 3–9 m. high.

## GUTTIFERAE

*Calophyllum Rekoi* Standl. (*C. Calaba* of authors, not Jacq.) MARÍA, SANTA MARÍA, PALO DE MARÍA.

**Clusia flava** Jacq. A shrub or small tree, often epiphytic, with thick wedge-shaped leaves and cream-colored flowers.

**Clusia mexicana** Vesque. Usually a shrub but occasionally a small tree.

*Clusia rosea* Jacq.

**Rheedia edulis** Tr. & Pl. CAIMITO, CAIMITO DE MONTAÑA. A large or medium-sized forest tree with small cream-colored flowers. Fruit edible.

**Clusia Salvinii** Donn. Smith. OREJA DE BURRO. A small tree, sometimes 6 m. high. In the high mountains above Siguatepeque.

*Symphonia globulifera* L. f. LECHE AMARILLA.



## HAMAMELIDACEAE (Witch Hazel Family)

*Liquidambar Styraciflua* L. LIQUIDÁMBAR. The tree is common in the mountains about Siguatepeque, growing mostly at higher levels, in association with pines.

## HERNANDIACEAE

*Gyrocarpus americanus* Jacq.

*Hernandia guianensis* Aubl. HOJA TAMAL, MANO DE LEÓN, TAMBOR.

**Sparattanthelium guatemalense** Standl. A small tree, collected at Progreso.

## HYDROPHYLLACEAE (Waterleaf Family)

*Wigandia caracasana* H. B. K. CHICHICASTE.

## JUGLANDACEAE (Walnut Family)

*Juglans* sp. NOGAL, CEDRO NEGRO.

## LACISTEMACEAE

*Lacistema aggregatum* (Berg) Rusby. The name "Cera vegetal" reported for this tree is doubtless incorrect, and belongs properly to *Myrica mexicana*.

## LAURACEAE (Laurel Family)

**Misanteca capitata** C. & S. AGUACATILLO. A tree about 9 m. high, the flowers in long-stalked heads.

*Nectandra glabrescens* Benth.

**Nectandra globosa** (Aubl.) Mez. AGUACATILLO, SANGRE BLANCO. A large or small tree with white flowers.

**Nectandra membranacea** Griseb. A large, nearly glabrous tree of the Tela region.

*Nectandra sanguinea* Rottb.

**Ocotea cernua** (Nees) Mez. AGUACATILLO. A tree, usually 6–8 m. high.

**Persea americana** Mill. AGUACATE, AVOCADO, ALLIGATOR PEAR. Cultivated commonly almost throughout Honduras for its fruit.

*Persea amplifolia* Mez & Donn. Smith. AGUACATILLO.

**Persea Schiedeana** Nees. A large tree with edible fruit, on the hills above Lancetilla.

*Phoebe ambigens* Blake. AGUACATILLO.

**Phoebe helicterifolia** Mez. A slender tree 5–7.5 m. high, frequent in the region of Siguatepeque.

**Phoebe mexicana** Meissn. AGUACATILLO. A nearly glabrous tree about 9 m. high, frequent in the Tela region.

## LECYTHIDACEAE (Monkey-pot Family)

*Gustavia integrifolia* Standl. (Reported incorrectly as *Grias Fendleri*). IRAYOL. Called JAGÜILLO about Tela.

LEGUMINOSAE (Bean Family)

**Acacia Donnelliana** Safford. CORNEZUELO, ISCANAL, BULLHORN ACACIA. A tree of 4.5–9 m. with high narrow crown. Common about Tela. The specific determination is somewhat uncertain.

*Acacia Farnesiana* (L.) Willd. CACHITO DE AROMO. Called ESPINO and AROMO in central Honduras.

*Acacia glomerosa* Benth. ESPINO BLANCO.

*Acacia Hindsii* Benth. ISCANAL, BULLHORN ACACIA.

*Acacia macracantha* H. & B. ESPINO DE PLAYA.

*Acacia paniculata* Willd. BISQUITE.

**Acacia salvadorensis** (Britt. & Rose) Standl., comb. nov. (*Acaciella salvadorensis* Britt. & Rose). An unarmed tree about 6 m. high, growing about Siguatepeque.

*Albizzia adinocephala* (Donn. Smith) Britt. & Rose (*Pithecolobium discolor* Pittier.)

*Andira inermis* H. B. K. ALMENDRO, CABBAGE-BARK.

*Andira* sp. AMARGOSO, GUACAMAYO.

*Baubinia cumanensis* H. B. K. Determination probably incorrect.

*Baubinia divaricata* L. CASCO DE VENADO.

*Caesalpinia pulcherrima* (L.) Sw. GUACAMAYO, SANTA ROSA.

**Calliandra yoroensis** (Britton) Standl. (*Anneslia yoroensis* Britton). A slender shrub or tree 2.5–4.5 m. high with white flowers. Collected at Progreso.

**Calliandra tetragona** (Willd.) Benth. A shrub or tree 3–5.5 m. high.

**Cassia bacillaris** L. A shrub or tree 2–6 m. high, about Lancetilla.

*Cassia biflora* L. COMAYAGUA.

*Cassia grandis* L.f. CARAO.

*Cassia oxyphylla* Kunth.

*Cassia reticulata* Willd. BARAJA, BARAJO. A shrub or sometimes a tree as much as 6 m. high, very showy when in flower in spring.

*Cassia spectabilis* DC. CANDELILLO.

*Centrolobium* sp.

**Cynometra retusa** Britt. & Rose. FRUTA DE DANTO. A tree of 6–12 m.; leaves with only 2 leaflets.

**Dalbergia cubilquitzensis** (Donn. Smith) Pittier. GRANADILLO, ROSEWOOD. A medium-sized tree, common in the Tela region. The wood is highly esteemed for furniture and for construction purposes.

**Dalbergia Ecastophyllum** (L.) Taub. A shrub or tree 3–7.5 m. high, common in coastal thickets.

*Dalbergia* cf. *lineata* Pittier. GRANADILLO, PALO NEGRO.

**Dalbergia monetaria** L.f. A shrub or small tree, in coastal swamps.

**Delonix regia** (Boj.) Raf. GUACAMAYA; POINCIANA. Often planted for ornament, especially on the Pacific slope.

*Dialium divaricatum* Vahl. PALETA, TAMARINDO, TAMARINDO PRIETO. One of the two or three most abundant trees of the Tela region, where the wood is used for fence posts, bridge timbers, etc.



*Diphysa robinioides* Benth. GUACHIPILÍN, QUEBRACHO DE CERRO. This species grows in some abundance about Siguatepeque.

*Erythrina glauca* Willd. GUILIQUEME.

**Erythrina hondurensis** Standl. PITO. A very prickly shrub or tree, sometimes 6 m. high, with showy, bright red flowers. Known only from the Tela region.

*Erythrina rubrinervia* H. B. K. PITO.

*Enterolobium cyclocarpum* (Jacq.) Griseb. GUANACASTE.

*Gliricidia sepium* (Jacq.) Steud. MADRE DE CACAO, MADRIAL, MADRIADO, CACAGUA, MADERA NEGRA.

*Haematoxylon campechianum* L. BRASIL, PALO BRASIL, TINTA, LOGWOOD.

*Hymenæa Courbaril* L. GUAPINOL.

**Inga edulis** Mart. GUAMA. A small or medium-sized tree with broad crown. Collected at Siguatepeque and in the Tela region. The pods contain an edible pulp.

**Inga multijuga** Benth. GUAMO. A tree about 6 m. high.

**Inga Pittieri** Micheli. A tree of 9 m. with large 4-sided pods.

**Inga punctata** Willd. CUAJINIQUIL. A tree 6–9 m. high with broad rounded crown; flowers white, in short dense spikes.

**Inga Roussoviana** Pittier. A tree about 9 m. high with dense crown.

**Lonchocarpus atropurpureus** Benth. CHAPERNO. A tree of 9 m., collected at Siguatepeque.

*Lonchocarpus guatemalensis* Benth. CHAPEL.

**Lonchocarpus hondurensis** Benth. A tree of 6–8 m. with red-purple flowers.

*Lonchocarpus latifolius* H. B. K. CINCHO.

*Lonchocarpus luteomaculatus* Pittier.

**Lonchocarpus Michelianus** Pittier. CINCHO. A small or large tree, said to reach a height of 30 m.

**Lonchocarpus monospermus** Standl. A tree of 4.5–9 m., in the swamps about Tela.

*Lysiloma acapulcense* Benth.? QUEBRACHO?

*Machaerium latifolium* (Benth.) Pittier. MATA PIOJO. I was given the name Sangre for this tree at Tela, but the tree probably was confused with *Pterocarpus*, the leaves being rather similar.

**Machaerium marginatum** Standl. A shrub or small tree with bristly-hairy branches.

*Myroxylon Pereirae* Klotzsch. BÁLSAMO.

*Ormosia coccinea* (Aubl.) Jacks.? (Probably the *O. nitida* of the first list represents the same species.) More complete material is necessary in order to determine the species of this genus as represented in Central America.

**Piscidia grandifolia** (Donn. Smith) I. M. Johnston. A small tree, common about Siguatepeque.

**Parkinsonia aculeata** L. Cultivated commonly in many parts of Honduras and sometimes naturalized. A shrub or small tree.

**Pithecolobium arboreum** (L.) Urban. BARBA DE JOLOTE. An unarmed tree 9–18 m. high with small greenish white flowers in globose heads.

**Pithecolobium dulce** (Roxb.) Benth. Trees apparently belonging to this species are common in the Comayagua Valley.

*Pithecolobium guatemalense* (Britt. & Rose) Standl. (*Chloroleucum guatemalense* Britt. & Rose.)

*Pithecolobium insigne* Micheli.

**Pithecolobium Johanseni** Standl. (*P. telense* Britton). A tree 6–9 m. high, growing about La Ceiba and Tela.

**Pithecolobium latifolium** (L.) Benth. MAYAMAYA. An unarmed tree 6–11 m. tall, growing along streams and in coastal swamps.

*Pithecolobium ligustrinum* Klotzsch.

**Pithecolobium longifolium** (H. & B.) Standl. MAYAMAYA. A small tree with flowers in short spikes. Growing along streams.

*Pithecolobium microstachyum* Standl.

**Pithecolobium Saman** (Jacq.) Benth. RAINTREE. A large tree with broad spreading crown.

**Platymiscium dimorphandrum** Donn. Smith. HORMIGO. A large tree, 15 m. high or more, with small yellow flowers.

*Platymiscium polystachyum* Donn. Smith. HORMIGO, GRANADILLO (?).

*Platymiscium trifoliatum* Benth. HORMIGO. The *Platymiscium* species of Central America are much confused, and more and better material is needed to elucidate the relationship of the species.

*Prosopis chilensis* (Mol.) Stuntz. ALGARROBA.

*Pterocarpus belizensis* Standl. SANGRE, COWEE.

*Schizolobium parahybum* (Vell.) Blake. PLUMAJILLO, ZORRA. Also called TAMBOR in the Tela region.

**Swartzia darienensis** Pittier. NARANJILLO. A shrub or tree, rarely over 7 m. high; leaflet only one. Flowers yellow.

**Swartzia panamensis** Benth. PATERNO. A tree 12 m. high or more, with long pendent racemes of pale yellow flowers. The wood is reported to be of good quality, and is used about Tela for posts.

*Sweetia panamensis* Benth. CHICHIPATE.

**Zollernia tango** Standl. TANGO. A tall forest tree; leaflet only one, toothed. The wood is said to be of good locality, and is used locally for various purposes. This species, the only one of the genus known to occur north of Brazil, is known only from Honduras and British Honduras.

**Tamarindus indica** L. TAMARINDO, TAMARIND. Often planted for its fruit, and sometimes growing without cultivation.

## LILIACEAE (Lily Family)

**Dracaena americana** Donn. Smith. ISOTE. A tree 4.5–9 m. high, with few branches, long linear leaves, and small white flowers in panicles.

**Yucca elephantipes** Regel. ISOTE. Commonly planted throughout Honduras, especially in the interior. The flowers are cooked and eaten.

## LYTHRACEAE (Loosestrife Family)

*Grislea secunda* Loefl.



## MALPIGHIACEAE

**Bunchosia cornifolia** H. B. K. A shrub or tree, sometimes 7.5 m. high, the showy flowers bright yellow; fruits red.

*Bunchosia nitida* (Jacq.) DC. A shrub or tree 4.5–6 m. high.

*Byrsonima crassifolia* (L.) DC. NANCE, NANCITO.

*Malpighia glabra* L. Sometimes a tree of 6 m., but more commonly only a shrub.

## MALVACEAE (Mallow Family)

*Abutilon Chittendenii* Standl.

*Hibiscus tiliaceus* L. MAJAGUA, MAJAO.

*Malvaviscus arboreus* Cav.

**Malvaviscus grandiflorus** H. B. K. QUESILLO. A shrub or small tree, 1.5–4.5 m. high, with bright red flowers.

**Robinsonella divergens** Rose & Baker. A handsome tree 6 m. high, with showy white flowers. Collected at Siguatepeque.

**Robinsonella pilosa** Rose. AGUAMEQUE. The type of this species was collected between Flores and Comayagua.

## MELASTOMACEAE (Melastome Family)

*Conostegia xalapensis* (Bonpl.) Don. CAPIROTO, SIRÍN; called UVA about Tela.

*Miconia argentea* (Sw.) DC. SIRÍN, SIRINÓN; called CENIZO at Tela.

**Miconia Donnell-Smithii** Cogn. A shrub or tree 3–4.5 m. high.

*Miconia hondurensis* Donn. Smith. A shrub or tree, sometimes reaching a height of 6 m.; petals pure white.

**Miconia hyperprasina** Naud. A slender shrub or tree, 5.5 m. high or less.

*Miconia impetiolaris* (Sw.) Don. Usually a shrub.

*Miconia laevigata* (L.) DC.

**Miconia Schlimii** Triana. SIRÍN, SIRÍN BLANCO. A shrub or tree 3–7.5 m. high, with edible fruits.

*Miconia stenostachya* DC.

*Mouriria parvifolia* Benth.

## MELIACEAE (Mahogany Family)

*Carapa guianensis* Aubl. CRABWOOD.

*Cedrela longipes* Blake. CEDRO.

**Cedrela mexicana** Roem. CEDRO, SPANISH CEDAR. A large tree; the common species about Tela.

**Guarea bijuga** C. DC. Usually a shrub, but probably sometimes also a tree; leaflets only 4.

**Guarea excelsa** H. B. K. CARBÓN. A large tree with broad dense crown. The wood is much used locally for general construction purposes and as a source of charcoal.

*Guarea longipetiola* C. DC. CARBÓN.

*Melia Azedarach* L. PARAÍSO, CHINABERRY.

*Swietenia macrophylla* King. CAOBA, MAHOGANY. About Tela the tree is called MAJAINE, an evident corruption of the English name.

**Trichilia breviflora** Blake & Standl. A shrub or small tree; leaves with a single leaflet. Known only from the Tela region.

*Trichilia havanensis* Jacq. BARREHORNO, LIMONCILLO.

## MENISPERMACEAE (Moonseed Family)

**Hyperbaena phanerophlebia** Standl. A slender glabrous shrub or small tree with narrow leathery leaves; occurring also in Salvador.

*Hyperbaena Tonduzii* Diels.

## MONIMIACEAE

**Mollinedia Butleriana** Standl. A shrub or small tree, sometimes as much as 6 m. high.

## MORACEAE (Mulberry Family)

**Artocarpus communis** Forst. PALO DE PAN, MAZAPÁN, BREADFRUIT. Planted commonly in many parts of Honduras, and often found half wild along the coast.

**Brosimum costaricanum** Liebm. MASICARÁN, MASICARÓN. A large forest tree, common in the Tela region.

**Brosimum terrabanum** Pittier. MASICA. A very large tree, one of the two or three most abundant species of the forests of the north coast. The wood is used chiefly for charcoal, but also for lumber. The seeds are cooked and eaten.

*Castilla elastica* Cerv. ULE, HULE, RUBBER TREE.

*Cecropia asperrima* Pittier. GUARUMO.

**Cecropia hondurensis** Standl. GUARUMO. A common tree of the Tela region, reaching a maximum height of about 15 m. Stems hollow and always inhabited by small ants which bite savagely.

*Chlorophora tinctoria* (L.) Gaud. MORA, FUSTIC.

*Coussapoa panamensis* Pittier. Called MATAPALO at Tela.

*Coussapoa Ruizii* Klotzsch.

**Ficus Colubrinae** Standl. A tree about 12 m. high.

**Ficus crassiuscula** Warb. HIGUERO. A large tree with broad thin buttresses.

*Ficus glabrata* H. B. K. AMATE; called HIGUERO and MATAPALO about Tela.

*Ficus Hemsleyana* Standl. MATAPALO; called also HIGUERO.

**Ficus inamoena** Standl. A small tree, growing in pine forest at Siguatepeque.

**Ficus involuta** (Liebm.) Miq. HIGO, MATAPALO. A large tree; found at Siguatepeque and also in the Tela region.

**Ficus Kellermanii** Standl. HIGUERO, MATAPALO, HIGUILLO. A large tree with broad dense crown.

**Ficus Oerstediana** Miq. HIGUILLO. A tree of 15 m., or often only a small epiphytic shrub.



**Ficus padifolia** H. B. K. HIGUILLO. A large tree; found at Siguatepeque and also in the Tela region.

*Ficus panamensis* Standl. Called HIGUERO at Tela.

**Ficus Popenoei** Standl. HIGUILLO. A medium-sized tree with small, densely hairy leaves and obovoid fruits.

**Ficus radula** Willd. HIGO, HIGUERO. A large tree with rough leaves.

**Ficus segoviae** Miq. HIGO, HIGUERO. A large or small tree with narrow elongate leaves.

**Ficus Tonduzii** Standl. HIGUERO. A large tree with broad, coarsely nerved leaves.

**Ficus velutina** Willd. A tree of 9 m., found at Siguatepeque.

**Morus multicaulis** Perr. MORERA. This mulberry has been planted about Siguatepeque and elsewhere in Honduras, with the hope of developing a silk-producing industry.

**Naucleopsis naga** Pittier. CONCHA DE INDIO, MAJAO DE INDIO. A tree 9 m. high or larger, the large fruits covered with stiff spinelike tubercles. The bark is said to be used by some of the Honduran Indians for making mats and other articles.

*Pourouma aspera* Trécul. GUARUMO DE MONTAÑA. A large forest tree, the leaves deeply lobed and resembling those of the Cecropias, but not peltate as in that genus.

**Trophis chorizantha** Standl. A tree of 9 m. with smooth leaves.

*Trophis racemosa* (L.) Urban (*Sabagunia uropbylla* Donn. Smith). RAMÓN. At Tela I was given the name SAN RAMÓN, evidently an unnecessary modification of the term current in Central America for this tree.

## MORINGACEAE

*Moringa oleifera* Lam. HORSE-RADISH TREE.

## MYRICACEAE (Bayberry Family)

**Myrica cerifera** L. BAYBERRY. A shrub or small tree, scarcely exceeding 4.5 m. in height, in coastal thickets near Tela.

**Myrica mexicana** Willd. CERA VEGETAL. A tree of 4.5–6 m., common in the region of Siguatepeque.

## MYRISTICACEAE (Nutmeg Family)

*Compsoneura Sprucei* (A. DC.) Warb. SANGRE.

**Virola guatemalensis** (Hemsl.) Warb. SANGRE. A large forest tree, the leaves pale and nearly glabrous beneath; seeds resembling those of nutmeg, covered with a beautiful lace-like aril. One of the common forest trees of the north coast.

*Virola merendonis* Pittier. SANGRE.

## MYRSINACEAE

**Ardisia amplifolia** Standl. UVA DE MONTE, UVA DE MONTAÑA. A shrub or tree 2.5–4.5 m. high with large black juicy edible fruits.

*Ardisia compressa* H. B. K. CUCUYUL; called CAMACA at Siguatepeque.

**Ardisia Mitchellae** I. M. Johnston. A slender shrub or small tree 2.5–6 m. high with pink flowers in umbels. Known only from the Tela region.

*Ardisia paschalis* Donn. Smith.

**Parathesis serrulata** (Sw.) Mez. CUYA. A shrub or tree 3–9 m. high or more, the leaves rusty-tomentose beneath; flowers white or pink.

**Rapanea ferruginea** (R. & P.) Mez. A tree 4.5–6 m. high, growing in the mountains about Siguatepeque.

## MYRTACEAE (Myrtle Family)

*Calyptranthes bullata* DC.

**Calyptranthes hondurensis** Standl., ined. A shrub or small tree 3–6 m. high, known only from the region of Siguatepeque.

**Eucalyptus** sp. Two species of this genus were noted in cultivation at Siguatepeque.

**Eugenia axillaris** (Sw.) Willd. A shrub or small tree, sometimes 7.5 m. high, with small black berries.

**Eugenia Doubledayi** Standl., ined. A shrub or tree 3–6 m. high, known only from the region of Siguatepeque.

*Eugenia guatemalensis* Donn. Smith. FIERRILLO.

**Eugenia Jambos** L. MANZANA, ROSE-APPLE. A fine large tree with very dense, spreading crown; fruit edible. Often planted for its scented fruit, and naturalized in many localities.

**Eugenia lancetillae** Standl. A slender shrub or tree up to 6 m. high; known only from the vicinity of Lancetilla.

**Myrcia Oerstediana** Berg. A shrub or tree 3–7.5 m. high, with purple-red fruit which has a spicy flavor and is edible.

**Pimenta officinalis** Lindl. PIMENTA GORDA, ALLSPICE. Often planted, and sometimes naturalized; probably not native in Honduras.

**Psidium Friedrichsthalianum** (Berg) Niedenzu. GUAYABA AGRIA. A shrub or tree 3–6 m. high with small acid edible fruits.

**Psidium Guajava** L. GUAYABA, GUAVA. Common in most parts of Honduras, where it is often planted for its fruit. Native, and often forming dense thickets on the Pacific slope.

**Psidium molle** Bertol. GUAYABILLA, HUEVO DE GATO. Usually a shrub but sometimes a tree of 5 meters. The fruit is of superior quality. The tree or shrub is common in the region of Siguatepeque.

## NYCTAGINACEAE

*Neea psychotrioides* Donn. Smith. A shrub or tree of 3–6 m.

*Pisonia aculeata* L. Called CARGALERA about Tela.

## OLACACEAE

**Heisteria macrophylla** Oerst. A shrub or small tree, the calyx bright red and saucer-shaped; fruits black.

*Schoepfia Schreberi* Gmel. SOMBRA DE ARMADO.

*Ximenia americana* L. CHOCOMICO, MANZANILLA; called CAGALERA about Tela; TALLOW-WOOD.



## PALMACEAE (Palm Family)

**Acrocomia mexicana** Karw. COYOL, WINE PALM. Common on the Pacific slope, and extending nearly to the north coast. A tall tree.

**Astrocaryum cohune** (Wats.) Standl., comb. nov. (*Bactris cohune* Wats.). LANCETILLA. A slender palm, usually 4.5 m. high or less, armed with long flat spines.

**Attalea cohune** Mart. COROZO, MANACA, COHUNE PALM. Abundant along the north coast. The largest and finest of Central American palms.

**Bactris hondurensis** Standl. BISCOYOL. A slender spiny palm, rather a shrub than a tree. Known only from the Tela region.

**Bactris major** Jacq. BISCOYOL. A small, slender, horridly spiny palm of the coastal swamps.

**Chamaedorea Arenbergiana** Wendl.? PACAYA. A low unarmed palm of the upland forests; rather a shrub than a tree.

**Chamaedorea geonomaeformis** Wendl. PACAYA. A small palm with simple leaves. Not a tree, but mentioned here, like some of the other species, in order to complete the list of palm species.

**Chamaedorea graminifolia** Wendl. PACAYA. A slender-stemmed palm 1.5–5 m. high.

**Chamaedorea pacaya** Oerst. PACAYA. Plants 1.5–3.5 m. high.

**Cocos nucifera** L. Coco, COCONUT. Abundant along the coasts and often planted inland.

**Desmoncus polyacanthos** Mart. BALAIRE. A large, savagely armed, climbing palm.

**Geonoma binervia** Oerst. PACUCA. An unarmed palm 1–4.5 m. high.

**Geonoma glauca** Oerst.? PACUQUILLA. A shrubby palm with pinnately cut leaves.

**Geonoma trifurcata** Oerst. PACUQUILLA. A shrubby palm with simple leaves.

**Iriartea durissima** Oerst.? PALMICHE. A tall slender palm, on the tops of the hills above Lancetilla. Determination very uncertain.

**Malortiea gracilis** Wendl. A slender unarmed palm, the small leaves with perforations or "windows" along the midrib.

**Oreodoxa oleracea** Mart.? YAGUA. A tall slender palm with smooth trunk, common in the coastal swamps.

**Phoenix dactylifera** L. DÁTIL, DATE PALM. Sometimes planted in the drier regions of Honduras.

## PHYTOLACCACEAE (Pokeweed Family)

*Achatocarpus nigricans* Triana.

## PINACEAE (Pine Family)

*Abies religiosa* (H. B. K.) S. & C. PINO.

*Cupressus Benthamii* Endl. CIPRÉS. Planted commonly, but doubtfully native.

*Pinus caribæa* Morelet. OCOTE, PINO OCOTE, PINAVETE, CUBAN PINE.

*Pinus oöcarpa* Schiede. Ocote, Pino blanco. The common pine of the mountains about Siguatepeque.

*Pinus pseudostrobus* Lindl. Pinavete. Common high on the mountains above Siguatepeque.

PIPERACEAE (Pepper Family)

**Piper auritum** H. B. K. Matarro. A fragrant shrub or small tree, sometimes 4.5 m. high, with few thick branches.

**Piper gracillimum** Trel. A shrub or tree 3–6 m. high.

**Piper laterifissum** Trel. A coarse shrub or tree 3–4.5 m. high, with very large leaves.

**Piper perinaequilongum** Trel. A shrub or tree 2–6 m. high.

**Piper tuberculatum** Jacq. A dense shrub or tree 2–5.5 m. high. One of the common species of Central America.

POLYGONACEAE (Buckwheat Family)

*Coccoloba acuminata* H. B. K. Rabo de león, Tapatamal. Usually a shrub but sometimes a small tree.

**Coccoloba anisophylla** Standl. A shrub or small tree 3–6 m. high, known only from the Tela region.

*Coccoloba barbadensis* Jacq. Called Uva about Tela.

**Coccoloba belizensis** Standl. Uva. A large tree with oval to ovate leaves.

*Coccoloba Browniana* Standl. Tolondrón.

*Coccoloba caracasana* Meisn.

*Coccoloba floribunda* (Benth.) Lindau. A species of the Pacific coast.

**Coccoloba hirsuta** Standl. Uva. A large tree. Known only from the Lancetilla Valley.

**Coccoloba Tuerckheimii** Donn. Smith. A shrub or small tree with very large, obovate leaves.

*Coccoloba uvifera* (L.) Jacq. Uva, Uva de la playa, Papaturro.

*Neomillspaughia paniculata* (Donn. Smith) Blake. Amarra jabón. The writer noted this small tree as being common in the dry Comayagua Valley.

PROTEACEAE

**Grevillea robusta** Cunn. Gravilea, Silk-oak. Planted commonly as a shade tree in many parts of Honduras.

PUNICACEAE (Pomegranate Family)

**Punica Granatum** L. Granada, Pomegranate. Planted for its fruit in central and western Honduras.

RHAMNACEAE (Buckthorn Family)

**Colubrina rufa** Reissek. A tree 6–9 m. high with reddish-tomentose branchlets; flowers small, greenish, in cymes.

*Karwinskia Calderoni* Standl. This species was noted growing in the Comayagua Valley.



RHIZOPHORACEAE (Mangrove Family)

**Cassipourea elliptica** Poir. A shrub or small tree with opposite glabrous leaves. Usually growing close to the coast.

*Rhizophora Mangle* L. Mangle, Mangle colorado, Mangrove.

ROSACEAE (Rose Family)

**Chrysobalanus Icaco** L. Icaco, Coco-plum. A shrub or very small tree with edible fruit; confined to sea beaches.

*Couepia dodecandra* (DC.) Hemsl. Zapotillo; called Munzap at Tela.

**Cydonia oblonga** Mill. Membrillo, Quince. Cultivated in the interior for its fruit.

**Eriobotrya japonica** Lindl. Níspero, Loquat. Planted at Siguatepeque and elsewhere in the interior for its excellent fruit.

*Hirtella americana* L. (*H. racemosa* Lam.) Called Pasta at Tela. Usually a shrub and perhaps never a tree.

**Hirtella guatemalensis** Standl. Pasta. A shrub or small tree, sometimes 6 m. high, with white and rose-purple flowers.

*Licania arborea* Seem.

*Licania hypoleuca* Benth.

**Licania platypus** (Hemsl.) Fritsch. Urraco. A very large tree with handsome foliage, and with very large, edible fruit of poor quality. Called Sunzapote in the interior.

**Malus sylvestris** Mill. Manzana, Apple. Cultivated occasionally in the interior of Honduras.

**Prunus Persica** (L.) Sieb. & Zucc. Durazno, Peach. Cultivated in many parts of Honduras, but chiefly in the mountains of the interior.

**Pyrus communis** L. Pera, Pear. Cultivated sparingly in the mountains of the interior.

RUBIACEAE (Madder Family)

*Alibertia edulis* (L. Rich.) A. Rich. Called Lirio about Tela. Commonly a shrub, but perhaps sometimes a small tree.

*Calderonia salvadorensis* Standl. Brasil.

*Calycophyllum candidissimum* (Vahl) DC. Madroño, Salamo.

**Coffea arabica** L. Café, Coffee. Cultivated commonly in Honduras, although less extensively than in other Central American countries.

**Faramea stenura** Standl. A glabrous shrub or small tree 2.5–6 m. high with bright blue flowers. Known only from the region of Lancetilla.

*Genipa Caruto* H. B. K. Jagua. *G. americana* L. probably does not occur in Honduras.

**Guettarda macrosperma** Donn. Smith. A shrub or small tree, sometimes 6 m. high. Collected on the north coast and also about Siguatepeque.

**Hamelia longipes** Standl. Coloradillo. A slender glabrous shrub or small tree 3–6 m. high, with red flowers.

*Hamelia patens* Jacq. (*H. erecta* Jacq.). Coral, Coralillo. Rarely if ever a tree.

*Hamelia Rovirosae* Wernham. CLAVILLO; called COLORADILLO about Tela. Normally a shrub.

*Isertia Haenkeana* DC.

**Morinda panamensis** Seem. CONCHA DE HUEVO. A glabrous shrub or tree, reaching a height of 6 m.; flowers small, white, fragrant.

**Pentagonia Donnell-Smithii** Standl. A shrub or tree, sometimes 9 m. high, with few branches; leaves very large, with fine parallel nerves.

*Posoqueria latifolia* (Rudge) R. & S. Called CACHITO about Tela.

**Psychotria chiapensis** Standl. A shrub or small tree, reaching a height of 6 m.; flowers white.

**Psychotria crebrinervia** Standl. A slender shrub or tree 3–4.5 m. high with small black fruits.

**Psychotria grandis** Sw. A tree 4.5–6 m. high with red fruits.

**Psychotria simiarum** Standl. A shrub or small tree, attaining a maximum height of 7.5 m. Occurring also in Guatemala.

*Randia armata* (Sw.) DC. JAZMÍN CIMARRÓN; called CAGALERO and CRUCETILLA about Tela.

**Rondeletia buddleoides** Benth. A slender tree of 6–9 m. with small, pale pink flowers.

*Rondeletia Deamii* (Donn. Smith) Standl. CANDELILLO.

**Rondeletia gracilis** Hemsl. A tree up to 7.5 m. high, with dull red flowers.

**Rondeletia stachyoidea** Donn. Smith. A slender shrub or tree of 2–6 m., the leaves covered beneath with long silky hairs.

**Rudgea ceratopetala** Donn. Smith. A glabrous shrub or tree of 2.5–6 m.

## RUTACEAE (Satinwood Family)

*Amyris elemifera* L. CHILILLO, PIMIENTA, TARAY.

*Casimiroa tetrameria* Millsp. MATASANO. The tree is common about Siguatepeque.

**Citrus aurantifolia** (Christm.) Swingle. LIMÓN, LIME. Planted abundantly and often naturalized.

**Citrus Aurantium** L. NARANJA ÁCIDA, SOUR ORANGE. Planted, and naturalized in some localities.

**Citrus grandis** (L.) Osbeck. TORONJA, GRAPEFRUIT. Planted in many localities.

**Citrus Limonia** Osbeck. LIMÓN REAL, LEMON. Planted, but very sparingly.

**Citrus medica** L. CIDRA, CITRON. Planted commonly for its fruit.

**Citrus sinensis** Osbeck. NARANJA, NARANJA DULCE, SWEET ORANGE. Planted throughout the country.

*Decazyx macrophyllus* Pitt. & Blake.

*Zanthoxylum Fagara* (L.) Sarg. CHINCHO.

*Zanthoxylum Kellermanii* P. Wils. LAGARTO AMARILLO; called CEDRO ESPINO about Tela.

**Zanthoxylum procerum** Donn. Smith. CEDRILLO. A large tree with crenate leaflets.



## SALICACEAE (Willow Family)

*Salix chilensis* Mol. SAUCE.

## SAPINDACEAE (Soapberry Family)

**Allophylus occidentalis** (Sw.) Radlk. A large shrub or small tree; leaves with 3 leaflets.

**Blighia sapida** Koen. AKEE. Cultivated along the north coast, especially by the Jamaicans, for its edible fruits.

**Cupania glabra** Sw. COLA DE PAVO. A shrub or tree of 4.5–9 m. with large pinnate leaves.

*Matayba glaberrima* Radlk. CARBÓN.

*Sapindus Saponaria* L.

**Thouinidium decandrum** (H. & B.) Radlk. A tree about 7.5 m. high, abundant in the Comayagua Valley.

## SAPOTACEAE (Sapodilla Family)

*Achras chicle* Pittier. ZAPOTILLO.

**Calocarpum mammosum** (L.) Pierre. ZAPOTE. Cultivated commonly for its edible fruit, and also wild in the forests of the north coast.

**Calocarpum viride** Pittier. ZAPOTILLO. A large forest tree, common about Lancetilla.

**Chrysophyllum Cainito** L. CAIMITO, STAR-APPLE. A handsome tree, cultivated in many localities for its edible fruit.

**Chrysophyllum mexicanum** Brandeg. CAIMITO. A small or medium-sized tree, the leaves brownish-silky beneath; fruits small, edible. Found on the north coast and also in the interior.

**Labatia Standleyana** Pittier? ZAPOTILLO. A large forest tree. The specimens are sterile, and the determination therefore doubtful.

**Lucuma campechiana** H. B. K.? A small tree found near Progreso. Specimens sterile.

**Lucuma izabalensis** Standl. SILIÓN. A very large tree with tall trunk and broad thin buttresses. Common on the hills about Lancetilla.

## SIMARUBACEAE (Bitterwood Family)

*Alvaradoa amorphoides* Liebm. ZORRA. The tree was noted as abundant in the Comayagua Valley.

*Picramnia Bonplandiana* Tul.? Specimens of this genus were noted along the road near Lake Yojoa, but material was not collected.

*Simaruba glauca* DC. ACEITUNO, NEGRITO.

## SOLANACEAE (Potato Family)

**Cestrum lanatum** Mart. & Gal. A shrub or tree up to 6 m. high. Common in the Comayagua Valley.

*Cestrum nocturnum* L. HUELE DE NOCHE.

*Cestrum panamense* Standl. HUELE DE NOCHE.

*Cestrum vespertinum* L. This species should probably be omitted from the list.

*Solanum umbellatum* Mill. FRIEGA-PLATO.

**Solanum verbascifolium** L. FRIEGA-PLATO, HOJA BLANCA. An unarmed shrub or tree 2–4 m. high with white flowers and yellow fruits.

STAPHYLEACEAE (Bladdernut Family)

**Turpinia paniculata** Vent. A small tree, about 6 m. high, with pinnate leaves and with small white flowers in large panicles.

STERCULIACEAE (Cacao Family)

*Guazuma ulmifolia* Lam. GUÁCIMO, CAULOTE.

**Sterculia apetala** (Jacq.) Karst. CASTAÑO. A large tree with spreading crown; leaves long-stalked, 3–5-lobed. Common in the drier regions of Honduras.

*Theobroma Cacao* L. CACAO.

TAXACEAE (Yew Family)

*Podocarpus* sp. Probably *P. guatemalensis* Standl. (*P. coriaceus* of the former list). CEDRO?, CHILCA?

THEACEAE (Tea Family)

*Ternstroemia tepezapote* S. & C. Collected by the writer at Siguatepeque.

THEOPHRASTACEAE

*Jacquinia aurantiaca* Ait.

TILIACEAE (Linden Family)

*Belotia Campbellii* Sprague. SIRÍN DE PALOMA; called CAPULÍN about Tela.

*Heliocarpus appendiculatus* Turcz. MAJAO, MECATE DE AGUA.

*Heliocarpus Donnell-Smithii* Rose. MAJAO.

*Heliocarpus glanduliferus* Rob. MAJAO BLANCO.

*Luehea candida* (DC.) Mart. CAULOTE BLANCO.

*Luehea Seemannii* Tr. & Pl. GUÁCIMO COLORADO; called CAULOTE in the Tela region.

ULMACEAE (Elm Family)

**Celtis Hottlei** Standl. MANTECA. A tree 18 m. high. Collected near Progreso by W. D. Hottle.

*Celtis iguanæa* (Jacq.) Sarg. Usually a shrub, but sometimes perhaps with the size and habit of a tree.

**Chaetoptelea mexicana** Liebm. MORA (probably an erroneous name). Frequent on the mountains above Siguatepeque. A large or medium-sized tree.

*Trema micrantha* (L.) Blume. CAPULÍN, CAPULÍN, NEGRO.

URTICACEAE (Nettle Family)

*Myriocarpa obovata* Donn. Smith.



*Myriocarpa yzabalensis* (Donn. Smith) Killip. CHICHICASTILLO.

**Pouzolzia obliqua** Gaud. A shrub or small tree, occasionally as much as 6 m. high, but usually smaller.

**Pouzolzia occidentalis** Wedd. A shrub or tree of 2.5–4.5 m.

**Urera alceaefolia** Gaud. A shrub or small tree, reaching a height of 4.5 m.

**Urera baccifera** (L.) Gaud. CHICHICASTE. Usually a shrub but sometimes a small tree, armed with coarse hairs which sting very painfully. Often planted for hedges in Central America.

*Urera caracasana* (Jacq.) Griseb. CHICHICASTE. Sometimes a tree 6 m. high. The hairs of this species sting but slightly.

*Urera elata* (Sw.) Griseb. Called CHICHICASTE about Tela. A tree of 7.5 m., armed with stinging hairs.

VERBENACEAE (Teak Family)

*Aegiphila elata* Sw. A shrub or small tree, sometimes 6 m. high.

*Aegiphila fasciculata* Donn. Smith. Called VARA BLANCA about Tela.

*Avicennia nitida* Jacq. PALO DE SAL, BLACK MANGROVE.

**Callicarpa acuminata** H. B. K. Usually a shrub, but occasionally as much as 6 m. high; leaves finely stellate-pubescent; flowers small, white.

**Citharexylum caudatum** L. A glabrous shrub or tree 1.5–4.5 m. high; flowers small, in slender racemes.

*Cornutia grandifolia* (S. & C.) Schauer. ZOPILOTE; called CUCARACHO about Tela.

**Lippia Kellermanii** Greenm. CUTUFUME. A tree of 4.5–6 m., growing in the mountains above Siguatepeque.

**Vitex Kuylenii** Standl. FLOR AZUL. A tree of medium or large size, frequent in forests.

VIOLACEAE (Violet Family)

**Rinorea guatemalensis** (Wats.) Bartlett. A slender shrub or tree of 3–7.5 m.

VOCHYSIACEAE

**Vochysia hondurensis** Sprague. SAN JUAN. A large tree with whorled leaves and with narrow panicles of bright yellow flowers.

ZYGOPHYLLACEAE (Lignum-vitae Family)

*Guaiacum* sp. GUAYACÁN. A tree of this genus was seen in bloom by the writer at Comayagua, but it was impossible to obtain specimens.

CHECK LIST OF THE COMMON NAMES

| | | |
|---|---|---|
| Aceituno | *Simaruba glauca* DC. | Simarubaceae |
| Achiote | *Bixa Orellana* L. | Bixaceae |
| Agajo | *Adelia triloba* (Muell. Arg.) Hemsl. | Euphorbiaceae |
| Aguacate | *Persea americana* Mill. | Lauraceae |
| Aguacatillo | *Misanteca capitata* C. & S. | Lauraceae |

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| Aguacatillo | *Nectandra globosa* (Aubl.) Mez | Lauraceae |
| Aguacatillo | *Ocotea cernua* (Nees) Mez | Lauraceae |
| Aguacatillo | *Persea amplifolia* Mez & Donn. Smith | Lauraceae |
| Aguacatillo | *Phoebe* spp. | Lauraceae |
| Aguameque | *Robinsonella pilosa* Rose | Malvaceae |
| Akee | *Blighia sapida* Koen. | Sapindaceae |
| Algarroba | *Prosopis chilensis* (Mol.) Stuntz | Leguminosae |
| Alligator pear | *Persea americana* Mill. | Lauraceae |
| Allspice | *Pimenta officinalis* Lindl. | Myrtaceae |
| Almendro | *Andira inermis* H. B. K. | Leguminosae |
| Almendro | *Terminalia* spp. | Combretaceae |
| Almond, Indian | *Terminalia Catappa* L. | Combretaceae |
| Amargoso | *Andira* sp. | Leguminosae |
| Amarra jábón | *Neomillspaughia paniculata* (Donn. Smith) Blake | Polygonaceae |
| Amate | *Ficus glabrata* H. B. K. | Moraceae |
| Anatto | *Bixa Orellana* L. | Bixaceae |
| Anona | *Annona* spp. | Annonaceae |
| Anona | *Rollinia Jimenezii* Safford | Annonaceae |
| Anona de redecilla | *Annona reticulata* L. | Annonaceae |
| Apple | *Malus sylvestris* Mill. | Rosaceae |
| Aromo | *Acacia Farnesiana* (L.) Willd. | Leguminosae |
| Avocado | *Persea americana* Mill. | Lauraceae |
| Azaharillo | *Capparis* sp. | Capparidaceae |
| Balaire | *Desmoncus polyacanthos* Mart. | Palmaceae |
| Balsa | *Ochroma limonensis* Rowlee | Bombacaceae |
| Bálsamo | *Myroxylon Pereirae* Klotzsch | Leguminosae |
| Baraja or Barajo | *Cassia reticulata* Willd. | Leguminosae |
| Barba de jolote | *Pithecolobium arboreum* (L.) Urban | Leguminosae |
| Barenillo | *Croton glabellus* L. | Euphorbiaceae |
| Barrehorno | *Trichilia havanensis* Jacq. | Meliaceae |
| Bayberry | *Myrica cerifera* L. | Myricaceae |
| Bejuco negro | *Cordia ferruginea* (Lam.) R. & S. | Boraginaceae |
| Biscoyol | *Bactris* spp. | Palmaceae |
| Bisquite | *Acacia paniculata* Willd. | Leguminosae |
| Brasil | *Calderonia salvadorensis* Standl. | Rubiaceae |
| Brasil | *Haematoxylon campechianum* L. | Leguminosae |
| Breadfruit | *Artocarpus communis* Forst. | Moraceae |
| Bullhorn acacia | *Acacia* spp. | Leguminosae |
| Button mangrove | *Conocarpus erecta* L. | Combretaceae |
| Cabbage-bark | *Andira inermis* H. B. K. | Leguminosae |
| Cacagua | *Gliricidia sepium* (Jacq.) Steud. | Leguminosae |
| Cacao | *Theobroma Cacao* L. | Sterculiaceae |
| Cachito | *Posoqueria latifolia* (Rudge) R. & S. | Rubiaceae |
| Cachito de aromo | *Acacia Farnesiana* (L.) Willd. | Leguminosae |



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|---|---|---|
| Café | *Coffea arabica* L. | Rubiaceae |
| Cagalera | *Ximenia americana* L. | Olacaceae |
| Cagalero | *Randia armata* (Sw.) DC. | Rubiaceae |
| Cargalera | *Pisonia aculeata* L. | Nyctaginaceae |
| Caimito | *Chrysophyllum* spp. | Sapotaceae |
| Caimito; C. de montaña | *Rheedia edulis* Tr. & Pl. | Guttiferae |
| Calabash, Black | *Enallagma cucurbitina* (L.) Baill. | Bignoniaceae |
| Calabash tree | *Crescentia Cujete* L. | Bignoniaceae |
| Camaca | *Ardisia compressa* H. B. K. | Myrsinaceae |
| Candelillo | *Cassia spectabilis* DC. | Leguminosae |
| Candelillo | *Rondeletia Deamii* (Donn. Smith) Standl. | Rubiaceae |
| Canelito | *Alchornea latifolia* Sw. | Euphorbiaceae |
| Caoba | *Swietenia macrophylla* King | Meliaceae |
| Capiroto | *Conostegia xalapensis* (Bonpl.) Don | Melastomaceae |
| Capulín | *Belotia Campbellii* Sprague | Tiliaceae |
| Capulín; C. negro | *Trema micrantha* (L.) Blume | Ulmaceae |
| Carao | *Cassia grandis* L. f. | Leguminosae |
| Carbón | *Matayba glaberrima* Radlk. | Sapindaceae |
| Carbón | *Guarea* spp. | Meliaceae |
| Carbón | *Tetragastris Stevensonii* Standl. | Burseraceae |
| Carne asada | *Cordia ferruginea* (Lam.) R. & S. | Boraginaceae |
| Cascarilián | *Croton glabellus* L. | Euphorbiaceae |
| Casco de venado | *Baubinia divaricata* L. | Leguminosae |
| Cashew | *Anacardium occidentale* L. | Anacardiaceae |
| Castaño | *Sterculia apetala* (Jacq.) Karst. | Sterculiaceae |
| Caulote | *Gazuma ulmifolia* Lam. | Sterculiaceae |
| Caulote | *Luehea Seemannii* Tr. & Pl. | Tiliaceae |
| Caulote blanco | *Luehea candida* (DC). Mart. | Tiliaceae |
| Cedar, Spanish | *Cedrela mexicana* Roem. | Meliaceae |
| Cedrillo | *Zanthoxylum procerum* Donn. Smith | Rutaceae |
| Cedro | *Cedrela* spp. | Meliaceae |
| Cedro | *Podocarpus* sp. | Taxaceae |
| Cedro espino | *Bombacopsis Fendleri* (Seem.) Pittier | Bombacaceae |
| Cedro espino | *Zanthoxylum Kellermanii* P. Wils. | Rutaceae |
| Cedro negro | *Juglans* sp. | Juglandaceae |
| Ceiba | *Ceiba pentandra* (L.) Gaertn. | Bombacaceae |
| Cenizo | *Miconia argentea* (Sw.) DC. | Melastomaceae |
| Cera vegetal | *Myrica mexicana* Willd. | Myricaceae |
| Chachalaco | *Cordia* spp. | Boraginaceae |
| Chanchito | *Tabernaemontana citrifolia* L. | Apocynaceae |
| Chaparro | *Curatella americana* L. | Dilleniaceae |
| Chapel | *Lonchocharpus guatemalensis* Benth. | Leguminosae |

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| Chaperno | *Aspidosperma megalocarpon* Muell. | Apocynaceae |
| Chaperno | *Lonchocharpus atropurpureus* Benth. | Leguminosae |
| Chichicaste | *Urera* spp. | Urticaceae |
| Chichicaste | *Wigandia caracasana* H. B. K. | Hernandiaceae |
| Chichicastillo | *Myriocarpa yzabalensis* (Donn. Smith) Killip. | Urticaceae |
| Chichipate | *Sweetia panamensis* Benth. | Leguminosae |
| Chilca | *Podocarpus* sp. | Taxaceae |
| Chilca | *Thevetia peruviana* (Pers.) Schum. | Apocynaceae |
| Chilillo | *Amyris elemifera* L. | Rutaceae |
| Chinaberry | *Melia Azedarach* L. | Meliaceae |
| Chinacuite | *Bursera Simaruba* (L.) Sarg. | Burseraceae |
| Chincho | *Zanthoxylum Fagara* (L.) Sarg. | Rutaceae |
| Chino | *Bursera Simaruba* (L.) Sarg. | Burseraceae |
| Chocomico | *Ximenia americana* L. | Olacaceae |
| Cidra | *Citrus medica* L. | Rutaceae |
| Cincho | *Lonchocarpus* spp. | Leguminosae |
| Ciprés | *Cupressus Benthamii* Endl. | Pinaceae |
| Ciruela | *Spondias purpurea* L. | Anacardiaceae |
| Ciruelillo | *Astronium graveolens* Jacq. | Anacardiaceae |
| Citron | *Citrus medica* L. | Rutaceae |
| Clavillo | *Hamelia Rovirosae* Wernham | Rubiaceae |
| Coco | *Cocos nucifera* L. | Palmaceae |
| Coco mamá | *Quararibea Fieldii* Millsp. | Bombacaceae |
| Coconut | *Cocos nucifera* L. | Palmaceae |
| Coco-plum | *Chrysobalanus Icaco* L. | Rosaceae |
| Coffee | *Coffea arabica* L. | Rubiaceae |
| Cojón de burro; C. de mico | *Stemmadenia Donnell-Smithii* (Rose) Woodson | Apocynaceae |
| Cojón de mico | *Tabernaemontana* spp. | Apocynaceae |
| Cola de pavo | *Cupania glabra* Sw. | Sapindaceae |
| Coloradillo | *Hamelia* spp. | Rubiaceae |
| Comayagua | *Cassia biflora* L. | Leguminosae |
| Comida de culebra | *Casearia nitida* (L.) Jacq. | Flacourtiaceae |
| Con | *Perymenium strigillosum* (Rob. & Greenm.) Greenm. | Compositae |
| Concha de huevo | *Morinda panamensis* Seem. | Rubiaceae |
| Concha de indio | *Naucleopsis naga* Pittier | Moraceae |
| Copal | *Protium sessiliflorum* (Rose) Standl. | Burseraceae |
| Copón | *Bursera Simaruba* (L.) Sarg. | Burseraceae |
| Coral; Coralillo | *Hamelia patens* Jacq. | Rubiaceae |
| Cornezuelo | *Acacia Donnelliana* Safford | Leguminosae |
| Corozo | *Attalea cohune* Mart. | Palmaceae |
| Cortez | *Tabebuia* spp. | Bignoniaceae |
| Costilla de danto | *Acalypha diversifolia* Jacq. | Euphorbiaceae |
| Cotton-tree | *Ceiba pentandra* (L.) Gaertn. | Bombacaceae |



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|---|---|---|
| Cowee | *Pterocarpus belizensis* Standl. | Leguminosae |
| Coyol | *Acrocomia mexicana* Karw. | Palmaceae |
| Crabwood | *Carapa guianensis* Aubl. | Meliaceae |
| Crucetilla | *Randia armata* (Sw.) DC. | Rubiaceae |
| Cuajiniquil | *Inga punctata* Willd. | Leguminosae |
| Cucaracho | *Cornutia grandifolia* (S. & C.) Schauer. | Verbenaceae |
| Cucuyul | *Ardisia compressa* H. B. K. | Myrsinaceae |
| Curtidor | *Hieronyma alchorneoides* Allem. | Euphorbiaceae |
| Cutufume | *Lippia Kellermannii* Greenm. | Verbenaceae |
| Cuya | *Ardisia paschalis* Donn. Smith | Myrsinaceae |
| Dátil | *Phoenix dactylifera* L. | Palmaceae |
| Durazno | *Prunus Persica* (L.) Sieb. & Zucc. | Rosaceae |
| Encino | *Quercus* spp. | Fagaceae |
| Encino negro | *Quercus callosa* Benth. | Fagaceae |
| Escambrón | *Adelia triloba* (Muell. Arg.) Hemsl. | Euphorbiaceae |
| Escambrón | *Casearia aculeata* Jacq. | Flacourtiaceae |
| Espino blanco | *Acacia glomerosa* Benth. | Leguminosae |
| Espino de playa | *Acacia macracantha* H. & B. | Leguminosae |
| Fierrillo | *Eugenia guatemalensis* Donn. Smith | Myrtaceae |
| Flor azul | *Vitex Kuylenii* Standl. | Verbenaceae |
| Fontolo | *Protium sessiliflorum* (Rose) Standl. | Burseraceae |
| Friega-plato | *Solanum* spp. | Solanaceae |
| Frotón | *Protium sessiliflorum* (Rose) Standl. | Burseraceae |
| Fruta de danto | *Cynometra retusa* Britt. & Rose | Leguminosae |
| Fustic | *Chlorophora tinctoria* (L.) Gaud. | Moraceae |
| Granada | *Punica Granatum* L. | Punicaceae |
| Granadillo | *Dalbergia* spp. | Leguminosae |
| Granadillo | *Platymiscium polystachyum* Donn. Smith | Leguminosae |
| Grapefruit | *Citrus grandis* (L.) Osbeck | Rutaceae |
| Gravilea | *Grevillea robusta* Cunn. | Proteaceae |
| Guacamaya | *Delonix regia* (Boj.) Raf. | Leguminosae |
| Guacamayo | *Andira* sp. | Leguminosae |
| Guacamayo | *Caesalpinia pulcherrima* (L.) Sw. | Leguminosae |
| Guachipilín | *Diphysa robinioides* Benth. | Leguminosae |
| Guácimo | *Guazuma ulmifolia* Lam. | Sterculiaceae |
| Guácimo colorado | *Luehea Seemannii* Tr. & Pl. | Tiliaceae |
| Guamo | *Inga* spp. | Leguminosae |
| Guanábana | *Annona muricata* L. | Annonaceae |
| Guanacaste | *Enterolobium cyclocarpum* (Jacq.) Griseb. | Leguminosae |
| Guano | *Ochroma limonensis* Rowlee | Bombacaceae |
| Guapinol | *Hymenæa Courbaril* L. | Leguminosae |

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|---|---|---|
| Guarumo | *Cecropia* spp. | Moraceae |
| Guarumo de montaña | *Pourouma aspera* Trécul | Moraceae |
| Guatuso | *Hasseltia mexicana* (Gray) Standl. | Flacourtiaceae |
| Guava; Guayaba | *Psidium Guajava* L. | Myrtaceae |
| Guayaba agria | *Psidium Friedrichsthalianum* (Berg.) Niedenzu. | Myrtaceae |
| Guayabilla | *Psidium molle* Bertol. | Myrtaceae |
| Guayabo | *Terminalia Hayesii* Pittier? | Combretaceae |
| Guayacán | *Guaiacum* sp. | Zygophyllaceae |
| Guiliqueme | *Erythrina glauca* Willd. | Leguminosae |
| Higo; Higuero; Higuillo | *Ficus* spp. | Moraceae |
| Hogplum | *Spondias Mombin* L. | Anacardiaceae |
| Hoja blanca | *Solanum verbascifolium* L. | Solanaceae |
| Hoja tamal | *Hernandia guianensis* Aubl. | Hernandiaceae |
| Hormigo | *Platymiscium* spp. | Leguminosae |
| Horse-radish tree | *Moringa oleifera* Lam. | Moringaceae |
| Huele de noche | *Cestrum* spp. | Solanaceae |
| Huevo de gato | *Psidium molle* Bertol. | Myrtaceae |
| Hule | *Castilla elastica* Cerv. | Moraceae |
| Icaco | *Chrysobalanus Icaco* L. | Rosaceae |
| Indio desnudo | *Arbutus xalapensis* H. B. K. | Ericaceae |
| Indio desnudo | *Bursera Simaruba* (L.) Sarg. | Burseraceae |
| Irayol | *Gustavia integrifolia* Standl. | Lecythidaceae |
| Iscanal | *Acacia Donnelliana* Safford | Leguminosae |
| Isote | *Dracaena americana* Donn. Smith | Liliaceae |
| Isote | *Yucca elephantipes* Regel | Liliaceae |
| Jagua | *Genipa Caruto* H. B. K. | Rubiaceae |
| Jagüillo | *Gustavia integrifolia* Standl. | Lecythidaceae |
| Jazmín cimarrón | *Randia armata* (Sw.) DC. | Rubiaceae |
| Jicarillo | *Cochlospermum vitifolium* (Willd.) Spreng. | Cochlospermaceae |
| Jícaro | *Crescentia Cujete* L. | Bignoniaceae |
| Jiote | *Bursera Simaruba* (L.) Sarg. | Burseraceae |
| Jobo | *Spondias Mombin* L. | Anacardiaceae |
| Jocomico | *Protium sessiliflorum* (Rose) Standl. | Burseraceae |
| Jocote | *Spondias* spp. | Anacardiaceae |
| Jocote marañón | *Anacardium occidentale* L. | Anacardiaceae |
| Lagarto amarillo | *Zanthoxylum Kellermanii* P. Wils. | Rutaceae |
| Lancetilla | *Astrocarym cohune* (Wats.) Standl. | Palmaceae |
| Laurel; L. blanco | *Cordia alliodora* (R. & P.) Cham. | Boraginaceae |
| Laurel negro | *Cordia* spp. | Boraginaceae |
| Leche amarilla | *Symphonia globulifera* L. | Guttiferae |
| Lemon | *Citrus limonia* Osbeck | Rutaceae |
| Lián | *Croton glabellus* L. | Euphorbiaceae |



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|---|---|---|
| Lime; Limón | *Citrus aurantifolia* (Christm.) Swingle | Rutaceae |
| Limoncillo | *Trichilia havanensis* Jacq. | Meliaceae |
| Limón real | *Citrus limonia* Osbeck | Rutaceae |
| Liquidámbar | *Liquidambar styraciflua* L. | Hamamelidaceae |
| Lirio | *Alibertia edulis* (L. Rich.) A. Rich. | Rubiaceae |
| Logwood | *Haematoxylon campechianum* L. | Leguminosae |
| Loquat | *Eriobotrya japonica* Lindl. | Rosaceae |
| Macuelizo | *Tabebuia pentaphylla* (L.) Hemsl. | Bignoniaceae |
| Madera negra; Madre de cacao; Madriado; Madrial | *Gliricidia sepium* (Jacq.) Steud. | Leguminosae |
| Madroño | *Calycophyllum candidissimum* (Vahl) DC. | Rubiaceae |
| Mahogany | *Swietenia macrophylla* King | Meliaceae |
| Majagua | *Hibiscus tiliaceus* L. | Malvaceae |
| Majaine | *Swietenia macrophylla* King | Meliaceae |
| Majao; M. colorado | *Hampea stipitata* Wats. | Bombacaceae |
| Majao | *Heliocarpus* spp. | Tiliaceae |
| Majao | *Hibiscus tiliaceus* L. | Malvaceae |
| Majao blanco | *Heliocarpus glanduliferus* Rob. | Tiliaceae |
| Majao de indio | *Naucleopsis naga* Pittier | Moraceae |
| Mecate de agua | *Heliocarpus appendiculatus* Turcz. | Tiliaceae |
| Membrillo | *Cydonia oblonga* Mill. | Rosaceae |
| Membrillo | *Terminalia Hayesii* Pittier? | Combretaceae |
| Manaca | *Attalea cohune* Mart. | Palmaceae |
| Mango | *Mangifera indica* L. | Anacardiaceae |
| Mangle | *Rhizophora Mangle* L. | Rhizophoraceae |
| Mangle blanco | *Laguncularia racemosa* (L.) Gaertn. | Combretaceae |
| Mangle colorado; Mangrove | *Rhizophora Mangle* L. | Rhizophoraceae |
| Mangrove, Black | *Avicennia nitida* Jacq. | Verbenaceae |
| Mano de león | *Hernandia guianensis* Aubl. | Hernandiaceae |
| Mano de león | *Oreopanax Salvinii* Hemsl. | Araliaceae |
| Manteca | *Celtis Hottlei* Standl. | Ulmaceae |
| Manteca | *Tetrorchidium rotundatum* Standl. | Euphorbiaceae |
| Manzana | *Eugenia Jambos* L. | Myrtaceae |
| Manzana | *Malus sylvestris* Mill. | Rosaceae |
| Manzanilla | *Ximenia americana* L. | Olacaceae |
| Marañón | *Anacardium occidentale* L. | Anacardiaceae |
| María | *Calophyllum Rekoi* Standl. | Guttiferae |
| Masica | *Brosimum terrabanum* Pittier | Moraceae |
| Masicarán | *Astronium graveolens* Jacq. | Anacardiaceae |
| Masicarán or Masicarón | *Brosimum costaricanum* Liebm. | Moraceae |
| Masicarán | *Tabebuia chrysantha* (Jacq.) Nichols. | Bignoniaceae |

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|---|---|---|
| Matapalo | *Coussapoa panamensis* Pittier | Moraceae |
| Matapalo | *Ficus* spp. | Moraceae |
| Mata piojo | *Machaerium latifolium* (Benth.) Pittier | Leguminosae |
| Matarro | *Piper auritum* H. B. K. | Piperaceae |
| Matasano | *Casimiroa tetrameria* Millsp. | Rutaceae |
| Mayamaya | *Pithecolobium* spp. | Leguminosae |
| Mazapán | *Artocarpus communis* Forst. | Moraceae |
| Mora | *Chaetoptelea mexicana* Liebm. | Ulmaceae |
| Mora | *Chlorophora tinctoria* (L.) Gaud. | Moraceae |
| Morera | *Morus multicaulis* Perr. | Moraceae |
| Morro | *Crescentia Cujete* L. | Bignoniaceae |
| Munzap | *Couepia dodecandra* (DC.) Hemsl. | Rosaceae |
| Nance; Nancito | *Byrsonima crassifolia* (L.) DC. | Malpighiaceae |
| Naranja; N. dulce | *Citrus sinensis* Osbeck | Rutaceae |
| Naranja ácida | *Citrus Aurantium* L. | Rutaceae |
| Naranjillo | *Swartzia darienensis* Pittier | Leguminosae |
| Negrito | *Simaruba glauca* DC. | Simarubaceae |
| Níspero | *Eriobotrya japonica* Lindl. | Rosaceae |
| Nogal | *Juglans* sp. | Juglandaceae |
| Ocote | *Pinus* spp. | Pinaceae |
| Olivo | *Capparis* sp. | Capparidaceae |
| Orange, Sweet | *Citrus sinensis* Osbeck | Rutaceae |
| Orange, Sour | *Citrus Aurantium* L. | Rutaceae |
| Oreja de burro | *Clusia Salvinii* Donn. Smith | Guttiferae |
| Pacaya | *Chamaedorea* spp. | Palmaceae |
| Pacuca | *Geonoma binervia* Oerst. | Palmaceae |
| Pacuquilla | *Geonoma* spp. | Palmaceae |
| Palacio | *Zuelania Roussoviae* Pittier | Flacourtiaceae |
| Palanco | *Sapranthus campechianus* (H. B. K.) Standl. | Annonaceae |
| Palanco | *Xylopia frutescens* Aubl. | Annonaceae |
| Paleta | *Dialium divaricatum* Vahl | Leguminosae |
| Palm, Cohune | *Attalea cohune* Mart. | Palmaceae |
| Palm, Date | *Phoenix dactylifera* L. | Palmaceae |
| Palmiche | *Iriartea durissima* Oerst. | Palmaceae |
| Palm, Wine | *Acrocomia mexicana* Karw. | Palmaceae |
| Palo brasil | *Haematoxylon campechianum* L. | Leguminosae |
| Palo chino | *Bursera Simaruba* (L.) Sarg. | Burseraceae |
| Palo de agua | *Gilibertia stenocarpa* Donn. Smith | Araliaceae |
| Palo de María | *Calophyllum Rekoi* Standl. | Guttiferae |
| Palo de pan | *Artocarpus communis* Forst. | Moraceae |
| Palo de sal | *Avicennia nitida* Jacq. | Verbenaceae |
| Palo mulato | *Bursera Simaruba* (L.) Sarg. | Burseraceae |
| Palo negro | *Dalbergia* cf. *lineata* Pittier | Leguminosae |
| Palo obero | *Astronium graveolens* Jacq. | Anacardiaceae |
| Papaturro | *Coccoloba uvifera* (L.) Jacq. | Polygonaceae |
| Papaya | *Carica Papaya* L. | Caricaceae |



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|---|---|---|
| Paraíso | *Melia Azedarach* L. | Meliaceae |
| Pascua | *Euphorbia pulcherrima* Willd. | Euphorbiaceae |
| Pasta | *Hirtella* spp. | Rosaceae |
| Paterno | *Swartzia panamensis* Benth. | Leguminosae |
| Peach | *Prunus Persica* (L.) Sieb. & Zucc. | Rosaceae |
| Pear | *Pyrus communis* L. | Rosaceae |
| Pela nariz | *Croton* sp. | Euphorbiaceae |
| Pera | *Pyrus communis* L. | Rosaceae |
| Pinavete | *Pinus* spp. | Pinaceae |
| Pine, Cuban | *Pinus caribæa* Morelet | Pinaceae |
| Pino | *Abies religiosa* (H. B. K.) S. & C. | Pinaceae |
| Pino | *Casuarina equisetifolia* L. | Casuarinaceae |
| Pino blanco | *Pinus oöcarpa* Schiede | Pinaceae |
| Piñón | *Jatropha* Curcas L. | Euphorbiaceae |
| Pino ocote | *Pinus caribæa* Morelet | Pinaceae |
| Pimenta gorda | *Pimenta officinalis* Lindl. | Myrtaceae |
| Pimienta | *Amyris elemifera* L. | Rutaceae |
| Pito | *Erythrina* spp. | Leguminosae |
| Plumajillo | *Schizolobium parahybum* (Vell.) Blake | Leguminosae |
| Plum, Spanish | *Spondias purpurea* L. | Anacardiaceae |
| Poinciana | *Delonix regia* (Boj.) Raf. | Leguminosae |
| Poinsettia | *Euphorbia pulcherrima* Willd. | Euphorbiaceae |
| Pomegranate | *Punica granatum* L. | Punicaceae |
| Provision tree | *Pachira aquatica* Aubl. | Bombacaceae |
| Putunín | *Eupatorium albicaule* Sch. Bip. | Compositae |
| Quebracho | *Lysiloma acapulcense* Benth. | Leguminosae |
| Quebracho | *Tabebuia chrysantha* (Jacq.) Nichols. | Bignoniaceae |
| Quebracho de cerro | *Diphysa robinioides* Benth. | Leguminosae |
| Quesillo | *Malvaviscus grandiflorus* H. B. K. | Malvaceae |
| Quince | *Cydonia oblonga* Mill. | Rosaceae |
| Rabo de león | *Coccoloba acuminata* H. B. K. | Polygonaceae |
| Raintree | *Pithecolobium Saman* (Jacq.) Benth. | Leguminosae |
| Ramón | *Trophis racemosa* (L.) Urban | Moraceae |
| Roble | *Quercus* spp. | Fagaceae |
| Roble blanco | *Tabebuia pentaphylla* (L.) Hemsl. | Bignoniaceae |
| Ronrón | *Astronium graveolens* Jacq. | Anacardiaceae |
| Rose-apple | *Eugenia Jambos* L. | Myrtaceae |
| Rosewood | *Dalbergia cubilquitzensis* (Donn. Smith) Pittier | Leguminosae |
| Rubber tree | *Castilla elastica* Cerv. | Moraceae |
| Sandbox | *Hura crepitans* L. | Euphorbiaceae |
| Sangre | *Compsoneura Sprucei* (A. DC.) Warb. | Myristicaceae |
| Sangre | *Pterocarpus belizensis* Standl. | Leguminosae |
| Sangre | *Virola* spp. | Myristicaceae |
| Sangre blanco | *Nectandra globosa* (Aubl.) Mez. | Lauraceae |

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| Sangre de playa | *Zuelania Roussoviae* Pittier | Flacourtiaceae |
| San Juan | *Tabebuia Donnell-Smithii* Rose | Bignoniaceae |
| San Juan | *Vochysia hondurensis* Sprague | Vochysiaceae |
| San Ramón | *Tropbis racemosa* (L.) Urban | Moraceae |
| Santa María | *Calophyllum Rekoi* Standl. | Guttiferae |
| Santa Rosa | *Caesalpinia pulcherrima* (L.) Sw. | Leguminosae |
| Sapocillo | *Saurauia villosa* DC. | Actinidiaceae |
| Sardinillo | *Tecoma stans* (L.) H. B. K. | Bignoniaceae |
| Sauco | *Sambucus mexicana* Presl | Caprifoliaceae |
| Sencuya | *Annona purpurea* Moc. & Sessé | Annonaceae |
| Silión | *Lucuma izabalensis* Standl. | Sapotaceae |
| Silk-oak | *Grevillea robusta* Cunn. | Proteaceae |
| Sirín | *Conostegia xalapensis* (Bonpl.) Don | Melastomaceae |
| Sirín | *Miconia* spp. | Melastomaceae |
| Sirín blanco | *Miconia Schlimii* Triana | Melastomaceae |
| Sirín de paloma | *Belotia Campbellii* Sprague | Tiliaceae |
| Sirinón | *Miconia argentea* (Sw.) DC. | Melastomaceae |
| Sombra de armado | *Casearia sylvestris* Sw. | Flacourtiaceae |
| Sombra de armado | *Schoepfia Schreberi* Gmel. | Olacaceae |
| Sombra de ternero | *Cordia nitida* Vahl | Boraginaceae |
| Soursop | *Annona muricata* L. | Annonaceae |
| Star-apple | *Chrysophyllum Cainito* L. | Sapotaceae |
| Sunzapote | *Licania platypus* (Hemsl.) Fritsch | Rosaceae |
| Tallow-wood | *Ximenia americana* L. | Olacaceae |
| Tamarind | *Tamarindus indica* L. | Leguminosae |
| Tamarindo; T. prieto | *Dialium divaricatum* Vahl | Leguminosae |
| Tamarindo | *Tamarindus indica* L. | Leguminosae |
| Tambor | *Hernandia guianensis* Aubl. | Hernandiaceae |
| Tambor | *Schizolobium parahybum* (Vell.) Blake | Leguminosae |
| Tango | *Zollernia tango* Standl. | Leguminosae |
| Tapatamal | *Coccoloba acuminata* H. B. K. | Polygonaceae |
| Taray | *Amyris elemifera L.* | Rutaceae |
| Tigüilote | *Cordia* spp. | Boraginaceae |
| Tiñe anzuelo | *Eupatorium Pittieri* Klatt | Compositae |
| Tiñe cordel | *Eupatorium albicaule* Sch. Bip. | Compositae |
| Tinta | *Haematoxylon campechianum* L. | Leguminosae |
| Tolondrón | *Coccoloba Browniana* Standl. | Polygonaceae |
| Toronja | *Citrus grandis* (L.) Osbeck | Rutaceae |
| Ule | *Castilla elastica* Cerv. | Moraceae |
| Urraco | *Licania platypus* (Hemsl.) Fritsch | Rosaceae |
| Uva | *Coccoloba* spp. | Polygonaceae |
| Uva | *Conostegia xalapensis* (Bonpl.) Don | Melastomaceae |
| Uva de la playa | *Coccoloba uvif.ra* (L.) Jacq. | Polygonaceae |
| Uva de montaña | *Ardisia amplifolia* Standl. | Myrsinaceae |



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|---|---|---|
| Uva de monte | *Ardisia amplifolia* Standl. | Myrsinaceae |
| Vara blanca | *Aegiphila fasciculata* Donn. Smith | Verbenaceae |
| Yagua | *Oreodoxa oleracea* Mart. | Palmaceae |
| Zapote | *Calocarpum mammosum* (L.) Pierre | Sapotaceae |
| Zapotillo | *Achras chicle* Pittier | Sapotaceae |
| Zapotillo | *Calocarpum viride* Pittier | Sapotaceae |
| Zapotillo | *Couepia dodecandra* (DC.) Hemsl. | Rosaceae |
| Zapotillo | *Labatia Standleyana* Pittier | Sapotaceae |
| Zapotillo | *Saurauia villosa* DC. | Actinidiaceae |
| Zapotón | *Pachira aquatica* Aubl. | Bombacaceae |
| Zopilote | *Cornutia grandifolia* (S. & C.) Schauer | Verbenaceae |
| Zorra | *Alvaradoa amorphoides* Liebm. | Simarubaceae |
| Zorra | *Schizolobium parahybum* (Vell.) Blake | Leguminosae |

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**The influence of forests on climate and water supply in Kenya.** By J. W. Nicholson and A. Walter. Forest Dept. Pamphlet No. 2, Narobi. Pp. 40; 6 x 9½.

### Conclusions

1. "There are certain regions of the world, which include at least parts of Kenya and Uganda, where the total rainfall is likely to be affected by changes in the covering of vegetation not only appreciably but possibly enormously."

2. "In East Africa, trees and deep-rooted shrubs contribute more moisture to the air than herbaceous vegetation or bare soil and they are therefore more likely to influence rainfall than the latter type of vegetation."

3. "Under favorable circumstances mountain forests in East Africa can induce occult precipitation up to at least 25 per cent of the total annual rainfall."

4. "Forests have little or no influence on cyclonic rain and that problem does not concern Kenya."

5. "In the case of monsoon rainfall the local effect of forests on rainfall is limited to a maximum of about 3 per cent, but the regional effect may be far greater."

6. "Wherever meteorological conditions in East Africa are favorable to the production of instability rain, the possibility and quantity of such rain is greatly increased by the presence of forests."

## CURRENT LITERATURE

**The coconut palm, *Cocos nucifera*.** By JOHN K. SMALL. *Journ. N. Y. Bot. Garden* 30: 153–161, 194–203, 1929. Illustrated.

This paper is largely concerned with the planting and cultivation of Coconut Palm in Florida, but the introductory part on early history is of general interest because of the evidence presented regarding the origin of this plant. "There seems to be no evidence pointing to the probability of American origin, except that based on the supposition that its closest relatives were American. . . . The argument that *Cocos nucifera* must be American because the palms most closely related to it are American, is shown by Beccari to be incorrect. This eminent authority shows that *Cocos nucifera* is to be regarded as monotypic, more closely related to *Jubaeopsis caffra*, of southern Africa, than to any of the so-called *Cocos* species of South America, all of which he has separated from the genus *Cocos* into other genera; and one of the most convincing arguments of all is the fact that the robber crab, *Birgus Latro*, which is especially adapted for feeding upon the Coconut, is associated with it nearly throughout its range in the Pacific, while it is quite absent from America."

**Trinidad and Tobago. Administration report of the Conservator of Forests for the year 1928.** By R. C. MARSHALL. Port-of-Spain, 1929. Pp. 20; 8¼ x 13.

The first 2½ pages of this report are devoted to a consideration of the fuelwood and charcoal situation, which is becoming serious, particularly in the case of Port-of-Spain, because of the diminution of available forests. The main source of firewood is Mangrove, and between 5000 and 6000 cords are required annually in Port-of-Spain; most of this is supplied by trees of barely 6 inches girth, although larger sizes are preferred.

"The silvicultural research work which has been carried out on Cedar [*Cedrela*] took an interesting development during the year, in that the problem transferred itself from obtaining good results in the first year, to maintaining these results during succeeding years. As far as choice of site is concerned the three prime factors are sloping land with good natural drainage, a good soil, and adequate protection from the wind. Given these factors and sufficient overhead light—the more the better—then, providing no unforseen factors interfere with the germination of the seed, direct-sowing normally gives good healthy plants at the end of the first season. But so far real success has not been obtained in maintaining the satisfactory growth and health of the crop. There is all too often a tendency for the crop—whether obtained by sowing or planting—to 'go back' in the succeeding years. This is usually associated with the invasion of the plot with grass and weeds. Attention has therefore been directed to soil conditions, in the belief that if means could be devised to keep the soil in good order the desired results would follow.

"The natural forest keeps its forest floor in good condition free from grass. But Cedar will not regenerate under the shade of the forest. And yet when one removes the forest cover soil conditions promptly go wrong. As far as Cedar is concerned therefore, it seems that to keep the soil in good condition we need a good cover crop under the Cedar."

"*Hypsipyla grandella*, the shoot-borer of Cedar, Mahogany, and Crappo, continued its depredations. Towards the end of the year Dr. J. G. Myers, of the Imperial Bureau of Entomology, arrived in the Colony for a tour of duty in the West Indies in connection with the biological control of insect pests. Among other matters this officer has interested himself in the problem of *Hypsipyla*. The discovery of a voracious parasite which will feed on *Hypsipyla* would make a big difference in the growing of the meliaceous species which at present suffer so much from it."



**Studies of American plants. I, II.** By PAUL C. STANDLEY. Field Museum of Natural History (Chicago) Pub. 264, Bot. Ser. 4: 8: 197–345, Oct. 24, 1929.

Part I (pp. 195–299) is "occupied primarily with descriptions of new species of Mexican and Central American plants, recognized in collections received for determination, chiefly from Prof. Samuel J. Record of the School of Forestry, Yale

University, and Associate in Wood Technology in Field Museum.

"The most important of these collections is one made by Mr. G. Proctor Cooper in the winter of 1927–28 in the general region of Almirante, Panama. Mr. Cooper collected a few numbers, also, about Permé, on the San Blas Coast of Panama.[1] His collection is the most interesting that the writer ever has received for study. It consists chiefly of trees, the plants most difficult to collect, and the ones which receive least attention from most collectors. It is not surprising, therefore, that the Cooper collection should contain so large a number of undescribed species, especially since it comes from localities in which little or no botanical work had been done previously. It contains representatives of one family and of several genera unknown previously from Central America, and of two genera which appear to be undescribed.

"This Panama collection emphasizes the remarkable wealth of the Panama flora, and proves that it still needs further exploration. A few of the Cooper collections, although in fairly good condition, still baffle determination, and evidently represent plants of great interest. The value of the collection is enhanced by the fact that wood was obtained from many of the trees. The Panama expedition was organized by the School of Forestry of Yale University, and also supported by the New York Botanical Garden and Field Museum. A set of the specimens is deposited in each of these institutions, and duplicates have been distributed to other herbaria.

"Another important Central American collection received through Professor Record is one consisting of several hundred numbers made on the eastern coast of Nicaragua in the region of Bragman's Bluff by F. C. Englesing.[2] Nicaragua is

[1] See *Tropical Woods* 16: 1–37, Dec. 1, 1928. The name originally proposed by Standley for Cooper's No. 634 (Yale No. 12267) from Permé was *Perebea laevigata* (see bottom page 36), but this has been changed by him to *Perebea glabrata*. The determination of Cooper & Slater's No. 102 (Yale No. 10283) from Changuinola Valley (see p. 11) has been changed from *Rollinia Pittieri* Safford to *R. microsepala* Standl., sp. nov.—S. J. R.

[2] See *Tropical Woods* 17: 18–38, March 1, 1929.—S. J. R.



at present perhaps the least known botanically of the Central American countries, and no collections, at least none of any considerable size, have ever been made near the Atlantic coast, except along the San Juan River.

"Mr. Englesing's series is too small to give a comprehensive idea of the flora of the region, but in general it indicates, as would be expected, a flora similar to that of the northern coast of Honduras. It includes a substantial number of interesting new species, some of which already have been published by the writer in *Tropical Woods*.

"The value of Mr. Englesing's specimens is increased by the copious notes which accompany many of them. These include information regarding habitat, vernacular names, associated plants, size, color descriptions, and economic data. If all collectors would supply similar data, botanical knowledge would advance rapidly."

"In the present paper there are described numerous new species contained in a large collection of plants made by Mrs. Ynes Mexia in the states of Jalisco and Nayarit, Mexico. This is one of the most important and valuable series obtained in Mexico in recent years. It comes from localities previously unexplored, for Mrs. Mexia did not confine her activities to the usual fields along railway lines. Most of the species based upon her collections are strikingly distinct. Dr. S. F. Blake already has described several new Compositae from the same collection, and Dr. B. L. Robinson has dedicated to Mrs. Mexia a genus of the same family, *Mexianthus*.

"Besides the descriptions of new species, there are included here new nomenclatorial combinations which are necessary under the International Rules. Most of these are made for the purpose of bringing the nomenclature of the 'Trees and Shrubs of Mexico' (volume 23 of the Contributions from U. S. National Herbarium) into conformity with those rules."

Part II (pp. 301–345) "consists almost wholly of descriptions of new species of trees and shrubs from tropical America. About half of the plants described as new belong to the family Rubiaceae, and represent a partial result of the writer's recent studies in this group, preparatory to a monographic treatment of the Rubiaceae native in western South America.

"Most of the plants of other families described here are from Honduras, and were collected by the writer during a visit to the northern coast of that country in the winter of 1928–29. The flora of the lowlands of Honduras does not appear to be so interesting or so varied as that of Costa Rica or Panama, but in view of the fact that scarcely any botanical collecting had been done there previously, it was to be expected that a substantial number of new species would appear in the collection."

**British Honduras. Annual report of the Forest Trust for the year ended 31st March 1928.** By J. N. OLIPHANT. Belize, 1929. Pp. 17; 8 x 13¼.

The silvicultural work of "improving" seedling and saplings of Mahogany and certain other species has been continued and extended. More than 21 million super. ft. of Mahogany, valued at $2,000,000, and about ¾ million ft. of Cedar, worth nearly $52,000, were exported from the Colony in 1927. The value of these two woods (domestic origin) slightly exceeded 80 per cent of the total value of all classes of exports. The re-exports of Mahogany were over 3½ million ft. "There is more cause for anxiety with regard to the supply [of Mahogany] than to the future demand, and the vital need of railway communication to take supplies near and across the border is becoming more and more evident."

The export of chicle gum of domestic origin was 460,000 lbs., worth about $206,000, while the re-exports amounted to over 2½ million lbs., valued at $1,216,000. "The continued exploitation of Crown gum promises some extension of life to the chicle industry, and the investigations of the Tropical Plant Research Foundation [for the Chicle Development Company] into conservative tapping methods and the extraction of chicle substitutes from species other than *Achras zapota* can hardly fail to yield results of practical commercial value."

A tabular classification of land areas of the Colony, including cayes but excluding open lagoons and rivers, may be summarized as follows: Private lands, 2,793,756 acres. Crown lands: leased, 62,088 acres; forest, 2,646,876 acres. Total area, 5,502,720 acres.



**La question forestière dans la République Argentine.** By M. NOVERRAZ. *Journ. Forestière Suisse* 80: 3: 57–59, March 1929.

Although about 38 per cent, or 417,000 square miles, of the total area of Argentina is classed as forest or woodland, the value of the imports of wood and paper is more than three times that of the exports of forest products. Of the latter about 95 per cent is represented by Quebracho extract and wood for tanning purposes. There are various factors contributing to this situation. Though the wooded areas are of vast extent, commercial timber is scattered and generally inaccessible for want of transportation facilities. The forests which are accessible have been badly depleted through irrational exploitation, while high freight rates make it difficult for native timber to compete with imported lumber.

The first forestry legislation dates back to 1807 when measures were taken to protect the forests in the vicinity of the capital. It was not until 1906 that a general law was enacted to regulate the exploitation of forests and other vegetation. The application of the law was beset with many difficulties, but in 1911 the Forest Service of Department of Agriculture began to function in a practical manner and established research stations and forest nurseries to provide trees suitable for planting in the different provinces. Information regarding planting and care of forests was printed and distributed to all who were interested.

The Argentine Forestry Association is now actively engaged in promoting forestry in the Republic and has held two conventions, the first devoted largely to arboriculture, the second (October 2–6, 1928) dealing with strictly forest problems. The different phases of the work considered are as follows:

1. Forest legislation.
2. Commerce and industry.
3. Technical forestry matters.
4. Studies of forestry in foreign countries.
5. Forest pathology and climatology.
6. Forest education, research stations, nurseries, etc.

The convention recommended the enactment of

estry legislation adapted to conditions as they now exist, involving the creation of a Forest Service with a competent technical staff and establishment of a forestry school and schools for training forest guards. One of the first tasks of fundamental importance is the preparation of a map showing the location of the different forest types, their composition and commercial possibilities. The task ahead is large and difficult, but it is being faced with understanding of its importance to the national welfare.

**Recent travels through parts of western Brazil and eastern Bolivia.** By D. Bourke-Borrowes. *Empire Forestry Journal* 8: 60–70, 1929. Illustrated.

"Matto Grosso has an area of about 550,000 square miles, and a population of 279,000; it is a new country in every way, and in the northern half of the province vast areas are as yet completely unexplored. The country consists mostly of dense tropical forests and scrub lands, varied with rolling pastures. The main industry is cattle-ranching and next to this lumbering, agriculture, and mining. . . .

"Since the arrival of the railway a good deal of lumbering has been developed along the line and a few of the best kinds of hardwood are being regularly exported to São Paulo and other towns. In the extreme south-west of the province, that is, in the tracts bordering on the Paraguay River, there is great potential forest wealth, including Quebracho. Some local exploitation is carried on; the timber and fence posts, for which there is great demand in the Argentine and Uruguay, being carted to the river-side in high-wheeled carts and loaded into river steamers for despatch southwards. But, as yet, there is no real organized lumbering."

"Eastern Bolivia proper has an area about the size of the British Isles and lies approximately between 14° and 19° latitudes south. . . . The general configuration is flat or gently rolling, broken at wide intervals by forest-clad ranges of hills. It is probable that at least 60 per cent of the area is occupied by dense high forests, locally known as 'monte alto,' while the remaining 40 per cent or so is classed as 'campo.' The high forests grow almost entirely on loamy soils.



On sandy soils the forest is replaced by campo, whose vegetation is of very variable composition, thin open palm forests, for example, or scattered mixed forests of palms, trees, and shrubs, or various types of scrub forests, or stretches of grass lands. All continuous tracts of campo are taken up by the local people for cattle ranching, but owing to the scrubby nature of such lands most of the grazing is of very poor quality."

"The agriculture practised is of a most primitive description. It is in fact the shifting cultivation so widely spread over parts of Asia. The best stands of timber are felled, spread, and burnt during the dry weather. The cultivators then plant or dibble in sugar cane, mandioca, rice, and maize in the ashes. Vegetables are hardly ever cultivated. For working the soil the agriculturists use a long-handled spade. Ploughing and other such operations are unknown. The virgin forest soils yield bountiful crops and after cropping the land for one to three years the farmer moves on to an adjoining block of forest. This is called locally 'chakra.' . . .

"The general composition of the high forest is regular. The lower story consists of a dense thicket of bushes, shrubs, and creepers, forming in most places an impenetrable wall of thorny vegetation, which is chiefly evergreen and partly deciduous. Above this is an upper story of trees, largely deciduous. The general level of the forest canopy is about 50 feet. Fine belts of timber with trees up to 100 feet high are sometimes found, but on the average the timber is of medium size only. The number of species is simply amazing, especially as regards the bushes, shrubs, and creepers, and it is probable that there are numbers of useful vegetable products to be found in these forests as yet unknown to science. It is very noticeable how many of the older Bolivian Indians are herbalists, employing a great number of local remedies, gathered in these forests.

"Two features catch the eye—firstly, the beauty and variety of the orchids and other parasitic plants, and secondly, the wealth and size of the cactuses, many of which are as big as small forest trees and develop regular boles, often several feet in circumference. At present these forests are only exploited

to a very small extent for local use, although they are known to contain a great variety of excellent hard and medium timbers."

"Immediately south of Eastern Bolivia proper is situated what is generally known as the Bolivian-Paraguayan Chaco. This is a great triangular area, 500 to 600 miles from north to south. . . . The northern portion of this triangle is a veritable 'no man's land.' In this no man's land conditions are different to Eastern Bolivia proper. The country is undulating and the uplands are covered with long irregular 'islands' or zones of dense high forests. The vegetation in the lowlands and depressions is of varying character, such as palm forests or mixed scrub and palm forests. Water as usual is very scarce during the dry weather, but there are a few perennial streams where good grazing is obtainable. The tract is practically unexplored and contains no inhabitants save the usual wild Indian tribes, who have hardly ever come into contact with the outside world. . . .

"Here the most important and widely distributed tree is the one known locally as 'Quebracho colorado,' believed to be a completely new species of *Schinopsis*. It is a fine upstanding forest tree with a well-developed bole—specimens up to 70 feet high are common. The timber has the usual external characteristics of Quebracho timber and contains tannin.

"In the remaining portion of the Chaco, which is under the direct control of the Paraguayan Government, great economic developments have taken place in the last twenty years or so. A considerable proportion of the area has been explored and taken up by various companies and private owners and extensive tannin-extract and ranching industries have been developed.

"The Quebracho tree of this region, which produces the extract, is the *Schinopsis Balansae*, known locally as 'la hembra' (the female). This tree also grows extensively in western Brazil in association with *Schinopsis brasiliensis*, but is much less common than the latter. It has considerable external resemblance to Quebracho colorado, but is smaller and less beautiful. The timber has a high tannin content of 22 to 24 per cent."



**Maté: an important Brazilian product.** By C. R. CAMERON. *Bull. Pan American Union* (Washington, D. C.) 63: 10: 988–1005, Oct. 1929.

An interesting, well-illustrated account of an important forest industry of southern Brazil. Maté is the name given to the dried leaves of species of *Ilex*, principally *I. paraguarensis*, from which is prepared an infusion similar to that made from the ordinary tea of China. It is estimated that between 10 and 15 million South Americans use it, and active propaganda has been undertaken to increase the industry and develop trade overseas. Maté ranked fourth in value of Brazilian exports in 1928.

**A exploração do mate.** Monographia elaborada pelo Serviço de Inspecção e Fomento Agricolas, Min. da Agr., Ind. e Com., Rio de Janeiro, Brazil, 1929. Pp. 116; 6¾ x 10; illustrated.

A detailed account of the most valuable forest product of Brazil. The various species of *Ilex* producing Maté are listed, together with their vernacular names. There is a wealth of information regarding all phases of the industry, supplemented by tables and numerous interesting photographs.

**A exploração da castanha do Pará.** Monographia elaborada pelo Serviço de Inspecção e Fomento Agricolas, Min. da Agr., Ind. e Com., Rio de Janeiro, Brazil, 1929. Pp. 70; 7¼ x 10½; illustrated.

Castanhas do Pará, commonly known in English as Brazil nuts, are the produce of the Castanheira, *Bertholletia excelsa* H. B. K., one of the tallest trees of the Amazon forest. This monograph contains a full account of the Brazil-nut industry.

**A exploração da carnaúba.** Monographia elaborada pelo Serviço de Inspecção e Fomento Agricolas, Min. da Agr., Ind. e Com., Rio de Janeiro, Brazil, 1929. Pp. 44; 7¼ x 10¼; illustrated.

A full account of the Carnaúba Palm (*Copernicia cerifera*), including botanical description, distribution, cultivation, and the utilization of its various products, namely, wood, fiber, oil, and wax.

**Annual report of the Director of Forestry of the Philippine Islands for the fiscal year ended December 31, 1928.** By ARTHUR F. FISCHER. Manila, 1929. Pp. 280; 6 x 9.

"The refusal of the Supreme Court to review the adverse decision of the Federal Trade Commission on the Philippine Mahogany Case and the passage of new tariff laws in Australia increasing the duty on Philippine lumber were measures that, for a time at least, produced some discouragement among those interested in the lumber industry in the Islands. But despite these adverse measures, the demand for Philippine lumber abroad continues to increase. For instance, the total export for the year 1928 amounts to 85,897,736 board feet valued at 6,256,904 pesos as compared with 72,034,632 board feet valued at 5,580,003 pesos in 1927, or an increase of 19 per cent. . . .

"The tables indicate that the United States continues to be our biggest customer, absorbing more than twice as much as Japan, the second largest consumer of Philippine lumber. The United Kingdom and the Australian markets remain practically the same as in 1927, while China has resumed the position she used to occupy before civil war broke out."

"Summing up, it may be said that the year just passed was a good year, witnessing as it did an increase over the previous year of 32 per cent in the amount of timber brought to the sawmills; 18 per cent in actual lumber tally or mill production; 36 per cent in the amount of forest charges collected; 19 per cent in the amount of export; and 16 per cent in the consumption in the local markets."

"Collections of marine wood-borers causing the failure of the timbers along the waterfront were made and are being studied in the Bureau of Science. On the Manila waterfront, the principal cause of destruction of timbers is not teredo, but *Sphaeroma destructor* and *Martesia striata*. These bore into the wood in such great numbers that they reduce the diameter to such an extent that they cause the wood to fail. *Teredo* and, possibly, *Xylotrya* are also present, but these are of secondary importance as there are only very few of these found in structures that have failed in use. The durability test of 16 species of woods set at the Engineer Island and the



Quarantine Station at Mariveles, consisting of 16 blocks, 4 by 4 by 6 inches in size, were examined every three months and the condition recorded. Upon the completion of the latter test, the Bureau will have a more definite idea of the resistance of the more common woods against the marine wood borers in these localities. The durability of woods in contact with the water is not always the same, because of different borers found in waters of different salinity; thus a given wood might be resistant to *Teredo* and yet the same wood might be easily destroyed where *Sphaeroma* is prevalent. It is, therefore, necessary to test the durability of woods in the different parts of the Islands.

"The durability test of the different species of timbers sent by the Chrysler Sales Corporation has been inspected regularly every three months. A number of American woods in this test already show signs of decay, whereas none of the Philippine woods under the same conditions show signs of deterioration after a year's exposure to sunshine and rain. This verifies the result of studies conducted some few years ago on the durability of woods used in American-built cars. The Bureau brought to the attention of a number of automobile manufacturers in the United States the fact that the American woods used for framing automobile bodies easily deteriorate in the Philippines and that if their cars are expected to render good service in the Islands, more durable woods should be used, preferable those that have been tried here, namely, Guijo, Yakal, Narra, Tanguile, Lumbayau, etc."

**Progress of forest research in India, 1st April 1927 to 31st March 1928.** Calcutta, 1929. Pp. 207; 6¼ x 9½; illustrated. Price 8 s.

In silviculture, particular attention has been paid to the methods of sowing and planting important species; 1300 sample plots have been laid out in India and the number is steadily increasing.

Considerable progress has been made in the identification of plants from the forests of Burma, esp. Tenasserim, and the forest botanist has been engaged in completing Duthie's Flora of the Upper Gangetic Plain. A start was made in in-

vestigations of fungi important in the management of Indian forests.

The report is printed on paper made in the paper-pulp section of the Forest Research Institute, Dehra Dun, from the Kayin Bamboo (*Melocanna bambusoides*) of Arakan, Burma. It is expected that definite projects for utilizing the bamboos of India for the manufacture of pulp will soon be organized by commercial interests. Other investigations in the section of forest economy include timber testing, wood preservation, artificial seasoning, technology, etc.

Good progress is reported in forest entomology, the most important subjects being the insect pests of Teak in Nilambur, Madras, and of Sal in the Central Provinces.

**India. Instructions for the operation of timber-seasoning kilns.** By S. N. KAPUR. Forest Bul. No. 72, Economy series, Calcutta, 1929. Pp. 21; 7¼ x 9¾; pls. 12. Price 3 s.

**The Burma bamboo pulp survey.** By W. RAITT. *The Indian Forest Records* (Economy series) 14: 1: 1–48. Illustrated. Two large maps. Price 4 s 9 p.

The report sums up the information available on the subject of areas considered suitable for pioneer enterprise in bamboo pulp production in Burma.

**Testing of Indian woods for veneers and plywood, including tests on glues.** By W. NAGLE. **Mechanical tests.** By L. N. SEAMAN and R. K. BANERJEA. Pub. by Forest Research Institute, Dehra Dun, 1929. Pp. 25; 7 x 9¾; pls. 13. Price 4 s.

**Annual progress report on forest administration in the Presidency of Bengal for the year 1927–28.** By E. A. C. MODDER. Calcutta, 1928. Pp. 60; 8¼ x 13; 1 large map.

"*Timber seasoning.*—It has been found that nearly all woods are liable to serious deterioration through end-splitting when sawn into planks in the Siliguri Mill, and *Terminalia tomentosa* logs have been known to split with loud reports when being converted into planking. The cause appears to



be the rapid drying of logs at the ends in the interval between logging in the forest and actual conversion in the mill. Conversion into planks by hand sawyers in the forest immediately follows cross cutting, so that little or no end-drying of the logs occurs. The trouble should be obviated by pond storage of logs at the mill-site, pending conversion. The only woods, of those converted in the mill, which do not end split in plank form are Sal (*Shorea robusta*) and Gamari (*Gmelina arborea*)."

**Ceylon. Report of the committee on the commercialization of the Forest Department.** Colombo, 1929. Pp. 10; 8¼ x 13.

"Forestry in Ceylon until recently has meant taking the best timber from the most accessible forests for the use of the State and putting little or nothing back into the forests in return. Consequently our forests are now for the most part either inaccessible or poorly stocked.

"This exploitation of the forest for State use has been of great assistance to the economical development of the Colony by supplying Government with cheap timber, but now the timber obtained in this way is no longer cheap and what was originally regarded as the main object of forest policy has ceased to be a matter of importance.

"The main problem in forest policy which presents itself today as a result of the policy of the past is the necessity of re-creating tracts of forest in accessible areas in order to ensure future supplies of timber, the best possible use being made in the meantime of what is left of the natural forests.

"The policy by which the Department proposes to ensure future supplies may be briefly summed up as intensive restocking in the wet zone and experimental reconstruction in the dry zone.

"In order to protect the present limited timber resources of the Colony during the long interval required for restocking operations to bear fruit, it is necessary to continue the reservation of large tracts of what is left of the natural forest in the least inaccessible areas.

"The restocking and reconstruction processes will cost

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"This exploitation of the forest for State use has been of great assistance to the economical development of the Colony by supplying Government with cheap timber, but now the timber obtained in this way is no longer cheap and what was originally regarded as the main object of forest policy has ceased to be a matter of importance.

"The main problem in forest policy which presents itself today as a result of the policy of the past is the necessity of re-creating tracts of forest in accessible areas in order to ensure future supplies of timber, the best possible use being made in the meantime of what is left of the natural forests.

"The policy by which the Department proposes to ensure future supplies may be briefly summed up as intensive restocking in the wet zone and experimental reconstruction in the dry zone.

"In order to protect the present limited timber resources of the Colony during the long interval required for restocking operations to bear fruit, it is necessary to continue the reservation of large tracts of what is left of the natural forest in the least inaccessible areas.

"The restocking and reconstruction processes will cost

money, and it is therefore necessary that what is left of our forest resources should be so utilized as to bring in the revenue required to pay for these processes.

"The Forest Department must be relieved of what has hitherto been its most absorbing occupation, *viz.*, exploitation of the forests for State use, by a change of policy in regard to supplies of timber for Government departments. These departments should obtain their supplies of timber in the open market, and there is a prospect that the net result of this change of policy, after it has been in force for some years, will be an increase rather than a decrease in the amount of indigenous timber which is put to a commercial use."

**Ceylon. Administration report of the Conservator of Forests for 1928. Part II.** By J. D. SARGENT. Colombo, 1929. Pp. 22; 8¼ x 13.

"The introduction of an impregnation scheme for Ceylon timbers was carried forward a further stage by the favorable reports received from Dehra Dun on the 250 sleepers of Hora (*Dipterocarpus zeylanicus*) sent in 1927. This timber has been compared with Indian Dipterocarps in regular use for impregnation purposes, and found to be almost exactly similar. A life of not less than twelve years in the line is promised on the analogy of Indian species, and it is high time for Ceylon to take up this question of the greater utilization of the indigenous timbers, particularly those, like Hora, which are found gregariously and can be extracted at reasonably low cost. An officer, who will be on leave in 1929 and will be taking a full course of wood technology at the Imperial Forestry Institute, Oxford, has been entrusted with the further investigation of impregnation plant and methods applicable to Ceylon conditions. Should the introduction of plant be found practicable, it will make a profound difference to the matter of exploitation of the less accessible forests of the wet zone."

Exports of timber, as indicated by the Customs returns, amounted to 3734 tons, distributed as follows:

| | | | |
|---|---|---|---|
| Ebony | 16 | Palu | 58 |
| Satinwood | 1126 | Teak | 19 |
| Halmilla | 4 | Misc. | 2511 |



**De botanische en houttechnische boschexploratie in de Buitengewesten.** By F. H. ENDERT. *Tectona* (Buitenzorg, Java) 22: 507–532, June–July 1929. Illustrated.

**Mangrove forests of the Malay Peninsula.** By J. G. WATSON. *Malayan Forest Records*, No. 6, Kuala Lumpur, F. M. S., 1928. Pp. 275; 7¼ x 10¼; 73 half-tone plates; 6 diagrams. Price 7 s.

This book maintains the high standard of excellence one has come to expect from the forestry department of the Federated Malay States. It is an exhaustive treatise, handsomely printed and profusely illustrated. The scope of the work is shown by the chapter headings: (1) General description; (2) The flora: its general characteristics; (3) Botanical descriptions; (4) Silviculture; (5) Management; (6) Utilization; (7) Exploitation. There are also appendices (A to E), bibliography, glossary, and index.

**Mangrove bark as a tanning material.** By T. A. BUCKLEY. *Malayan Forest Records* No. 7, Kuala Lumpur, F. M. S., 1929. Pp. 40; 7 x 10½. Price 1 s.

"The present investigation has revealed numerous facts which do not find mention in other reports on the subject. While thick bark from old trees is best, the tanning value of bark changes with height up the trunk or with any difference of position. No two strips of bark from a tree are the same. The differences from tree to tree are often of the same order as from species to species. The tanning value varies with the mode of removal from the tree and the method of disintegration before extracting. The properties of the bark undergo a marked change with drying. The bark does not easily develop mold under conditions of free access of air, and does not suffer by railway journeys in sacks, though if stored in closed jars, a vigorous growth of mold is soon in evidence. Presumably, where air can circulate, surface drying inhibits mold growth. Infusions of the bark, although at a tropical temperature, exhibit a marked freedom from mold. If bark is exported, it will need to be dried; but for local consumption it can easily be transported moist; and, if it were to be used for cutch manufacture locally, it would not require drying."

**Federated Malay States. Report on forest administration for the year 1928.** By F. W. FOXWORTHY. July 5, 1929. Pp. 66; 8¼ x 13.

"There was a marked decrease in the demand for both timber and firewood compared with the last few years in spite of the fact that prices were generally low. . . . For many years efforts have been made to induce the public to make use of the many timbers of good quality which occur in the forests, but which are unknown because supplies of well-known timbers have always been easily available. It is reported that some success has been achieved in this direction, but many years are likely to elapse before the unknown timbers come into general use.

"The increased use of oil, coal, and electricity continues to reduce the consumption of firewood, but the change is being effected more slowly than appeared likely a few years ago. . . . There was a reduction of 4000 tons under the head of charcoal, which is to be regretted. The use of charcoal is to be encouraged, as it provides a market for the second-class timber, which it is desired to remove from forest reserves in regeneration and improvement felling operations. Unfortunately the cost of manufacture is high, and a good deal of charcoal is imported."

"The results of the tests on sleepers have not yet been fully analyzed, but it can be said that the conclusions drawn from the fewer tests made in 1927 have been proved over a greater number of tests, and that *Dipterocarpus Scortechinii* and Kempas (*Koompassia malaccensis*) can be easily treated with creosote diluted to various strengths with Diesel fuel, and that Keruing (unidentified botanically) can also be treated with sufficient of the same mixtures under the full-cell process (with possibly a preliminary steaming treatment) to ensure that it will fail by mechanical stress or abrasion before it yields to fungus or termite attack."

Gutta percha was practically unsaleable because of the lack of demand that resulted from the cable and wireless conflict.

The outturn of Jelutong increased from 576 tons in 1927 to 1002 tons in 1928. Regarding the keeping properties of Jelutong shipped to American chewing-gum manufacturers, "it now appears that one of the most fruitful causes of deterioration is the presence of minute quantities of iron in the latex prior to or during coagulation."



**Neu-Caledonien: Land und vegetation.** By A. U. DÄNIKER. *Mitt. Bot. Mus. der Universität Zürich* 74: 170–197, June 30, 1929. Illustrated.

An excellent account of the soil, climate, and types of vegetation of New Caledonia.

**Australia. Notes on the seasoning of timber.** By J. T. McCORMICK and R. E. SUMMERS. Pub. by Munitions Supply Board, Dept. of Defence, Melbourne, Aug. 1927. Pp. 53; 6 x 9½; illustrated.

"A supply of sound, well-seasoned hardwood in large billets is required for the normal defense program in peace time and, as suitable timber is not on the market, the department's experimental kilns are being used to season timber for current requirements.

"Comparatively little investigation has been published of seasoning large billets of Australian timbers, and, owing to the properties of the main genus, *Eucalyptus*, the seasoning of these timbers presents many difficulties not encountered in the treatment of foreign timbers. This paper . . . records the results of laboratory work and semi-commercial scale seasoning carried out during the last four years at the laboratories of the Munitions Supply Board.

"The appendices record in considerable detail the various steps by which conclusions have been reached. The details have been included in order that those who may be interested to the point of using one or other of the systems may be forewarned of some of the difficulties met with in developing the process on a commercial scale."

**A forest products laboratory for Australia. Justification for its creation, outline of its organization, and rough estimate of cost.** By A. J. GIBSON. Pamphlet No. 9, Council for Sci. & Ind. Research, Melbourne, 1928. Pp. 28; 6 x 9½.

**Wood borers damaging timber in Australia.** By T. C. ROUGHLEY and M. B. WELCH. Bul. No. 8 (2d ed.), Tech. Education Branch, Technological Museum, Sydney, 1929. Pp. 27; 7 x 9¾; figs. 18. Price 1 s.

An excellent popular treatise on wood borers and methods of preventing or reducing damage from their attacks on both seasoned and unseasoned timbers.

**Kraft pulp and paper from *Pinus insignis*.** By L. R. BENJAMIN, J. L. SOMERVILLE, R. B. JEFFREYS, and W. E. COHEN. Bul. No. 35, Council for Sci. & Ind. Research, Melbourne, 1928. Pp. 32; 6 x 9½; 4 samples kraft paper.

**Paper-pulp and cellulose from the Eucalypts by the sulphite process.** By L. R. BENJAMIN and J. L. SOMERVILLE. Bul. No. 37, Council for Sci. & Ind. Research, Melbourne, 1928. Pp. 84; 6 x 9½; illustrated.

**Australia. Council for Scientific and Industrial Research. Forest Products Division: Projected programme of work for the year 1929–30.** By I. H. BOAS. East Melbourne, July 1929. A mimeograph; pp. 16.

The projects outlined are as follows: (1) Tannin extracts from Eucalypts; (2) Survey of present seasoning practices in Australia; (3) Seasoning of *Pinus radiata;* (4) Seasoning of Hoop Pine; (5) Kiln-drying of N. S. W. timbers; (6) Identification of Australian timbers; (7) Utilization studies; (8) The chemistry of Australian timbers; (9) Investigation of extractives of Cypress Pine; (10) Survey of present position of wood preservation in Australia; (11 and 12) Service tests of fluarized and of powellized Karri cross-arms and sleepers; (13) Preservative treatment of fence posts; (14) Fluarizing treatment of timber; (15) Density of Australian hardwoods.

**South Australia. Forestry handbook.** By E. JULIUS and A. L. PINCHES. Pub. by Woods & Forests Dept., Adelaide, 1928, for Empire Forestry Conference. Pp. 146; 5½ x 8½; illustrated; 3 maps, one (17 x 19) in color.



**Western Australia. First decennial review of the operations of the Forests Department, together with the annual report of the Conservator of Forests for the year ending 30th June 1929.** By S. L. KESSELL. Perth, 1929. Pp. 49; 8½ x 13; illustrated.

**Waste kauri wood as a source of paper-pulp and resin.** Leaflet No. 13, Branch of Forest Products, N. Z. State Forest Service, Wellington, 1929. Pp. 8; 6 x 9¾.

A reprint from *Bulletin of the Imperial Institute* (London), Vol. 24, 1926. (See *Tropical Woods* 10: 64, June 1, 1927.)

**New Zealand. Prevention of sap-stain in white pine.** By C. E. DIXON. Circ. No. 26, N. Z. State Forest Service, Wellington, 1928. Pp. 16; 6 x 9¾; figs. 9.

Presents the results of a series of tests made by the State Forest Service to prevent staining of the sapwood of New Zealand White Pine (*Podocarpus dacrydioides*) during seasoning. The conclusion is that sap-stain attack can be retarded and almost eliminated by both dipping the timber in a borax bath and piling it in an approved manner, such as the open-filleted box type. Roofing of treated stacks is essential to prevent washing off of the borax.

**The properties and uses of silver-beech (*Nothofagus Menziesii*).** By W. C. WARD. Leaflet No. 14, Branch of Forest Products, N. Z. State Forest Service, Wellington, 1929. Pp. 8; 6 x 9¾.

**Forests and forestry in New Zealand. A statement prepared for the British Empire Forestry Conference (Australia and New Zealand), 1928.** Wellington, 1928. Pp. 43; 6 x 9¾; illustrated; 1 map in colors.

**Monograph on the New Zealand beech forests. Part II. The forests from the practical and economic standpoints.** By L. COCKAYNE. Bul. No. 4, N. Z. State Forest Service, Wellington, 1928. Pp. 59; 6 x 9¾; 16 half-tone plates. Price 2 s. 6 p.

"In this part of the monograph there is considered the practical and economic bearing of those sections needing such treatment, the term 'economic' being used in a broad sense. The introductory section of Part I shows, for instance, that the monograph does not alone aim at explaining the meaning of the Beech forests for New Zealand forestry and their silviculture, but goes somewhat further and seeks to be of value for the education of New Zealand foresters in the all-important forest ecology of the region; further, it hopes to interest such of the public as possess a love for the trees and forests, and attempts to bring home to all how these latter should be a perpetual source of great national wealth to be prized to the utmost and guarded with jealous care. This is no new aspiration, but one which the State Forest Service has aimed at from its initiation.

"Then, though the subject lies rather out of the track of my researches, something is said in this part about the relative value of the timber of the various species of *Nothofagus* for economic purposes. Although belonging more properly to Part I, a list of the Beech-forest species is supplied, and a bibliography of the principal literature dealing with these forests."

**The flora and vegetation of New Zealand.** By L. Cockayne. Cir. No. 27, N. Z. State Forest Service, Wellington, 1929. Pp. 8; 6 x 9¾.

The New Zealand flora consists of about 1848 species and well-marked varieties, of which 148 are ferns, 19 fern-allies, 20 Gymnosperms, 426 Monocots, and 1235 Dicots, and they belong to 109 families and 382 genera. Nearly 79 per cent of this flora is endemic; of the remaining species, 236 are Australian, 58 subantarctic South American, and the others cosmopolitan in a narrow sense (mostly also Australian), Norfolk Island, Lord Howe Island, and Polynesian. A good many of the families and genera are Malayan, these tropical elements having found their way to New Zealand during a great extension of its area northward in the early Tertiary period. The high endemism of the flora is not confined to the species, for there are 39 endemic genera, some of which are



only very distantly related to genera elsewhere. Besides the species and their varieties, the flora contains, according to recent research, no less than 353 groups of hybrids (some with hundreds of distinct forms) between the species, together with many within the species themselves between their varieties; there are also a few well-marked hybrids between certain genera. Hybridism is now known to occur naturally in representatives of 44 families and 101 genera. "This new knowledge concerning natural hybridism is already making radical changes in the classification of New Zealand plants, and it may also have a profound bearing on plant classification in general and on theories of evolution."

**Notes on some Australian timbers grown in South Africa.** By M. H. Scott. Bul. No. 23, Union of South Africa, Pretoria, 1928. Pp. 52; 6 x 9½.

**The varieties and geographical forms of *Pinus pinaster* Soland in Europe and South Africa.** By C. E. Duff. Pub. by Union of South Africa, Pretoria, 1928. Pp. 56; 6 x 9½; 18 half-tone plates; 1 map.

**South African tanning materials: The black wattle.** By C. O. Williams. Sci. Bul. No. 63, Dept. of Agr., Union of South Africa, Pretoria, 1928. Pp. 68; 6 x 9½. Price 6 d.

**British hardwoods—their structure and identification.** By L. Chalk and B. J. Rendle. Bul. No. 3, Forest Products Research, Dept. Sci. & Ind. Research and Imp. For. Institute. H. M. Stationery Office, London, Oct. 29, 1929. Pp. 53; 7¼ x 9¾; 47 photomicrographs, mostly full-page. Price 5 s. net.

A well prepared, attractively printed, and splendidly illustrated book. Its aim is "to describe the structure of all hardwoods grown in the British Isles which are of any economic importance, apart from fuel, so that they can be identified with no further apparatus than a sharp knife and a simple magnifying glass or hand lens. The descriptions are arranged for convenience in alphabetical order of common names.

The botanical names of the timbers are printed in italics. The type descriptions of the British hardwoods are followed by shorter notes on related species and other woods which may resemble the native timber in name or general character. The photographs, which are ten times natural size, are intended to illustrate the structure of the wood as seen on an end surface, or cross section, under a lens. A key to the British woods has been added. This is intended to serve merely as a guide, and results obtained from the key should always be verified by reference to the type descriptions. The latter are intended to cover the range of variation likely to be found in normal samples of timber. They are not applicable to distorted wood such as is obtained from burrs.

"The descriptions are based on the examination of a large number of specimens from different sources. Full use has been made of the existing literature on the subject, a select bibliography of which is given on page 47. In addition to the titles, short notes have been appended to give some indication of the scope of each book.

"In both the descriptions and the key only those features have been included which can be seen on a clean-cut surface with the unaided eye or with a lens of a magnification of eight to ten times. Features only visible at higher magnifications have been omitted, as the use of a microscope is not generally practicable. It should be realized, however, that the examination of prepared sections under a microscope is always more reliable and is often the only certain means of distinguishing closely allied woods, such as willow and poplar. Technical terms have been avoided as far as possible; those terms which have been used are explained in the brief account given of the structure of wood."

**Summary of tariff information, 1929, on the Tariff Act of 1922. Schedule 4: Wood and manufactures of.** Compiled by U. S. Tariff Commission for Committee on Ways and Means, House of Representatives. Govt. Printing Office, Washington, D. C., 1929. Pp. 917–966; 6 x 9. Price 10 c.

Contains statistical and other data regarding the imports of wood and wood manufactures into the United States.

M. M. CHATTAWAY.

Price 35 cents

School of Forestry

Yale University

# TROPICAL WOODS

JUNE 1, 1930

NUMBER 22

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Yale University School of Forestry

# TROPICAL WOODS

NUMBER 22 June 1, 1930

*A technical journal devoted to the furtherance of knowledge of tropical woods and forests and to the promotion of forestry in the Tropics.*

*The editor of this publication and the writer of any articles therein, the authorship of which is not otherwise indicated, is* SAMUEL J. RECORD, *Professor of Forest Products, Yale University.*

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## CONFERENCE ON SYSTEMATIC ANATOMY OF WOOD

On the occasion of the Fifth International Botanical Congress, to be held at Cambridge from August 16 to 23, 1930, it is proposed to hold an informal conference on the Systematic Anatomy of Wood. The subject is rapidly increasing in importance, particularly in relation to the identification of timber. The numerous anatomical descriptions of timbers, which have been published of recent years, direct attention to the lack of any standard terminology, and it is thought that the Congress will provide a unique opportunity for discussing the possibility of introducing some measure of standardization, at least among English-speaking people. If sufficient support were forthcoming it might prove desirable to appoint a standing committee to collate the views of workers in this field and to issue recommendations for general adoption.

It is also hoped to arrange a scheme for the exchange of material among botanists and forest botanists who are willing to undertake the study of a family or group.

We are desirous of obtaining the views and co-operation of as many as possible of those who are interested in this subject, and we therefore invite suggestions of matter for discussion both from botanists who propose to attend the Congress and from those who will be unable to do so.

L. CHALK,
*Imperial Forestry Institute, Oxford*
S. J. RECORD,
*Yale School of Forestry*
B. J. RENDLE,
*Forest Products Research Laboratory, Princes Risborough*

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## THE YALE WOOD COLLECTIONS

A mimeograph catalog of the wood collections of the School of Forestry, Yale University, was distributed in December. A few copies are still available and will be sent upon request so long as the supply lasts. A supplement will be issued within the year, as new material is continually being received. One lot in prospect, from a previously little known region, contains over 2000 samples, all collected with herbarium material.

Cuttings large enough for making sections for microscopic study will be made from any of the material on hand and sent to any properly qualified investigator who will agree to send mounted sections of the woods in return. Several hundred slides have already been received on this exchange basis.

Progress in the systematic study of these woods by families can be reported as follows:

**Juglandaceae** (all genera), by D. A. Kribs. Condensed report published in *Tropical Woods* 12: 16–21, Dec. 5, 1927.

**Meliaceae** (37 genera), by same. Dissertation for degree of Doctor of Philosophy, Yale University. Summary and key being prepared for publication.



**Coniferae** (43 genera), by E. H. S. Boulton, Cambridge, England, and J. R. Beversluis, Wageningen, Holland. No report.

**Anacardiaceae** (40 genera), by R. Kanehira, Fukuoka, Japan. Work completed on 52 species of 28 genera, as reported April 1, 1930.

**Euphorbiaceae** (85 genera), by same. Specimens sent March 13, 1930.

**Flacourtiaceae** (35 genera), by graduate student under direction of Walter W. Tupper, University of Michigan. Specimens sent March 24, 1930.

**Violaceae** (6 genera), by same. Specimens sent March 17, 1930.

**Juniperus** and **Quercus** (all available species) have been sent to Professor Bredeman, Institut für angewandte Botanik, Hamburg, Germany.

**Nothofagus** (9 samples of 3 species from Chile) have been sent to B. E. Parham, Canterbury College School of Forestry, Christchurch, New Zealand.

It is hoped that the coming conference on wood anatomy at Cambridge will greatly stimulate this work. There is urgent need for additional material of the less common trees and the larger shrubs and lianas, and all persons who are in a position to contribute authentic samples are urged to do so as soon as possible.

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## NOTE REGARDING THE USE OF THE NAME MAHOGANY

In reference to the proper use of the name Mahogany, Dr. H. Harms, the noted German authority on the Meliaceae, writes as follows:

"The genera of the Meliaceae-Swietenioideae are so nearly related to each other that their timbers can be named Mahogany, a name originally derived from the genus *Swietenia* as the type of that group. The Dipterocarpaceae [the source of so-called Philippine Mahogany] are in nearly every respect entirely different from the Meliaceae, so it is nonsense to use the name Mahogany for their timbers."

# ESPAVÉ (*ANACARDIUM RHINOCARPUS* DC.)

*By* G. Proctor Cooper

*Field Assistant in Tropical Forestry, Yale University*

Espavé occurs in large quantities on the Pacific coast of Costa Rica and Panama and on the Caribbean coast of Colombia and Venezuela. I failed to find it on the northern side of Panama from Bocas del Toro to the Colombian border and it is not known at Puerto Limón, Costa Rica. It seems to be confined to regions having distinct dry seasons. Although typical of the dense evergreen forest it does not grow at the higher elevations; at least this was found to be the case in Chiriquí, Panama, where the species finds its best development on the lower, well-drained soils. In that locality I found an average of 4 or 5 trees per acre, with a maximum of 10 or 12 massive trees 75 to 125 feet tall. In Darién Province it is said to compose almost pure stands over large areas. Its gregarious occurrence is presumably due to the facility with which it reproduces itself and to its ability to crowd out competing species.

The tree has various local names. In Costa Rica it is best known as Espavel, although an alternative is Quina, perhaps in reference to the bitter bark. The Panama name is Espavé or Espavá; the Colombian, Caricolí; the Venezuelan, Mija or Mijaguo. The West Indians call it Wild Cashew because of the resemblance to the cultivated Cashew, to which it is closely related. The use of the name Mahogany for this tree or its timber, as is occasionally the practice of dealers and promoters, is wholly without justification.

## Description of the Tree

Under favorable conditions in the forest, Espavé attains a height of 125 to 150 feet, with an unbuttressed trunk 4 to 6 feet in diameter above the basal swelling and free of limbs for 40 to 50, occasionally over 60, feet; the crown is often spreading or urn-shaped, with some of the branches large enough for small sawlogs. Grown in the open, the tree has a short, thick trunk and a full crown of low-spreading branches. The



pale, grayish bark, which is scaly or roughly plated, but not deeply furrowed, serves readily to distinguish the tree from its associates in the forest.

The dark green, smooth, and leathery leaves are simple and alternate, up to 12 inches long, obovate, rather narrow, and tapering toward the petiole, which is about an inch in length; the apex may be rounded (obtuse), slightly pointed (mucronate), or with a small notch (retuse). A characteristic feature is the venation, since at right angles to the midrib are prominent parallel veins with finely reticulate nerves between. The twigs are blackish and contain a large core of pith. The buds are brownish, with a soft pubescence. The flowers are small, but borne in profusion in terminal, low-stalked panicles so that the tree in bloom is very conspicuous from a distance, especially when it overtops its neighbors, as it so frequently does. The drupaceous fruit is oval, about an inch long, and of a greenish color changing to reddish purple when ripe; the fleshy cotyledons are eaten by the natives.

## Description of the Wood

The sapwood, which may be as much as 6 inches thick in large logs, is dingy gray, more or less streaked or blotched with yellow or purple. Fresh heartwood is dull brown, with purplish-red streaks; the freshly exposed interior of thoroughly dry specimens has a lusterless lemon-yellow color, with darker striping. When a dry plank is exposed to the air and light for some time the color gradually changes into a rich golden brown, the striped effect becomes more pronounced, and the purplish tints change to reddish brown. On quarter-sawed boards, the rays are very distinct, for although not large they are darker than the fiber background and show effectively. The vessel lines are also dark-colored and distinct, especially on tangential surfaces. A newly felled log has a slight resinous or pungent scent, but this is probably attributable to the bark, as the dry wood is odorless and tasteless.

The wood is in some ways easy to work, but radial surfaces have a tendency to become fuzzy when planed or sand-

papered, due to the fact that the walls of the fibers are rather soft and yielding and do not cut off sharply and smoothly where the grain is alternating. This type of grain, often called roe or feather grain or cross-banding, is typical of many of the finest cabinet woods, but there the tools make a much sharper and cleaner cut over the crossed grain than is possible with Espavé. However, when varnish is applied, followed by light sanding and wax, a high polish is obtainable. The wood takes stains readily. Occasionally pin knots are found deeply buried in the log and their pith is likely to fleck out when the lumber is being worked. Espavé nails without splitting and holds its shape well in box form if kept dry; exposed to the weather, it will warp and check. It is not very durable in contact with the ground.

### Local Uses and Market

The natives use the wood for making kitchen utensils and dishes because it is easy to work and the articles made from it are light, but resistant to wear. The large trunks are well adapted for the making of dugout canoes as they can be fashioned with crude tools, are not easily split, and have a fairly long life.

The timber is to be had at the local lumber yards in the various parts of the countries where the trees are available. It is used for general carpentry and construction, inexpensive furniture, and other purposes for which it is suited on account of its lightness, fair durability, and low cost.

The comparative prices of different kinds of lumber were obtained at a large yard in San José, Costa Rica, in 1928. Espavé was the lowest, the price for planed boards being $62.50 per thousand board feet; Cenizero (*Enterolobium cyclocarpum*), $81.25; Cedro Amargo and Cedro Grenadine (*Cedrela* spp.), $125; Caoba or Mahogany (*Swietenia*), $150.

Attempts to introduce the lumber into the markets of the United States have been made in a desultory way, but with little success, as the wood is not of sufficiently high grade to sell itself. It is none the less potentially a very useful timber and occurs in sufficient abundance to justify careful investigation by industries in this country.



### Gross Anatomy of the Wood

Growth rings sometimes clearly defined by variation in density of adjoining layers, at other times indistinct or not discernible. Parenchyma paratracheal, scarcely visible except on smoothly cut surface moistened to bring out the contrast in color with the ground mass; not in tangential lines or bands. Pores visible, resembling small pinholes, filled with lustrous tyloses; evenly distributed, but not abundant, occurring singly or sometimes in radial pairs or small groups. Vessel lines conspicuous, being darker than background on account of coloring matter in the tyloses and parenchyma cells. Rays faintly visible on cross and tangential sections, fine but very distinct on radial surface on account of their deep color. No gum ducts and ripple marks observed.

### Minute Anatomy of the Wood

*Cross section:* Pores subcircular or oval, thin-walled, scattered; mostly single, sometimes paired; filled with thin-walled tyloses. Parenchyma associated with pores, the best development being at the sides; not very abundant; of approximately the same size as the fibers. Rays numerous, coarse-celled, 1 or 2 cells wide, bending around pores. Wood fibers thin-walled, squarish, arranged in fairly definite radial rows.

*Radial section:* Vessels with simple perforations; tyloses abundant. Rays coarse-celled, many of the cells square or upright, without distinct layer of procumbent cells; gum deposits abundant; large crystals common; pits into vessels mostly very large and widely variable in shape. Fibers with simple, indistinct pits; sometimes septate.

*Tangential section:* Rays exceedingly numerous; uniseriate or biseriate; mostly less than 15 cells high, but occasionally much higher. Pits between vessels large, crowded; apertures open lenticular; pits into parenchyma large, irregular, partially bordered.

### Tests of the Mechanical and Physical Properties

These tests were made in the laboratory of the Yale School of Forestry upon material cut from a hewed block 4 feet long and 1 foot square obtained from Chiriquí, Panama, through the courtesy of Dr. John R. Johnston of the Research Department, United Fruit Company. This block was allowed to season in the testing laboratory for three months during the summer of 1929 and was then sawed into 1″ and 2″ planks. The inside was found to be very damp, so much so that the

sawdust could be squeezed into a firm ball. The planks were allowed to dry in a heated room for five months before the test pieces were cut from them. Because of the small amount of material, the tests were necessarily few and therefore the

MECHANICAL PROPERTIES OF ESPAVÉ

| Kind of test | Moisture Content | *Maximum* | *Minimum* | *Mean* |
|---|---|---|---|---|
| | *Per cent* | *Pounds per square inch* | | |
| Static bending: | | | | |
| Modulus of rupture | 15.6 | ... | ... | 7,175 |
| Modulus of elasticity | | ... | ... | 1,683,500 |
| Fiber stress at elastic limit | | ... | ... | 4,690 |
| Compression parallel to grain: | 7.83 | | | |
| Fiber stress at elastic limit | | 6,666 | 5,714 | 6,190 |
| Max. crushing strength | | 8,333 | 8,128 | 8,230 |
| Modulus of elasticity | | 1,841,205 | 1,758,240 | 1,799,720 |
| Tension perpendicular to grain | 7.41 | 718 | 586 | 636 |
| Shearing strength parallel to grain | 4.86 | 1,388 | 954 | 1,178 |
| | | *Pounds per inch of width* | | |
| Cleavage strength | 7.66 | 264 | 222 | 247 |
| | | *Pounds* | *Pounds* | *Pounds* |
| Hardness (load required to imbed 0.444-in. ball ½ its diam.): | 9.70 | | | |
| Radial surface | | 730 | 615 | 680 |
| Tangential surface | | 765 | 650 | 700 |
| End surfaces | | 795 | 620 | 710 |



data should be considered as giving only a rough indication of the properties of the timber. The number of each kind of test is as follows: Static bending, 1; compression parallel to the grain, 2; volumetric expansion, 2; specific gravity, 2; tension perpendicular to grain, 4; shearing, 4; cleavage, 3; hardness: radial, 7; tangential, 8; end, 12.

The results of the tests of the physical properties were as follows: Sp. gr. (vol. when soaked and wt. when oven-dry) 0.48 and 0.49, resp. Sp. gr. (vol. and weight when air-dry, 6.7% and 7.5% moisture), 0.55 and 0.57, resp. Weight per cubic foot (air-dry, as preceding), 34.5 and 35.5 lbs., resp. Increase in volume from prolonged soaking of air-dry specimens, 7.84 and 7.32%, resp.

## *SICKINGIA KLUGEI*, A TREE OF PANAMA AND VENEZUELA

*By* PAUL C. STANDLEY

*Field Museum of Natural History*

In 1925 the writer described from Panama a new tree, *Calderonia Klugei*, founded upon a specimen collected near Chepo, Panama, by H. C. Kluge (No. 19). The species was based upon fruiting material, and doubt was expressed as to its proper reference to the genus *Calderonia*. It may be mentioned that there is at present some doubt, unfortunately, as to whether the original species of that genus, *Calderonia salvadorensis*, which grows in Salvador and British Honduras, can be separated from *Sickingia*.

A short time ago Mr. H. Pittier kindly presented to Field Museum part of the type material of his new species, *Sickingia parvifolia*. It is clearly conspecific with a collection made in Panama in 1911 by Mr. Pittier, but for some reason missed by the present writer, although it has existed unnamed somewhere in the United States National Herbarium during all these years.

The Panama plant, cited below, is evidently the same as *Sickingia parvifolia*, and it is also identical with *Calderonia Klugei*. Its synonymy is as follows:

**Sickingia Klugei** (Standl.), comb. nov. *Calderonia Klugei* Standl. Journ. Wash. Acad. Sci. 15: 6. Jan. 4, 1925. *Sickingia parvifolia* Pittier, Bol. Mus. Comerc. Venez. 1: 71. 1925.

I do not know the exact date of the paper in which *Sickingia parvifolia* was published, but since there is cited in it a specimen collected May 21, 1925, it must have appeared much later than my own description.

The following specimens of this tree are in the herbarium of Field Museum: PANAMA: Dry wooded hills around Alajuela, Province of Panama, alt. 30–100 m., May 1911, *H. Pittier 3499*.—VENEZUELA: Vicinity of Barquisimeto, Lara, September 1923, *José Saer 24*.

The genus *Sickingia*, of the family Rubiaceae, is noteworthy for the color of its wood, which is of a rather bright red when freshly cut. If the wood is protected from light, its color is retained for a long time (at least in the herbarium), but upon exposure to sunlight, it soon fades. *S. Klugei* is reported to be a small tree in the vicinity of Chepo, Panama, growing usually on overflowed land. It is known, appropriately enough, in that locality by the name "palo colorado" (red wood).

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## NOTES ON TROPICAL TIMBERS

*By* SAMUEL J. RECORD

### Mahogany in Western Brazil

Through the courtesy of Ichabod T. Williams & Sons, New York, I recently received specimens cut from logs said to have originated in the valley of the upper Purús River, Amazonas, Brazil. The wood is unquestionably Mahogany, and presumably of the same species of *Swietenia* as that found to the westward of the range of mountains on the boundary between Peru and Brazil. As in Peru, the vernacular name for the tree is Aguano.

Mr. Charles E. Rogers, of the above-mentioned firm, writes on March 4: "I have talked with a number of people experienced in the 'bush' in the western part of Brazil, and one old Colombian, who had been down in that country for a good many years, assured me that the Aguano occurred on a number of Brazilian streams, though only in small quantities. We received the logs in question through a very intelligent Brazilian exporter and he believes that a moderate quantity of Aguano could be developed from Brazilian territory."



### Philippine Ipil for Flooring

Ralph A. Bond Company, Inc., special woodwork and floor builders, Chicago, Illinois, is very favorably impressed with the behavior and appearance of Ipil (*Intsia bijuga* O. Ktze.) when used for high-grade flooring. The timber is obtainable in large sizes and, if properly handled, can be laid in the form of wide planks without subsequent checking, opening of joints, or buckling. It takes a good natural polish, is highly resistant to wear and abrasion, and its color becomes richer with age. About six months ago this firm received a consignment of logs, which, according to Director Fischer of the Philippine Bureau of Forestry, represented the first export of the timber in that form, previous shipments having been of lumber only.

Ipil is practically unknown on the American market, but it is highly esteemed in the Philippines. Schneider (*Commercial woods of the Philippines*, Manila, 1916, p. 121) says that "on account of its hardness, stiffness, and great durability, it is one of the best woods in the Islands. It is found in practically all provinces having a seacoast; though not as abundant as any of the Dipterocarps, there is a steady supply of it in the markets." He describes the wood as follows (*loc. cit.*, p. 120): "Wood hard to very hard; heavy to very heavy, specific gravity 0.673 to 0.807 (Gardner), 0.758 to 0.909 (Foxworthy); sapwood 4 to 8 centimeters thick, whitish, sharply distinguished from heartwood, very perishable; heartwood when fresh and perfectly sound bright yellow, turning to dark brown on exposure; peculiar, oily odor resembling that of raw peanuts; small quantities of oil exuding from surface, causing characteristic, small, dull black spots when sandpapered; when fresh, oil makes indelible brown spots on paper and cloth; grain straight or somewhat crossed; texture fine, taking a glossy cut under sharp tools; does not warp much, but in

large sizes is liable to check badly if not seasoned carefully; hard to saw, but not difficult to surface. Durability I, except as regards teredo."

Ipil, or Merbau, also occurs in the Malay Peninsula. Foxworthy (*Commercial woods of the Malay Peninsula*, 1921, p. 112) says that, though not abundant, it is one of the best known woods of that country, being used for all kinds of high-grade construction on land and for fine furniture. Very large trees are found and logs 3 to 4 feet in diameter and up to 50 feet or more in length can sometimes be obtained. "Although this wood is very resistant to the attacks of white ants and other insects, it is not resistant to the work of the teredo and so is unsuited to marine work. For heavy construction the wood is very suitable, except that it has the troublesome property of corroding steel nails and bolts. The wood produces a brownish coloring substance which can be used in the preparation of brown, yellow, and black dyes. If the wood is finished while still unseasoned, this coloring material will often work through the finish, making black spots."

### Principal Local Woods used in Pará, Brazil

While on a visit to Brazil last year, Dr. B. E. Dahlgren, Acting Curator of Botany at Field Museum, obtained specimens of lumber manufactured by Serraria Claudio Ltd. in Belem (Pará). As these are said to be the sorts most generally used in that locality, they afford an index of the composition of the forest from a commercial point of view. The vernacular names in the following list are those which accompanied the specimens. I have attempted to supply the scientific names, basing my determinations upon the anatomy of the woods.

| *Common name* | *Scientific name* | *Family* |
|---|---|---|
| Acapú | *Vouacapoua americana* Aubl. | Leguminosae |
| Angelim rajado | *Stryphnodendron flammatum* Kleinh. | Leguminosae |
| Araracanga | *Aspidosperma* aff. *desmanthum* Muell.-Arg. | Apocynaceae |
| Cedro | *Cedrela Huberi* Ducke | Meliaceae |
| Cupiúba | *Goupia paraënsis* Huber | Celastraceae |
| Freijo | *Cordia Goeldiana* Huber | Borraginaceae |
| Louro faia | *Roupala* sp. | Proteaceae |



| | | |
|---|---|---|
| Louro vermelho | *Ocotea* sp. | Lauraceae |
| Macacaúba | *Platymiscium Ulei* Harms | Leguminosae |
| Marupá | *Simaruba amara* Aubl. | Simarubaceae |
| Massaranduba | *Mimusops Huberi* Ducke | Sapotaceae |
| Muirapiranga | *Brosimum paraënse* Huber | Moraceae |
| Páo amarello | *Euxylophora paraënsis* Huber | Rutaceae |
| Páo d'arco | *Tecoma violacea* Huber | Bignoniaceae |
| Páo mulato | *Calycophyllum Spruceanum* Benth. | Rubiaceae |
| Páo rôxo | *Peltogyne densiflora* (Hayne) Benth. | Leguminosae |
| Páo santo | *Zollernia paraënsis* Huber | Leguminosae |
| Piquiá | *Caryocar villosum* (Aubl.) Pers. | Caryocaraceae |
| Piquiá-rana | *Caryocar glabrum* (Aubl.) Pers. | Caryocaraceae |
| Quaruba | *Vochysia obidensis* Ducke | Vochysiaceae |
| Sapucaia | *Lecythis ollaria* L. | Lecythidaceae |
| Sucupira | *Bowdichia nitida* Spruce | Leguminosae |
| Tamanqueira | *Zanthoxylum rhoifolium* Lam. | Rutaceae |
| Tatajuba | *Bagassa guianensis* Aubl. | Moraceae |

## A NEW TREE FROM COLOMBIA

*By* Paul C. Standley

*Field Museum of Natural History*

The collection of trees made last January near Santa Marta, Colombia, by Professor Record and Henry Kuylen contains numerous interesting species. Some of them represent additional collections of species described from the large series obtained about Santa Marta 30 years ago by Herbert H. Smith, but several escaped the notice of that collector. Although the flora of Santa Marta is better known, perhaps, than that of any other part of Colombia, the tree described below seems not to have been distinguished previously.

### **Sideroxylon colombianum**, sp. nov.

Arbor magna, ramulis gracilibus subteretibus fusco-ferrugineis, novellis dense ochraceo-sericeis, internodiis brevibus; folia alterna, petiolo gracili 1–3.5 cm. longo supra anguste sulcato sparse sericeo vel fere glabro; lamina rigide membranacea elliptico-oblonga, 7–31 cm. longa, 3.5–9 cm. lata, apicem versus paullo angustata, interdum acuta, apice ipso obtuso, basi obtusa vel rotundata, saepe inaequalis, supra glabra, in sicco laete vel pallide viridis, costa subimpressa, venis non elevatis, subtus paullo pallidior, primo sparse sericea, mox glabrata, costa gracili elevata, nervis lateralibus utroque latere 8–12, obliquis, angulo acuto adscendentibus, gracilibus, prominentibus, in marginem desinentibus, venulis prominulis arcte reticulatis; flores ad et infra

axillas dense fasciculati, pedicellis gracilibus 5–7 mm. longis densissime griseo-sericeis; sepala rotundata 1.8 mm. longa apice late rotundata extus minute denseque albido-sericea; corolla glabra 3 mm. longa profunde 5-fida, lobis ovali-ovatis tubo longioribus apice rotundatis.

COLOMBIA: Region of Santa Marta, alt. 75 m., August, 1898–1901, *Herbert H. Smith 456* (Herb. Field Mus. No. 137, 514, type). Don Jaca, Santa Marta region, January 20, 1930, *S. J. Record 81*; *Yale No. 16480*.

"Mamón de leche." A large tree growing along a water-course, buttressed; sap milky; bark red-brown, blotched; wood orange, dense.

The type collection was distributed as *S. mastichodendron* Jacq. That species, as represented in the Antilles, differs conspicuously in the form of its leaves and in its nearly glabrous calyx and pedicels.

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## APITONG (*DIPTEROCARPUS* SPP.) OF NORTHERN NEGROS[1]

*By* LUIS J. REYES, *Wood Technologist*
*Philippine Bureau of Forestry*

There has been, during the last ten to fifteen years, a noticeable change in the quality of woods now found in the market from those of twenty to twenty-five years ago. This is due to the fact that during the early part of the American occupation, all logging operations were carried out by man and animal power only, and with these means, only small and medium-sized logs could be cut and hauled down. Modern methods of lumbering, making use of powerful logging engines, made possible the utilization of very large trees that measure from four to seven feet in diameter, yielding wood that averages harder and heavier than that of smaller individuals. For this reason, the Bureau of Forestry decided to conduct a new series of tests to ascertain, with a fair degree of accuracy, the real strength values of the timbers in the market.

[1] Reproduced, with minor editorial changes, from *The Makiling Echo* (9: 1: 37–39, Jan. 1930), a mimeograph issued quarterly by the Division of Forest Investigations, Bureau of Forestry, at Agricultural College, Laguna.



RESULTS OF TESTS ON APITONG OF NORTHERN NEGROS

| | | Static bending | Compression | | Shear | Hardness |
|---|---|---|---|---|---|---|
| | | | Along grain | Across grain | | |
| Moisture content—per cent. | | 17.0 | 18.5 | 18.3 | 17.7 | 17.7 |
| Fiber stress at E. L.—lbs. per sq. in. | | 6,287 | | | | |
| Modulus of rupture—lbs. per sq. in. | | 10,525 | | | | |
| Modulus of elasticity—lbs. per sq. in. | | 1,778,000 | | | | |
| Longitudinal shear—lbs. per sq. in. | | 374 | | | 1,254 | |
| Crushing str.—lbs. per sq. in. | at E. L. | | 4,722 | 892 | | |
| | max. | | 5,689 | | | |
| Work—in.-lbs. per sq. in. | to E. L. | | 1.32 | | | |
| | to max. ld. | | 13.60 | | | |
| Load required to imbed 0.444-in. ball ½ diam.—lbs. | end | | | | | 851 |
| | side | | | | | 803 |
| Specific gravity | at test | 0.70 | 0.71 | 0.70 | 0.70 | 0.70 |
| | oven-dry | 0.60 | 0.59 | 0.59 | 0.60 | 0.60 |

The strength values shown in the accompanying table are the results of tests on Apitong of Northern Negros, from the Concessions of the Insular Lumber Company at Fabrica

and the Negros-Philippine Lumber Company at Cadiz. The methods employed in the tests are similar to those developed by the United States Forest Products Laboratory at Madison, Wisconsin.

As compared with Apitong from Luzon, that from Negros averages less in bending strength, but is tougher. The wood is relatively more homogeneous and, for this reason, it seasons with less degrade.

It is a reddish brown wood, straight-grained or occasionally crossed, with a coarse texture; it shrinks rather excessively from the green to the air-dry state, a property common to all members of the genus *Dipterocarpus*, wherever found. It is a strong wood, as may be seen from the tests, and it is suitable for general construction, being especially valued for high-grade flooring on account of its homogeneous texture and uniform color. It is fairly durable when exposed to the weather and very lasting when used for interior work. For example, there is in Manila an old house with an Apitong floor that is still in an excellent state of preservation after at least 50 years.

Apitong is the most abundant of all structural woods of the Islands, as about 17 per cent of the total volume of standing timber, or 68 billion board feet, belongs to this genus. Big amounts of treated Apitong are employed for railroad ties, salt water piling, telegraph, telephone and electric light poles, bridge timbers, and other uses for which a strong, durable wood is required.

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## NOTE ON YALE-FIRESTONE LIBERIAN COLLECTIONS

Mr. J. Hutchinson and Dr. J. M. Dalziel, of the Royal Botanic Gardens, Kew, England, have completed their studies of the botanical specimens collected by G. Proctor Cooper on the site of the Firestone plantations in Liberia. Their list shows 305 species (mostly trees), 215 genera, and 67 families. At least 13 species are considered new to science, and one will be named in honor of Mr. Harvey Firestone.



## CURRENT LITERATURE

**Forest regeneration in Porto Rico.** By WILLIAM D. DURLAND. *Economic Geography* (Worcester, Mass.) 5: 4: 369–381, Oct. 1929.

"Porto Rico's forestry problem concerns the regeneration of its once valuable forest resources in order that the island may supply and assure its future needs. This involves the restoration of the 1,100,000 acres of forest land to a place of profitable, rather than the present state of profitless, activity."

"Technically the work involves artificial regeneration in its entity, as desirable trees from the standpoint of seed or species are either nonexistent, scarce, or are located in unsuited areas. Furthermore, on such soils as have been previously described, the proper seed-bed conditions for germination are wanting. Hence, planting stock must be used. Domestic sources of suitable indigenous seed are far from being abundant, but it is doubtful if the present practice of importing tree seed of expensive exotic species for reforestation purposes is to be recommended."

Information is given regarding the development of second-growth stands and plantations, based upon measurements taken by the author.

**Forestry in Trinidad.** By D. M. MATTHEWS. *Journal of Forestry* (Washington, D. C.) 28: 1: 72–77, Jan. 1930.

"Past results and present experimentation may be said to have demonstrated conclusively that plantations of Teak, Honduras Mahogany, and Cedar can be brought to closure, *i.e.*, to a point where no further expenditure will have to be incurred, at costs ranging from $20 to $35 per acre, depending on the amount of preparation required before planting. The lower cost is for cleared areas and the higher for areas where the remaining forest has to be felled and burned. Observed rates of growth in plantations which have attained ages of from 10 to 20 years indicate that yields of up to 35,000 board feet per acre on 50-year rotations can be confidently expected.

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"These probable results are confirmed by experience in Ceylon, India, Burma, and the Dutch East Indies. To the writer, who has had sixteen years experience in the forests of the Philippines and British Borneo, they present a very strong argument for management by the clear-cutting and planting system. Clear cutting, wherever it is possible, always simplifies the logging problem, gives a greater net return from the harvested crop, and thereby releases a greater proportional sum for reinvestment in the next crop. By this statement I do not mean to discount the very valuable work being done in Trinidad in the attempt to convert by cultural methods depleted forests of poor grade into manageable forests of crop trees fully stocked. Such operations will always have to be carried out, especially where it is essential that forest cover be maintained on the land. But results from such operations are necessarily very slow and it is felt that where new timber crops accompanied by adequate financial returns are the chief desideratum the establishment of new plantations is the quickest and surest way of obtaining it."

**The Middle American species of the genus *Inga*.** By HENRY PITTIER. *Journ. Dept. Agr. of Porto Rico* (Rio Piedras) 13: 4: 117–177, Dec. 1929; with 19 full-page half-tone plates.

"In 1916, the writer published a 'Preliminary revision of the genus *Inga*,' based mainly on the American collections at Harvard, New York, Chicago, and the Donnell Smith Herbarium at Baltimore. In that paper, about 40 new species or aberrant forms were described, bringing the number of known types up to 212. Since then, a relatively large number of new species have been described, so that the total may now reach about 250. . . .

"During the last three or four decades, a large number of *Inga* species have gradually acquired great importance as shade trees in coffee culture. In Costa Rica in particular, and in Central America generally, greater attention has been paid to the important question of sheltering the plantations against intense insolation as well as against the violence of the wind. . . . The trees of this genus are scattered all over



tropical America, but as it is in Central America and Mexico where the question of shade in coffee culture has received the greater attention, the selection of the better-adapted species is also more advanced there, and the study of the species growing in that area of more importance. The object of the paper is mainly to give every coffee or cacao planter a good descriptive knowledge of these useful trees, and in another contribution, which is now in preparation, the whole question of the shade and of the use of windbreakers will be discussed and the adaptability and convenience of each one and all the acceptable shade trees according to local conditions presented in the light of our present knowledge of the matter."

**The geology of British Honduras.** By LESLIE H. OWER. Belize, B. H., 1929. Pp. 24; 5½ x 8; 1 map, 8 x 13. Price 25c.

A report on a geological survey by the Imperial Geologist. "This is the first occasion that anybody has had the opportunity of investigating the whole of the Colony. . . The present survey must be considered only a preliminary investigation and it is to be hoped that the more detailed work will soon be justified." Every one interested in British Honduras will appreciate the map which contains not only the geological but also the latest topographical information available.

The author uses some local terms which are generally confusing to non-residents. Prominent among these is "ridge," which refers to a zone or belt of vegetation and does not imply elevation. "Pine Ridge" — areas of pine timber usually close to sea level and indicating poor soil. Pine ridges on hills are insignificant except in the case of the Mountain Pine Ridge, which covers an area of 150 square miles. "Cohune Ridge" — named after the Cohune Palm, its distinctive feature, seldom extends more than a mile back from the streams, but will be found in the limestone depressions and in rich soil. This palm does not occur at elevations greater than 1800 feet. "Broken Ridge" is the forest belt intermediate between the other two "ridges."

British Honduras has often been described as a low area, but the report shows that the amount of land having an elevation of 500 feet or less is 3000 square miles or 36 per cent of

the Colony, while the amount above 1000 feet is 4760 square miles or 57 per cent.

**Revised catalogue of the principal plants at the Canal Zone Plant Introduction Gardens.** By M. J. Rivero. Pub. by The Panama Canal, Balboa Heights, C. Z., 1930. Pp. 12; 6 x 9.

Consists of a list of scientific names arranged alphabetically by families. It was compiled from the office records and is believed to be complete to June 30, 1928. Many of the plants listed are not available for exchange or issue.

The Canal Zone Plant Introduction Gardens, located at Summit, will henceforth be called The Canal Zone Experiment Gardens, as the latter name is not only shorter and simpler but also more clearly expresses the nature of the institution's work, which includes the active introduction of valuable economic and ornamental plants from all parts of the tropics and subtropics, experiments with their culture and uses, and also their dissemination in the region surrounding the Canal. Exchanges of seeds and plants are maintained with botanic gardens and experiment stations in various parts of the world. Correspondence is invited from any similar institution having exchange material that can be used under tropical conditions. Communications should be addressed to: The Director, Canal Zone Experiment Gardens, Summit, C. Z.

**Arboles y arbustos nuevos de Venezuela.** By H. Pittier. Reprinted from *Boletin del Ministerio de Relaciones Exteriores*, Dec. 1929, pp. 105–132.

Contains botanical descriptions of two new genera (*Jahnia* and *Lubaria*) and 20 new species of Venezuelan trees and shrubs, as follows:

81. *Inga Java*
82. *Inga carachensis*
83. *Inga caracasana*
84. *Inga grandifolia*
85. *Inga camuriensis*
86. *Inga meridensis*
87. *Inga riparia*
88. *Calliandra rupicola*
89. *Calliandra affinis*
90. *Machaerium truxillense*



91. *Machaerium guaremalense*
92. *Lonchocarpus guaricensis*
93. *Lonchocarpus larensis*
94. *Fagara ocumarensis*
95. *Fagara valenciana*
96. *Jahnia meridensis* Pitt. & Blake
97. *Lubaria aroensis*
98. *Protium avilense*
99. *Protium tovarense*
100. *Trichilia Palmetorum*

Regarding *Jahnia meridensis* the authors state: "The tree is remarkable principally because it is, as far as we know, the first American representative of the group of Xanthoxyleae-Evodiinae with opposite leaves and carpids with more than 2 ovules, which included up to the present only the Australian genera *Pagetia*, *Bouchardatia*, and *Bosistoa*. *Jahnia* with its pentamerous flowers, is nearly allied to *Pagetia* which differs in having simple to 3-foliolate leaves, the leaflets with entire margins, and 4 to 6 ovules in each carpid. The occurrence in our Andes of a near relative of such a far-away genus is difficult to explain. As is well known, the group of the Xanthoxyleae includes probably the original, most primitive forms of the Rutaceae, and so the presence of a dislocated type in northern South America could be considered as an indication of a more extensive area of dispersion of the whole group in former geological periods. There are in the flora of South America other examples of such residual members of groups belonging at the present time almost exclusively to Australia and New Zealand. Thus *Tepualia*, *Aulacocarpus* (Myrtaceae), *Roupala*, *Panopsis*, *Embothrium* (Proteaceae), and quite a number of dislocated species."

**Les trois Guyanes — française, néerlandaise, britannique: Etude comparative.** By Camille Fidel. *Revue Int. des Produits Coloniaux* (Paris) 4: 48: 303–313, Dec. 1929.

**Guyane française: Géographie générale et voies de pénétration.** By Jacques de Bailliencourt-Courcol and Paul Le Cacheux. **Population et main-d'oeuvre.** By Paul Le Cacheux. *Revue Int. des Produits Coloniaux* (Paris) 4: 48: 314–319, Dec. 1929.

**L'exploitation forestière en Guyane française.** By J. Ménaud. *Revue Int. des Produits Coloniaux* (Paris) 4: 48: 320–326, Dec. 1929.

The exports of forest products from French Guiana for the years 1923-1927 were as follows (in tons):

| | 1923 | 1924 | 1925 | 1926 | 1927 |
|---|---|---|---|---|---|
| Logs, cabinet | 491 | 54 | 417 | 919 | 187 |
| Logs, common | 1058 | 5464 | 4529 | 5621 | 5283 |
| Lumber, cabinet | 5 | 30 | 4 | 127 | 6 |
| Lumber, common | 119 | 850 | 1374 | 1178 | 529 |
| Total | 1673 | 6398 | 6324 | 7845 | 6005 |
| Balata gum | 604 | 458 | 437 | 195 | 202 |
| Essence of rosewood | 84 | 86 | 92 | 104 | 70 |
| Charcoal | .... | 10 | 41 | 36 | 43 |

**Guyane française: Les bois de tonnellerie.** By M. Demougeot. *Revue Int. des Produits Coloniaux* (Paris) 4: 48: 327–329, Dec. 1929.

As a substitute for Oak for cooperage, the author recommends Angélique, *Dicorynia paraënsis* Huber, and Manil, *Symphonia globulifera* L. f.

**Guyane française: Le bois de rose.** By M. Raibaudi. *Revue Int. des Produits Coloniaux* (Paris) 4: 48: 330–332, Dec. 1929.

A description of the tree and an account of the industry to which it gives rise, *viz.*, the distillation of an essence consumed by the perfume trade in France. The author apparently is in doubt as to the identity of the Bois de Rose (femelle), except that it is a member of the family Lauraceae, but according to Ducke (see *Tropical Woods* 19: 45), it is *Aniba rosæodora*.

**The Macadamia nut in Hawaii.** By W. T. Pope. Bul. No. 59, Hawaii Agr. Exp. Sta., Honolulu, Nov. 1929. Pp. 23; 6x9; 9 illustrations; bibliography. Price 10c (Supt. of Documents, Washington, D. C.).

"The Macadamia Nut (*Macadamia ternifolia*) is a native of Queensland and New South Wales, Australia. It was introduced into Hawaii about 1892, when a few small plantings were made. These trees began to bear in 1908, and by 1910 considerable interest was aroused in the possibility of growing the nuts in commercial quantities.



"A description is given of the tree and the nuts, and suggestions are offered for the propagation of the trees."

**What is bird's-eye bagtikan?** By Luis J. Reyes. *The Makiling Echo* (Laguna, Phil. Is.) 9: 1: 40, Jan. 1930.

"Among the sawmills in Northern Negros, beautifully figured Lauan boards are occasionally found. Quite recently, a similar abnormal Lauan was collected at the sawmill of the Findlay-Millar Timber Company, at Kolambugan, Lanao. In Negros this freak Lauan is erroneously termed 'Bird's-eye Bagtikan.' The 'bird's eye' effect appears in flat sawn boards and consists of isolated rounded or spindle-shaped areas, varying from $\frac{1}{16}$ to $\frac{1}{4}$ of an inch in diameter. The 'eyes' are darker in color than the surrounding tissues, and have a tendency to appear in clusters. The woody tissues surrounding these patches are often normal in appearance except when the eyes are so close together as to interfere with the normal alignment of the wood fibers. The more pronounced and the more regular the markings, the greater the beauty of a board. Sawmill-men carefully lay such boards aside to be made into furniture, novelties, etc.

"An examination of the structure of the board shows that 'Bird's-eye Bagtikan' is not true Bagtikan (*Parashorea malaanonan* [Blco.] Merr.), but Almon (*Shorea eximia* Scheff.).

"We have all heard of the famous Bird's-eye Maple, which is very highly prized for furniture and cabinet making. In Maples the 'bird's-eye' is caused by an indentation in the grain of the wood; *i.e.*, the fibers are arranged in a different manner from those of the normal wood, thus reflecting light differently.

"If we examine the 'eye' in the Almon board with a lens we will see that it is composed of dark-colored, thin-walled parenchyma cells, very similar to the material of the pith or medulla, and these cells are also similar to those of the wood rays. In the transverse or end section these appear as broad wood, or pith, rays having their origin in the pith running in a horizontal direction and increasing in size towards the bark.

"Bird's-eye Almon is fairly common in the Northern Negros forests, but seldom are boards found with sufficiently

numerous and regular mottlings to be of value in furniture and cabinet making."

**The "kaiñgin" problem in the Philippines and a possible method of control.** By O. W. PFLUEGER. *Journal of Forestry* (Washington, D. C.) 28: 1: 66–71, Jan. 1930.

"In tropical countries, the most important cause of forest destruction is the shifting method of agriculture practiced by the natives. . . . In the Philippines it is known by the name of 'kaiñgin.' . . . We distinguish two types of kaiñgin in the Philippines: legal and illegal. A legal kaiñgin is one made under written permit, issued by the Bureau of Forestry, the location of which is selected by a forest officer. An illegal kaiñgin is one made without such permission and is located wherever the native finds a desirable place. This, unfortunately, is usually on land covered with forest growth.

"Briefly, the method of making kaiñgin practiced in most tropical countries without much modification is as follows: A part of the forest is selected by the primitive agriculturist and at the beginning of the dry season the trees and brush are cut and allowed to lie on the area until dry. Then the débris is wholly or partially burned.

"At the beginning of the rainy season the crop, usually rice, is planted and allowed to grow and shift for itself. Some grass and weeds come in, but the crop is in fairly good shape when mature. The same area may be used for a second or third crop, but the wild plants commence to gain the ascendency and the area is then abandoned. The native then goes to a new area and repeats this process."

"Many attempts have been made and numerous remedies proposed, both in the Philippines and elsewhere, to check kaiñgin-making. The best solution appears to be by educating the people and convincing them of the evil effects of this practice. However, the older generation is hard to convince and by the time the younger generation has reached manhood the destruction will have gone so far that the forests will be practically removed. Other methods are by rapid classification of the land into agricultural and forest zones, thus making available new areas for homesteads; a system of farm loans;



an increase in the forestry personnel, so that better patrol and protection of the forests can be secured; stringent laws which provide a heavy fine and imprisonment; and a system of making kaiñgin under contract which is practically a method of *forest colonization*.

"This latter method is, in the opinion of the writer, the best solution of the problem, for the present at least. It has been tried for the past seven years and has been found very satisfactory. A brief explanation of this system of control is given here.

"In 1910, when the Makiling Forest Reserve in the Province of Laguna, Island of Luzon, was established, a large number of squatters were found occupying the lower slopes of Mt. Makiling, making kaiñgins and cutting the forest growth indiscriminately and unchecked. They were therefore required to plant their kaiñgin areas, after harvesting the crop, with forest trees, but this method proved unsuccessful.

"In 1920, this Forest Reserve was designated as the Makiling National Botanic Garden and shortly after that its administration was placed in the hands of the Division of Investigation. The kaiñgineros were then granted annual permits to make clearings in places selected by the forest officer and after the crop was harvested were not allowed to shift to a new area. In most cases the areas granted were semi-agricultural in character and consisted of land which could be plowed. Some areas covered with brush and climbing bamboos were opened up so as to be available for reforestation a year or two later.

"Before a permit was granted to the kaiñginero he was required to sign a contract, the main conditions of which are as follows:

"1. The kaiñginero admits he has no title to the land.

"2. He agrees to furnish six days' free labor for each hectare he has under cultivation. If he cultivates less than a hectare he works the corresponding number of days. However, he is required to furnish at least three days' labor.

"3. He promises to observe the laws and regulations applying to the public forests.

"4. He is not allowed to plant permanent crops; annual crops only are permitted.

"This method is much more successful than the old one in which the kaiñginero was required to plant his clearing. It provides a concentration of labor in one place where it can be properly supervised. Areas in need of reforestation can be planted readily and very cheaply as the only costs involved are the raising and transporting of the nursery stock and the supervision.

"The main essential is a wide-awake, energetic forest officer in charge. The kaiñginero must be properly controlled and made to understand that any violation of the contract on his part will result in the cancellation of his permit. In the past the squatters on Mt. Makiling were troublesome, but under this new system there has been no difficulty in handling them and thus far not one has refused to report for work when notified."

**The common commercial timbers of India and their uses.**

By H. Trotter. Govt. of India Central Pub. Branch, Calcutta, 1929. Pp. 153; 5½ x 8½; 13 plates. Price 3s.

"A great deal has been written, of late years, concerning the 'vast forest wealth' of India. The fact remains, however, that except for Teak and a few parcels of other timbers from Burma, Madras, and the Andamans, there is practically no export of timber from this country. In the same way, the Indian markets concentrate on Teak, Sal, Deodar, and a few other well-known woods, while local craftsmen content themselves with the cheapest timber available, whether suitable for the purpose for which it is intended or not.

"This state of affairs could be understood when the prices of the well-known woods were low, but during the past decade prices have risen considerably and in some cases are now almost prohibitive to the consumer. Even the large timber users like the railways, the Ordnance Department, and the Public Works Department began to grow anxious when the price of Teak rose to a figure which was beyond all thought fifteen years ago. As a sequel to this unsatisfactory state of affairs, the Railway Board, in 1924, inaugurated an enquiry to investigate the possibility of using timbers other than Teak for railway carriage and wagon building and for repairs. The results of this enquiry are recorded in Mr. H. G. Norman-White's Report, published by the Oudh and Rohilkhand (now the East Indian Railway) Press, Lucknow, in February, 1925.



"As this report was a Railway Board publication and was not available, in a general way, to the public, it was considered that a similar treatise, published by the Forest Research Institute at Dehra Dun, and dealing, not only with timbers suitable for railway work, but also with those woods considered suitable for the general use of Indian timber merchants, both large and small, might serve a useful purpose.

"This, then, is the *raison d'être* of this publication.

"At the same time, it has become more and more evident that the technical literature on Indian timbers, published from time to time by the Forest Research Institute, rarely attracts the ordinary layman, and is little read even by timber merchants themselves.

"Every effort has been made, therefore, to make the present publication as simple as possible, and it is hoped that it will help to supply a much needed want to the trade.

"In this connection, it is only right to mention that Mr. R. S. Pearson, late Forest Economist, published a similar booklet in 1912, namely, *A commercial guide to the forest economic products of India*. This was well received by the trade and was of invaluable help to many who had known little of the subject. Sixteen years have now passed since that first Commercial Guide was published, and it is by way of bringing Mr. Pearson's Guide, as far as timbers are concerned, up to date in an improved form that the present work is placed before the public.

"Before passing on to the book itself, a special word of warning with regard to *seasoning* will not be out of place. The use of unseasoned wood has been the chief stumbling-block to the adoption of India's lesser known timbers, and the importance of proper seasoning cannot be overemphasized.

"A special chapter on air-seasoning, in simple language, has therefore been included in this publication, and if this helps, even in a small way, to eradicate the prehistoric drying methods now carried out by most timber merchants in this country, and to replace them with the simple but no more expensive methods described, then the author will feel more than repaid for his share in this publication."—From author's preface.

**Administration report of the Forest Department, Madras Presidency, 1928. I.** By A. WIMBUSH. Madras, 1929. Pp. 192; 6 x 9¾; illustrated.

"A total quantity of 677 tons of Sandalwood was sold. . . . The year's output, though smaller than that of the previous year by 47 tons, is yet far in excess of the ordinary possibility of the forests. This, as was explained last year, is due to the necessity of extracting trees killed by spike disease. Investigations relating to this obscure disease are being undertaken by the Institute of Science at Bangalore and field experiments are in hand in North Salem division. Since the disease kills young and old trees indiscriminately, much of the Sandalwood revenue comes inevitably from trees which normally would be too young and small to exploit. This unfortunate but inevitable extraction of immature trees must, in the course of time, result in a serious depletion of stock with a corresponding fall in the revenue from Sandalwood. Fortunately, Sandalwood regenerates itself readily from seed, and Nature is everywhere displaying a firm determination to spread the species, whilst the department is fully alive to the necessity of supplementing Nature's efforts by artificial means."

"The study of the natural regeneration in our tropical evergreen forests received and must continue to receive much attention. . . . Experiments in Karien Shola of South Coimbatore tend to show that manipulation of the light conditions, by different degrees of opening of the canopy, is not likely to have the desired effect of stimulating natural regeneration of tree species. In the experimental areas referred to it is interesting to see how the stimulation to the growth of the existing undergrowth and weeds, mostly strobilanthes,



in the place in question has been in direct proportion to the amount of light let in."

"The trial of raising Teak at Nilambur in conjunction with field crops, referred to last year, was continued. The method has given very little satisfaction and the revised working plan recently sanctioned does not contemplate its continuance, at any rate in the Teak plantation working circle. One essential for success in this method is the availability of cultivators anxious to take up the work. Men of the right type ready to work with their own hands, are conspicuous by their absence at Nilambur. . . .

"The revised working plan for Nilambur rightly prescribes a reversion to the methods which gave such success in the past. Great emphasis is laid on the necessity for adequate soil aeration. The use of forks, shaped like mamotties, has recently been tried for uprooting weeds round young plants and for loosening the soil, and the local labor seems to be taking to them kindly. Emphasis is also laid on the desirability of not frustrating Nature's efforts to create a certain amount of mixture in the crop from its earliest days. Silviculturally, we do not like pure Teak.

"In the Mount Stuart plantations of 1926 and 1927 this dislike for pure Teak has found expression in the deliberate introduction of alternating strips, of varying width, of Teak and Rosewood. The Rosewood promised well to start with, but, compared with Teak, its growth in the earliest years is very slow and it is already apparent that the marginal Teak trees which must, of necessity, form no inconsiderable portion of the crop, will have all the disadvantages inherent to Teak trees exposed to full light on one side; excessive branching seems inevitable. The Rosewood, moreover, is badly damaged by deer and other game and is also greatly impeded by weed growth. It is probable that a reversion to pure Teak will be advisable until the Rosewood in the plantations already made has grown up and formed a closed wood with the Teak, after which we shall be in a position to know whether the strip mixture is really unsuitable or otherwise.

"One of the most striking facts in many of the forests in Madras is the amount of damage caused by climbers. Recent

working plans contain prescriptions for combating this evil and much good has undoubtedly been done. . . .

"Madras can certainly uphold the opinion formed in several other provinces that artificial regeneration of most species, other than Teak, is so precarious without adequate wire fencing as to be of doubtful justification."

**Report on a second tour in the Province of Surat, Southern Siam (July 16th–August 16th 1927).** Reprinted from *The Record* No. 32, Ministry of Commerce & Communications, Bangkok, Apr. 1929. Pp. 6; 8½ x 12; 2 half-tone illustrations.

**Report on three tours in the Provinces of Nakawn Sritamarat, Songkla, Satul and Patalung. Tour I (December 21st 1927 to January 31st 1928).** Reprinted from *The Record* No. 33, Ministry of Commerce & Communications, Bangkok, July 1929. Pp. 12; 8½ x 12½; 1 map 11½ x 14½; 7 half-tones and 1 text figure.

These tours were made by a party from the Botanical Section, headed by the Director. The reports are highly interesting and provide intimate glimpses of the country traversed, including not only the vegetation and terrain, but also the inhabitants, living conditions, industries, means of communication, etc.

**The forests of Siam from a commercial aspect.** Section VIII, *Commercial Directory for Siam, 1929* (third edition) by Ministry of Commerce & Communications, Bangkok.

"The forests of Siam, though rich in timbers of value, and in minor forest products of great variety, are at present, from the exporter's point of view, important only on account of the extensive Teak-bearing areas. Other kinds of wood are found and exported to some extent, but they occur for the most part scattered somewhat sparsely throughout the forests and are, therefore, difficult and expensive to work. The tendency is for such woods to be exported when prices are high and for the export to fall off or cease altogether when prices fall. For this reason the export of such woods is small and liable to be intermittent, whereas the working and export of Teak goes



on steadily year after year on a considerable scale without intermission. The further development of trade in these other woods will depend largely on the making of the forests more accessible by railways, rivers, and roads, whether this be carried out by Government or by private agency.

"Forests of one kind or another cover probably as much as 70 to 80 per cent of the country, though much of this is, of course, of poor quality and practically valueless, consisting of swamps, grass land, scrub jungle, bamboos, and forest of secondary growth of inferior species which has originated from shifting cultivation or the burning of forest for temporary cultivation. The distribution of the different classes of forests in Siam depends as elsewhere on climate, latitude, elevation above sea level, configuration of ground, aspect, moisture, rock and soil, proximity to sea, and similar factors.

"The forests of Siam are classifiable under two main types, *viz.*, Evergreen and Deciduous or leaf-shedding:

### Evergreen Forests

"The percentage of evergreen forests in Siam is greater in the south and southeast and decreases as one proceeds northwards, though even in the north there are still to be found fairly extensive areas of evergreen forests, especially in those localities where the configuration of the ground and the amount of rain or river, or spring, water tends to keep the ground and atmosphere fairly damp all the year round. The greater part of the Peninsular forests are of this type; also the damp coastal regions of Prachin and Chantaburi, of which the Sriraja forests are an example, are mostly of the evergreen type. Other extensive evergreen forests are found in the hilly parts of Korat and neighboring provinces, and the famous, or rather infamous, Dong Phya Fai forest is typical of this locality.

"The following are the different kinds of evergreen forest found in Siam: (1) Pine Forests, which occupy the hilly country, mostly in the north, from an elevation of 2000 to 5000 feet, though they are occasionally found beyond those limits; (2) Damp Hill Forests, above 3000 feet; (3) Tropical Forests; (4) Swamp Forests; (5) Littoral Forests.

"There is no need to say much about these different evergreen forests, as few of the commercial woods of Siam come from them. Forests of the kinds (2) and (3) have many species in common and the differences are such as are caused by difference of elevation. The Littoral Forests (5) contain the valuable Mangrove.

### Deciduous Forests

"The deciduous or leaf-shedding forests of Siam differ from those of Europe in that they shed their leaves from two different causes and in two different seasons, whereas in Europe deciduous trees shed their leaves in the winter only from the cold. Here, besides the trees which shed their leaves from the cold in the winter, we have the much larger class which shed their leaves in the spring and summer on account of the dryness and excessive heat.

"The deciduous forests may be divided into:

"*Laterite Forests*, of which there are a plain and a hill type, obtaining their strong individuality from the laterite soil on which they are found growing. The characteristic species of those forests are *Shorea obtusa* (Mai Teng), *Pentacme siamensis* (Mai Rang), *Melanorrhœa usitata* (Mai Rak), *Terminalia macrocarpa*, *Strychnos nux-vomica*, *Odina Wodier*, *Lagerstroemia macrocarpa*, and *Dipterocarpus obtusifolius*. This last produces timber of inferior quality and yields a small quantity of oil.

"*Dry Forests*. These forests occur mostly in the north on calcareous sandstone formations, especially where they are overlaid by deposits of gravel, or by shingly or sandy soils. These forests are mostly very open, with a herbage of thin grass. The characteristic trees are *Acacia catechu*, *Garuga pinnata*, and *Anogeissus acuminatus*. One or more species of *Bombax*, *Dalbergia*, *Diospyros*, *Vitex*, and *Albizzia* are frequent associates. The first mentioned, *Acacia catechu*, is the commercially valuable tree of these forests. It is often found nearly pure over considerable areas. It yields the valuable cutch, used in the tanning, dyeing, and medicinal industries.

"*Upper Mixed Forests*. These forests are confined to hilly country and grow on siliceous sandstone or metamorphic rocks, the former producing trees of straighter and taller



growth than the latter. The most important tree of this forest is the Teak, *Tectona grandis*, and it is chiefly associated with such trees as: *Pterocarpus indicus* (Mai Pradoo), *Xylia dolabriformis* (Mai Deng), *Lagerstroemia tomentosa* (Mai Salao), *Garuga pinnata*, *Bombax insigne*, several species of *Sterculia*, *Terminalia*, *Cassia*, and many others.

"There is no clear-cut line between this class of forest and the next—the Lower Mixed Forest; the one merges into the other gradually, and both of them vary greatly and merge into other types of forest, such as the Dry Forest and different kinds of Evergreen Forest according to the differences in rock and soil formation, more or less moisture, aspect, slope, and other factors.

"*Lower Mixed Forests*. These forests occupy the lower situations and the alluvium, and change gradually as they approach the banks of the larger rivers and ascend the lower slopes to the Upper Mixed. They contain practically the same kinds of trees as are found in the Upper Mixed, but the growth is more stunted and the undergrowth and herbage are denser, and with different species.

"Teak is found in these forests, but generally much scattered, a large tree here and there, with practically no regeneration. In such forests the Teak seems to be disappearing, being unable to hold its own against trees more suited to the conditions. This seems to indicate a change in type of the forest due to changing conditions.

"In addition to the trees mentioned as occurring in the Upper Mixed Forest, the characteristic trees are: *Albizzia odoratissima*, *Albizzia procera*, *Cedrela toona*, *Cassia fistula*, *Nauclea sessifolia*, *Nauclea diversifolia*, *Nauclea parvifolia*, *Randia uliginosa*, *Lagerstroemia flos-reginae*, *Grewia laevigata*, *Butea frondosa*, *Bombax malabaricum*, and *Careya arborea*. The bamboos commonly found in these forests are *Cephalostachyum pergracile* (Mai Khao Lam) and *Bambusa arundinacea* (Mai Pai).

"The Upper and Lower Mixed Forests are the most valuable in the country, containing as they do most of the highly prized timbers. They are found mostly in the center and north of Siam, but also in the northern part of the Peninsula

—the Rajburi and Nakon Chaisri provinces—and other places.

### Timber Working

"Besides Teak[1] there are many kinds of trees producing fine timber. As most of these timbers are hard and heavy, they do not pay to bring to Bangkok, with the exception of a few valuable kinds which are required for export to foreign countries. These timbers are extracted to the river in the same way as Teak, but in floating them down to Bangkok they must be lashed to pontoons made of bamboos to keep them buoyant. In recent years large quantities have been transported to Bangkok by rail. The following timbers are worked largely for export to China and Japan: *Dalbergia* spp. (Rosewood), *Pterocarpus indicus*, *Gardenia* sp., *Diospyros mollis*, *Diospyros ebenum*, *Cassia* spp., and other kinds of black wood.

"A large number of logs of *Lagerstroemia calyculata* (Tabek), *Shorea obtusa* (Teng), and *Pentacme siamensis* (Rang) are annually sent to Bangkok for local consumption in building, for timber and house posts.

### Minor Forest Products

"A very large number of bamboos of various kinds are cut for local domestic as well as for fishing purposes.

"Many kinds of canes are collected both for export and local use.

"Lac is produced in the forest as well as in regular plantations. Most of the lac produced in Siam is sent out of the country; the quantity of sticklac exported in the year 1927–1928 amounted to 32,400 piculs, valued at Baht 2,213,000.

"Gutta-percha, Gum Benjamin or Benzoin, Dammar, Gamboge, and wood oils are also obtained from the forests, the quantities produced fluctuating according to the demand and the prevailing market prices. A reference to these will be found in the article on Economic Botany."

[1] A special article on Teak comprises Section IX of the Directory.



**Forestry in the Malay Peninsula.** By B. H. F. Barnard. *Journ. Cambridge Univ. Forestry Assn.* 4: 1: 7–12, 1929.

"The forest is of the type generally known as mixed tropical rain forest and is composed of a multitude of broad-leaved species. There is a larger number of tree species in the Malay Peninsula than in the whole of India and Burma. The forest is everywhere very dense, and it is impossible to move about in it without cutting one's way unless following a track previously made—and these are few and far between. The average height of forest of good quality is about 150 feet, the tallest record height measurement that can be guaranteed being 265 feet. This was a tree of the *Dyera* species, of the order Apocynaceae, which not infrequently exceeds 200 feet.

"As regards the kinds of trees of which the forest is made up, the Dipterocarpaceae are the most numerous and the most valuable. Valuation surveys indicate that in good forests about 60 per cent of the total volume of timber is produced by trees belonging to this order of the hardwoods. That known locally as Chengal or Benak (*Balanocarpus Heimii* King) is generally considered the best for heavy structural purposes. Its weight is about 67 lbs. per cubic foot and the trees obtain very large dimensions. The biggest specimen recorded had a height of about 200 feet, with a clear bole up to 125 feet and a girth of over 40 feet, 12 feet from the ground. There are several other hardwoods which are not far behind Chengal in point of value. Of the medium-hard woods, that known as Meranti (*Shorea* of many species) is the most abundant and most useful. It is used generally for purposes for which coniferous woods are used in temperate climates."

"The Government has declared its policy that the country shall be self-supporting as regards timber. It is impossible to forecast what the local demand for timber may be in the distant future, but there is no doubt that with good management the forest resources are equal to any demand that is likely to be made on them, and it is probable that in years to come there will be a surplus of certain kinds of timber available for export."

**Estate and native plantation rubber in the Middle East, 1929.** By H. N. WHITFORD. Pub. by The Rubber Mfgrs. Assn., Inc. (250 West 57th St., N. Y.), 1930. Pp. 120; 6 x 9; 30 half-tone cuts; 1 map, 6½ x 9.

"The area planted to rubber in the Middle East at the end of 1928 is estimated at 7,002,000 acres. The planted area for the rest of the world is estimated at 65,000 acres, making a grand total of 7,067,000 acres.

"The total area of productive age in the Middle East in 1929 is estimated at 4,715,000 acres. The area which it is estimated will be in production in 1935 in the Middle East is the area planted at the end of 1928, *i.e.*, 7,002,000 acres.

"Of the total planted area in the Middle East as of the end of 1928—3,286,000 acres, or 47 per cent, are owned by Europeans and Americans and the remainder by Asiatics.

"As of the same date, the area located in British territory amounted to 3,703,000 acres, or about 53 per cent, and 3,299,000 acres, or about 47 per cent, were in non-British territory.

"The total production of rubber in the Middle East during the year 1929 is estimated at 813,000 tons, of which 542,000 tons, or two-thirds, will be produced in British territory and 271,000 tons, or one-third, in non-British territory. The total production of rubber outside the Middle East (mostly wild) during 1929 is estimated at 30,000 tons, making an estimated world production of 843,000 tons for this year.

"Total world exports for 1929 are expected to be 20,000 tons or more in excess of world production.

"The potential productive capacity for 1935 in the Middle East is estimated at 1,230,000 tons, of which 598,000, or about 49 per cent, will come from British territory, and 632,000 tons, or about 51 per cent, from non-British territory. The potential productive capacity of the rest of the world (including wild and some plantation) in 1935 is estimated at 65,000 tons, making an estimated world potential productive capacity for 1935 of 1,295,000 tons.

"For the Middle East, the average production in 1929 is estimated at 386 pounds per acre. For European estates, the estimate is 351 pounds per acre, and for the productive area controlled by Asiatics, the estimated yield is 427 pounds per acre.

"In 1929 the estimated production of British Malaya alone is 435,000 tons, or 53 per cent of the total estimated production for the Middle East; while the Dutch East Indies will, it is estimated, produce 258,000 tons, or 32 per cent of that total. If the present planted area of the Middle East should be fully tapped in 1935, it is estimated that the Dutch East Indies will produce 46 per cent of the total for the Middle East for that year, and British Malaya 37 per cent.

"In 1929 British Malaya and the Dutch East Indies together, will, it is estimated, produce 693,000 tons of crude rubber, or 85 per cent of the estimated total for the Middle East for this year. For 1935 the potential capacity of these two regions is estimated at 1,018,000 tons, or 83 per cent of the estimated total for the Middle East for that year."



**De handel in het Nederlandsch-Indische copal (Manila copal) en het gebruik er van voor verschillende industrieële doeleinden.** By C. VAN DE KOPPEL. Pub. No. 2, Dienst van het Boschwezen in Ned.-Indië, Buitenzorg, Java. Reprinted from *Tectona* XXII, Nov. 1929. Pp. 139; 6¼ x 9½; illustrated.

The Netherlands Indies almost monopolize the exports of Manila copal and of damar, the most important resins of the Archipelago. The production of rosin and turpentine has only just begun, and the shellac industry has not yet become established, although there is a possibility that it will.

Manila copal is the name of the resin exuded from the bark of *Agathis alba* Foxw. Owing to lack of uniformity in the behavior of the resin from *Agathis* trees in different regions it seems likely that more than one species is involved. About 90 per cent exported from Netherlands Indies is tapped from the tree—70 per cent soft and 20 per cent semi-hard; the other 10 per cent is hard Manila copal, mostly dug out of the ground.

The relative importance of the different producing regions is: Moluccas, 47 per cent; Celebes, 44 per cent; Borneo, 9 per cent. More than three-fourths of the product is exported from Macassar harbor.

Hard Manila copal is exclusively employed for oil varnishes prepared by "running" the gum with linseed oil. The demand is declining, due in part to the competition of tung oil and rosin, and in part to lessening consumption of oil varnishes, especially in the automobile industry where nitrocellulose lacquers are used instead. Soft Manila copal is principally used in the manufacture of spirit varnishes and is in many instances being replaced. Semi-hard Manila copal finds its principal use in the making of gramophone records and large quantities are consumed for this purpose.

In order to prolong the life of the present industry, the author recommends that efforts be made to improve the quality of Manila copal, and emphasizes the need for experimental research with a view to the discovery of new applications for the product if its commercial importance is to be maintained.

**De handel in den Ned.-Indischen rotan en het gebruik er van voor verschillende industrieële doeleinden.** By C. VAN DE KOPPEL. Pub. No. 3, Dienst van het Boschwezen in Ned.-Indië, Buitenzorg, Java. Reprinted from *Tectona* XXII, Nov. 1929. Pp. 52; 6¼ x 9½.

An account of the rattan industry and descriptions of the most important species. The annual world consumption of rattan amounts to about 43,000 tons, of which over 90 per cent originates in the Netherlands Indies, as follows: Southern and Eastern Borneo, 40 per cent; Celebes, 33 per cent; South Sumatra, 8 per cent; Menado, 6 per cent. Rattan is not exported from the Moluccas because the freight rates to Macassar are prohibitive. The best sorts come from Sumatra and Borneo; as for the Celebes product, the core is used for "reed," but the outside is unfit for "cane."

The author is of the opinion that the limit in the consumption of rattan has been reached, and that the maintenance of the industry depends upon the discovery of new applications, development of markets in countries where it is now little used, and lowering freight rates.



**Karri bark as a source of tannin.** By W. E. COHEN. Reprint, *Journ. Council for Sci. & Ind. Research*, Australia, 1929. Pp. 4; 6 x 9½.

"Karri (*Eucalyptus diversicolor*) occurs in dense forest in the extreme southwest of Western Australia. The timber is extensively milled at several centers and the bark, which is very thick and dense, is wasted in the bush or is burnt at the mills. A recent investigation, under wet-season conditions, has shown that if all the bark is recovered from the logs at the falling site, together with a proportion from the tops, approximately 24 tons of green bark would be available at the largest mill for each working day of a 26-day month. This yield is estimated for about seven months of the year, the circumstances arising during the dry months having still to be studied."

"Even at this early stage, it is possible to predict that a satisfactory solution to the problem of the extraction of the tanning matter from Karri bark has been obtained. A clear liquid extract with a bright color can be produced. The process is very simple, involving open vat treatment at ordinary pressures but at elevated temperatures, and displacement of the strong liquor by the press leach system. No complicated plant, such as autoclaves, will be required and the greatest cost items at present appear to be steam, and power for disintegration purposes. It is anticipated that production costs will be sufficiently low to attract commercial exploitation of Karri tannin extract and thus eliminate at least one waste from the forests of Western Australia."

**Australian rain-forest trees (excluding the species confined to the tropics).** By W. D. FRANCIS. Commonwealth Govt. pub., Brisbane, 1929. Pp. 347; 6 x 9¾; 213 full-page half-tone plates, 25 text figs., 1 rainfall map.

A compendium of useful information, profusely illustrated with excellent reproductions of good photographs of trees and herbarium specimens, and some photomicrographs and drawings. In addition to the descriptions and illustrations which make up the bulk of this work, there are several short chap-

ters and notes which give evidence of the author's wide range of interest and observation.

"At the inception of this work it was intended to describe and illustrate about 100 of the principal, large species of trees of the rain forests. Subsequently it was thought advisable to make the work more comprehensive. In fulfilment of this purpose brief descriptions of the less important species of trees were added. As far as practicable it has been my object to include all Australian rain-forest species except those confined to the tropics. In determining which species are rain-forest ones, I have been directed chiefly by personal knowledge. In the principal descriptive works there has been very little discrimination as to the type of forest the species inhabit. In view of the circumstances, it is to be expected that at least some omissions of rain-forest species will be detected.

"In the attempt at comprehensiveness, unfortunately it happens that many of the descriptions are much less detailed than others. To have expanded the shorter descriptions to the size of the large, earlier ones would have brought about a desirable degree of uniformity, but the size of the work would have been multiplied and the expense of publication correspondingly increased. The species whose range is confined to the tropics have been excluded because of insufficient knowledge of their field characters. They could not be described with the same degree of familiarity as the large trees of the rain forests situated in the subtropical parts of Eastern Australia. However, a large number of the species found in the rain forests of the subtropical portion of the continent extend into the tropics. Because of this northerly extension of the range of many species, a knowledge of the trees described in this work is certainly helpful to persons studying the trees in the tropical rain forests of Northern Queensland. Apart from the actual species common to the tropics and subtropics, many of the purely tropical species are allied to species in the subtropics. In many instances the tropical species can be assigned to their families by a person familiar with the species in the rain forests within the subtropics.

"At the commencement of the work it was recognized that the usual botanical descriptions are unintelligible to the aver-



age reader. This fact has come under my notice repeatedly. For this reason the descriptions have been made as simple as possible and technical terms avoided as far as practicable. In the detailed descriptions (to the number of about 100) the field characters of the trees are given special attention. These field characters in the past have been very much neglected. The notes on the bark in the descriptions were made in the field and in most cases from the specimens illustrated."—From author's preface.

**Trees from other lands for shelter and timber in New Zealand: Eucalypts.** By J. H. Simmonds. Auckland (Brett Printing and Pub. Co.), 1927. Pp. XVIII plus 164; 9½ x 12; 76 botanic and 28 scenic plates. Price £2 10s.

"This book covers a wide range of topics relevant to its main theme. In Section III seventy species, including all the most valued timber yielders of the genus and some others of less importance, are described in detail, each being given a separate botanic plate. At the end of the volume is a descriptive list of all the species of *Eucalyptus* named and recorded up to the date of this publication. Based upon the very latest investigations into the character and growth of the Eucalypts, splendidly illustrated, and enriched with constant references to the classics of Eucalyptology, this book is certain to become a standard authority on the cultivation of these trees, and long to retain its position.

"An original and unique feature of *Eucalypts in New Zealand* is the distribution of species in thermometric groups. The seventy species described and illustrated in Section III are arranged in six groups according to the mean and exceptional degrees of temperature it is believed they will endure. The scheme is bold and admittedly tentative; but to those who will heed the grouping and instructions it cannot fail to ensure immunity from serious loss due to the thermometric conditions of any given locality.

"The list in Section VII of the book is an alphabetical and briefly descriptive index to the 400 species described in Maiden's *Critical Revision*. This index will greatly facilitate

the task of reference to Maiden's work; and for those who cannot possess the *Critical Revision* it will still serve as an exceedingly valuable botanical catalogue of the species.

"In addition to sound and comprehensive scientific information, this book contains a great store of general instruction and suggestion of immense value to the practical man."—From foreword by Profs. CORBIN and GROSSMANN.

**L'arganier, essence forestière particulière au Maroc.** By PASCAL PROVASOLI. *Le Monde Colonial Illustré* (Paris) 8: 77: 20, Jan. 1930.

A short description of the Argan tree, *Argania sideroxylon*, an interesting and useful representative of the otherwise tropical family Sapotaceae, growing in the temperate climate of Morocco.

**La forêt de gommiers du Bled Talha (Sud-tunisien.)** By L. LAVAUDEN. Reprint from *Revue des Eaux et Forêts*, Nov. 1929, pp. 15. Illustrated.

A very interesting account of a desert island of open *Acacia* forest, a tropical relic considered one of the most remarkable natural curiosities of northern Africa. The principal associates of the *Acacia* (the exact species being in doubt) are Jujubier (*Zizyphus lotus* L.) and Sumac (*Rhus oxyacantha* Cav.). Gommier trees make very slow growth, those 16 inches in diameter being 120 to 130 years old, while the largest (about 36 inches) are at least 300. They yield a good quality of Gum Arabic.

**Kenya. Annual report of Forest Department, 1928.** By H. M. GARDNER. Nairobi, 1929. Pp. 32; 6 x 9¾.

"The idea appears to be prevalent that the Colony's forests are so limited that they are rapidly being cut out and a reduction in the annual cut would therefore be welcome. This is entirely contrary to the facts. The Colony's forests are very small compared to the total area of the country, but in comparison with the present consumption the Colony's timber resources are very large indeed. At the present rate of



cutting there is enough timber to last at least 200 years. As existing plantations will begin to yield abundant supplies of timber in 50 to 60 years' time it is obvious that we could well afford to double or treble our present rate of cutting, and, in fact, until this is done a large potential and legitimate revenue is being lost and capital is lying idle. . . .

"The more difficult problem is to find markets for the considerable quantity of timber that will be available. There will probably not be much difficulty in the case of pencil Cedar [*Juniperus procera*]. As regards other timbers, the Department is taking steps to have the more abundant species, such as Musharage (African Olive) and Camphor, thoroughly tested and reported on in England. The proposed East African Forest Research Institute, if it were established, would prove invaluable for this work, and would enable far more timbers to be tested and in a much more thorough manner, particularly as regards seasoning."

"The interest in this wood [Cedar] for pencil manufacture increased considerably during the year, as is shown by the larger export, *viz.*, 39,551 cubic feet, compared with 13,548 cubic feet in the previous year.

"The outlook for this trade appears to be bright, provided only carefully selected, accurately sawn, and thoroughly seasoned slats are shipped and the price is moderate. A process has been developed in England for rapid treatment of the slats which appears to be most successful in seasoning and at the same time slightly softening the wood. The process appears to be a valuable one, which should help the trade considerably. Provided, however, the slats are carefully selected and thoroughly air seasoned, *i.e.*, scientifically stacked under properly regulated conditions of air and moisture for, say, twelve months, the wood appears to be entirely suitable for pencil manufacture without artificial treatment. . . .

"There are very considerable quantities of pencil Cedar in the Colony, but the survey of these is still very incomplete. The existing sawmills with Cedar concessions can supply any immediate demands, and it is hoped in the near future to have other areas ready for exploitation."

**A tour of the Anglo-Egyptian Sudan.** By T. F. CHIPP. *Empire Forestry Journal* 8: 1: 37–44, 1929. Illustrated.

"South of the 13th parallel, up the Nile, or southwards through Kordofan, the type of vegetation changes and a new belt is entered. This is characterized by the almost sudden dominance of the Combretaceous trees, chiefly Combretums and Terminalias, whilst other Leguminosae such as *Entada* and *Bauhinia* come to share the representation of this family with the Acacias. The general appearance of the country now is that of an open woodland, for the trees are still too isolated to attempt to form a canopy.

"That trees exist at all, let alone present a woodland appearance, is remarkable, for these vast tracts of country are fire-swept almost annually, large herds of goats ruthlessly graze not only everything that nourishes but everything that interests and pleases them, everywhere within long reach of habitation, whilst shepherds break down the branches of the taller trees which the camel does not require, to help provide the goat and the sheep with additional fodder."

"Along most of the White Nile the trees form a narrow and interrupted fringe along high water mark only, with the Haraz (*Acacia albida*) as a characteristic tree of the countryside. . . . But the trees of this fringe have a precarious existence between the time they are partially submerged at flood time and the period of ruthless grazing to which they are submitted for the rest of the year. . . .

"A little above Kosti the steamer passes the first of the areas adjoining the river which have been afforested by the Forest Department under 'rainland' conditions. . . . The Taufikia plantation, which is the largest, stretches some three to four miles along the east bank of the river and is about half-a-mile deep, covering 700 acres. The first plantings were in 1923 and have subsequently been continued. The seed is of *Acacia arabica* gathered from the Blue Nile forests and treated with sulphuric acid before it is sown at stake at distances of 1 m x 1 m. The progress of these trees, especially those nearer the river, is most encouraging, but the imminent



danger from the inflammable tall grasses renders fire protection of first importance to the success of the scheme.

"Shortly after leaving Taufikia, the mouth of the Bahr el Zeraf is passed and Lake No entered. This is the region of the great mass of floating vegetation popularly known as the Sudd. . . . Behind it in most directions is a modified form of the Combretaceous type of vegetation previously mentioned, whose colonizers, notably *Acacia Seyal* (Red Talah), are continually advancing or retreating according to the amount of land uncovered or flooded.

"In the Sudd itself the most interesting tree is perhaps the Ambatch, which is chiefly *Herminiera elaphroxylon*, though species of *Aeschynomene* are also known by this name. This tree, which grows in isolated clumps 20 to 30 ft. above the water, has an exceedingly light wood, and is much sought after by the river-dwelling population for canoe rafts and as floats for firewood and timber rafts. Its beautiful large buttercup-yellow flowers give it an attractive appearance, though the sharp spines which occur freely over its stem do not invite closer acquaintance.

"The Sudd gradually decreases to a fringe from about Bor southwards, and the country around as far as the head of steamer navigation at Rejaf, 1090 miles south of Khartoum, is occupied by the Combretaceous type of vegetation. . . .

"Westwards out of Rejaf a good all-weather motor road runs through to Aba in the Belgian Congo, some 160 miles. About 50 miles along this road an escarpment is ascended to the edge of a plateau averaging between 3000 and 3500 ft. The belt of *Oxytenanthera abyssinica* fringes the plateau and then the vegetation changes into the 'Sudanese' type, another of the belts which stretches across tropical Africa from French Guinea.

"The plateau, which is deeply furrowed by heavily-forested ravines, is the actual watershed between the Nile and the Congo, or rather, in this particular area, between their respective tributaries the Bahr-el-Gebel and the Uélé. . . . Both in its general physiognomy and in its composition it resembles

the type of vegetation popularly called 'savannah' or 'savannah forest' in Central and West Africa. . . . The rainfall over this area is in the neighborhood of 50 inches annually, and the soil formation is typical of the moist tropics, with 'laterite' capped ridges and black soil in the bottom of the undulations.

"The country of south-central Mongalla to the east of Rejaf presents a similar variation. Below 2000 ft. the Combretaceous type of vegetation is general, its composition and the abundance and development of the trees depending on the frequency of the fires and the grazing from the villages. Above 2000 ft. towards Opari the 'Sudanese' vegetation again appears. . . . The 'Sudanese' type of vegetation extends generally over the hillsides, but along the course of the ravines the closed equatorial forest threads its way, creeping up to some 6000 ft., when it gives place to a forest of a higher zone. *Khaya*, *Entandrophragma*, *Alstonia*, and *Chlorophora* form the predominant trees, with Rubiaceae common in the middle strata. . . .

"As the mountains are ascended the forests of the ravines and of the mountain sides change in their composition until, above 8000 ft., the open spaces become mountain meadows and the ravines are filled with the *Podocarpus* forest similar to that found on other tropical African equatorial mountains. The trees are festooned with lichens and mosses, and the edges of the forests are fringed with the mountain bamboo. As the highest point, Mt. Kineti, is approached the tall growth becomes dwarfed and above 10,000 ft. is reduced to a few bushes, chiefly of *Hypericum lanceolatum* and *Lasiosiphon glaucus*. The actual summit, 10,414 ft., is devoid of trees and shrubs."

**Détermination botanique des *Entandrophragma* de la Côte d'Ivoire.** By MARTINEAU. *Bull. Mensuel de l'Agence Écon. de l'A. O. F.* (Paris) 11: 110: 49, Feb. 1930.

Four species of *Entandrophragma* are known in the Ivory Coast. They are: *E. macrophyllum* (Tiama), *E. utilis* (Sipo), *E. Candollei* (Kosipo), and *E. cylindricum* (Aboudikro).



**Étude sur le tempérament des principales essences de la Côte d'Ivoire.** By MARTINEAU. *Actes et Comptes Rendus de l'Association Colonies-Sciences* (Paris) 6: 56: 30–35, Feb. 1930.

A report on the observations made by members of the Ivory Coast Forest Service of the effects of different densities of forest cover on the seed germination and seedling height growth of 20 species of trees (including Asiatic Teak). They are arranged in the following groups of shade tolerance:

| | | |
|---|---|---|
| | LIGHT-DEMANDING SPECIES | |
| Badi | *Sarcocephalus Pobeguini* | Rubiaceae |
| Bahia | *Mitragyne macrophylla* | Rubiaceae |
| Fraké | *Terminalia altissima* | Combretaceae |
| Framiré | *Terminalia ivorensis* | Combretaceae |
| Iroko | *Chlorophora excelsa* | Moraceae |
| Samba | *Triplochiton scleroxylon* | Sterculiaceae |
| Teak | *Tectona grandis* | Verbenaceae |
| | SHADE-ENDURING SPECIES | |
| Aboudikro | *Entandrophragma cylindricum* | Meliaceae |
| Avodiré | *Turreanthus africanus* | Meliaceae |
| Bossé | *Guarea cedrata* | Meliaceae |
| | INTERMEDIATE SPECIES | |
| Acajou | *Khaya ivorensis* | Meliaceae |
| Acajou blanc | *Khaya anthotheca* | Meliaceae |
| Dibétou | *Lovoa Klaineana* | Meliaceae |
| Makoré | *Mimusops Heckeli* | Sapotaceae |
| Niangon | *Tarrietia utilis* | Sterculiaceae |
| Tiama | *Entandrophragma macrophyllum* | Meliaceae |

**Le niangon.** By AUBREVILLE. *Bull. Mensuel de l'Agence Écon. de l'A. O. F.* (Paris) 11: 110: 49–52, Feb. 1930.

A full account of the tree known in Ivory Coast as Niangon, including range and abundance, site requirements, botanical characters, and properties and uses of the wood. The rather soft, reddish wood has a golden satiny luster, is easy to work, and is highly appreciated locally for carpentry, furniture, and cabinet work. It is often sold as Mahogany. Following is the number of trees cut from 1924–1928: 1041 in 1924; 873 in 1925; 844 in 1926; 1865 in 1927; 737 in 1928.

The author uses the name *Heritiera utilis* for this tree, but this is a synonym for *Tarrietia utilis* Sprague. Additional synonyms are *Cola proteiformis* Chev. and *Triplochiton utilis* Sprague. Other species of *Tarrietia*, with similar wood, occur in Australia, Malaya, French Indo-China, and the Philippines; in the last-named country the best-known species (*T. javanica*) is called Lumbayao.

**A text-book of tropical agriculture.** By Sir Henry Alford Nicholls, revised by John Henry Holland. London (Macmillan & Co., Ltd.), 1929. Pp. 639; 5 x 7¼; 213 illustrations. Price 15s.

A revision and enlargement of a standard work which was originally published in 1892 and subsequently reprinted seven times. Although intended primarily as a text-book for the use of schools and colleges in the West Indies it has had a far wider circulation and influence. The great expansion in the field of tropical agriculture had made it imperative that the book, to maintain its importance, should be brought up to date,—an exacting and arduous task calling for a wide range of knowledge and experience. For this Mr. Holland was peculiarly fitted and he has done his work with characteristic thoroughness and care.

**Oregon hardwood industries.** By William A. Fowler, assisted by Ronald H. Robnett. Univ. of Oregon Business Administration Series, Vol. 1, No. 4, Dec. 1929. Pp. 96; 6¾ x 10; 4 charts; 4 half-tone cuts.

Contains much useful information concerning the introduction and utilization of tropical woods in the United States, with particular reference to the strategic position of Oregon in the further development of hardwood industries. Some of the chapter headings are: Foreign hardwoods used on the Pacific Coast (pp. 35–46); Philippine hardwoods used on the Pacific Coast (pp. 47–55); Introducing new hardwoods to the Pacific Coast trade (pp. 56–69); Attitude of ocean shipping companies toward development of foreign hardwood trade (pp. 70–71).

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Yale University — School of Forestry

# TROPICAL WOODS

NUMBER 23 — SEPTEMBER 1, 1930

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Yale University School of Forestry

# TROPICAL WOODS

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*A technical journal devoted to the furtherance of knowledge of tropical woods and forests and to the promotion of forestry in the Tropics.*

*The editor of this publication and the writer of any articles therein, the authorship of which is not otherwise indicated, is* SAMUEL J. RECORD, *Professor of Forest Products, Yale University.*

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## THE WALLABAS OF BRITISH GUIANA

*By* J. B. AITKEN, *Assistant Conservator of Forests*

There are several trees producing timber commonly known as Wallaba in British Guiana, but the best known are the Ituri Wallaba (*Eperua Jenmani* Oliver) and the Soft Wallaba (*E. falcata* Aubl.), the timbers derived from these two trees being indistinguishable commercially. Other trees known locally as Wallaba have been identified as *Eperua Schomburgkii* Benth. and *E. rubiginosa* Miq.; Yoboko Wallaba, *Eperua* sp., probably *E. Hohenkerkii* Sprague; Clump Wallaba, *Dicymbe corymbosa* Benth.; and Water Wallaba, *Vouapa bifolia* Aubl. The following statements refer principally to Soft and Ituri Wallabas, as the information available regarding the other species is scanty.

### DESCRIPTION OF TREE AND FOREST

The trees are small, diameters of over 24 inches not being

common, and the heights average about 80 feet. They make fairly rapid growth and, under suitable conditions, when a Wallaba forest has been cut over the area is ready for cutting again in about 30 years.

Wallaba occurs in almost pure stands and while these are to be found throughout the greater part of the forest lands, the most extensive areas occur in the central and eastern part of the Colony and on the white residual quartz sands of the more elevated portions. This partiality of Wallaba for the white sands is very marked and, although scattered Wallaba trees may be found in almost every type of forest, there is a distinct line where one type of forest ends and Wallaba forest on white sand begins, the Wallaba type being obviously an edaphic climax. This white quartz sand is useless from an agricultural point of view, but it is capable of supporting Wallaba forest averaging 600 cubic feet of merchantable timber per acre.

There are excellent Wallaba forests adjacent to good loading berths on some of the larger rivers of the Colony, which are navigable for ocean-going steamers. The water has been analyzed and its suitability for use in the manufacture of paper pulp determined, while the head of water available offers a potential source of power.

## Properties of the Wood

*General description:* Sapwood dingy white, with resinous streaks; clearly defined. Heartwood dull reddish brown, deepening to reddish purple; decidedly resinous. Odor of fresh wood rather acrid, suggesting creosote. Hard and heavy, but not difficult to cut; splits readily and fairly cleanly, the surface of fresh material becoming sticky with exudations from ducts similar to those in Pine.

Although the two kinds of Wallaba are so much alike as not to be kept distinct in the trade, they differ macroscopically in that the rays are deeper, the growth rings more clearly defined, and the pores larger in the Soft Wallaba than in the Ituri.

*Mechanical properties:* The results of tests made by the Imperial Institute on Soft Wallaba are reported as follows:



| | |
|---|---|
| Weight per cubic foot | 52.06 lbs. |
| Crushing strength | 9,599 lbs. per square inch |
| Coefficient of transverse strength | 18,200 lbs. per square inch |
| Coefficient of elasticity | 1,171 tons per square inch |
| Shearing strength | 750 lbs. per square inch |

*Pulping properties:* The results of tests by the Imperial Institute on the suitability of Wallaba as a paper-making material are as follows (*Bulletin* 26: 1: 7, April 1928):

### Chemical analysis

| | | |
|---|---|---|
| Moisture | 16.7 | per cent |
| Ash | 0.58 | " " |
| Cellulose (wood as received) | 33.1 | " " |
| Cellulose (dry wood basis) | 39.7 | " " |

### Dimensions of fibers

| | *Length* | *Diameter* |
|---|---|---|
| Maximum | 2.0 mm. | 0.028 mm. |
| Minimum | 0.6 " | 0.005 " |
| Average | 1.4 " | 0.015 " |

The wood was treated with caustic soda under conditions similar to those employed for the production of paper pulp on a commercial scale. The results are given in the following table and are expressed on a basis of the wood as received.

### Pulping Test

| Parts of caustic soda used per 100 parts of— | | Conditions of digestion | | Parts of caustic soda consumed per 100 parts of wood | Yield of dry pulp | |
|---|---|---|---|---|---|---|
| Wood | Solution | Time | Temp. | | Unbleached | Bleached |
| 20 | 4 | 5 hrs. | 160°C | 10.0 | 35% | 32% |

Under the conditions of the trial a well-reduced pulp was obtained which felted well and furnished a soft, grayish brown paper of good strength and quality. The pulp bleached readily

to a pale cream color. These results indicate that Wallaba gives a pulp of good quality and readily bleachable, but that the yield is rather lower than from most timbers.

Wallaba is in universal use throughout the Colony for house frames, vat staves, fence poles, telephone poles, and shingles. Its durability, due to its resinous character, makes it especially suitable for poles, and the engineering branch of the British Guiana Post Office Service reports that "while the average life of an untreated pole is 20 years, poles have been found to be in excellent condition after 30 years."

There is an export trade to the West Indian Islands in shingles, staves, and poles, and the market, particularly of this last product, is worthy of further development.

Most species of Wallaba burn well and the wood is used throughout British Guiana for fuel. An excellent type of charcoal is obtained from Wallaba and the following figures are available as a result of tests carried out by the Imperial Institute:

| | | |
|---|---|---|
| Soft Wallaba..... | 7,320 calories | 13,176 B.T.U. |
| Ituri Wallaba..... | 6,450 " | 11,610 " |

The results obtained from Wallaba and mixed English charcoals used in a portable Parker producer gas plant as a fuel driving a Ford ton truck are summarized below:

| Kind of charcoal | Ton miles per lb. | Miles per lb. of charcoal | Remarks |
|---|---|---|---|
| Soft Wallaba..... | 2.11 | 1.03 | Rather smoky when starting up |
| Ituri Wallaba..... | 1.935 | 0.944 | " |
| Mixed English..... | 1.00 | 0.976 | |

### Prices of Wallaba Products

Sawn timber: 6–7 cents per foot B. M.
Vat staves: 6 ft., 24 cents; 7 ft., 30 cents; 8 ft., 36–40 cents.
Shingles: $7.00 per thousand.
Firewood: $2.60 per cord of 2½ tons.
Charcoal: $1.00 per 120 lbs.



### Poles

| Length | Top diam. | Butt diam. | Price |
|---|---|---|---|
| 20′ | 5″ | 7″ | $3.00 |
| 30′ | 7″ | 9″ | $6.00 |
| 40′ | 8″–9″ | 11″ | $10.00 |
| 55′ | 7″–8″ | 13″ | $25.00 |

## Identity of the "Junipappeeywa" of Hans Staden

In Hans Staden's account[1] of his captivity among the cannibal tribes of Tupinambá Indians in eastern Brazil some 375 years ago is a paragraph (*Bericht etlicher beume des landes*, Caput XXXVII) to the effect that the savages painted themselves with the extracted juice of a fruit, having some resemblance to an apple, borne on trees called Junipappeeywa. This juice, though transparent when first applied to the skin, would later turn as black as ink and persist, despite repeated washing with water, until the ninth day, when it would disappear.

Burton, in an annotation of Tootal's translation[2] (p. 165), identifies this tree with the Pawpaw or Melon Tree (*Carica papaya*), "generally called Mammoeira, from the fruit Mammao being shaped like mammae." He cites a footnote by Southey (III, 317) explaining that it is "a sort of bread-fruit, probably the *Mammea americana*."

From both the Indian name and the description of the juice it seems obvious that the fruit in question is the common Genipapo of Brazil and that the tree is the Genipapeiro, *Genipa americana* L., a Rubiaceous species widely distributed in tropical America.

[1] *Warhafftig' Historia unnd beschreibung eyner Landtschafft der Wilden, Nacketen, Grimmigen, Menschfresser Leuthen in der Newen Welt America gelegen.* Marpurg, 1557.

[2] *The captivity of Hans Stade of Hesse, in A. D. 1547–1555, among the wild tribes of eastern Brazil.* Translated by Albert Tootal; annotated by Richard F. Burton. London, 1874.

## COCOBOLO AS A DYEWOOD

*By* B. J. RENDLE

*Forest Products Research Laboratory, Great Britain*

Cocobolo is the product of five or more known species of *Dalbergia*, section *Miscolobium*, indigenous to Central America and southwestern Mexico. The wood is well known to commerce and is largely used in the cutlery trade for knife handles. It is also employed in turnery and inlay work. There appears to be no record of its use as a source of dye, the only reference under this head being Record and Garratt's statement that attempts to obtain dyestuffs and steam distillates of commercial value from the sawdust have been unsuccessful.[1]

While turning a sample of Cocobolo on a lathe the operator found that his hands became indelibly dyed with orange stain, and he was accordingly led to have the dyeing properties of the alcoholic extract investigated by the Chemical Research Laboratory. The following is a summary of the chemist's report: The dyes indicate that the coloring matter is neither haematein or brazilein. Comparison of the dyeings with patterns obtained from authentic red woods (on chrome and iron mordants) shows that there is no resemblance to Camwood, Barwood, or Sanderswood (*Baphia nitida* Lodd. and *Pterocarpus* spp.). The tests suggest a coloring matter allied to that of Catechu.

A variety of color shades was obtained by the use of different mordants on woolen cloth. With a chrome mordant the crude alcoholic extract gave a rich dark brown color and the ether-soluble portion of the extract a medium orange brown. A similar orange brown was obtained by using a mordant consisting of 6 per cent copper sulphate and 2 per cent sulphuric acid. With an iron mordant the crude extract gave a dark greenish brown and the ether-soluble portion a lighter, khaki shade. The wood used in these tests was obtained from a timber merchant as Nicaraguan Rosewood and was identified as probably *Dalbergia retusa* Hemsley.

[1] *Cocobolo*, Bull. No. 8, Yale School of Forestry, 1923.



## A NEW *INGA* FROM BRITISH HONDURAS

*By* PAUL C. STANDLEY

*Field Museum of Natural History*

Although numerous species of *Inga* already have been described from Central America, many of them appear to be limited in their distribution, and it is probable that still more will be discovered. The one described below can not be referred to any of the species recorded previously from the region.

**Inga Stevensonii**, sp. nov.

Arbor fere omnino glabra; folia 12 cm. longe petiolata, petiolo ut rhachis 12.5 cm. longa gracili subtereti; foliola trijuga, petiolulis crassis 5–7 mm. longis glabris; lamina lanceolato-oblonga, c. 12–15 cm. longa et 4–5 cm. lata, breviter acuminata, acumine attenuato-acuminato, basi saepe inaequali breviter angustata, glabra, supra sublucida, subcoriacea, costa venisque supra prominentibus, subtus valde prominentibus, nervulis subtus prominulis et arcte reticulatis; flores breviter spicati, spicis 4–6 mm. longe pedunculatis, pedunculis ferrugineo-puberulis gracilibus; calyx campanulatus 1 mm. longus minute sordido-puberulus, breviter dentatus, dentibus triangularibus acutis; corolla extus sparse puberula gracilis 9–10 mm. longa, supra vix dilatata, lobis anguste triangularibus erectis acutis 1.4 mm. longis; stamina c. 1 cm. longe exserta.

BRITISH HONDURAS: Freshwater Creek, March, 1928, *D. Stevenson* (II) 65 (Herb. Field Mus. No. 584, 345, type; Yale No. 3338).

A well-marked species, recalling by its habit and general appearance some of the trees referred to the *Zygia* group of the genus *Pithecolobium*.

The vernacular name is Turtle Bone.

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### Note on the wood of *Inga Stevensonii*

The specimen (Yale No. 3338) is all sapwood; color yellow or slightly brownish; from appearance of small knot it seems likely that the heartwood is reddish brown. Wood very dense, rather horn-like, fine-textured, tough, and strong. Growth rings more or less clearly defined by fine terminal line of parenchyma. Pores very small, not very numerous, well distributed, occurring singly or in radial pairs. Vessel lines fairly distinct, due to parenchyma sheaths. Parenchyma abundantly developed about pores in diamond-shaped patches or in wings that tend to become confluent; also in rather widely but irregularly spaced, thin lines independent of pores. Rays minute; not visible without lens on cross and tangential sections; fine and inconspicuous on radial. Ripple marks absent.—S. J. R.

# COCOBOLO AS A DYEWOOD

*By* B. J. Rendle

*Forest Products Research Laboratory, Great Britain*

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## TRUE "PAU HOI" TREE OF CHINA A NEW SPECIES

*By* Ryozo Kanehira

There has been considerable discussion in this journal (see *Tropical Woods* 3: 1; 6: 11; 10: 53; 15: 13) regarding the botanical source of Pau Hoi shavings which yield a mucilaginous extract used by Chinese women to bandoline their hair. Professor Ip (*l.c.*, 15: 13) says that in South China every species of *Machilus* and *Phoebe* is involved more or less; in Central China the wood of *Firmiana simplex* is sold as Pau Hoi, either alone or in mixture with the others; in North China *Ulmus pumila* and *U. japonica* are the principal sources. From my investigations I am convinced that there is a true Pau Hoi, and that the others mentioned are commercial substitutes or adulterants.

I have examined 6 different Laureaceous woods from Japan proper, 24 from Formosa, and 8 from China, as well as the species of *Ulmus* and *Firmiana* mentioned above, and have found only two yielding any mucilage material when soaked in water, namely, *Cinnamomum Pseudo-Loureiri* Hay. of Formosa and an authentic specimen of Bandoline Wood collected by Mr. Y. Shimada in Fokien, China. As I have previously stated (*l.c.*, 10: 53), not only does Mr. Shimada's botanical material agree with three specimens of the Bandoline Tree collected by Professor H. H. Chung at Yeping, Chaping, and Minhow, Hsien, and preserved at Arnold Arboretum, but all of them exactly conform with *Machilus Thunbergii* S. & Z., Hook. Icon. Pl. sub. t. 2538 noted by Hemsley as the real source of Bandoline Wood. I propose the following name for this tree:

**Machilus pauhoi** Kanehira, nom. nov.

*Machilus Thunbergii* (non S. & Z.) Hemsley in Hook. Icon. Pl. sub. t. 2538 (1897).

The present plant is very near *Machilus ichangensis* Rehder & Wilson (which, according to E. H. Wilson [*Pl. Wils.* II, p. 622] is not used for purposes of bandolining), but differs in having much narrower leaves.

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The platform of Dr. Julio Prestes, president-elect of Brazil, recommended reforestation of the northeastern states for its ameliorating effect upon the climate.



## SANTA MARTA VALLEY, COLOMBIA

*By* Samuel J. Record *and* Henry Kuylen

Santa Marta Valley, as here described, is situated in northeastern Colombia, South America, being bounded on the north and west by the Caribbean Sea (including Ciénaga Grande), on the east by the foothills of the Sierra Nevada de Santa Marta, and on the south by the Río Fundación. Its area is about 375,000 acres. There are three distinct types of land, namely, (1) saltpeter flats, (2) slightly hilly and rolling country, and (3) rich alluvial lands.

The saltpeter flats, about 80,000 acres in extent, are low areas lying parallel to the Ciénaga Grande, which evidently were covered at some not very remote time by the Caribbean Sea. They are mostly barren and devoid of all growth, except some scrubby cactus, small, thorny shrubs, and, in some places, Mangrove. There are, however, certain small portions, known locally as "salitre" soil, consisting chiefly of fine sand with a small mixture of clay, upon which enough grass grows to make them useful for pasturage. At one place along the railway is a salt pit, "Salinas Pozos Colorado," which is controlled by the Colombian government.

The foothills reach the sea at the port of Santa Marta and keep near the coast for 30 kilometers southward. They vary in altitude from a few hundred to 1000 feet, and are sparsely covered with a scrubby growth, of which the most conspicuous elements are cactus trees. The annual rainfall here is between 15 and 30 inches and as it is unequally distributed and strong offland winds prevail during the dry season, it follows that only desert plants can survive naturally, except along the streams. There are some pasture lands in the narrow valleys.

At Don Jaca, a point on the coast about two-thirds of the distance between the towns of Santa Marta and Cieñaga, is a tableland about 50 feet above the sea, where the forest growth is somewhat taller and the variety of trees greater. Some of the principal trees are Volador (*Gyrocarpus*), Trebo, Quebrahacha, Carreto, Ebano, Palo de Agua, Jaboncillo, Brasil, Negrito, and Mamón de Leche. Lianas ("bejucos") are common, one of the most conspicuous while in flower being a kind of Morn-

ing Glory (*Ipomoea carnea*); others belong to the genera *Hippocratea*, *Arrabidæa*, and *Bauhinia*. Among the common shrubs are *Cordia globosa*, *Melochia tomentosa*, *Calotropis gigantea* (a giant milkweed, Lechoso), *Croton niveus*, *Pithecolobium dulce*, *Cestrum nocturnum*, and *Melochia tomentosa*. Many of the thickets are a tangle of cacti (*Cephalocereus*, *Pereskia*, and *Opuntia*), lianas, and thorny shrubs. Along the sandy beach are Lignum-vitae, Manchineel, *Jacquinia gracilis*, etc. On the hillsides south of Don Jaca the most abundant and conspicuous tree is *Gyrocarpus americanus*.

It is at Ciénaga that the real valley begins and gradually widens to the south. The soils are alluvial deposits of numerous streams flowing westward from the Sierra Nevada and they range through various grades of very fine sandy loam, fine sand, sand, clay loam, and clay. Records of precipitation over a period of 21 years show a variation in the total amount from 20.69 inches in 1923 to 91.92 inches in 1916; average 48.84 inches. Although there is no month in which at least half an inch of rain has not been recorded during some year, there is a distinct dry season between October and April; bright sunny days and cloudless skies prevail and the heat is intense. It is not unusual for the period between the middle of December and the first of April to be almost entirely rainless. The rainy season usually comes on gradually as the heavy mountain storms extend westward. Sometimes there are torrential downpours that flood the rivers and enrich the inundated lands with their silt; they may be accompanied by strong winds, with serious damage to plantations.

The principal crop of the valley at present is bananas, and for their cultivation irrigation is necessary. The chief sources of water supply are the Río Frio, Río Sevilla, Río Tucuriuca, Río Aracataca, and Río Fundación. The last three are fed in considerable part by melting snow from the Sierra Nevada, 18,000 feet above sea level. Banana cultivation began at Río Frio about 30 years ago and has since extended southward to Río Fundación. All of this land was presumably heavily timbered, but the areas now forested are on the least desirable sites and have been heavily culled of their best trees to supply the local demand for heavy construction, such as bridges,



railway crossties, building, etc. These forests now supply little wood except for fuel; for larger sizes one must go a continually increasing distance into the interior. The Río Fundación affords water transportation for logs of Ceiba Colorada, this being one of the few timbers, now utilized on a fairly large scale, which will float. The heavier kinds are brought in by means of burros and oxen.

The timbers most in demand, chiefly because of their durability, are Carreto, Ceiba Colorada or Tolú, Quebrahacha, Guayabo de Montaña, Divi-divi, Guayacán, and Caoba (Mahogany). The Mahogany used for furniture and cabinetwork is not produced locally. Ceiba Colorada is employed for bridge decking and also for general building purposes. Some of the heavy planking used on the docks at Santa Marta is of Albarco. The crossties of the Santa Marta Railroad are mostly Guayacán and Carreto, although creosoted foreign pine is also used. The two native woods are very hard, requiring the drilling of spike holes, but they are giving good service and the track is kept in excellent condition.

## Annotated List of the Trees, Shrubs, and Lianas

The following list is based upon collections made by the authors in January 1930, and determined by Paul C. Standley. There are included several additional trees that were recognized in the forest, but not collected. The localities are as follows: Nos. 1–7, the Prado, Santa Marta; Nos. 8–19, Río Sevilla; Nos. 20–37, Guamachito; Nos. 38–44, between terminus of railroad and Bongo (lower Río Fundación); Nos. 45–58 and 60–85, Don Jaca; No. 59, near dam east of Santa Marta. The local names were supplied by well-informed native employees of the United Fruit Company and it is believed that a high degree of accuracy was attained. There are a few duplications, but it is not now possible to determine if these are due to mistakes in identity or the use of the same name for more than one tree. Since many of the trees and woods have been described at length in *Timbers of Tropical America*, frequent reference is made to that work under the abbreviation *T. of T. A.*

## ACANTHACEAE

**Aphelandra tetragona** (Vahl) Nees. CABELLITO. Shrub, with opposite leaves, the blade long-tapering at the base. Red flowers few (at a time) in white-lined, terminal spikes. Wood very hard. (No. 36; Yale No. 16435.)

**Beloperone Rohrii** (Vahl) Nees. Shrub, with square twigs, large, opposite leaves, and terminal, scurfy clusters of white flowers. (No. 35; Yale No. 16434.)

## ANACARDIACEAE

**Anacardium rhinocarpus** DC. CARACOLÍ. Large tree, common along water courses near Sevilla. Little used. (See *Tropical Woods* 22: 4–9, June 1, 1930.)

**Astronium fraxinifolium** Jacq. QUEBRAHACHA. Medium-sized tree, with compound leaves resembling Walnut. Wood hard, reddish with darker streaks, durable. Good for heavy construction and furniture; same as the Gonçalo Alves of Brazil. (No. 63; Yale No. 16462. See *T. of T. A.*, p. 389.)

**Spondias mombin** L. JOBO. Common tree in the forest. Often used for live fence posts. Wood white, soft, perishable; not utilized, although suitable for match sticks and box boards.

## APOCYNACEAE

**Aspidosperma elliptica** Rusby. CARRETO. Rather large tree, with simple, alternate, leathery, finely-veined leaves and yellow, hard, fine-textured wood used chiefly for railway crossties. (No. 66; Yale No. 16465. See *T. of T. A.*, pp. 514–5.)

**Stemmadenia grandiflora** (Jacq.) Wood. LAIDRÉ. Small tree, with opposite, thin, wedge-shaped, pointed leaves, fleshy fruit, and scurfy, green bark; juice milky. (No. 41; Yale No. 16440.)

**Tabernaemontana** spp. Several trees of this genus were recognized in the lowland forest, but not collected.

## ASCLEPIADACEAE

**Calotropis gigantea** (Willd.) R. Br. LECHOSO. Sprawling shrub, with large leaves, clasping the stem at the base; pods large and inflated; seeds and pappus as in common milkweed. All green parts with copious milky latex. Bark corky and chaffy. Wood soft. (No. 52; Yale No. 16451.)

## BIGNONIACEAE

**Arrabidæa rhodantha** var. **Balbisiana** Sprague. Common liana, stem over 1 inch thick, cylindrical, but with cruciform wood. Leaves palmately compound, the leaflets large, long petiolulate. Pods long, flat, velvety; seeds broadly winged. (No. 74; Yale No. 16473.)

**Arrabidæa Sanctæ-Marthæ** Sprague. Liana, with ridged stem 1½ inches thick, with opposite, palmately compound leaves, the leaflets large, subcircular, mucronate. Flowers in large, showy clusters. (No. 71; Yale No. 16470.)



**Crescentia cujete** L. CALABAZO. The common Calabash Tree, whose gourd-like fruits find many local uses. (See *T. of T. A.*, pp. 544–5.)

**Tecoma (or Tabebuia)** sp. GUAYACÁN. A common tree of the interior, with very dense and durable wood used almost exclusively for railway crossties. (See *T. of T. A.*, pp. 541–3.)

## BIXACEAE

**Bixa orellana** L. ACHIOTE. The common Anatto, cultivated throughout tropical America on account of the orange dye supplied by the seeds.

## BOMBACACEAE

**Bombacopsis** sp. CEIBA COLORADA; TOLÚ. Large tree, common in the interior, yielding a reddish wood that is light, tough, strong, easy to work, and fairly durable; planks of it are in demand for bridge decking in the banana plantations and it is also used for general construction and carpentry. (See *T. of T. A.*, pp. 415–7.)

**Bombax barrigon** (Seem.) Dcne. MAJAGUA. Large tree, with bottle-shaped trunk, covered with smooth, fibrous bark with long, greenish gussets. Leafless at time of flowering. Clusters of stamens resemble a powder-puff. Wood soft, perishable, not utilized. (No. 27; Yale No. 16426.)

**Cavanillesia platanifolia** H.B.K. BONGO. Very large tree, with massive trunk and wide-spreading crown in the open; tall and short-crowned in the forest. One of the commonest trees on alluvial deposits; an indicator of good soil. Wood very light, soft, perishable; not utilized. (See *T. of T. A.*, pp. 420–2.)

**Ceiba pentandra** (L.) Gaertn. CEIBA. Very large, spreading tree, with soft perishable wood of no commercial importance. (See *T. of T. A.*, pp. 419–20.)

**Ochroma** sp. BALSA. A fairly common tree in second-growth stands near streams. Not utilized.

## BORRAGINACEAE

**Cordia alba** (Jacq.) R. & S. CAUJARO. A low, spreading, rough-leaved tree, with masses of white blossoms and a small, edible fruit, called Uvita. Used for live fence posts. (No. 1; Yale No. 16400.)

**Cordia globosa** (Jacq.) H.B.K. Very common low shrub with whitish stems, and rough leaves having the general appearance of catnip. (No. 45; Yale No. 16444.)

**Cordia sebestena** L. CANALETE. Medium-sized tree, with a brown-and-black heartwood of excellent quality for furniture. (See *T. of T. A.*, pp. 516–8.)

## BURSERACEAE

**Bursera simaruba** (L.) Sarg. GUÁCIMO. The common West Indian Birch or Gumbo Limbo, generally known in Spanish America as Almácigo.

A rather slender tree, with crooked trunk made conspicuous because of its lustrous, copper-colored bark; of frequent occurrence in places. Used for live fence posts. (See *T. of T. A.*, pp. 337–9.)

**Protium insigne** Engl. VARA BLANCA. Medium-sized, resinous tree, with rather large, smooth, compound leaves having a long-stalked terminal leaflet. Flowers very small, in large, branched clusters. Resin used medicinally. (No. 12; Yale No. 16411.)

## CACTACEAE

**Cephalocereus Russelianus** (Otto) Rose. CARDÓN. The common tree-cactus forming the most conspicuous vegetation on the dry hillsides and some of the flat lands.

**Opuntia elatior** Mill. TUNA. This Prickly Pear Cactus sometimes attains the size of a small tree.

**Pereskia colombiana** Britt. & Rose. GUAMACHO. Small, coarse, spiny tree with glossy bark and somewhat fleshy leaves. Wood yellowish and coarse-textured; not utilized. (No. 76; Yale No. 16475. See *Tropical Woods* 11: 13 for note regarding related species in Guatemala.)

## CAPPARIDACEAE

**Capparis odoratissima** Jacq. OLIVO. Small tree with leathery leaves, glossy green above and silvery or bronze beneath. (No. 22; Yale No. 16421.)

**Capparis tenuisiliqua** Jacq. PALO DE AGUA. Small tree, with smooth or checked, grayish brown bark, large, pubescent leaves, and creamy white, hard wood. (Nos. 69 and 80; Yale Nos. 16468 and 16479. See *T. of T. A.*, p. 191.)

**Capparis verrucosa** Jacq. MATARATÚ. Large shrub or small tree, with rather small, coarse, sessile, alternate leaves, gray-green, warty bark, and whitish hard wood. (Nos. 44, 68, and 82; Yale Nos. 16443, 16467, and 16481.)

**Morisonia americana** L. TORO. Small tree, with rather large leaves, covered below with a scurfy, brown pubescence when young. Fruit globose, woody, 1–2 inches in diameter. (No. 23; Yale No. 16422.)

## COMPOSITAE

**Lycoseris oblongifolia** Rusby. A common liana, with 3-nerved leaves, dark green above and whitish below. Flowers thistle-like, with orange-yellow rays. (No. 33; Yale No. 16432.)

**Vernonia patens** H.B.K. MATA PAJA. A large shrub, headed with clusters of small flowers. (No. 8; Yale No. 16407.)

## CONVOLVULACEAE

**Ipomoea carnea** Jacq. Very common liana, with large pink flowers suggesting those of the common morning-glory. (No. 48; Yale No. 16447.)



## DILLENIACEAE

**Doliocarpus semidentatus** Garcke. Large liana, with scaly, brown bark and laminated stem. Flowers small, in axillary umbels. (No. 16; Yale No. 16415.)

## EUPHORBIACEAE

**Acalypha salicioides** Rusby. Shrub, with alternate, crenate, long-pointed leaves, and short, axillary aments. Wood yellow. (No. 37; Yale No. 16436.)

**Croton niveus** Jacq. PLATIADO. Large shrub, with thin, scurfy bark. Leaves ovate, somewhat cordate at base, silvery beneath. Flowers crowded in short axillary racemes; capsules covered with silvery scales and brown-dotted. Wood yellow, dense. (No. 62; Yale No. 16461.)

**Hippomane mancinella** L. Medium-sized tree, with pointed, slender-petioled leaves, and small, apple-like fruits. Sap caustic. (No. 56; Yale No. 16455. See *T. of T. A.*, pp. 371–3.)

**Hura crepitans** L. CEIBA DE LECHE; JABILLO. The Sand-box Tree of the West Indies; common in places. The branches and young trunks are spiny and the juice is caustic. The specific name, *crepitans*, refers to the explosive dehiscence of the pumpkin-shaped capsules. Wood not utilized in Colombia. (See *T. of T. A.*, pp. 374–7.)

## FLACOURTIACEAE

**Casearia spiralis** Johnston. PELOTO. Large shrub or small tree, with rather large, alternate leaves, 3-valved, many-seeded, capsular fruit, speckled, brown bark, and fine-textured, yellow wood. (No. 78; Yale No. 16477.)

**Xylosma prunifolium** Gris. GUAMACHO. Large shrub, the trunk armed with sharp, compound thorns. Leaves alternate, prominently toothed. (No. 10; Yale No. 16409.)

## HERNANDIACEAE

**Gyrocarpus americanus** Jacq. VOLADOR. Large tree, abundant in places, with glossy brown bark and large clusters of fleshy fruits, each provided with two long wings (calyx lobes), and suggesting a shuttlecock. Wood light and soft; perishable. (No. 57; Yale No. 16456.)

## HIPPOCRATEACEAE

**Hippocratea celastroides** H.B.K. A liana, about 1 inch in diameter, with green bark, simple, opposite leaves, and axillary cymes of minute, greenish flowers. (No. 65; Yale No. 16464.)

## LAURACEAE

**Nectandra concinna** Nees. LAUREL. A tall shade tree, with shiny leaves, and small yellow flowers in clusters. (No. 5; Yale No. 16404.)

## LECYTHIDACEAE

**Cariniana pyriformis** Miers. ALBARCO. Tall tree of the interior, with a hard and strong, reddish brown timber used for heavy planking and general construction. (See *T. of T. A.*, pp. 467–70.)

**Lecythis elliptica** H.B.K. OLLA DE MONO. Medium-sized tree, with coarse, ovate leaves. Long-stalked fruits consist of a woody capsule, with lid which falls away and liberates the large seeds. Wood hard and strong; not utilized. (No. 30; Yale No. 16429. See *T. of T. A.*, pp. 460–3.)

## LEGUMINOSAE

**Acacia polyphylla** DC. CHOCOLATILLO. Large shrub or small tree, with very fine spray, numerous thin pods, and dense, yellow wood. (No. 26; Yale No. 16425.)

**Acacia riparia** H.B.K. SARSA. Large shrub, with very fine spray and thin, flat pods. (No. 21; Yale No. 16420.)

**Acacia sarmentosa** Dcne. (?). CARITA. Small, smooth-barked tree, with finely divided spray and long, thin, blackish pods prominently ribbed along the margins. Wood of medium density. (No. 75; Yale No. 16474.)

**Acacia tortuosa** (L.) Willd. TRUPI. Small tree, with stipular thorns, very fine spray, and slender, reddish brown pods. Wood very hard. (No. 49; Yale No. 16448.)

**Acacia** sp. GUACAMAYO. Large shade tree with very fine, fern-like spray and numerous thin, flat pods. (No. 7; Yale No. 16406.)

**Acacia** sp. Small tree, with delicate, few-pinnate leaves, recurved stipular prickles, and thin, flat, brown pods. Bark smooth, slate-gray. Wood hard, blackish. (No. 51; Yale No. 16450.)

**Bauhinia heterophylla** Kuntz. BEJUCO CADENA. A liana, with flat, crooked stem 2″ wide and 1″ thick, with rather small, butterfly-like leaves, clusters of white flowers, and short, flat, dark brown pods. (No. 84; Yale No. 16483.)

**Bauhinia Pauletia** Pers. PATA DE VACA. Large shrub, with butterfly-like leaves, and long, flat, brown pods, the valves of which twist spirally upon dehiscing. (No. 20; Yale No. 16419.)

**Benthamantha glabrescens.** (Benth.) Alef. MURCIELAGO. Small, smooth-barked tree, with pinnate leaves, and bearing numerous delicate, slender, X-marked pods. Wood yellow, very hard. (No. 73; Yale No. 16472.)

**Caesalpinia coriaria** Willd. DIVI-DIVI. A medium-sized tree, of very frequent occurrence, bearing a profusion of small, flat, curled or S-shaped pods rich in tannin content. The extremely hard, strong, durable, reddish-brown heartwood is used for railway crossties, fence posts, and heavy construction. (See *T. of T. A.*, p. 251.)

**Caesalpinia ebano** Karst. EBANO. Small or medium-sized tree, with doubly pinnate leaves, thin, smooth, blotchy bark, and very dense, dark-colored, durable wood. (No. 64; Yale No. 16463. See *T. of T. A.*, p. 252.)



**Caesalpinia paucijuga** Benth. GRANADILLO. Small tree, with bipinnate leaves, smooth, green, gray-blotched, thin bark, and very dense wood. (No. 40; Yale No. 16439.)

**Caesalpinia platyloba** Wats. GUAMITO MACHO. Small tree, with large, doubly pinnate leaves having rather large leaflets. Pods thin. Bark smooth. Wood dense, orange-colored. (No. 53; Yale No. 16452.)

**Cassia bacillaris** L. PLATANITO. Small tree, with large compound leaves and great masses of conspicuous golden yellow blossoms. Very common. (No. 19; Yale No. 16418.)

**Cassia emarginata** L. Small, smooth-barked tree, with pinnate leaves having rather large leaflets. Fruits slender, flat, constricted at intervals. Wood yellow. (No. 46; Yale No. 16445.)

**Dialium divaricatum** Vahl. GRANADILLO ? This is the same as the Paleta of Honduras, and is sometimes known by this name. The hard, durable wood is used for crossties. (See *T. of T. A.*, pp. 239–40.)

**Diphysa carthaginensis** Jacq. NEGRITO. Small tree, with small, pinnate leaves, bladder-like pods, smooth, red-brown bark. Wood olive-colored, very hard. (No. 77; Yale No. 16476. See *T. of T. A.*, pp. 275–6.)

**Enterolobium cyclocarpum** (Jacq.) Gris. This massive, spreading, soft-wooded tree is known as Guanacaste in Central America and sometimes by that name in this locality. Not utilized. (See *T. of T. A.*, pp. 204–7.)

**Gliricidia sepium** (Jacq.) Steud. MATA RATÓN. Small, spreading tree, bearing a profusion of pinkish, pea-like blossoms. Commonly planted for live fence posts. Leaves used for making rat poison. Wood dark-colored, hard, durable. This is the Madre Cacao of Central America. (No. 58, Yale No. 16457.)

**Haematoxylon brasiletto** Karst. BRASIL. Small tree, with deeply fluted trunk, and compound leaves having few heart-shaped leaflets. Flowers bright yellow. Heartwood red or deep orange, containing a well-known dyestuff. (Nos. 79 and 85; Yale Nos. 16478 and 16484. See *T. of T. A.*, pp. 247–8.)

**Inga** spp. GUAMO. Small, spreading trees, of very common occurrence along water courses. Of little or no value, except for shade.

**Machaerium glabratum** Pittier. Small tree, with finely pinnate leaves, small winged fruits, laminated stem, and red sap. (No. 24; Yale No. 16423.)

**Machaerium Moritzianum** Benth. TACHUELO. Small, rough-barked tree, with rather large, pinnate leaves and axillary clusters of winged fruits. Sap red. Wood moderately hard. (No. 83; Yale No. 16482.)

**Machaerium** sp. SIETE CUEROS. Small tree or large shrub, with rather coarsely pinnate leaves, laminated trunk, and red sap. (No. 15; Yale No. 16414.)

**Parkinsonia aculeata** L. SAUCE. Spreading, spiny tree, with long, drooping spray and clusters of bright yellow flowers and thin pods. Planted for decorative purposes. (No. 3; Yale No. 16402.)

**Peltogyne** sp. NAZARENO. Slender, well-formed tree, occurring scatteringly in the forest where the soil is not too dry. The purple heartwood is very hard, tough, strong, and durable. (See *T. of T. A.*, pp. 233–6.)

**Pithecolobium dulce** (Roxb.) Benth. TIRACO; CHANCÁN. Shrub, with paired leaflets and heads of purplish flowers. Pods contorted; seeds black. Bark rough, reddish brown. Wood dark brown, very hard. (Nos. 32, 43, and 59; Yale Nos. 16431, 16442, and 16458.)

**Pithecolobium lanceolatum** (H. & B.) Benth. PATA DE VACA. Small tree, with large, paired leaflets. (No. 39; Yale No. 16438.)

**Pithecolobium longifolium** (H. & B.) Standl. GUAMO PRIETO. Small tree, with rather large, paired leaflets and long, C-shaped, rather flat pods. (No. 14; Yale No. 16413.)

**Platymiscium polystachyum** Benth. TREBO. Medium-sized to large, rough-barked tree, having compound leaves with few, large, black-petioled leaflets. Wood red, hard, durable; suitable for furniture and cabinet work. (No. 61; Yale No. 16460. See *T. of T. A.*, pp. 297–8.)

**Platypodium Maxonianum** Pittier. CAÑOETO. Small tree, with coarsely pinnate leaves, large winged fruits, red sap, and hard, fine-textured wood. (No. 25; Yale No. 16424.)

**Prosopis chilensis** (Mol.) Stuntz (=*P. juliflora* DC.). TRUPILLO. Small, spreading tree, with finely divided spray and irregular bole. Wood very hard and durable; used for fence posts and charcoal. (Nos. 2 and 50; Yale Nos. 16401 and 16449. See *T. of T. A.*, pp. 217–20.)

**Schizolobium parahybum** (Vell.) Blake. This is the same as the Quam of British Honduras. Only a few young trees were observed, along water courses. (See *Tropical Woods* 2: 2–5, June 1925.)

## MALPIGHIACEAE

**Tetrapteris Schiedeana** Schl. & Cham. Slender liana, with large clusters of 4-winged fruits, two of the wings much shorter than the others. Very common. (No. 31; Yale No. 16430.)

## MELASTOMACEAE

**Miconia prasina** H.B.K. Large shrub with large, smooth, prominently nerved, opposite leaves. (No. 18; Yale No. 16417.)

## MELIACEAE

**Cedrela** spp. CEDRO. Large and valuable timber trees, now confined to the less accessible places in the interior. The Spanish Cedar timber is highly esteemed for general carpentry, joinery, and furniture, throughout its wide range in tropical America. (See *T. of T. A.*, pp. 340–8.)

## MORACEAE

**Cecropia** sp. GUARUMO. Small trees of common occurrence in moist sites. Of no commercial value. (See *T. of T. A.*, pp. 144–7.)



**Chlorophia tinctoria** (L.) Gaud. MORA. Bushy tree, with irregular bole. Heartwood yellow, hard, heavy, and durable; used for heavy, durable construction and as a source of a yellow dye. The wood is the same as the Fustic of the dyewood trade. (See *T. of T. A.*, pp. 118–22.)

**Ficus nitida** Thunb. PIVIJAY; INDIAN LAUREL. A large, wide-spreading shade tree, with milky juice. (No. 4; Yale No. 16403.)

**Ficus** spp. HIGUERÓN. Various species of wild Fig-trees occur in the forests along water courses. They are of no commercial importance. (See *T. of T. A.*, pp. 142–3.)

## MYRSINACEAE

**Ardisia revoluta** H.B.K. Large shrub, with rather long, wedge-shaped leaves and terminal, open clusters of blue berries. (No. 17; Yale No. 16416.)

## NYCTAGINACEAE

**Pisonia aculeata** L. BUEN AMIGO. Large shrub, with rounded leaflets and with flowers in small, axillary heads. Wood light, of anomalous structure, containing numerous, regularly arranged strands of soft bast. (No. 38; Yale No. 16437.)

## PALMACEAE

**?Acanthorrhiza** sp. CHINGALÉ. A spiny fan palm, 40 to 50 feet high, forming dense thickets on low-lying areas such as occur between the Santa Marta Railroad and Ciénaga Grande. The stems are usually very straight and are used locally for temporary rough construction, crossties, and bridges.

**Attalea gomphococca** Mart. PALMA DE VINO. A common palm much like the Cohune or Manaca of Central America. The leaves are used for thatching and wine is made in the 'cabbage' part of the living plant.

## POLYGONACEAE

**Coccoloba acuminata** H.B.K. PASTELILLO. A large shrub, with shiny, alternate leaves on slender, zig-zag twigs, and with elongated, terminal inflorescence. (No. 9; Yale No. 16408.)

**Coccoloba leptostachya** Benth. JUAN GAROTE. Large shrub, with rounded leaves and long, slender, terminal spikes of green berries. (No. 34; Yale No. 16433.)

**Coccoloba ramosissima** Lind. CORALLERO. Small, smooth-barked tree, with rather small, ovate leaves, short axillary spikes of small red fruits, and reddish, hard wood. (No. 70; Yale No. 16469.)

**Ruprechtia ramiflora** (Jacq.) Mez. GUAYABO; VOLADOR. Slender tree, with rather small coarse leaves and small axillary clusters of flowers and purplish-winged fruits. Wood pinkish, hard. (Nos. 42 and 67; Yale Nos. 16441 and 16466. See *T. of T. A.*, p. 155.)

**Triplaris americana** L. VARA SANTA. Slender tree, with very large leaves having four parallel creases from base to tip on each side of the midrib. Flowers in spikes; the bright, purplish calyx lobes give the fruits the ap-

pearance of small 3-winged shuttlecocks. (No. 29; Yale No. 16428. See *T. of T. A.*, pp. 153–4.)

### RHIZOPHORACEAE

**Rhizophora mangle** L. Mangle. The common Red Mangrove occurs in places on the saltpeter flats and along the shore of Ciénaga Grande. The wood is useful for fuel and charcoal.

### RUBIACEAE

**Psychotria carthaginensis** Jacq. Goterero. Rather large shrub, with opposite, wedge-shaped leaves and open, terminal clusters of red berries. (No. 11; Yale No. 16410.)

**Randia aculeata** L. Corallero. Small tree, with smooth bark, spiny twigs, and small obcordate leaves in opposite pairs. Fruit a small black berry, borne singly in axils along stem. Wood light-colored, fine-textured, very dense. (No. 60; Yale No. 16459.)

### SAPINDACEAE

**Melicoccus bijugatus** Jacq. Mamón. Large shade tree. Leaves compound, with two pairs of opposite leaflets. (No. 6; Yale No. 16405.)

**Sapindus saponaria** L. Jaboncillo. Medium-sized tree, with compound leaves having winged rachis and few rather large leaflets. Fruits berry-like, bluish, fleshy. The common Soap-berry. (No. 72; Yale No. 16471. See *T. of T. A.*, p. 402.)

**Talisia olivaeformis** Radlk. Cotoprís. Small tree, with compound leaves, smooth bark, and very hard wood. Not utilized. (No. 28; Yale No. 16427.)

### SAPOTACEAE

**Sideroxylon colombianum** Standl. Mamón de leche. Large, buttressed tree, with large, glossy leaves and blotchy red-brown bark containing a milky sap. Wood orange-colored, hard, heavy, and strong. A new species described in *Tropical Woods* 21: 13–14, June 1, 1930. (No. 81; Yale No. 16480. See *T. of T. A.*, pp. 492–4.)

### SOLANACEAE

**Cestrum nocturnum** L. A shrub, with slender, alternate, entire leaves and small, terminal clusters of white flowers. (No. 86.)

### STERCULIACEAE

**Guazuma ulmifolia** Lam. Caulote. Small or medium-sized tree, of very frequent occurrence. The small, warty fruits, which are borne in abundance, are eaten by cattle. Not otherwise utilized. (See *T. of T. A.*, pp. 248–9.)

**Melochia tomentosa** L. Very common low shrub, with small, toothed, pale green, pubescent leaves, and large axillary clusters of chaffy fruits. (No. 47; Yale No. 16446.)



### THEOPHRASTACEAE

**Jacquinia gracilis** Mex. Small seaside tree, with narrow, spine-tipped leaves, clusters of small, dark-red flowers, and very hard, yellowish wood having conspicuous rays. (No. 54; Yale No. 16453. See *T. of T. A.*, p. 486.)

### TILIACEAE

**Triumfetta lappula** L. Cadillo. Medium-sized shrub, with velvety leaves and topped with clusters of little bur-like fruits in abundance. (No. 13; Yale No. 16412.)

### ZYGOPHYLLACEAE

**Guaiacum officinale** L. Guayacán. Medium-sized, crooked, seaside tree, with compound leaves, blue flowers, and yellow, flattened fruits. Bark peeling off in irregular patches. Wood extremely dense — the Lignum-vitae of commerce. (No. 55; Yale No. 16454. See *T. of T. A.*, pp. 314–6.)

### CHECK LIST OF THE COMMON NAMES

| | | |
|---|---|---|
| Achiote | *Bixa orellana* L. | Bixaceae |
| Albarco | *Cariniana pyriformis* Miers | Lecythidaceae |
| Balsa | *Ochroma* sp. | Bombacaceae |
| Bejuco cadena | *Bauhinia heterophylla* Kuntz | Leguminosae |
| Bongo | *Cavanillesia platanifolia* H.B.K. | Bombacaceae |
| Brasil | *Haematoxylon brasiletto* Karst. | Leguminosae |
| Buen amigo | *Pisonia aculeata* L. | Nyctaginaceae |
| Cabellito | *Aphelandra tetragona* (Vahl) Nees | Acanthaceae |
| Cadillo | *Triumfetta lappula* L. | Tiliaceae |
| Calabazo | *Crescentia cujete* L. | Bignoniaceae |
| Canalete | *Cordia sebestena* L. | Borraginaceae |
| Cañoeto | *Platypodium Maxonianum* Pitt. | Leguminosae |
| Caracolí | *Anacardium rhinocarpus* DC. | Anacardiaceae |
| Cardón | *Cephalocereus Russelianus* (Otto) Rose | Cactaceae |
| Carita | *Acacia sarmentosa* Dcne. (?) | Leguminosae |
| Carreto | *Aspidosperma elliptica* Rusby | Apocynaceae |
| Caujaro | *Cordia alba* (Jacq.) R. & S. | Borraginaceae |
| Caulote | *Guazuma ulmifolia* Lam. | Sterculiaceae |
| Cedro | *Cedrela* spp. | Meliaceae |
| Ceiba | *Ceiba pentandra* (L.) Gaertn. | Bombacaceae |
| Ceiba colorada | *Bombacopsis* sp. | Bombacaceae |
| Ceiba de leche | *Hura crepitans* L. | Euphorbiaceae |
| Chancán | *Pithecolobium dulce* (Roxb.) Benth. | Leguminosae |
| Chingalé | *?Acanthorrhiza* sp. | Palmaceae |
| Chocolatillo | *Acacia polyphylla* DC. | Leguminosae |
| Corallero | *Coccoloba ramosissima* Lindl. | Polygonaceae |
| Corallero | *Randia aculeata* L. | Rubiaceae |
| Cotoprís | *Talisia olivaeformis* Radlk. | Sapindaceae |

| | | |
|---|---|---|
| Divi-divi | *Caesalpinia coriaria* Willd. | Leguminosae |
| Ebano | *Caesalpinia ebano* Karst. | Leguminosae |
| Goterero | *Psychotria carthaginensis* Jacq. | Rubiaceae |
| Granadillo | *Caesalpinia paucijuga* Benth. | Leguminosae |
| Granadillo ? | *Dialium divaricatum* Vahl | Leguminosae |
| Guacamayo | *Acacia* sp. | Leguminosae |
| Guacimo | *Bursera simaruba* (L.) Sarg. | Burseraceae |
| Guamacho | *Pereskia colombiana* Britt. & Rose | Cactaceae |
| Guamacho | *Xylosma prunifolium* Gris. | Flacourtiaceae |
| Guamito macho | *Caesalpinia platyloba* Wats. | Leguminosae |
| Guamo | *Inga* spp. | Leguminosae |
| Guamo prieto | *Pithecolobium longifolium* (H. & B.) Standl. | Leguminosae |
| Guarumo | *Cecropia* sp. | Moraceae |
| Guayabo | *Ruprechtia ramiflora* (Jacq.) Mez | Polygonaceae |
| Guayacán | *Guaiacum officinale* L. | Zygophyllaceae |
| Guayacán | *Tecoma* (or *Tabebuia*) sp. | Bignoniaceae |
| Higuerón | *Ficus* spp. | Moraceae |
| Jabillo | *Hura crepitans* L. | Euphorbiaceae |
| Jaboncillo | *Sapindus saponaria* L. | Sapindaceae |
| Jobo | *Spondias mombin* L. | Anacardiaceae |
| Juan garote | *Coccoloba leptostachya* Benth. | Polygonaceae |
| Laidré | *Stemmadenia grandiflora* (Jacq.) Wood | Apocynaceae |
| Laurel | *Nectandra concinna* Nees | Lauraceae |
| Laurel, Indian | *Ficus nitida* Thunb. | Moraceae |
| Lechoso | *Calotropis gigantea* (Willd.) R. Br. | Asclepiadaceae |
| Lignum-vitae | *Guaiacum officinale* L. | Zygophyllaceae |
| Majagua | *Bombax barrigon* (Seem.) Dcne. | Bombacaceae |
| Mamón | *Melicoccus bijugatus* Jacq. | Sapindaceae |
| Mamón de leche | *Sideroxylon colombianum* Standl. | Sapotaceae |
| Manchineel | *Hippomane mancinella* L. | Euphorbiaceae |
| Mangle | *Rhizophora mangle* L. | Rhizophoraceae |
| Mata paja | *Vernonia patens* H.B.K. | Compositae |
| Mata ratón | *Gliricidia sepium* (Jacq.) Steud. | Leguminosae |
| Mataratú | *Capparis verrucosa* Jacq. | Capparidaceae |
| Mora | *Chlorophora tinctoria* (L.) Gaud. | Moraceae |
| Murcielago | *Benthamantha glabrescens* (Benth.) Alef. | Leguminosae |
| Nazareno | *Peltogyne* sp. | Leguminosae |
| Negrito | *Diphysa carthaginensis* Jacq. | Leguminosae |
| Olivo | *Capparis odoratissima* Jacq. | Capparidaceae |
| Olla de mono | *Lecythis elliptica* H.B.K. | Lecythidaceae |
| Palma de vino | *Attalea gomphococca* Mart. | Palmaceae |
| Palo de agua | *Capparis tenuisiliqua* Jacq. | Capparidaceae |
| Pastelillo | *Coccoloba acuminata* H.B.K. | Polygonaceae |
| Pata de vaca | *Baubinia Pauletia* Pers. | Leguminosae |



| | | |
|---|---|---|
| Pata de vaca | *Pithecolobium lanceolatum* (H. & B.) Benth. | Leguminosae |
| Peloto | *Casearia spiralis* Johnston | Flacourtiaceae |
| Pivijay | *Ficus nitida* Thunb. | Moraceae |
| Platanito | *Cassia bacillaris* L. | Leguminosae |
| Platiado | *Croton niveus* Jacq. | Euphorbiaceae |
| Quebrahacha | *Astronium fraxinifolium* Jacq. | Anacardiaceae |
| Sarsa | *Acacia riparia* H.B.K. | Leguminosae |
| Sauce | *Parkinsonia aculeata* L. | Leguminosae |
| Siete cueros | *Machaerium* sp. | Leguminosae |
| Tachuelo | *Machaerium Moritzianum* Benth. | Leguminosae |
| Tiraco | *Pithecolobium dulce* (Roxb.) Benth. | Leguminosae |
| Tolú | *Bombacopsis* sp. | Bombacaceae |
| Toro | *Morisonia americana* L. | Capparidaceae |
| Trebo | *Platymiscium polystachium* Benth. | Leguminosae |
| Trupi | *Acacia tortuosa* (L.) Willd. | Leguminosae |
| Trupillo | *Prosopis chilensis* (Mol.) Stuntz | Leguminosae |
| Tuna | *Opuntia eliator* Mill. | Cactaceae |
| Vara blanca | *Protium insigne* Engl. | Burseraceae |
| Vara santa | *Triplaris americana* L. | Polygonaceae |
| Volador | *Gyrocarpus americanus* Jacq. | Hernandiaceae |
| Volador | *Ruprechtia ramiflora* (Jacq.) Mez | Polygonaceae |

## Tercentenary of First Use of Quinine

Although 1638 is generally accepted as the first date in the history of quinine, Dr. George T. Moore, President of the Shaw Botanical Gardens, has established through old volumes in the Garden's library that the first recognized use occurred in 1630. In that year, he found, the bark cured the malaria of Juan Lopez Canizares, Spanish corregidor of Loxa. Traditionally, it was the corregidor who recommended the treatment to the Countess of Chincón, wife of the Governor of Peru, whose cure at Lima in 1638 gave the Cinchona tree its name.

The story of the natives, who used it for an unknown period, is that a Cinchona tree fell into a pool of water, and that a native, drinking the water, found his fever cured. Knowledge of its value was disseminated throughout Europe by the Jesuits, so that the "sacred bark" became known also as "Jesuits' bark."

The tercentenary of the first recognized use of quinine will be made the occasion for a meeting of pharmacologists in St. Louis, Missouri, October 31 and November 1, 1930.

## CURRENT LITERATURE

**Rapport aangaande de wijze, waarop de regeering in Nederland en het gouvernement van Suriname in de toekomst werkzaam zullen kunnen zijn ter bevordering van den houtuitvoer van Suriname.** By J. PH. PFEIFFER. Pub. by Algemeene Landsdrukkerij, 's-Gravenhage, 1929. Pp. 110; 8 x 11¼; 32 half-tone illustrations; 4 large maps (in pocket).

A well-printed and attractively illustrated book concerning the forests of Surinam, with particular reference to their industrial development.

**Ueber das aetherische oel und den krystallisierten ester aus dem kernholze von *Vouacapoua americana* Aubl.** By D. B. SPOELSTRA. *Recueil des Travaux Chimiques des Pays-bas* (Haarlem, Holland) 49: 2: 226–236, FEB. 15, 1930.

**La forêt de la Guyane française.** By M. DEMOUGEOT. *Revue Internationale des Produits Coloniaux* (Paris) 5: 52: 161–168.

**Segunda contribución al conocimiento de los arboles y arbustos cultivados en la Argentina.** By ENRIQUE C. CLOS. *Boletin del Ministerio de Agricultura de la Nacion* (Buenos Aires) 28: 4: 441–468, Oct.–Dec. 1929. Illustrated with 18 plates and 5 text figs.

The first of this series of contributions appeared in the *Boletin* for Jan.–Mch. 1929 (see *Tropical Woods* 20: 37) and dealt with 10 miscellaneous species. The present is concerned with the Mimosoideae group of the Leguminosae cultivated in Buenos Aires and its environs. Of the 23 species described, 10 are indigenous to Argentina, 11 are Australian, and two are Asiatic. The genera are: *Albizzia* (1), *Calliandra* (3); *Acacia* (16), *Mimosa* (1); *Piptadenia* (2).

***Pilgerodendron*, eine neue koniferengattung aus Süd-Chile.** By RUDOLF FLORIN. *Svensk Botanisk Tidskrift* 24: 1: 132–135, 1930.

The Chilean genus *Pilgerodendron* is named in honor of Dr. Robert Pilger, author of the work on the Coniferae in the new edition of Engler's *Pflanzenfamilien*. The new combination, *Pilgerodendron uviferum* (Don) Florin, has the following synonymy: *Juniperus uvifera* Don (1824); *Thuja tetragona* Hooker (1844); *Libocedrus tetragona* Endlicher (1847); *Libocedrus cupressoides* Sargent (1896); *Libocedrus uvifera* Pilger (1926).



**L'exploitation forestiere au Paraguay.** By M. NOVERRAZ. *Journ. Forestier Suisse* 80; 7–8; 163–167, July–Aug. 1929.

The exportation of forest products is one of the more important sources of revenue to Paraguay. These products consist of (1) Quebracho Colorado extract and logs and (2) construction timbers and minor products.

Paraguay is divided by the Paraguay River into two entirely distinct zones, (1) to the east, the Paraguay Chaco where the Quebracho forests occur and (2) to the west, Paraguay proper whose forests supply timber for construction.

The Chaco as a whole is an immense flat plain extending eastward from the foothills of the Andes to the Paraguay River and from south of the 29th parallel, a continuation of the vast pampas, to the 17th parallel, penetrating into Brazil and Bolivia. The climate is extreme and the annual rainfall of about 36 inches is badly distributed, prolonged droughts alternating with floods. The clay soil, with a variable admixture of fine sand and loam, is shallow and underlaid with hardpan. Salts, such as sodium chloride and sodium sulphate, are present in the soil and subsoil, some places in abundance. The water of wells is salty. Streams are rare, and are mostly series of shallow ponds, half-stagnant and briny.

The vegetation adapts itself to these conditions and the forest is confined almost entirely to a fringe of variable width along the Paraguay and Pilcomayo Rivers. In places this forest is broken into islands by savannahs, Black Palm flats, and marshes or "bañados." Quebracho Colorado and various less valuable trees dominate an impenetrable undergrowth of thorny shrubs. In the virgin forest there may be as many as 40 merchantable Quebracho trees per hectare.

Located along the Paraguay River are six Quebracho ex-

tract plants with a combined capacity of 50,000 to 60,000 tons of extract a year; this is about one-fifth the capacity of the Argentine plants. From 5000 to 7000 tons of Quebracho logs are exported to Europe and the United States. The total consumption of this timber, for Paraguay, is about 200,000 tons of heartwood. Exploitation is conducted on the entirely erroneous theory that Quebracho Colorado is a species of exceedingly slow growth and impossible of regeneration. The advice of experts is disregarded and such destructive methods are followed that the tree is being exterminated. According to the best information obtainable the supply of timber will be completely exhausted within 30 years.

Paraguay proper is of an entirely different character. It is well-watered and drained, the soil is fertile, and the climate is very favorable to vegetation, particularly to forest growth, except in the southwest portion. Optimum conditions prevail in the zone to the eastward along the Paraná River and the foot of the Cordillera, and the forest is dense and luxuriant. From it is obtained the Cedro Colorado (*Cedrela tubiflora* Bertoni) so highly appreciated in the Buenos Aires market. This timber, along with Tucumán Walnut and native Oak, commands the highest price, the latest available quotation for squared logs being more than 300 Swiss francs per cubic meter. Other kinds of wood used are Lapacho, Petereví, Ivirapita, Incienso, Iviraro, Curupay, Urunday, Laurel, etc. Minor forest products are wild Yerba Maté, which commands a higher price than the cultivated, and essence of *petit grain* distilled from the leaves of the Bitter Orange.

Getting out timber is usually done by contractors who deliver the logs to depots along the streams. Large timbers are squared with axes in the forest, the smaller sizes are taken out in the round. They are rafted out to navigable water for shipping by boat to Buenos Aires or by rail to certain other markets. The merchantable species are scattered in a mixed stand, the average on 1550 hectares examined being between 3 and 5 trees per hectare, as follows: Cedro and Ivirapita, 1 or 2; Lapacho, 1; Petereví and Iviraro, 0.1 to 0.3; Incienso, 0.1. The supply of Cedro is being rapidly depleted and its conservation calls for restrictive measures by the govern-



ment. This tree grows rapidly and would lend itself readily to profitable forest management.

**Boletim da Escola de Chimica Industrial annexa ao Museu Commercial, No. 1, anno de 1929.** Pub. by Associação Commercial do Pará, Pará-Belem, Brazil, 1930. Pp. 105; 7 x 9; illustrated.

This is the first number of a bulletin of the School of Industrial Chemistry, which is conducted in connection with the Commercial Museum of Pará under the distinguished leadership of Dr. Paul Le Cointe. This issue is devoted mainly to an account of the results of chemical research work of the School on various forest products from the Amazon region, under the following headings:

**A glycyrrhizina do "pau doce,"** by GEORGES BRET, pp. 5–7. Concerns the extraction of a glucoside from the bark of *Glycoxylon prœaltum* Ducke (fam. Sapotaceae).

**O cajueiro,** by GEORGES BRET and PAUL LE COINTE, pp. 11–13. A study of the fruit of *Anacardium occidentale* L. (fam. Anacardiaceae) as a source of oil, wine, alcohol, tannin, gum, etc.

**A casca de pequeá como succedaneo da "noz de galha,"** by GEORGES BRET, pp. 15–16. The mesocarp and rind of the fruits of *Caryocar villosum* Pers. (fam. Caryocaraceae) are rich in tannin and may be used as a substitute for gallnuts.

**Os acidos graxos dos oleos de jupaty, castanha e cayaté,** by ANDRE CALLIER, pp. 17–25. Concerns the oils of the Jupaty Palm (*Raphia taedigera* Mart.), Brazilnut or Castanha do Pará (*Bertholletia excelsa* H.B.K.), and Cayaté (*Omphalea diandra* Aubl.), known in French Guiana as Ouabé or Omphalier.

**Novas sementes oleaginosas,** by PAUL LE COINTE, pp. 26–29. Seven kinds of seeds were tested: (1) Assacú, *Hura crepitans* L. or *H. brasiliensis* Wild. (fam. Euphorbiaceae); (2) Cumacá-y, *Lophostoma calophylloides* Meissn. (fam. Thymelæaceae); (3) Cupú-assúrana or Cupú-rana, *Matisia paraënsis* Huber (fam. Bombacaceae); (4) Quaruba de Flores Roxas or Jaboty da Terra Firme, *Erisma uncinatum* Warm.

(fam. Vochysiaceae); (5) Tacacazeiro, Envireira, or Capote, *Sterculia pruriens* (Aubl.) Schum. (fam. Sterculiaceae), the Touroutier or Mahot-cochin of French Guiana; (6) Uchy-pucú, *Saccoglottis uchi* Huber (fam. Humiriaceae); (7) Umary, *Poraqueiba paraënsis* Ducke (fam. Icacinaceae).

**Nota sobre a "saponina" do saboneteiro,** by GEORGES BRET, pp. 30–32. A study of the glucoside saponin of the fruits of the Saboneteiro, *Sapindus saponaria* L. (fam. Sapindaceae).

**Contribuição ao estudo chimico das plantas Amazonicas,** by CLARA B. MARTIN, pp. 33–39. A summary of a thesis concerning the following plants: (1) Cipó-cururú, *Echites cururu* Mart. (fam. Apocynaceae); (2) Pedra-hume-caá, *Myrcia* or *Eugenia* (fam. Myrtaceae); (3) Pau Paratudo, *Simaba cedron* Planch. (Simarubaceae); (4) Carú-caá (undetermined shrub); (5) Caxinguba, *Pharmacosicea anthelmintica* Miq. or *Ficus anthelmintica* Mart. (fam. Moraceae), also known as Coajinguva, Lombrigueira, and Uapuim-assú.

**O principio activo das plantas do genero *Ryania* or *Patrisia,*** by PAUL LE COINTE, pp. 43–47.

**Estudo chimico dos glucosides da raiz da *Ryania acuminata,*** by GEORGES BRET, pp. 48–50 (to be continued).

**Plantas taniferas Amazonicas,** by ELIAS M. SERFATY, pp. 62–70. Gives the tannin content of the barks of 20 different trees.

**Exploração das florestas no Pará,** by PAUL LE COINTE, pp. 71–79. A discussion of the forests of Pará, which contain about 1500 species of trees, although only about 60 are utilized; consideration of the peculiarities and difficulties of tropical forestry; suggestions for a rational program.

**As madeiras da Amazonia na industria do papel,** by ARTHUR BASTOS, pp. 80–83. Preliminary study of the suitability for paper pulp of the principal soft-wooded trees of the Amazon region.

**Modernos processos de identificação das madeiras,** by ARTHUR BASTOS, pp. 86–100. Contains anatomical descriptions and photomicrographs of six woods: (1) Marupá, *Simaruba amara* Aubl. (fam. Simarubaceae); (2) Parapará, Marupá Falso, or Carnauba da Matta, *Jacaranda copaia* D. Don (fam. Bignoniaceae); (3) Morototó, *Didymopanax morototoni* Aubl. (fam. Araliaceae); (4) Freijo, *Cordia Goeldiana* Huber (fam. Borraginaceae); (5) Envira Preta, *Xylopia* sp. (fam. Annonaceae); (6) Cinzeiro, *Terminalia tanibouca* Smith (fam. Combretaceae).



**A estructura do lenho da embuia.** By FERNANDO ROMANO MILANEZ. Pub. by Serviço de Informações, Min. da Agr., Ind. e Com., Rio de Janeiro, Brazil, 1930. Pp. 12; 6¼ x 9¼; ill. with photomicrographs and drawings.

A complete description of the anatomy of the wood of Embuia (*Phoebe porosa* Mez), a very important timber of southern Brazil. Among other interesting observations are these: that the fibers are septate; that oil cells occur in the rays as well as in the parenchyma strands; and that the large vessel-rays pits are more or less distinctly bordered.

**A situação do commercio de madeiras do Brasil com a Allemanha.** *Revista Florestal* 1: 7: 9, Jan. 1930.

The German demand is chiefly for Brazilwood (Páo Brazil) and Rosewood (Jacarandá). The latter, however, has to compete with the Rosewood of India, inferior in quality but marketed with more regard for the requirements of the German trade. Among other Brazilian woods that find some use in Germany are Spanish Cedar (Cedro), Massaranduba, Tulipwood (Páo Rosa), Imbuia, Cubari, Putumujú, and Gonçalo Alves.

**A industria nacional dos oleos seccativos.** *Revista Florestal* (Rio de Janeiro, Brazil) 1: 4: 20–21, Oct. 1929.

The Oiticica (*Couepia grandiflora* Benth.) is an important tree of northwestern Brazil, well known on account of its large size and its resistance to drought. Its ovoid fruit contains seeds having an average weight of 3 grams and an oil content of 62 per cent, though the amount usually extractable is about 57–58 per cent.

In 1861, Freire Allemão, writing about this tree, spoke of its abundant, oily seeds, little used because of the disagreeable

smell and taste of the oil. The first attempt at commercial utilization was in 1876, but it was not successful. During the Great War a considerable quantity of oil of Oiticica was produced, principally in Rio Grande do Norte, the greater part being exported for use in making soap, a purpose for which it was ill adapted on account of the odor. It was then discovered that the oil is well suited for paints and varnishes, giving results fully equal to linseed oil.

According to Bolton and Revis, oil of Oiticica, which is semi-solid at ordinary temperatures, is of a pale cream color when solidified, and golden yellow in a liquid state. It begins to melt at 21.5°, and completely liquifies at 65°.

In view of the large Brazilian importations of drying oils (over 19 million kilos of linseed oil from 1921–1925), the possibilities of Oiticica oil are considered worthy of thorough investigation.

**The identity of the South American fish poisons, "cube" and "timbó."** By E. P. Killip and A. C. Smith. *Journ. Wash. Acad. Sci.* 20: 5: 74–81, March 4, 1930.

"Recent investigations by chemists and entomologists, members of the department of Agriculture staff, and others have shown that the roots of a plant called 'cube' contain a substance of value as an insecticide. . . . On a trip of botanical exploration which we have just made into the interior of Peru and across Amazonian Brazil . . . we saw thousands of plants of 'cube' in cultivation on plantations, and in a wild state in the dense forest occasional plants that appear to be nearly or quite identical. The name *cube* (pronounced coó bay) was applied to it in the region about Huancayo and southward. Farther to the north in Peru the plant was referred to locally as 'coñapi' or 'pacai,' the most commonly used names, however, being 'barbasco legítimo' or simply 'barbasco,' which is the general name given to fish poisons in Spanish America. In Brazil the word 'timbó' is used for fish poisons in general, the 'barbasco legítimo' of Peru becoming 'timbó legítimo.' In British Guiana *cube* and other fish poisons are known as 'haiari'; in French Guiana the word 'nicou' is similarly employed.



"We found that although several kinds of plants were used as fish poisons, such as *Cracca toxicaria*, *Cracca nitens*, and one or more species of *Clibadium*, and in Brazil, certain species of *Lonchocarpus*, one plant alone (*cube*) was most commonly cultivated and almost everywhere was said to be the most powerful. . . . From the vegetative characters it seems clear that the plant in question is *Lonchocarpus nicou* (Aubl.) DC., described by Aublet in 1775 as *Robinia nicou* from a plant cultivated in French Guiana."

"Along the south bank of the Rio Negro above Manáos we found a second species, *Lonchocarpus floribundus*, . . . a low shrub, 1 to 1.5 meters high. . . . The roots were of a softer, more porous texture than those of *nicou*, but were said to be quite as effective as a fish poison. . . .

"At Gurupá, a settlement on the lower Amazon River at the mouth of the Rio Xingú, several plants of a third species of *Lonchocarpus* were obtained, the roots of which were reported as a fish poison even more effective than *L. nicou*, which is also grown in that vicinity. . . . The Gurupá plant may be known as *Lonchocarpus urucu* Killip & Smith, sp. nov. . . . The name '*timbó urucú*' is given this plant by the natives because of the reddish indument of the inflorescence."

**The forests of the Colony of Fiji.** By J. P. Mead. *Fiji Legislative Council Paper No. 4*, Suva, 1928. Pp. 47; 8½ x 13; 2 separate maps in color.

A comprehensive report by the Conservator of Forests of Sarawak. The topics covered are as follows: Part I, General: (1) General description of the country (topography, geology and soils, climate, communications, population); (2) General description of the forest growth (littoral forests—beach and mangrove; inland forests—rain forests and dry-zone plains). Part II, Detailed description of the forest: (3) Area; (4) Most important forest products (trees, timber, firewood, minor products); (5) Ownership; (6) Present forestry position (legislation, reservations, revenues and expenditures, outturn of timber and fuel); (7) Forest industries; (8) Growing stock, yield, and increment. Part III, Future forest policy: (9) General; (10) Proposed forest department; (11) New legisla-

tion; (12) Constitution of reserved forests; (13) Improvement of growing stock; (14) Future system of working forest produce; (15) Working plans and research; (16) Summary. Appendix I, List of botanical-vernacular names of trees; II, Vernacular-botanical names; III, Notes on the less important trees and timbers; IV, Preliminary yield tables; V, Bark yield of Ndongo; VI, Strip valuation or linear surveys; VII, Results of strip valuation surveys; VIII, Measurements of planted sandalwood; IX, British Solomon Islands Protectorate.

**Die koniferengattung *Libocedrus* Endl. in Ostasien.** By Rudolf Florin. *Svensk Botanisk Tidskrift* 24: 1: 117–131, 1930. Illustrated.

Contains a description of *Libocedrus macrolepis* (Kurz) Benth., a tree of Yunnan Province, China, and the Burma border; also a new species, *L. formosana*, of Formosa.

**Die untersuchung über die grundlage der holzidentifizierungsmethode. II. Ueber die klassifizierung der porenanordnung- und porenverbindungsarten.** (In Japanese.) By Chûjô Kaneshi. *Journal of the Society of Forestry* (Tokyo), 1929, pp. 637–660. Illustrated.

The first paper in this series concerned the classification of the different types of rays in dicotyledonous woods. (See *Tropical Woods* 17: 43.) The present deals with the arrangement of the pores, and six principal types and various subtypes are described and figured.

**Le bois de sao.** By Jean Collardet. *Revue International des Produits Coloniaux* (Paris) 5: 52: 153–157.

An account of *Hopea odorata* Roxb., an important Dipterocarp of Indo-China.

**Proceedings of the third silvicultural conference, Dehra Dun, March 14th–20th, 1929.** Govt. of India Press, Calcutta, 1929. Pp. 389; 8¼ x 13.



**Progress report of forest research work in India for the year 1928–29.** Pub. by Govt. of India, Calcutta, 1930. Pp. 194; 6¼ x 9½; 5 half-tone plates; price 7s. 3d.

**Culturen op de slechte mergelgronden van Tanggoeng tot Goendih.** By H. M. J. Hart. No. 23, *Med. van het Proefstation voor het Boschwezen*, Buitenzorg, Java, 1929. Pp. 271; 6¼ x 9¼; 59 half-tone illustrations.

**De djaticultuur op Java.** By J. H. Becking. No. 22, *Med. van het Proefstation voor het Boschwezen*, 1928. Pp. 304; 6½ x 9½; 13 figs., 6 maps.

A comparative study of the results of different methods of growing Teak in Java.

**Voordrachten, gehouden op de 18 de openbare bijeenkomst der vereeniging van hoogere ambtenaren bij het boschwezen in Nederlandsch Oost-Indië te Djokjakarta op 20 en 21 April 1929, en op de vergadering van den adviseur van den dienst der bosschen in de Buitengewesten met de dienstkringbeheerders in de Buitengewesten op 18 en 19 April 1929 te Djokjakarta.** Reprinted from *Tectona* 22: 6, 7, Buitenzorg, Java, 1929. Pp. 291: 6 x 9½; 4 maps.

**Australia. Notes on strength of timbers, with list of transverse tests on specimens in the Technological Museum.** By M. B. Welch. Bul. No. 13, Tech. Education Branch, Technological Museum, Sydney, 1929. Pp. 21; 5½ x 8.

"The earlier timber tests, from which the mean figures given in this bulletin are compiled, were carried out on timber specimens supplied by the Technological Museum to the Technical College Laboratory. . . . More recently tests have been made by the writer, and these, together with the earlier tests, were brought together in Bulletin No. 6, Technological Museum, 1923. This is now out of print, and to bring the results up to date this bulletin has been compiled.

"While the earlier static bending tests were made on small specimens 3 in. by 3 in. by 36 in. span, central loading, more recently the standard size 2 in. by 2 in. by 28 in. span has been adopted. . . . The average of at least three tests is given in the accompanying table. It is important to note that in the case of the indigenous timbers all names are based on botanical material obtained from the same tree as the timber, so there can be no question as to their authenticity."

**Some mechanical properties of Australian grown *Pinus insignis* (*P. radiata*).** II. By M. B. Welch. Reprint, *Journ. & Proc. Royal Soc. N. S. W.* 63: 111–121, Feb. 26, 1930.

"Several years ago, through the courtesy of the Forestry Commission of New South Wales, timber specimens of *Pinus insignis* (*P. radiata*) were obtained from Gosford and Sutton Forest, New South Wales; Creswick, Victoria; and Wirrabara and Mt. Gambier, South Australia. A number of static bending and Izod impact tests were made, and the results published in a paper read before this Society. Subsequently the necessary apparatus for the making of compression, shear, cleavage, tension, and hardness tests, in conformity with the standard practice first adopted by the United States Forest Products Laboratory, and subsequently by most similar institutions in the British Empire, was obtained. A further series of tests on small clear specimens had been made" and the results are incorporated in this report. These indicate that "the wood is not brittle and devoid of strength, as is commonly believed," but has much the same mechanical properties as Oregon or Douglas Fir (*Pseudotsuga taxifolia*). "It seems, therefore, that by proper grading, *Pinus insignis* can be obtained for many of the purposes for which imported coniferous softwoods are used, provided, of course, that it can be obtained in lengths free from defects."

**Some properties of red satinay, *Syncarpia Hillii*.** By M. B. Welch. Reprint, *Journ. & Proc. Royal Soc. N. S. W.* 63: 122–130, March 17, 1930. Ill. with 4 photomicrographs.



Red Satinay or Fraser Island Turpentine (*Syncarpia Hillii* Bailey) is a very large, hard-wooded tree practically confined to Fraser Island, off the Queensland Coast, where it is estimated there are 50 million feet of the timber available. It is strong and durable, but requires care in seasoning, and is too dense for many purposes. "The close-textured wood is typically dull reddish brown in color, without pronounced sheen when straight-grained, but lustrous when figured, due to reflection of the light from the surface of the undulating fibers. It possesses no natural figure, but may possess a high degree of accidental figure giving rise to fiddle mottle, ribbon grain, or a combination of these two. It is moderately hard and heavy, and while it is somewhat 'gritty,' and inclined to dull tools quickly, it works cleanly and planes crisply, with little tendency of the 'grain' to tear up. In sawing or drilling it is inclined to 'burn,' but does not splinter, and is not tough or leathery, but has rather a tendency to be 'short-grained.' It requires little filler, and readily takes a high polish. A high tannin content in the wood is indicated by the blue-black coloration produced when the wet timber is worked with steel tools."

The paper contains a detailed description of the gross and minute anatomy and a report on mechanical and other tests.

**Note on the influence of forests on climate and water supply in Uganda.** By J. W. Nicholson. Suppl. to Kenya Forest Dept. Pamphlet No. 2, Govt. Press, Uganda. Pp. 14; 6 x 10.

**Setlhapiñ nomenclature and uses of the indigenous trees of Griqualand West.** By F. H. Ferreira. Pp. 349–356; 6¼ x 10.

An interesting account of 23 kinds of trees and shrubs of Griqualand West, South Africa, together with the scientific and native names.

**L'utilisation des bois de la Côte d'Afrique dans l'industrie des chemins de fer.** By Léon Géraud. *Revue Interna-*

*tionale des Produits Coloniaux* (Paris) 5: 52: 142–146, Apr. 1930.

Emphasizes the importance to the French colonies in Africa of developing and stabilizing the timber industry through regular and systematic employment of African woods for crossties and other railway construction.

**L'acajou de Bassam (*Khaya ivorensis*).** By [André] Aubreville. *Bulletin Mensuel de l'Agence Économique de l'Afrique Occidentale Française* (Paris) 10: 107: 314–320, Nov. 1929.

A full account of the Mahogany of the Ivory Coast with reference to its distribution and abundance, silvical and botanical characters, the properties and uses of the wood, and the history and development of the timber trade.

**L'iroko.** By [André] Aubreville. *Bulletin Mensuel de l'Agence Économique de l'Afrique Occidentale Française* (Paris) 11: 111: 81–84, March 1930.

A comprehensive account of Iroko or Teck d'Afrique (*Chlorophora excelsa* Benth.), one of the largest and commonest trees in the West African forests. The article applies particularly to Ivory Coast.

**Essai d'identification des Méliaciées de la Côte d'Ivoire.** By André Aubreville. Reprinted from *Actes & Comptes Rendus de l'Assn. Colonies-Sciences* (Paris) 57, 58, Mar., Apr. 1930. Pp. 15; 6¼ x 9½.

Contains descriptions and keys for the identification of the Ivory Coast woods of the genera *Khaya*, *Entandrophragma*, *Lovoa*, *Turræanthus*, *Guarea*, and *Trichilia*.

**Études sur les périodes de végétation des arbres de la Basse Côte d'Ivoire.** By Martineau. *Actes et Comptes Rendus de l'Association Colonies-Sciences* (Paris) 5: 54: 258–261, Dec. 1929.

Report on observations of the periodicity of the fall of leaves, flowers, and fruits of the principal forest trees. There are two complete cycles a year, corresponding with the alternation of the wet and dry seasons. The duration of the seasons is as follows: Middle of December to middle of March—main dry season; middle of March to middle of July—main wet season; middle of July to middle of October—little dry season; middle of October to middle of December—little wet season.



**L'action du service forestier de la Côte d'Ivoire. II. Project d'aménagement et d'enrichissement de la forêt réservée du Banco.** By J. Meniaud. *Revue International des Produits Coloniaux* (Paris) 5: 51: 113–116, March 1930.

The Banco forest reserve, with a total area of about 3500 hectares, is located just north of the Ebrié Lagoon in the vicinity of the railroad terminus, Abidjan. The forest varies according to local conditions, but in general it gives the impression of being dense, two-storied, and tangled with lianas. The Forest Service has counted more than 110 different species of trees, of which 25 are of the first order and 65 of the second (lower) order; there are others remaining to be identified, as well as a great variety of shrubs.

An inventory of the trees on 13 sample plots, having a combined area of 210 hectares, shows 5703 trees of the following diameter classes: 20 inches, 3081; 24 inches, 900; 28 inches, 457; 32 inches, 379; 36 inches, 336; 40 inches, 414; 48 inches, 101; 56 inches and over, 15. These trees represent 65 different species, of which the most abundant are Avodiré, *Turræanthus africanus* Pellegr. (18 per cent of the stand); Azobé, *Lophira procera* A. Chev. (10 per cent); Adjouaba, *Haematostaphis Barteri* Hook. f. (10 per cent); Abalé, *Petersia viridiflora* A. Chev. (10 per cent); Dabéma, *Piptadenia africana* Hook. f. (4.5 per cent). Avodiré, the dominant species, is much the most important commercially. The others mentioned are dense woods, chiefly useful for railway crossties, charcoal, and fuel, although Azobé is beginning to find a market in Europe for maritime construction.

**Probeflächen-aufnahmen aus dem Kameruner regenwald.** By J. MILDBRAED. *Notizblatt des Bot. Gart. u. Mus. Berlin-Dahlem* 10: 99: 951–976, March 1930.

A report of exceptional value to all interested in the composition of tropical rain forests. The trees 1 foot and over in diameter at breast height or above buttresses were enumerated and measured for diameter and clear length of bole on 15 sample plots of one hectare each, located in the Likomba forest at the foot of the Cameroon Mountains between Victoria and the Mungo River. Young trees of the large kinds, but less than 1 foot in diameter, were tallied but not measured. Tables are given showing the number of each species, the individual dimensions, and the total cubic contents for each species and each plot.

On the 15 plots there were only 40 trees having a diameter of 40 inches or more. The two largest trees measured were a *Ceiba* (64 inches) and a *Klainedoxa* (62 inches). The average number of tree species represented on the 15 plots was 20.5 per hectare (8.3 per acre). While this seems high in comparison with the forests of Germany, which contain only 36 indigenous tree species all told, it is much lower than has been reported for some other parts of the Cameroons. For instance, Jentsch found on a half-hectare plot at Mundeck 323 trees, 7 cm. or more in diameter, representing 80 different species; the number a foot or more in diameter was 57, representing 34 species, or about 47 trees and 27 species per acre. (See *Beiheft zum Tropenpflanzer XII*, 1911.)

On the 15 plots there were 65 species of trees attaining the minimum diameter of a foot. In addition, 71 other species were noted, of which 14 were of the large tree class, and 57 small trees and shrubs. The actual number of woody species is in excess of 136. Ten species of the larger woody lianas were collected.

The largest and most prevalent tree was found to be *Lophira procera* A. Chev. Others of special prominence were *Sterculia rhinopetala* K. Schum., *Staudtia stipitata* Warb., *Homalium africanum* (Hook. f.) Benth., *Strombosia* sp., *Vitex grandifolia* Gürke, and *Enantia chlorantha* Oliv.

The volumes of the usable timber, computed by the



cylinder formula and reduced 20 per cent as an allowance for taper (latter figures in parentheses), are given for 7 of the plots as follows (in cubic meters); I, 320 (256); II, 285 (228); V, 214 (172); VII, 315 (252); XI, 93 (75); XII, 253 (203); XV, 224 (179). Omitting plot XI, which is exceptionally low, the average of the other six is 269 (215) cubic meters per hectare, equivalent to 3812 (3050) cubic feet or about 26,900 (21,500) board feet per acre.

According to Bertin (*Les bois du Cameroun*, p. 67), the forest vegetation of Cameroon is not sensibly different from that of Ivory Coast where the average stand is from 200 to 250 cubic meters per hectare, of which between 100 and 150 cubic meters (roughly equivalent to from 10,000 to 15,000 board feet per acre) are utilizable.

It is interesting to compare these figures with those of Whitford for certain types in the Philippine Islands (*The forests of the Philippines*, Part I, tables 3–6). The volume of trees 16 inches and over in diameter (average of 40–55 hectares) was found to be as follows: (1) In northern Negros, total Dipterocarpaceae, 429 cubic meters per hectare or 42,900 board feet per acre; including non-Dipterocarpaceae 451.6 $m^3$ or 45,160 bd. ft. (2) On a delta plain in eastern Mindoro, total 163 $m^3$ or 16,300 bd. ft. (3) In the Port Banga region, Mindanao, total 289 $m^3$ or 28,900 bd. ft. (4) In Bataan Province, Luzon, total 285.2 $m^3$ or 28,520 bd. ft. The average volume of the Dipterocarp forests over an area of 30,000 square miles is roughly estimated (*loc. cit.*, table 2) to be 100 cubic meters per hectare or 10,000 board feet per acre.

The last seven pages of Dr. Mildbraed's report contain an annotated list of the plants of the Likomba forests. From it is compiled the following check list of the Bulu and Jaunde vernacular names.

CHECK LIST OF THE VERNACULAR NAMES

| | | |
|---|---|---|
| Abang | *Chlorophora excelsa* (Welw.) B. & H. | Moraceae |
| Abé | *Homalium africanum* (Hook.f.) Benth. | Flacourtiaceae |
| Abem | *Berlinia bracteosa* Benth. | Leguminosae |
| Abfan | *Panda oleosa* Pierre | Pandaceae |
| Abö | *Canarium Schweinfurthii* Engl. | Burseraceae |

| | | |
|---|---|---|
| Abot; Abotnsok | *Ochrocarpus africanus* Oliv. | Guttiferae |
| Afwom | *Cleistopholos patens* (Benth.) Engl. & Diels | Annonaceae |
| Ajuss | *Triplochiton scleroxylon* K. Schum. | Sterculiaceae |
| Akak | *Duboscia macrocarpa* Bocq. | Tiliaceae |
| Akellăng | *Corynanthe pachyceras* K. Schum. | Rubiaceae |
| Akenneng | *Grewia coriacea* Mast. | Tiliaceae |
| Akŏ | *Corynanthe dolichocarpa* Brandt | Rubiaceae |
| Akŏk | *Tylostemon* cf. *crassifolius* Engl. | Lauraceae |
| Akom | *Terminalia superba* Engl. & Diels | Combretaceae |
| Akondug; Akunduk | *Sarcocephalus* cf. *Trillesii* Pierre | Rubiaceae |
| Alen? | *?Amphimas* sp. | Leguminosae |
| Aloa | *Antiaris* cf. *Welwitschii* Engl. | Moraceae |
| Andingding | *?Randia* sp. | Rubiaceae |
| Andog | *Irvingia gabonensis* (A. Lec.) Baill. | Simarubaceae |
| Angŏk; Anjek | *Ongokea Klaineana* Pierre | Olacaceae |
| Asse; Assie | *Entandrophragma* cf. *cylindricum* Sprague | Meliaceae |
| Atuij | *Piptadenia africana* Hook.f. | Leguminosae |
| Aweb | *Holoptelea grandis* (Hutch.) Mildbr. | Ulmaceae |
| Djib | *Strombosia grandifolia* Hook.f. | Olacaceae |
| Ebaij | *Cordia platythyrsa* Bak. | Borraginaceae |
| Ebusok | *Sapium Mannianum* Benth. | Euphorbiaceae |
| Ehaletombo | *Drypetes Paxii* Hutch. | Euphorbiaceae |
| E(i)jóng; Ej(u)ong | *Sterculia oblonga* Mast. | Sterculiaceae |
| Ejen | *Distemonanthus Benthamianus* Baill. | Leguminosae |
| Ekó | *Lannea Welwitschii* (Hiern) Engl. | Anacardiaceae |
| Ekob | *Cynometra Afzelii* (Oliv.) Harms | Leguminosae |
| Elamtăk | *?Randia* sp. | Rubiaceae |
| Elun | *Erythrophloeum guineense* G. Don | Leguminosae |
| Enem | *Symphonia gabonensis* Pierre | Guttiferae |
| Engó | *Casearia* sp. | Flacourtiaceae |
| Engong | *Phialodiscus unijugatus* (Bak.) Radlk. | Sapindaceae |
| Epfog | *Pterygota macrocarpa* K. Schum. | Sterculiaceae |
| Essesang | *Ricinodendron Heudelotii* Pierre | Euphorbiaceae |
| Essomba; Essombe | *Rauwolfia macrophylla* Stapf | Apocynaceae |
| Eteng | *Pycnanthus kombo* (Baill.) Warb. | Myristicaceae |
| Ewaletombo | *Drypetes Paxii* Hutch. | Euphorbiaceae |
| Ewoei | *Microdesmis puberula* Hook.f. | Euphorbiaceae |
| Ewu | *Vitex grandifolia* Gürke and *V. rivularis* Gürke | Verbenaceae |
| Issógbe | *Bosqueia Welwitschii* Engl. | Moraceae |
| Issombe | *Rauwolfia macrophylla* Stapf | Apocynaceae |
| Issote | *Cyrtogonone argentea* (Pax) Prain | Euphorbiaceae |
| Malwini | *Diospyros* cf. *gracilescens* Gürke | Ebenaceae |
| Masamuko | *Strombosiopsis tetranda* Engl. | Olacaceae |



| | | |
|---|---|---|
| Mbanda | *Hylodendron gabunense* Taub. | Leguminosae |
| Mbapfolo | *Homalium africanum* (Hook.f.) Benth. | Flacourtiaceae |
| Mbe | *Pterocarpus Soyauxii* Taub. | Leguminosae |
| Mbikam | *Newbouldia laevis* Benth. | Bignoniaceae |
| Mboasoo | *Strombosia* sp. | Olacaceae |
| Mbonda | *Staudtia stipitata* Warb. | Myristicaceae |
| Mwei; Mwié | *Celtis* sp. | Ulmaceae |
| Ndamba | *Holarrhena Wulfsbergii* Stapf | Apocynaceae |
| Ngon | *Klainedoxa gabonensis* Pierre var. *oblongifolia* Engl. | Simarubaceae |
| Nkanna(ng) | *Sterculia rhinopetala* K. Schum. | Sterculiaceae |
| Nsu | *Daniellia oblonga* Oliv. | Leguminosae |
| Odu | *Celtis Zenkeri* Engl. | Ulmaceae |
| Ojankuij | *Xylopia* cf. *Thomsoni* Oliv. | Annonaceae |
| Okoa; Okoga | *Lophira procera* A. Chev. | Ochnaceae |
| Okómbokuij | *Spondianthus Preussii* Engl. | Euphorbiaceae |
| Olom | *Afrostyrax kamerunensis* Perk. | Styracaceae |
| Omang | *Desbordesia glaucescens* (Engl.) Pierre | Simarubaceae |
| Onjā | *Symphonia gabonensis* Pierre | Guttiferae |
| Onŏng | *Carpolobia alba* Don | Polygalaceae |
| Ossang | *Diospyros gracilescens* Gürke | Ebenaceae |
| Ossanga | *Diospyros polystemon* Gürke | Ebenaceae |
| Otu | *Canarium Schweinfurthii* Engl. | Burseraceae |
| Otunga | *?Polyalthia* sp. | Annonaceae |
| Owindefam | *Diospyros* cf. *suaveolens* Gürke | Ebenaceae |
| Owoë | *Hexalobus grandiflorus* Benth. | Annonaceae |
| Owŏng | *Copaifera Tessmannii* Harms | Leguminosae |
| Woma; Womba | *Xylopia striata* Engl. | Annonaceae |

**Le problème forestier en Afrique.** By E. DE WILDEMAN. Reprinted from *Revue des Questions Scientifiques* (Louvain), Sept. 1929, pp. 231–246.

**A propos de bois dits "acajous africains" et de certains *Entandrophragma* C. DC. (Méliacées) producteurs africains de bois succédanes de celui de *Swietenia mahogani* (L.) Jacq., "acajou vrai."** By PAUL LEDOUX. *Revue Internationale des Produits Coloniaux* (Paris) 5: 52: 132–136, Apr. 1930.

An argument for the use of scientific names instead of vernacular and trade names to designate timbers of commerce, with particular reference to substitutes for true Mahogany.

**Sur une nouvelle espèce du genre *Entandrophragma* C. DC. (Meliaceae) du Kivu (Congo Belge): *Entandrophragma Gillardini* Ledoux, nov. sp.** By Paul Ledoux. *Communications du Lab. des Prod. Vég. et de l'Herb. du Service Forestier du Kivu* (Brussels) No. 1, Apr. 1930. Pp. 13; 6¼ x 9½; 1 half-tone plate.

This new species, named in honor of Forest Engineer Jos. Gillardin, belongs to the section Basidehiscentes (as distinct from the Apicidehiscentes) of the genus *Entandrophragma*. It differs from *E. congoense* (De Wild.) A. Chev., *E. Delevoyi* De Wild., *E. Leplaei* Verm., *E. macrophyllum* A. Chev., and *E. septentrionale* A. Chev., all of which have basally dehiscent capsules, in the size and appearance of the valves, columella, and gynophore, and in the character of the seed, more particularly the wing.

**Étude sur les bois de trois Méliacées du Congo Belge.** By Fl. Duchesne. *Revue de Zoologie et de Botanique Africaines* 19: 1: 131–149, Apr. 15, 1930.

Contains detailed descriptions of the woods of three species of Meliaceous trees of the Belgian Congo, namely, (1) *Khaya canaliculata* DeWild. (Pseudo-Senga), (2) *Khaya Wildemanii* Ghesq. (Dibwe-Mutshi), and (3) *Leplæa coalescens* Verm. (Mpoasa). The paper is illustrated with 9 full-page photomicrographs showing the cross, radial, and tangential sections of each wood.

The description of *Leplæa coalescens* may be summarized as follows: *Growth rings* more or less distinct, due to variations in the fibers and in the arrangement of parenchyma. *Pores* ovoid, uniformly distributed, 15 to 18 per square millimeter, occurring singly or in radial pairs or sometimes in 3's, rarely 4's; diameter 0.10 mm. to 0.25 mm. (av. about 0.18 mm.), though there are some which are very much smaller. *Vessel segments* variable in length from 0.41 mm. to 0.715 mm. (av. 0.51 mm.); pits very small and crowded; plugs of brown gum and tannin common in the simple perforations. *Parenchyma* in considerable abundance about the pores and in irregular, broken or continuous bands variable in width from 1 to 8 cells (av. 3 cells); the continuous bands are spaced from 0.10 mm. to 0.62 mm. apart; many of the cells are filled with brown gummy deposits. *Rays* numerous (about 10 or 11 per mm. tang.), bending around the pores, uniseriate (exceptionally biseriate in part), 5 to 25 (av. 15) cells (0.13 mm. to 0.52 mm.) high, homogeneous, the cells much elongated radially and rectangular in section; pits into vessels very small; gum deposits abundant. *Fibers* small, fairly uniform in size (only apparently of two sizes on cross section), arranged in rather definite radial rows, and radially flattened at the termination of seasonal growths; length 0.67 mm. to 0.96 mm. (av. 0.75 mm.). Although the wood has various features in common with *Khaya canaliculata*, it differs from it in having rays which are more numerous, narrower, and lower.



The heartwood of *Leplæa* has a characteristic cedar-like scent, is easy to work, and takes a beautiful polish. Sp. gr. (dry), 0.64. It is used for cabinet-making and fine furniture, and for interior trim.

From an examination of the photomicrographs of *Khaya canaliculata*, the reviewer is strongly inclined to doubt that it is *Khaya*, as the numerous, closely spaced, irregular bands of parenchyma are certainly not characteristic of this genus. According to the description, these bands vary in width from 1 to 6 cells, av. 3 cells, and are about 0.25 mm. apart. The rays are mostly biseriate and therefore much narrower than in other species of *Khaya*, and the pores are about four times as numerous as in *K. Wildemanii*.

**Gum, tannin, and resin in relation to specificity, environment, and function.** By James B. McNair. *Amer. Journ. Bot.* 17: 187–196, March 1930.

In this paper is developed the taxonomic and climatic distribution of plants containing relatively large amounts of gum, tannin, and resin. Gum-bearing plants are classified according to their content of tannin and resin. Resin-bearing plants are classified according to their content of gum and tannin. The climatic occurrence of these substances is considered in relation to their function.

**The taxonomic and climatic distribution of oils, fats, and waxes in plants.** By JAMES B. MCNAIR. *Amer. Journ. Bot.* 16: 832–841, December 1929.

This paper develops the relationship of the melting point of a plant oil to the temperature of its environment. Tropical plants have higher melting points than those of plants of temperate climates; seed-kernel oils may have lower melting points than the oils in seed coverings; plants of tropical origin probably retain their high melting point oils when in temperate climates. Oils often provide specific physical and chemical properties of taxonomic value. There is close agreement between the oils of the different species of a genus. Oils of smaller families are in closer intrafamilial agreement than in larger families while those of larger families are often in better agreement if they are considered in tribal groups.

**Fish-poison plants.** By F. N. HOWES. *Kew Bull. Misc. Inf.* No. 4, 1930, pp. 129–153.

Contains an account of the plants used as fish poisons in Africa, America, Asia, and Europe. Includes a list of 48 references and an index to the plants.

"There is little doubt but that many of these plants are of potential economic value and may in time be put to more profitable use than fish-poisoning. The practical utility of some, notably species of *Derris*, has already been demonstrated in the commercial manufacture of efficient contact insecticides. . . . Apart from use as insecticides the possibility exists, in view of the diverse nature of these plants, that the active principles peculiar to certain of them may prove of further use in pharmacognosy and toxicology. The fact that certain of the fresh-water snails, known to be hosts of, and essential for the complete life cycle of, the organism responsible for schistosomiasis or bilharzia in main, are sensitive to the influence of fish-poisoning species of *Tephrosia*, suggests the possibility of such plants being of use in those areas where the incidence of the disease is high."

Price 50 cents

Yale University — School of Forestry

# TROPICAL WOODS

NUMBER 24 — DECEMBER 1, 1930

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Yale University School of Forestry

# TROPICAL WOODS

NUMBER 24 December 1, 1930

*A technical journal devoted to the furtherance of knowledge of tropical woods and forests and to the promotion of forestry in the Tropics.*

*The editor of this publication and the writer of any articles therein, the authorship of which is not otherwise indicated, is* SAMUEL J. RECORD, *Professor of Forest Products, Yale University.*

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## INTERNATIONAL ASSOCIATION OF WOOD ANATOMISTS

Last February a printed letter was sent out from the Imperial Forestry Institute at Oxford inviting all persons interested in the systematic anatomy of woods to meet in Cambridge at the time of the Fifth International Botanical Conference. This invitation was also published in *Tropical Woods* (June 1, 1930). The three signatories were Dr. L. CHALK, Imperial Forestry Institute, Professor S. J. RECORD, Yale School of Forestry, and Mr. B. J. RENDLE, Forest Products Research Laboratory at Princes Risborough.

The purposes of the proposed conference, though only briefly outlined, met with a hearty response on the part of investigators and institutions in various parts of the world. Letters expressing a sympathetic interest in the conference and offering coöperation were received from members of the

following institutions: Institut für angewandte Botanik, Hamburg, Germany; Forest Research Institute, Dehra Dun, India; U. S. Forest Products Laboratory, Madison, Wisconsin; School of Forestry, Canterbury College, Christchurch, New Zealand; Technological Museum, Sydney, Australia; Commonwealth Forestry Bureau, Canberra, Australia; Forest Research Institute, Kepong Selangor, Federated Malay States; Forest Products Laboratories of Canada, Vancouver, B. C.; Forest Department, Union of South Africa, Pretoria; Royal Botanic Gardens, Kew, England; and Wood Technology Section, U. S. National Museum, Washington, D. C. There were also letters from individual wood technologists who could not attend the conference.

At the International Congress of Tropical Agriculture at Antwerp July 28–31, the Section of Forest Exploitation voted a resolution which was presented to a plenary session of the Congress for adoption. The resolution is (in substance) as follows:

*Whereas*, a comprehensive scientific study of tropical and subtropical woods is absolutely necessary from a triple point of view, namely, the botanical, the technological, and the commercial; and

*Whereas*, such a comprehensive scientific study is only at its beginning and is being conducted only in a strictly national manner; and

*Whereas*, the development of commerce in tropical and subtropical woods concerns, on the contrary, all nations together—producers as well as consumers; and

*Whereas*, therefore, it is necessary to promote this study and to learn to know these woods and to coördinate scattered efforts; be it

*Resolved*, that this Congress approves the initiative taken to call an informal conference on wood anatomy on the occasion of the Fifth International Botanical Congress and expresses the hope that, at the International Congress on Tropical and Subtropical Woods to be held in Paris in June 1931, there will be formed a permanent international association for the study of woods.

## The Meetings at Cambridge

The Department of Forestry of the University of Cambridge kindly placed its building at the disposal of the conference, and three public sessions were held there. There were also committee meetings and informal gatherings in quarters supplied by Pembroke College.



At the first session (August 18) the three conveners explained more fully the purposes of the conference, and they were followed by several other speakers. It soon became evident that all present approved the principle of international coöperation, although naturally there was some difference of opinion as to the best means of attaining this object. It was suggested at the meeting, and also in some of the letters received, that any association formed should be broad enough to embrace the whole field of research in forest products, but the majority were of the opinion that the undertaking should, initially at least, be kept within the limits of the original proposal. It was accordingly decided to form an International Association of Wood Anatomists, and a committee was appointed to draft a constitution for consideration at the next meeting.

At the second session of the conference (August 19), the committee proposed a form of organization modeled after the constitution and rules of the Society of Foresters of Great Britain. The first three articles were adopted (though later changed to the status of resolutions), as follows:

I. The Association shall be called the *International Association of Wood Anatomists*.

II. The object of the Association shall be to advance the knowledge of wood anatomy in all its aspects.

III. The activities of the Association shall be:

(a) To interchange ideas and information through correspondence and meetings.

(b) To facilitate the collection and exchange of material.

(c) To work toward standard terminology and descriptions.

(d) To stimulate the publication of scientific articles and abstracts.

(e) To encourage and assist the study and teaching of wood anatomy.

(f) To engage in any other activity consistent with the object of the Association.

There was lack of uniformity of opinion regarding eligibility for membership and it was suggested that there be different grades of members in order to permit all interested in the objects of the Association to become affiliated with it in some manner or other. It also developed that the proposed form of constitution did not fully meet certain international legal requirements. The matter was accordingly referred back to the committee for further consideration.

At the third session (August 20), the committee reported that, as a result of its deliberations, aided by the representatives of other countries, it seemed advisable to postpone further attempts at formal organization. It recommended, instead, that an organizing committee with full powers be appointed to deal with the question and report to the next conference, to be held in Paris next summer on the occasion of the Congrés International des Bois Tropicaux et Subtropicaux. This recommendation was adopted and a committee of nine members elected. Attempt was made to have this committee as internationally representative as possible, but choice was necessarily limited to those in attendance or who had by letter expressed a willingness to coöperate. Furthermore it was essential that a majority should be chosen from among those present in order that the committee might begin to function immediately. The membership is as follows:

Mr. E. H. B. Boulton, University of Cambridge Department of Forestry.
Prof. Dr. G. Bredemann, Institut für angewandte Botanik, Hamburg, Germany.
Dr. Laurence Chalk, Imperial Forestry Institute, Oxford, England.
Mr. Jean Collardet, Comité National des Bois Coloniaux, Paris, France.
Dr. Paul Ledoux, Institut Botanique Léo Errara, Brussels, Belgium.
Dr. J. Ph. Pfeiffer, Technische Hoogeschool, Delft, Netherlands.
Prof. Samuel J. Record, Yale School of Forestry, New Haven, Connecticut.
Mr. B. J. Rendle, Forest Products Research Laboratory, Princes Risborough, England.
Mr. M. B. Welch, Technological Museum, Sydney, Australia.

The organizing committee met in Pembroke College August 21. Six members, namely, Boulton, Chalk, Collardet, Ledoux, Record, and Rendle, together with Reinders, representing Netherlands and Java, were present. Professor Record was appointed secretary of the committee. Plans for the next conference were considered and the committee expects to be able to submit at that time at least three reports, namely, (1) a definite form of organization, (2) a plan for the exchange of material, (3) a polyglot glossary of terms used in describing woods.

The organizing committee has assumed a large and difficult task and the time at its disposal is short. Its work would be greatly facilitated if everyone interested would write out fully any suggestions which may occur to him and transmit them to the secretary or any member of the committee. Only through hearty coöperation can the object of the Association be attained.



Every interested person who can is urged to attend the Paris conference. Not the least value of such meetings is in the opportunity they afford for personal acquaintance with one's co-workers. The contacts thus formed, the informal discussions, the new points of view obtained, the sociability—all make for better understanding and better work.

---

Attendance at the Three Sessions of the Conference

| *Name* | *Country* | *1st* | *2nd* | *3rd* |
|---|---|---|---|---|
| E. H. B. Boulton | England | x | x | x |
| J. Burtt Davy | England | x | x | – |
| L. Chalk | England | x | x | x |
| D. F. Chesters | Nigeria | x | x | – |
| Miss G. Clamp | ? | x | – | – |
| S. H. Clarke | England | x | x | x |
| Jean Collardet | France | x | x | x |
| H. A. Cox | England | x | – | – |
| W. Dawson | England | x | x | x |
| Miss D. G. Downe | ? | x | – | – |
| F. E. Fritsch | England | x | – | – |
| Miss G. J. Griffin | U. S. A. | x | x | – |
| H. S. Holden | England | x | – | x |
| F. N. Howes | England | x | x | – |
| Miss R. L. Hull | ? | x | – | – |
| P. Jaccard | Switzerland | x | – | – |
| F. W. Jane | England | – | x | x |
| Paul Ledoux | Belgium | x | x | x |
| C. R. Metcalfe | England | x | x | x |
| P. Navet | Switzerland | x | – | – |
| R. T. Patton | Australia | x | x | – |
| S. J. Record | U. S. A. | x | x | x |
| E. Reinders | Netherlands | x | x | – |
| A. B. Rendle | England | x | – | – |
| B. J. Rendle | England | x | x | x |
| L. Williams | U. S. A. | x | x | x |
| S. E. Wilson | England | – | – | x |

# FORESTRY IN BRITISH HONDURAS

*By* SAMUEL J. RECORD

In 1920–21 the forest resources of British Honduras were investigated at the instance of the Colonial Research Committee by Mr. C. HUMMEL, formerly of the Federated Malay States Forest Service. His report, published on October 31, 1921, resulted in his appointment as Conservator of Forests, with no staff, as from April 1, 1922.

## THE FOREST TRUST

On August 15, 1923, two ordinances were enacted. The first vested in a Forest Trust, consisting of two official and two non-official members under the chairmanship of the Governor, the responsibility for the development and maintenance of the Crown forests of the Colony and for the administration of the funds provided for that purpose. The second provided for the raising of a loan of $250,000 to supplement such contribution from general revenue as it might be possible to devote to forest development.

These ordinances may be regarded as the constitutional formation of the Forest Trust, though its status was not finally defined until the passing of Ordinance 32, dated October 14, 1926, as follows:

*Object.*—The management of the Crown forests of the Colony in accordance with the forest policy of the Government shall be vested in a Trust called the "Forest Trust," hereinafter called the Trust.

*Finance.*—All moneys appropriated from the general revenue of the Colony or assigned under the provisions of any loan ordinance for the development and maintenance of the forests of the Colony, together with the income from any investment by the Trust of such moneys, shall be termed "Forest Trust Funds" and the expenditure of such funds shall be at the discretion of the Forest Trust subject to the proviso that no such expenditure in excess of one thousand dollars, not provided for in the estimates hereinafter referred to, shall be incurred without the approval of the Secretary of State.

*Composition.*—The Trust shall consist of the Governor, the Colonial Secretary, the Conservator, and one other member holding office in the public service of the Colony (hereinafter termed the third official member), and of two unofficial members. The third official member and the two unofficial members shall be appointed by the Governor. The unofficial members shall hold their appointment for a term of three years. Appointed members shall be eligible for reappointment.



*Status of Forest Officers.*—The Conservator shall fulfil the function of manager of the Trust and shall, together with all officers subordinate to him, be deemed to be employed by and responsible to the Trust; provided, that nothing in the foregoing shall be held to affect his or their position as public officers in the terms of Chapter II of the Colonial Office Regulations.

*Appropriation of Funds.*—There shall be appropriated from general revenue, as a contribution to Forest Trust funds, a sum amounting in the fiscal year 1925–26 to 40 per centum, in the fiscal year 1926–27 to 50 per centum, and thereafter to 60 per centum of the total general forest revenue, that is to say revenue derived from the export tax on wood, from the export tax on chicle from whatever source of origin, from licenses to cut or collect and remove timber and other forest produce, and such other revenue as the Governor in Council may, from time to time, with the approval of the Legislative Council, determine to be forest revenue.

Under this Ordinance were enacted the Forest Rules of 1927 which came into force January 1, 1927. They deal with the issuing of licenses. The most important clause is that transferring from the Surveyor General to the Conservator the power of issuing licenses to remove forest produce.

## STAFF

Since the greater part of the accessible Mahogany forest in the Colony has been alienated in the past, it has been the aim of the Trust since its inception to arouse the interest of the landowners to the necessity for conservative management of their forests. Thus when a trained staff was being recruited, there had to be kept in view the fact that trained officers would be required for deputation to concerns interested in the exploitation of forest produce.

Mr. HUMMEL continued as Conservator without a trained staff until January 5, 1924, when Mr. J. N. OLIPHANT, B.A. Dipl. For. (Oxon.), formerly of the Indian Forest Service, arrived to take up the duties of Deputy Conservator. Mr. OLIPHANT had already been in the Colony in 1920 when he investigated the forests of the Belize Estate & Produce Co., Ltd., London (hereafter referred to as B.E.P.C.).

He was followed in February 1924 by Mr. DUNCAN STEVENSON, B.Sc. For. (Edin.), and Mr. C. L. STOCKER, B.A. Dipl. For. (Oxon.),—both as Assistant Conservators. On June 30, Mr. OLIPHANT took up the duties of Conservator as Mr. HUMMEL resigned to take over the managership of the

B.E.P.C., which office he still holds. The benefit of Mr. HUMMEL's wide experience has been retained by the Trust through his appointment as unofficial member. On account of ill health, Mr. STOCKER resigned on December 3, 1924. Mr. NEIL S. STEVENSON, B.Sc. For. (Edin.), arrived on December 10.

The staff was augmented in 1925 by the following arrivals: Mr. D. L. FORBES, B.Sc. For. (Edin.), April 12; seconded to B.E.P.C. Capt. H. M. HEYDER, M.C., Dipl. For. (Edin.), May 25; seconded to Chicle Development Co. Mr. C. S. BROWN, B.Sc. For. (Edin.), October 19; seconded to B.E.P.C. Capt. R. STRUMP, Dipl. For. (Edin.), October 19; Government Service.

The changes in 1926 were as follows: Mr. FORBES resigned on June 1. Capt. HEYDER reverted to Government Service on April 1; Mr. BROWN resigned to take up a permanent appointment with the B.E.P.C. at the end of the year and is still with that Company. Mr. J. B. AITKEN, B.Sc. For. (Edin.), arrived on November 1, and was seconded to the B.E.P.C. Thus at the end of 1926 there were four officers on Government duty and one seconded to a private concern.

In 1927: Capt. STRUMP left the Colony on vacation leave in February, preparatory to the termination of his appointment by the Government. Mr. AITKEN remained on deputation to the B.E.P.C. throughout the year. The following Assistant Conservators were appointed: Mr. G. H. DONALD, B.A. (Oxon.), April 19; Mr. J. B. KINLOCH, B.Sc. For. (Edin.), October 3; and Mr. C. L. STOCKER, B.A. Dipl. For. (Oxon.), October 24. Mr. STOCKER took up special duties as Agricultural Officer, *pro tem.*

In 1928: Capt. HEYDER retired from the Service on September 4. On account of a shortage of forest officers in British Guiana, Mr. AITKEN, then on vacation leave, was seconded to the Forest Service of that Colony, with effect from November 30, and the secondment has since been made a permanent transfer. Mr. DUNCAN STEVENSON was appointed Senior Assistant Conservator of Northern Rhodesia with effect from November 11, on which date he left the Colony. Thus the personnel at the end of 1928 was—Conservator: Mr. OLIPHANT; Deputy Conservator: Mr. NEIL S. STEVENSON; Assistants: Mr. DONALD, Mr. KINLOCH, and Mr. STOCKER (Acting Agricultural Officer). The same personnel was estimated for in the year 1929–30.



In 1929: Mr. KINLOCH was seconded to the B.E.P.C. throughout the year. Mr. OLIPHANT proceeded on leave and was transferred to the Federated Malay Service with effect from December 14. Mr. STOCKER proceeded on leave October 5 and was transferred to Tanganyika Territory with effect from January 15, 1930. In 1930, Mr. DONALD was transferred to Kenya Colony with effect from January 26. At the beginning of the year 1930 the personnel was—Conservator: Mr. N. S. STEVENSON; Assistant: Mr. KINLOCH. No provision has been made for further recruitment in the immediate future.

*Local Staff.*—The subordinate staff has been recruited locally, but with some difficulty, the greatest problem being the finding of bush men with sufficient education or natives of education fitted for bush work. The following statement shows the changes in subordinate staff during the seven years 1924–30:

| | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | 1930 |
|---|---|---|---|---|---|---|---|
| Forest Rangers | 1 | 2 | 3 | 4 | 4 | 4 | 2 |
| Forest Guards | 1 | 3 | 7 | 4 | 2 | 2 | 2 |
| Inspector of Crown Licenses | – | 1 | 1 | 1 | 1 | 1 | 1 |

## WORK OF THE FOREST DEPARTMENT

*Exploration.*—When the Forest Department was started, one of its greatest difficulties was the almost complete lack of topographical maps of the Colony. Little was known from the Government standpoint of the forest resources of the Colony, though they were commonly reputed to be inexhaustible.

Exploration and mapping have accordingly comprised a large part of the program of the trained staff until now fairly accurate, detailed topographical maps showing forest types, etc., covering the greater part of the Colony, have been compiled on the scale of 1 inch to the mile. A much more accurate estimate of the Colony's forest resources has been obtained, an estimate which makes clear that, under the present system of exploitation, the forests are very far from inex-

haustible. The urgency for conservative working of the forests has been clearly shown.

Since the subordinate staff is not yet capable of carrying out rough survey work, exploration must necessarily proceed much more slowly with the decrease in trained staff. A great deal of work in filling gaps remains to be done.

*Silviculture.*—Silvicultural work has of necessity been mainly confined to the treatment of the primary species, namely, Mahogany, Spanish Cedar, and Sapodilla. Such treatment was for a time extended to several potentially valuable secondary species, but it has been discontinued until better prospects for utilization of these species materialize. Silviculture has been carried out on two lines—tree improvements and seedling improvements. The tree improvements aim at speeding up the growth of the trees by the cutting of lianas and the removal of interfering inferior species by girdling or felling. The undergrowth is also opened out round the improved trees to favor regeneration, thus effecting a form of seeding felling. A record is kept in 18″ girth classes of all improved trees. Thus, simultaneously with improvement, stock-taking, upon which felling plans can be based, is carried out.

Seedling improvements aim at the replacement and increase of the Mahogany regeneration. Three methods have been employed with great success in their respective areas: (a) Underbrushing through the selected area to favor existing regeneration and to form a seeding felling. (b) Favoring existing regeneration in cut-over areas by following up the Mahogany operation and improving, by underbrushing, the regeneration occurring around the stumps. It was found that while regeneration is usually abundant around stumps during the first two years after the felling of the trees, it rapidly disappears thereafter as a result of competition in the bush. The abundant regeneration is thus saved by improvement during the first two years after the exploitation of the area and the old trees are replaced by a large stock of seedlings which have every chance of coming to maturity. (c) "Taungya," or the planting of shifting-cultivation areas with Mahogany. This has been inaugurated among the Maya Indians of the



south with excellent results. The natives do all the seed collecting, nursery work, and transplanting of seedlings and receive free rent of their land in return.

The first method is intensive and can be used on small estates for the establishment of a dense stock of Mahogany. The second is extensive and serves to replace the former Mahogany stock by large groups of regeneration over wide areas; the stock is not only replaced but greatly increased. The third converts worthless second-growth forest into blocks of what eventually will be almost pure stands of Mahogany.

The accompanying table shows the number of trees, saplings, and seedlings improved by methods (a) and (b) from the start of the Department to the end of 1929.

TOTAL NUMBER OF TREES, SAPLINGS, AND SEEDLINGS IMPROVED

| Locations | Trees | | Saplings | Seedlings |
|---|---|---|---|---|
| | Mahogany | Other species* | Mahogany | |
| CROWN FOREST RESERVES— | | | | |
| Sibun-Stann Creek | 292 | 4,027 | .... | .... |
| Freshwater Creek | 14,633 | 66,083 | .... | .... |
| Vaca | 1,307 | 3,543 | .... | 687 |
| Silk Grass | 2,462 | 1,545 | 5,591 | 438,192 |
| Columbia | 1,218 | 173 | 7,726 | 136,007 |
| Totals, Crown | 19,912 | 75,371 | 13,317 | 574,886 |
| PRIVATE LANDS— | | | | |
| Belize Est. & Prod. Co. | 67,957 | 35,177 | .... | 2,211 |
| Chicle Development Co. | 11,363 | 87,948 | 82,329 | .... |
| Totals, Company | 79,320 | 123,125 | 82,329 | 2,211 |
| Totals for Colony | 99,232 | 198,496 | 95,646 | 577,097 |

*Other species represented are as follows: SIBUN-STANN CREEK: Santa María, Banak, Salmwood, Yemeri, and Waika Chewstick. FRESHWATER CREEK and VACA: Sapodilla and Cedar. SILK GRASS: Cedar, Cypress, Mamee Apple, Salmwood, and Yemeri. COLUMBIA: Cedar. B.E.P.C.: Cedar, Sapodilla, Santa María, and Yemeri. CHICLE DEVELOPMENT CO.: Sapodilla.

Silviculture in the Pine forests has been confined to fire protection, which has been found sufficient to promote abundant regeneration. On account of the shortage of staff and the greater necessity for work on Mahogany, the full organization of the Pine forests has had to be postponed. Since 1923, selected areas have been protected from fire with encouraging results and it is hoped to extend the scope of fire protection in the near future.

*Miscellaneous.*—Other work has included the improvement of communications by road-building and the installation of telephone lines, the accumulation of research data on timber and other forest produce, collection of botanical material and timber samples, and the dissemination of information on forestry subjects.

### Transport

Communications within the Colony are still undeveloped and coastal communications are poor and uncertain. It was realized in 1923 that it would mean a decided saving in travelling time and an increase in efficiency on the part of forest officers on tour if their health and comfort were provided for by the acquisition of a motor-boat by the Trust. Eventually this idea materialized in October 1925 in the form of a cabin motor-launch of 25 tons, the "Lolette," which has since proved invaluable not only to forest officers on tour, but to officers of other Departments, in providing quick transport and in serving as a floating camp. The "Lolette" has also from time to time been chartered by private parties.

### Finance

The general scheme of finance has been outlined as the raising of a loan of $250,000 and annual contributions from general forest revenue on a sliding scale starting at 40 per cent in 1925–26, rising by 10 per cent annually to 60 per cent, and remaining at 60 per cent thereafter.

Part of the loan was raised during 1928–29, excess of expenditure over the contribution having previously been met by advances from the Colonial treasury. Since 1927 the surplus of contribution over expenditure was used to repay these advances, the amount outstanding at the end of 1927–28 being $29,388. This has since been repaid from loan.



### Recent Curtailment

After the Department had been in operation for seven years, the view held locally that, owing to the financial circumstances of the Colony and having due regard for other administrative needs, the expenditure on forestry was in excess of what the Colony could afford, led to the sending of a petition dated January 22, 1929, to the Governor and to the Secretary of State for the Colonies through the Governor, praying for retrenchment in the Forest Department and for curtailment of its expenditure and submitting proposals whereby such curtailment could be effected.

The reply to the petitioners, setting forth the views of the Secretary of State, was published in the *Belize Independent* October 16, 1929, and is quoted in full below:

Colonial Secretary's Office,
Belize, October 9, 1929.

*Gentlemen:*

With reference to the petition of the 22nd of January last, signed by the Unofficial Members of the Legislative Council, praying for a general curtailment of the forestry programme and reduction of the Forest Trust expenditure, I am directed by the Governor to inform you that His Excellency has now received a reply from the Secretary of State for the Colonies. Lord Passfield states that he has given the most careful attention to the representations of the memorialists and to the comments made thereon by His Excellency and his advisers.

2. In another connection the attention of the Secretary of State had been brought to the disquieting probability that the revenue derived directly and indirectly from forest products will suffer very serious depletion at no distant date. For this reason, in addition to those adduced by the memorialists, he is convinced that the present structure of the Forest Department is heavier than the Colony's economic frame-work can sustain.

3. At the same time, His Lordship is unalterably opposed to any amendment of the legislation governing the constitution, finance, and duties of the Forest Trust. British Honduras has depended upon its forest resources for 300 years; the approaching crisis in output will prove, it is earnestly to be hoped, of temporary duration; and the justification for providing machinery to regulate scientifically, so far as may be, the natural wealth of the Colony is as self evident now as it was when his predecessor directed the creation of the Trust.

4. His Lordship has accordingly reached the conclusion that the solution of

the present financial difficulty is to be sought, not by altering the status of the Trust, but by curtailing its activities and consequent expenditure to the minimum consistent with the discharge of its routine duties, the preservation of its records, and the maintenance of the valuable experimental work already in hand. The adoption of this policy will insure that when conditions justify the re-enlargement of the scope of the Trust, the nucleus of personnel and the knowledge and experience accumulated will be ready to hand.

5. He proposes accordingly to try to arrange for the transfer to other service of the Conservator of Forests and two of the present four Assistant Conservators when suitable vacancies occur. It should be understood, however, that it is impossible to forecast at the moment how soon such opportunities may arise and that there may be considerable delay before all the transfers can be effected. The subordinate staff of the Department should be proportionately reduced in accordance with such detailed recommendations as the Trust may decide on. The launch should be disposed of as suggested by the memorialists. Expenditure under other charges of the Forest Trust estimates should be reduced in every way practicable. By these expedients it should be possible, His Lordship conceives, to reduce the total expenditure of the Trust to a figure in the neighborhood of $30,000 or $35,000 per annum.

6. The Secretary of State further approves of the withdrawal from the Forest Loan of $10,000 per annum for each of the next five years, these amounts to be devoted towards meeting the Trust's current expenditures. The sum remaining to be spent from general revenue should, on this basis, not exceed $25,000 per annum. The estimates should, however, continue to provide for the allocation to the Trust of 60 per cent of forest revenue as defined in Section 32 of Ordinance No. 32 of 1926. The surplus remaining when the accounts of each year are closed should be re-transferred to general revenue by order of the Trust under Section 30 of the Ordinance.

7. His Lordship ventures to express the hope that the Unofficial Members of the Legislative Council will exercise the foresight which their position as guardians of the Colony's destinies demands and will lend their willing support in the policy here outlined.

I am, Gentlemen,
Your obedient servant,

F. P. GENEVE,
*Acting Colonial Secretary.*

The Hon'ble A. R. USHER, M.B.E., *et al.*, Belize.

At the time of the writer's visit to British Honduras last spring, that policy was in the process of being put into practice. The superior staff had been reduced to 1 Conservator and 1 Assistant, and the subordinate to 2 Rangers and 2 Forest Guards. The motor-launch "Lolette" was being advertised for sale. The estimates for 1930–31 are framed for an expenditure of $39,749. Four Reserves have been reduced to a care-and-maintenance basis and only in the south, where seedling improvement following a Mahogany operation is in progress, is improvement work being continued.

The nucleus of staff and organization and the necessary legislation for expansion at some more favorable financial period remain.



## LOCAL NAMES OF THE WOODY PLANTS OF BRITISH HONDURAS

*By* SAMUEL J. RECORD

At the time of the organization of the Forest Department of British Honduras there was very little reliable information as to the identities of the trees and other plants with which it had to deal. With comparatively few exceptions, the trees were known, if at all, by vernacular names only, and these varied in different localities and according to whether the language spoken was English, Creole, Spanish, North Maya, South Maya, Kickchi, or Carib.

To assist the Department in overcoming this handicap, I began about six years ago to compile a list of all of the available scientific and local names of the woody plants of the Colony. The first contribution, entitled, "Preliminary check list of British Honduras woods," was published in the initial issue of *Tropical Woods*, March 1925. It was only a short list, but it had a fairly substantial foundation and served at least to call attention to the need for much collecting. The hearty coöperation of the foresters was secured and has been maintained, with the result that a great many names have been added to the list, numerous doubtful classifications have been cleared up, and a considerable number of new species have been described. Most of the determinations of the herbarium material have been made by Mr. PAUL C. STANDLEY, formerly at the U. S. National Herbarium and later at Field Museum of Natural History.

Following my first visit to British Honduras in 1926, I began the issuance in typewritten form of revisions and extensions of the first check list. Each of these has been in two parts,

the first containing the botanical and common names of the species arranged by families and genera, the second consisting of the common names and their botanical equivalents. Copies were sent to the Forest Department and were made the basis for further additions and corrections. Six revisions were prepared, dated as follows: No. 1, August 27, 1926; No. 2, January 1, 1927; No. 3, June 14, 1927; No. 4, November 12, 1928; No. 5, March 21, 1929; No. 6, November 1, 1929. During the past two years numerous additions have been made to the list of scientific names through collections received at Field Museum from Mr. C. L. LUNDELL and Mr. WILLIAM SCHIPP. The knowledge of the common names has not kept pace with the scientific, and the first part of revision No. 6 lists over 250 species of woody plants for which local designations are unknown.

As a result of the recent curtailment of the activities of the Forest Department, the opportunities for further collections have been reduced, though the work has by no means been discontinued. It has been the intention to publish an annotated list of the forest flora, with extended descriptions of the most important species, and this plan has not been abandoned. Owing, however, to the uncertainty attending the carrying out of this project it seems worth while to make the check list available at this time, although it is admittedly very far from being complete and doubtless contains many mistakes.

CHECK LIST OF BRITISH HONDURAS TREES, SHRUBS, AND LIANAS

| *Common Name* | *Botanical Name* | *Family* |
|---|---|---|
| Aach-a-yong | *Cestrum panamense* Standl. | Solanceae |
| Aceituno | ? | Amygdalaceae |
| Achiote | *Bixa orellana* L. | Bixaceae |
| Aguacatillo | *Nectandra glabrescens* Benth. | Lauraceae |
| Aiquitz | *Thevetia Gaumeri* Hemsl. | Apocynaceae |
| Allspice tree | *Pimenta officinalis* Lindl. | Myrtaceae |
| Almendro | *Andira inermis* H. B. K. | Leguminosae |
| Almendro | *Lonchocarpus* sp. | Leguminosae |
| Amate | *Ficus Oerstediana* Miq., *F. radula* Willd., and other spp. | Moraceae |
| Ant thorn | *Acacia Cookii* Safford | Leguminosae |
| Atta | *Bixa orellana* L. | Bixaceae |



| | | |
|---|---|---|
| Atta-wood, Wild | *Sloanea faginea* Standl. | Elæocarpaceae |
| Axemaster | *Krugiodendron ferreum* (Vahl) Urban | Rhamnaceae |
| Axemaster, Bastard | *Allophylus longeracemosus* Standl. | Sapindaceae |
| Balché | *Lonchocarpus hondurensis* Benth. | Leguminosae |
| Balsa | *Ochroma bicolor* Rowlee | Bombacaceae |
| Balsam | *Myroxylon Pereirae* Kl. | Leguminosae |
| Bamboo | *Guadua aculeata* Rupr. | Poaceae |
| Banak | *Virola merendonis* Pittier | Myristicaceae |
| Barba jolote | *Cassia* aff. *emarginata* L. (?) | Leguminosae |
| Barba jolote | *Pithecolobium arboreum* (L.) Urban | Leguminosae |
| Basket tie-tie | ? | Palmaceae |
| Batidos | *Quararibea Fieldii* Millsp. | Bombacaceae |
| Bay cedar | *Guazuma ulmifolia* Lam. | Sterculiaceae |
| Bayal | ? | Palmaceae |
| Beef-food | *Cassia grandis* L. | Leguminosae |
| Bejuco de agua | *Vitis* sp. | Vitaceae |
| Bejuco de canasta | ? | Palmaceae |
| Billbird patter | *Ouratea pyramidalis* Riley | Ochnaceae |
| Billy Webb | *Sweetia panamensis* Benth. | Leguminosae |
| Billy Webb, Bastard | *Caesalpinia yucatanensis* Greenm. | Leguminosae |
| Birch wood | *Bursera Simaruba* (L.) Sarg. | Burseraceae |
| Birma | *Calophyllum antillanum* Britton | Guttiferae |
| Blossom berry | *Eugenia axillaris* (Sw.) Willd. | Myrtaceae |
| Blue blossom | *Vitex Gaumeri* Greenm. | Verbenaceae |
| Bobwood | *Annona glabra* L. | Annonaceae |
| Bohun | *Cordia alliodora* (R. & P.) Cham. | Borraginaceae |
| Bohun-ché | *Cordia Gerascanthus* L. | Borraginaceae |
| Bookoot or Bookut | *Cassia grandis* L. f. | Leguminosae |
| Botan | *Sabal excelsa* Morris | Palmaceae |
| Boy job | *Matayba apetala* (Macfad.) Radlk. | Sapindaceae |
| Braziletto | *Caesalpinia platyloba* Wats. | Leguminosae |
| Breadnut | *Brosimum alicastrum* Swartz | Moraceae |
| Bri-bri | *Inga* spp. | Leguminosae |
| Bri-bri macho | *Inga Recordii* Britt. & Rose | Leguminosae |
| Broadleaf | *Vismia ferruginea* H. B. K. | Guttiferae |
| Bullhoof macho | *Drypetes Brownii* Standl. | Euphorbiaceae |
| Bullet tree or Bully tree | *Bucida Buceras* L. | Combretaceae |
| Bully tree macho | *Eugenia* sp. | Myrtaceae |
| Burr | *Triumfetta lappula* L. | Tiliaceae |
| Butterfly tree | *Erblichia odorata* Seem. | Turneraceae |
| Buttonwood | *Conocarpus erecta* L. | Combretaceae |
| Cabbage | *Oreodoxa oleracea* Morris | Palmaceae |
| Cabbage-bark | *Andira inermis* H. B. K. | Leguminosae |
| Cabbage-bark | *Sapindus Saponaria* L. | Sapindaceae |
| Cabbage-bark, Black | *Lonchocarpus rugosus* Benth. | Leguminosae |

| | | |
|---|---|---|
| Cabello de angel | *Myginda oxyphylla* Blake | Celastraceae |
| Cacao | *Theobroma cacao* L. | Sterculiaceae |
| Cacho venado | *Mouriria* sp. | Melastomaceae |
| Cafecillo | *Rinorea guatemalensis* (Wats.) Bartl. | Violaceae |
| Calabash | *Crescentia cujete* L. | Bignoniaceae |
| Camphor | *Protium copal* (S. & C.) Engl. | Burseraceae |
| Caña fistula | *Cassia fistula* L. | Leguminosae |
| Candle-wood, Red | *Sideroxylon* sp. | Sapotaceae |
| Caoba | *Swietenia macrophylla* King | Meliaceae |
| Capache | ? | Burseraceae |
| Capulín | *Muntingia calabura* L. | Elæocarpaceae |
| Capulín de corona | *Calliandra Winzerlingii* (Britt. & Rose) Standl. | Leguminosae |
| Caramayo | *Caesalpinia Recordii* Britt. & Rose | Leguminosae |
| Carbón | *Andira inermis* H. B. K. | Leguminosae |
| Carbón | *Guarea chichon* C. DC. (?) | Meliaceae |
| Carbón | *Myginda eucymosa* Loes. & Pitt. | Celastraceae |
| Carbón | *Tetragastris Stevensonii* Standl. | Burseraceae |
| Casada | *Psychotria chiapensis* Standl. | Rubiaceae |
| Cashew | *Anacardium occidentale* L. | Anacardiaceae |
| Catseem logwood | *Mimosa hemiendyta* Rose & Rob. | Leguminosae |
| Caulote | *Luehea* spp. | Tiliaceae |
| Cedar | *Cedrela mexicana* Roem. | Meliaceae |
| Cedar, Bastard | *Trichilia* sp. | Meliaceae |
| Cedar, Bay | *Guazuma ulmifolia* Lam. | Sterculiaceae |
| Cedrillo | *Trichilia* sp. | Meliaceae |
| Cedrillo | *Zanthoxylum procerum* D. Sm. | Rutaceae |
| Cedro | *Cedrela mexicana* Roem. and *C. odorata* L. | Meliaceae |
| Ceiba | *Gossypium mexicanum* Tod. | Malvaceae |
| Cerbatana | *Dracaena americana* Donn. Smith | Liliaceae |
| Chacah | *Bursera Simaruba* (L.) Sarg. | Burseraceae |
| Cháchiga | *Dipholis salicifolia* A. DC. | Sapotaceae |
| Chac-mol-ché | *Erythrina rubrinervia* H. B. K. | Leguminosae |
| Chac-toc | *Hamelia erecta* Jacq. | Rubiaceae |
| Chac-anal | *Aphelandra Deppeana* Schl. & Cham. | Acanthaceae |
| Chaparro | *Curatella americana* L. | Dilleniaceae |
| Chaparro | *Davilla Kunthii* St. Hil. | Dilleniaceae |
| Chaperno | *Andira inermis* H. B. K. | Leguminosae |
| Chechém de caballo | *Cameraria belizensis* Standl. | Apocynaceae |
| Chechém | *Metopium Brownei* (Jacq.) Urb. | Anacardiaceae |
| Cherry | *Pseudolmedia oxyphyllaria* Donn. Sm. and *P. spuria* (Sw.) Gris. | Moraceae |
| Chewstick, Waika | *Symphonia globulifera* L.f. | Guttiferae |
| Chichimeca | *Mosquitoxylum jamaicense* K. & U. | Anacardiaceae |



| | | |
|---|---|---|
| Chichipate | *Sweetia panamensis* Benth. | Leguminosae |
| Chicle macho | *Achras chicle* Pittier | Sapotaceae |
| Chicle tree | *Achras Zapota* L. | Sapotaceae |
| Chiké | *Chrysophyllum mexicanum* Brandeg. | Sapotaceae |
| Chilillo | *Zygia latifolia* (L.) St. Hil. | Leguminosae |
| Chilillo | *?Pithecolobium* sp. | Leguminosae |
| Chilillo | *Picraena excelsa* Lindl. | Simarubaceae |
| Chintonrol | *Posoqueria latifolia* (Rudge) R. & S. | Rubiaceae |
| Chip-ché | *Jatropha Gaumeri* Greenm. | Euphorbiaceae |
| Chiquibul | ? | Sapotaceae |
| Choc-ché | *Zygia latifolia* (L.) St. Hil. | Leguminosae |
| Chozo | *Licania hypoleuca* Benth. | Amygdalaceae |
| Chuchum or Chuckem | *Acacia riparia* H. B. K. (?) | Leguminosae |
| Chuchum or Chuckem | *Pithecolobium albicaule* Benth. (?) | Leguminosae |
| Chum-pich | *Calliandra confusa* Sprague & Riley | Leguminosae |
| Cincho | *Lonchocarpus guatemalensis* Benth. | Leguminosae |
| Cinnamon, Wild | *Croton glabellus* L. | Euphorbiaceae |
| Ciruelo | *Spondias purpurea* L. | Anacardiaceae |
| Ciruelillo | *Phyllanthus conami* Sw. | Euphorbiaceae |
| Claw berries | *Phyllanthus nobilis* (L.f.) Muell. | Euphorbiaceae |
| Coapma wood | *Erythrina rubrinervia* H. B. K. | Leguminosae |
| Cockspur | *Acacia Cookii* Safford | Leguminosae |
| Coconut | *Cocos nucifera* L. | Palmaceae |
| Coco plum | *Chrysobalanus icaco* L. | Amygdalaceae |
| Coco plum, Wild | *Hirtella americana* L. | Amygdalaceae |
| Coco plum, Wild | *Linociera oblanceolata* Robinson | Oleaceae |
| Coffee, Wild | *Rinorea Hummellii* Sprague | Violaceae |
| Cohune | *Attalea cohune* Morris | Palmaceae |
| Cojón de fraille | *Bunchosia glandulosa* (Cav.) DC. | Malpighiaceae |
| Cojón de mico | *Stemmadenia Donnell-Smithii* (Rose) Woodson | Apocynaceae |
| Cojotón | *Stemmadenia Donnell-Smithii* (Rose) Woodson | Apocynaceae |
| Cojotón | *Tabernaemontana* spp. | Apocynaceae |
| Colorín | *Erythrina rubrinervia* H. B. K. | Leguminosae |
| Copal or C. macho | *Protium sessiliflorum* (Rose) Standl. | Burseraceae |
| Copal, Red | *Cupania guatemalensis* Radlk. | Sapindaceae |
| Corbán | *Symphonia globulifera* L.f. | Guttiferae |
| Cordoncillo | *Trichilia havanensis* Jacq. | Meliaceae |
| Corkwood | *Annona glabra* L. | Annonaceae |
| Cornwood | *Andira inermis* H. B. K. | Leguminosae |

| | | |
|---|---|---|
| Corozo | *Attalea cohune* Morris | Palmaceae |
| Cortez | *Tecoma* sp. | Bignoniaceae |
| Cotton | *Gossypium mexicanum* Tod. | Malvaceae |
| Cow-itch | *Urera baccifera* (L.) Gaud. | Urticaceae |
| Cow okra | *Parmentiera edulis* DC. | Bignoniaceae |
| Cramantee | *Guarea excelsa* H. B. K. | Meliaceae |
| Craboo or Crapoo | *Byrsonima crassifolia* (L.) DC. | Malpighiaceae |
| Cream tree | *Sideroxylon Gaumeri* Pitt. | Sapotaceae |
| Crowsfoot | *Acacia costaricensis* Schenck | Leguminosae |
| Cruceto | *Gymnopodium antigonoides* (Rob.) Blake | Polygonaceae |
| Custard apple, Wild | *Annona squamosa* L. | Annonaceae |
| Cypress | *Podocarpus guatemalensis* Standl. | Podocarpaceae |
| Dama de noche | *Cestrum panamense* Standl. | Solanaceae |
| Dead man's bones | *Psychotria pinularis* Sessé & Moc. | Rubiaceae |
| Deer's horn | *Mouriria* sp. | Melastomaceae |
| Dogwood | *Piscidia communis* (Blake) Standl. | Leguminosae |
| Dogwood, Ridge | *Lonchocarpus* sp. | Leguminosae |
| Dogwood, Swamp | *Lonchocarpus hondurensis* Benth. and *L. latifolius* H. B. K. | Leguminosae |
| Dzoi | *Sideroxylon Gaumeri* Pitt. | Sapotaceae |
| Ebony | *Maba verae-crucis* Standl. | Ebenaceae |
| Elder or Ella | *Piper aduncum* L. | Piperaceae |
| Emeri or Emery | *Vochysia hondurensis* Sprague | Vochysiaceae |
| Encino | *Quercus* spp. | Fagaceae |
| Faisán | ? | Sapotaceae |
| Fiddlewood (?) | *Dracaena americana* D.Sm. | Liliaceae |
| Fiddlewood | *Vitex* spp. | Verbenaceae |
| Fig or Wild fig | *Ficus Oerstediana* Miq., *F. radula* Willd., and other spp. | Moraceae |
| Fig, Strangling | *Ficus* sp. | Moraceae |
| Fish-poison | *Paullinia pinnata* L. | Sapindaceae |
| Fustic | *Chlorophora tinctoria* (L.) Gaud. | Moraceae |
| Give-and-take | ? | Palmaceae |
| Glassy wood | *Astronium graveolens* Jacq. | Anacardiaceae |
| Glassy wood | *Guettarda Seleriana* (Loes.) Standl. | Rubiaceae |
| Granadillo | ?*Platymiscium* sp. | Leguminosae |
| Grande Betty | *Cupania belizensis* Standl. and *C. guatemalensis* Radlk. | Sapindaceae |
| Grape, Sea | *Coccoloba barbadensis* Jacq. | Polygonaceae |
| Grape, Wild | *Coccoloba* spp. | Polygonaceae |
| Grenada | *Hirtella americana* L. | Amygdalaceae |
| Grenada | *Coccoloba barbadensis* Jacq. | Polygonaceae |
| Grenada cimarrón | *Eugenia axillaris* (Sw.) Willd. | Myrtaceae |
| Gru-gru | *Acrocomia sclerocarpa* Mart. | Palmaceae |
| Guamo | *Inga* spp. | Leguminosae |



| | | |
|---|---|---|
| Guanacaste | *Enterolobium cyclocarpum* (Swartz) Gris. | Leguminosae |
| Guapinol | *Hymenæa courbaril* L. | Leguminosae |
| Guarumo | *Cecropia mexicana* Hemsl. | Moraceae |
| Guascanal | *Acacia Cookii* Safford | Leguminosae |
| Guava blossom | *Lonchocarpus* sp. | Leguminosae |
| Guava, Wild | *Psidium Guajava* L. | Myrtaceae |
| Guayabo | *Terminalia Hayesii* Pittier | Combretaceae |
| Guiscoyol | *Bactris horrida* Oerst. | Palmaceae |
| Gumbo limbo | *Bursera Simaruba* (L.) Sarg. | Burseraceae |
| Gumbo limbo, White | *Gilibertia concinna* Standl. | Araliaceae |
| Habim | *Piscidia communis* (Blake) Standl. | Leguminosae |
| Half crown | *Mouriria* spp. | Melastomaceae |
| Hog plum | *Spondias purpurea* L. | Anacardiaceae |
| Hoo-loop | *Bravaisia tubiflora* Hemsl. | Acanthaceae |
| Huesillo | *Allophyllus occidentalis* (Sw.) Radlk. | Sapindaceae |
| Hueso de finado | *Psychotria pinularis* Sessé & Moc. | Rubiaceae |
| Hukup | *Bursera Simaruba* (L.) Sarg. | Burseraceae |
| Hulu-bal | *Bravaisia tubiflora* Hemsl. | Acanthaceae |
| Icaco | *Chrysobalanus icaco* L. | Amygdalaceae |
| Ich-bahatsch | *Trichilia cuneata* Radlk. | Meliaceae |
| Indio desnudo | *Bursera Simaruba* (L.) Sarg. | Burseraceae |
| Iril | *Coccoloba* spp. | Polygonaceae |
| Ironwood | *Dialium divaricatum* Vahl | Leguminosae |
| Ischim-ché | *Andira inermis* H. B. K. | Leguminosae |
| Ischim-ché | *Casearia nitida* (L.) Jacq. | Flacourtiaceae |
| Jabón-ché | *Sapindus Saponaria* L. | Sapindaceae |
| Jack wood | *Cordia alba* (Jacq.) R. & S. | Borraginaceae |
| Jobo | *Spondias purpurea* L. | Anacardiaceae |
| Jocote | *Phytolacca rivinoides* Kth. & Bouché | Phytolaccaceae |
| John crow | *Pithecolobium arboreum* (L.) Urban | Leguminosae |
| John-crow bead | *Pithecolobium Donnell-Smithii* (Britt. & Rose) Standl. | Leguminosae |
| John-crow redwood | *Calderonia salvadorensis* Standl. | Rubiaceae |
| Jug | *Mouriria* sp. | Melastomaceae |
| Kajana | *Hampea trilobata* Standl. | Bombacaceae |
| Kam-pak | *Belotia Campbellii* Sprague | Tiliaceae |
| Kaway or Swamp kaway | *Pterocarpus belizensis* Standl. | Leguminosae |
| Kazcat | *Luehea speciosa* Willd. | Tiliaceae |
| Ki-ich-ché | *Guettarda elliptica* Sw. | Rubiaceae |
| Ki-say-ing | ? | Leguminosae |

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| Knock-me-back | *Hyperbaena Winzerlingii* Standl. | Menispermaceae |
| Kunt-ich | *Acacia Farnesiana* (L.) Willd. | Leguminosae |
| Kush-uh-ché | *Croton* sp. | Euphorbiaceae |
| Lancetilla | *Euterpe edulis* Mart. | Palmaceae |
| Laurel | *Nectandra membranacea* Gris. and *N. sanguinea* Rottb. | Lauraceae |
| Laurel | *Phoebe helicterifolia* Mez | Lauraceae |
| Laurel blanco | *Cordia alliodora* (R. & P.) Cham. | Borraginaceae |
| Laurel blanco | *Nectandra glabrescens* Benth. | Lauraceae |
| Leche amarilla | *Symphonia globulifera* L.f. | Guttiferae |
| Leche de María | *Sapium lateriflorum* Hemsl. | Euphorbiaceae |
| Lignum-vitae | *Gymnanthes lucida* Sw. | Euphorbiaceae |
| Lime | *Citrus aurantifolia* (Christm.) Swingle | Rutaceae |
| Limoncillo? | *Rheedia edulis* Tr. & Pl. | Guttiferae |
| Liquidambar | *Liquidambar Styraciflua* L. | Hamamelidaceae |
| Locust | *Hymenæa courbaril* L. | Leguminosae |
| Logwood | *Haematoxylon campechianum* L. | Leguminosae |
| Logwood, Bastard | *?Pithecolobium* sp. | Leguminosae |
| Logwood brush | *Mimosa hemiendyta* Rose & Rob. | Leguminosae |
| Madre cacao | *Gliricidia sepium* (Jacq.) Steud. | Leguminosae |
| Mahass | *Quararibea funebris* (Llave) Standl. | Bombacaceae |
| Mahau | *Heliocarpus Donnell-Smithii* Rose | Tiliaceae |
| Mahban | *Virola merendonis* Pittier | Myristicaceae |
| Mahogany | *Swietenia macrophylla* King | Meliaceae |
| Mahogany, Wild | *Mosquitoxylum jamaicense* K. & U. | Anacardiaceae |
| Majahás | *Quararibea Fieldii* Millsp. | Bombacaceae |
| Majana | *Hampea trilobata* Standl. | Bombacaceae |
| Malady | *Aspidosperma megalocarpon* Muell. Arg. | Apocynaceae |
| Malady, White | *Aspidosperma* sp. | Apocynaceae |
| Mamee apple | *Calocarpum mammosum* (L.) Pierre | Sapotaceae |
| Mamee ciruela | *Lucuma Heyderi* Standl. | Sapotaceae |
| Mamee, Wild | *Alseis yucatana* Standl. | Rubiaceae |
| Mamey cerera | *Lucuma campechiana* H. B. K. | Sapotaceae |
| Manaca | *Attalea cohune* Morris | Palmaceae |
| Manchador | *Parethesis micranthera* D. Sm. | Myrsinaceae |
| Manchineel | *Hippomane Mancinella* L. | Euphorbiaceae |
| Mangle blanco | *Laguncularia racemosa* Gaertn. | Combretaceae |
| Mangle colorado | *Rhizophora mangle* L. | Rhizophoraceae |
| Mangle negro | *Avicennia nitida* Jacq. | Verbenaceae |
| Mangrove, Black | *Avicennia nitida* Jacq. | Verbenaceae |
| Mangrove, Red | *Rhizophora mangle* L. | Rhizophoraceae |
| Mangrove, White | *Laguncularia racemosa* Gaertn. | Combretaceae |



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| Mapola? | *Bernoullia flammea* Oliver | Bombacaceae |
| Mapola | *Luehea Seemannii* Tr. & Pl. | Tiliaceae |
| Maqueliz | *Tecoma* [*Tabebuia*] *pentaphylla* A. Juss. | Bignoniaceae |
| Maranga calalú | *Moringa oleifera* Lam. | Moringaceae |
| Masicarán | *Brosimum terrabanum* Pittier | Moraceae |
| Masico | *Brosimum alicastrum* Swartz | Moraceae |
| Matapalo | *Ficus* spp. | Moraceae |
| Matapalo | *Clusia* sp. | Guttiferae |
| Maya | *Miconia impetiolaris* (Sw.) Don and *M. leucocephala* (DC.) Naud. | Melastomaceae |
| Maya, Red | *Miconia* spp. | Melastomaceae |
| Maya, White | *Miconia* aff. *argentea* DC. | Melastomaceae |
| Mayflower | *Tecoma* [*Tabebuia*] *pentaphylla* A. Juss. | Bignoniaceae |
| Mescal | *Eugenia* sp. | Myrtaceae |
| Moho | *Hampea trilobata* Standl. | Bombacaceae |
| Moho, Blue | *Hibiscus tiliaceus* L. | Malvaceae |
| Moho, Broad-leaved | *Heliocarpus Donnell-Smithii* Rose | Tiliaceae |
| Moho, Narrow-leaved | *Belotia Campbellii* Sprague | Tiliaceae |
| Monkey fiddle | *Vitex* spp. | Verbenaceae |
| Monkey rattle | *Phyllanthus glaucescens* H. B. K. | Euphorbiaceae |
| Monkey tail | *Chamaedorea* sp. | Palmaceae |
| Mora | *Chlorophora tinctoria* (L.) Gaud. | Moraceae |
| Mountain cabbage | *Oreodoxa oleracea* Morris | Palmaceae |
| My lady | *Aspidosperma megalocarpon* Muell. Arg. | Apocynaceae |
| My lady, White | *Aspidosperma* sp. | Apocynaceae |
| Nargusta | *Terminalia Hayesii* Pittier | Combretaceae |
| Negrito | *Simaruba glauca* DC. | Simarubaceae |
| Nictaa | *Mosquitoxylum jamaicense* K. & U. | Anacardiaceae |
| Night bloom | *Melia Azedarach* L. | Meliaceae |
| No-choc-ché | *Guarea chichon* C. DC. (?) | Meliaceae |
| Oak | *Quercus* spp. | Fagaceae |
| Old William | *Vismia ferruginea* H. B. K. | Guttiferae |
| Old woman's walking stick | *Eupatorium bebebotryum* Hemsl. | Borraginaceae |
| Olive tree | ? | Amygdalaceae |
| Opay | *Bourreria mollis* Standl. | Borraginaceae |
| Paleta | *Dialium divaricatum* Vahl | Leguminosae |
| Palm, Cabbage | *Oreodoxa oleracea* Morris | Palmaceae |
| Palm, Coconut | *Cocos nucifera* L. | Palmaceae |
| Palm, Cohune | *Attalea cohune* Morris | Palmaceae |
| Palm, Gru-gru | *Acrocomia sclerocarpa* Mart. | Palmaceae |
| Palm, Monkey-tail | *Chamaedorea* sp. | Palmaceae |

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| Palm, Monkey-tail | *Euterpe edulis* Mart. | Palmaceae |
| Palm, Royal | *Oreodoxa regia* H.B.K. | Palmaceae |
| Palm, Silver thatch | *Thrinax argentea* Lodd. | Palmaceae |
| Palma de coco | *Cocos nucifera* L. | Palmaceae |
| Palma real | *Oreodoxa regia* H.B.K. | Palmaceae |
| Palo Chino | *Bursera Simaruba* (L.) Sarg. | Burseraceae |
| Palo jiote | *Bursera Simaruba* (L.) Sarg. | Burseraceae |
| Palo mulato | *Astonium graveolens* Jacq. | Anacardiaceae |
| Palo mulato | *Christiania africana* DC. | Tiliaceae |
| Palo mulato | *Lacistema aggregatum* (Berg) Rusby | Lacistemaceae |
| Palo sangre | *Virola merendonis* Pittier | Myristicaceae |
| Paradise tree | *Melia Azedarach* L. | Meliaceae |
| Pata de vaca | *Baubinia divaricata* L. | Leguminosae |
| Pear, Wild | *Persea Schiedeana* Nees | Lauraceae |
| Peccary wood | *Caesalpinia vesicaria* L. | Leguminosae |
| Peetsch-kitam | *Randia aculeata* L. | Rubiaceae |
| Physic nut, Wild | *Jatropha Gaumeri* Greenm. | Euphorbiaceae |
| Pigeon plum | *Licania hypoleuca* Benth. | Amygdalaceae |
| Pigeon plum | *Hirtella* sp. | Amygdalaceae |
| Pigeon plum, Wild | *Hirtella triandra* Sw. | Amygdalaceae |
| Pimento | *Pimenta officinalis* Lindl. | Myrtaceae |
| Pine | *Pinus caribæa* Mor. | Pinaceae |
| Pine, Waika | *Amyris elemifera* L. | Rutaceae |
| Pino | *Pinus caribæa* Mor. | Pinaceae |
| Piñón | *Jatropha Gaumeri* Greenm. | Euphorbiaceae |
| Pisch-tong | *Phyllanthus glaucescens* H.B.K. | Euphorbiaceae |
| Pito | *Erythrina rubrinervia* H.B.K. | Leguminosae |
| Pixoy | *Guazuma ulmifolia* Lam. | Sterculiaceae |
| Plum, Waika | *Rheedia edulis* Tr. & Pl. | Guttiferae |
| Plum, Wild | *Phyllanthus acidus* (L.) Skeels | Euphorbiaceae |
| Plum, Wild coco | *Hirtella americana* L. | Amygdalaceae |
| Pochote | *Cochlospermum vitifolium* (Willd.) Spreng. | Cochlospermaceae |
| Poison wood, Black | *Metopium Brownei* (Jacq.) Urb. | Anacardiaceae |
| Poison wood, Ridge white | *Excoecaria* aff. *bicolor* Hassk. | Euphorbiaceae |
| Poison wood, Savannah white | *Cameraria belizensis* Standl. | Apocynaceae |
| Pokenoboy | *Bactris horrida* Oerst. | Palmaceae |
| Polak | *Ochroma bicolor* Rowlee | Bombacaceae |
| Polewood | *Xylopia frutescens* Aubl. | Annonaceae |
| Pork-and-doughboy | *Bactris horrida* Oerst. | Palmaceae |
| Prickle wood | *Guettarda elliptica* Sw. | Rubiaceae |



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| Prickle wood | *Pithecolobium macrandrium* Donn. Sm. | Leguminosae |
| Prickly yellow | *Acacia glomerosa* Benth. | Leguminosae |
| Prickly yellow | *Zanthoxylum Kellermanii* P. Wils. | Rutaceae |
| Prickly yellow, Bastard | *Acacia glomerosa* Benth. | Leguminosae |
| Provision tree | *Pachira macrocarpa* Walp. | Bombacaceae |
| Quam | *Schizolobium parahybum* (Vell.) Blake | Leguminosae |
| Quebracho | *Krugiodendron ferreum* (Vahl) Urban | Rhamnaceae |
| Ramón | *Brosimum alicastrum* Swartz | Moraceae |
| Ramón, White | *Trophis racemosa* (L.) Urb. | Moraceae |
| Red fowl | *Hamelia erecta* Jacq. | Rubiaceae |
| Red fowl | *Pithecolobium Brownei* Standl. and *P. Winzerlingii* Britt. & Rose | Leguminosae |
| Redwood | *Erythroxylon affine* A. Rich. | Erythroxylaceae |
| Redwood, John crow | *Calderonia salvadorensis* Standl. | Rubiaceae |
| Redwood, Ridge | *Mosquitoxylum jamaicense* K. & U. | Anacardiaceae |
| Redwood, Swamp | *Erythroxylon obovatum* Macfad. | Erythroxylaceae |
| Roble | *Tecoma* [*Tabebuia*] *pentaphylla* A. Juss. | Bignoniaceae |
| Roble | *Quercus* spp. | Fagaceae |
| Roble | *Bourreria oxyphylla* Standl. | Borraginaceae |
| Rooder, Bush, Mountain, or Wild | *Zanthoxylum* aff. *procerum* D. Sm. | Rutaceae |
| Rosewood | *Dalbergia Stevensonii* Standl. | Leguminosae |
| Rosewood, Northern | *?Caesalpinia* sp. | Leguminosae |
| Rubber | *Castilla elastica* Cerv. | Moraceae |
| Sabak-ché | *Exostema indutum* Standl. | Rubiaceae |
| Sac-bay-eck | *Aegiphila pauciflora* Standl. | Borraginaceae |
| Sac-chacah | *Gilibertia concinna* Standl. | Araliaceae |
| Sac-pah | *Byrsonima crassifolia* (L.) DC. | Malpighiaceae |
| Sac-pom | *Cupania guatemalensis* Radlk. | Sapindaceae |
| Sage, Wild | *Casearia sylvestris* Sw. | Flacourtiaceae |
| Salmwood | *Cordia alliodora* (R. & P.) Cham. | Borraginaceae |
| Salom | *Lysiloma bahamense* Benth. | Leguminosae |
| Sangre | *Virola merendonis* Pittier | Myristicaceae |
| Sangre blanco | *Dialium divaricatum* Vahl | Leguminosae |
| San Juan | *Vochysia hondurensis* Sprague | Vochysiaceae |
| Santa María | *Calophyllum antillanum* Britton | Guttiferae |
| Santo Domingo | *Pachira macrocarpa* Walp. | Bombacaceae |
| Sapodilla | *Achras Zapota* L. | Sapotaceae |

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| Sapodilla, Bastard | *Ouratea pyramidalis* Riley | Ochnaceae |
| Scholte-schnook | *Eupatorium hebebotryum* Hemsl. | Compositae |
| Sick-it-tah | *Hibiscus trilobus* Aubl. (?) | Malvaceae |
| Siem-ché | *Pithecolobium Winzerlingii* Britt. & Rose | Leguminosae |
| Si-itz | *Jacobinia specigera* (Schl.) Bailey | Acanthaceae |
| Silión | *Lucuma belizensis* Standl. | Sapotaceae |
| Silly Young | *Bumelia laurifolia* Standl. | Sapotaceae |
| Silly Young | *Lucuma belizensis* Standl. | Sapotaceae |
| Siricote | *Cordia dodecandra* DC. | Borraginaceae |
| Sirín | *Miconia* spp. | Melastomaceae |
| Sirín cimarrón | *Belotia Campbellii* Sprague | Tiliaceae |
| Si-sim | *Trichilia* sp. | Meliaceae |
| Snake-seed tree | *Posoqueria latifolia* (Rudge) R. & S. | Rubiaceae |
| Soap-seed tree | *Sapindus Saponaria* L. | Sapindaceae |
| Sombra de ternero | *Bourreria formosa* (DC.) Hemsl. | Borraginaceae |
| Sos-chá | *Eupatorium hebebotryum* Hemsl. | Compositae |
| Southern main prickle | *?Pithecolobium albicaule* Britt. & Rose | Leguminosae |
| Spanish elder or ella | *Piper aduncum* L. | Piperaceae |
| Star apple | *Chrysophyllum mexicanum* Brandeg. | Sapotaceae |
| Star apple, Wild | *Chrysophyllum caimito* L. | Sapotaceae |
| Stinking-toe | *Cassia grandis* L. | Leguminosae |
| Stutz-tauk | *Diphysa carthaginensis* Jacq. | Leguminosae |
| Sul-sul | *Mouriria* sp. | Melastomaceae |
| Sumpank-lé | *Erythrina rubrinervia* H.B.K. | Leguminosae |
| Sweetwood | *Nectandra glabrescens* Benth. | Lauraceae |
| Tamarind | *Tamarindus indica* L. (Introduced) | Leguminosae |
| Tamarind, Bitter | *Tamarindus indica* L. (Introduced) | Leguminosae |
| Tamarind, Black or Red | *Pithecolobium arboreum* (L.) Urban | Leguminosae |
| Tamarind, Tame | *Tamarindus indica* L. (Introduced) | Leguminosae |
| Tamarind, Wild | *Albizzia Hummeliana* Britt. & Rose | Leguminosae |
| Tamarind, Wild or White | *Acacia* spp. | Leguminosae |
| Tama-tama | *Inga Recordii* Britt. & Rose and *I. Rodrigueziana* Pittier | Leguminosae |
| Tamay | *Casearia* sp. | Flacourtiaceae |
| Tango | *Zollernia tango* Standl. | Leguminosae |
| Tapasquit | *Luehea Seemannii* Tr. & Pl. | Tiliaceae |



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| Tarro | *Guadua aculeata* Rupr. | Poaceae |
| Tcan-lol | *Ouratea nitida* (Sw.) Engl. | Ochnaceae |
| Tcan-sick | *Jacquinia aurantiaca* Ait. | Theophrastaceae |
| Tea bark or Tea box | *Myrica mexicana* Willd. | Myrsinaceae |
| Tie-tie | *Anemopaegma belizeanum* Blake | Bignoniaceae |
| Tie-tie | *Banisteria laurifolia* L. | Malpighiaceae |
| Tie-tie | *Bignonia dasyonix* Blake | Bignoniaceae |
| Tie-tie | *Calopogonium coeruleum* Benth. | Leguminosae |
| Tie-tie | *Cissus biformifolia* Standl. | Vitaceae |
| Tie-tie | *Connarus longbotus* Blake | Connaraceae |
| Tie-tie | *Forsteronia viridescens* Blake | Apocynaceae |
| Tie-tie | *Paragonia pyramidata* (Rich.) Bur. | Bignoniaceae |
| Tie-tie, Barracouta | *Liabum polyanthum* Klatt. | Compositae |
| Tie-tie, Basket | ? | Palmaceae |
| Tie-tie, Water | *Vitis* sp. | Vitaceae |
| Tiger wood | *Erythrina rubrinervia* H.B.K. | Leguminosae |
| Timber sweet | *Phoebe helicterifolia* Mez | Lauraceae |
| Timber sweet | *Nectandra glabrescens* Benth. | Lauraceae |
| Tinta | *Haematoxylon campechianum* L. | Leguminosae |
| Tres Marías | *Forchammeria trifoliata* Radlk. | Capparidaceae |
| Trumpet | *Cecropia mexicana* Hemsl. | Moraceae |
| Tschcan-an | *Hamelia erecta* Jacq. | Rubiaceae |
| Tubroos | *Enterolobium cyclocarpum* (Swartz) Gris. | Leguminosae |
| Tulipán | *Malvaviscus grandiflorus* H.B.K. | Malvaceae |
| Turkey gill | *Pithecolobium arboreum* (L.) Urban | Leguminosae |
| Turkey victuals | *Morinda panamensis* Seem. | Rubiaceae |
| Turtle bone | *Croton* sp. | Euphorbiaceae |
| Turtle bone | *Inga Stevensonii* Standl. | Leguminosae |
| Turtle bone | *Zygia latifolia* (L.) St. Hil. and *Z. Peckii* (Rob.) Britt. & Rose | Leguminosae |
| Turtle bone, Bastard | *Calyptranthes belizensis* Standl. | Myrtaceae |
| Uayam-ché | *Hirtella americana* L. | Amygdalaceae |
| Uhee-tee | *Dialium divaricatum* Vahl | Leguminosae |
| Ule | *Castilla elastica* Cerv. | Moraceae |
| Vaina de espada | *Eugenia axillaris* (Sw.) Willd. | Myrtaceae |
| Verde lucero | *?Pithecolobium* sp. | Leguminosae |
| Veseet | *Acacia glomerosa* Benth. | Leguminosae |
| Waika bead | *Crataeva tapia* L. | Capparidaceae |
| Waika chewstick | *Symphonia globulifera* L.f. | Guttiferae |
| Waika pine | *Amyris elemifera* L. | Rutaceae |
| Waika plum | *Rheedia edulis* Tr. & Pl. | Guttiferae |
| Waika ribbon | *Acalypha* sp. | Euphorbiaceae |

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| Walk-naked | *Calyptranthes Millspaughii* Urban | Myrtaceae |
| Walnut, Honduras | *Metopium Brownei* (Jacq.) Urb. | Anacardiaceae |
| Warree or Warrie wood | *Caesalpinia yucatanensis* Greenm. and *C. Gaumeri* Greenm. | Leguminosae |
| Water wiss | *Vitis* sp. | Vitaceae |
| Water wood | *Cassipourea elliptica* Poir. | Rhizophoraceae |
| Water wood, Bastard | *Miconia pteropoda* Naud. | Melastomaceae |
| White wood | *Psychotria chiapensis* Standl. | Rubiaceae |
| Wild egg | *Morinda panamensis* Seem. | Rubiaceae |
| Willow | *Salix chilensis* Molina | Salicaceae |
| Wycot | *Symphonia globulifera* L.f. | Guttiferae |
| Xpu-ku-sikil | *Trichilia minutiflora* Standl. | Meliaceae |
| Yaha | *Curatella americana* L. | Dilleniaceae |
| Yash-can-an | *Psychotria chiapensis* Standl. | Rubiaceae |
| Yash-eck | *?Pithecolobium* sp. | Leguminosae |
| Yash-hulup | *Oreopanax meiocephalum* D. Sm. | Araliaceae |
| Yashnik or Yaxnik | *Vitex Gaumeri* Greenm. | Verbenaceae |
| Ydil | *Coccoloba Schiedeana* Lindau | Polygonaceae |
| Yellow mixed wood | ? | Leguminosae |
| Yemeri | *Vochysia hondurensis* Sprague | Vochysiaceae |
| Yemoke | *Vochysia hondurensis* Sprague | Vochysiaceae |
| Yuy | *Crataeva tapia* L. | Capparidaceae |
| Zapote | *Calocarpum mammosum* (L.) Pierre | Sapotaceae |
| Zapote faisán | *Dipholis Stevensonii* Standl. | Sapotaceae |
| Zapotillo | *Lucuma Durlandii* Standl. | Sapotaceae |
| Zapotón | *Pachira macrocarpa* Walp. | Bombacaceae |
| Zopilote | *Pithecolobium arboreum* (L.) Urban | Leguminosae |
| Zopilote | *Plumeria multiflora* Standl. | Apocynaceae |
| Zorra | *Schizolobium parahybum* (Vell.) Blake | Leguminosae |

## Tupi Manner of Forming Names of Trees

With reference to the note in *Tropical Woods* 23: 5, "Identity of the 'Junipappeway' of Hans Staden," Dr. B. E. Dahlgren, Field Museum of Natural History, writes:

"From a discussion of the Tupi manner of forming names of trees by S. Fróes Abreu in his publication entitled 'O Côco Babassú' (Rio de Janeiro, Brazil, 1929, p. 13), it appears that this is accomplished by the addition of what appears to be a suffix 'iú,' just as in Portuguese the suffix 'eiro' is added to the name of a product or a fruit, *e.g.*, Genipapo, to indicate the producing agent, in this case a tree, the name of which thus becomes 'Genipapeiro'; or it may be that this Tupi designation of a tree, 'iú,' corresponds more closely to the English word tree in such compound words as Cherry-tree, Redwood-tree, etc. Among the Guajajaras, true representatives of the ethnic group Tupi, the Genipapo is called 'Zanipá,' the tree 'Zanipá-iú.' The language of the Tupinambás may have been quite different from that of the other Tupi tribe, or Hans Staden may have been a bad speller, too extravagant of the letters of the alphabet in his attempt to render the Tupi word simply in his sixteenth century German account of his adventure."



## South American Viburnums Incorrectly Described as New Species of *Cornus*

In *Tropical Woods* 19: 4–5. 1929, I described two shrubs as new species of Dogwood, *Cornus peruviana* and *C. boliviana*, basing them on fruiting specimens collected in the two South American countries from which the species-names were derived. Recent study of these plants at Berlin-Dahlem in conjunction with material in that herbarium (through the courtesy of Professor Diels and staff) convinces me that *Cornus peruviana* is identical with an apparently unpublished species of *Viburnum* obtained in flower by Ruiz and Pavon; and that *C. boliviana* also is not a *Cornus*, although its identity is uncertain. A true Dogwood, therefore, remains unknown from south of Central America.

As stated in the original article, these shrubs (both in immature fruit) were referred to *Cornus* largely on a basis of their anatomical features. ***Viburnum peruvianum*** (Macbr.), comb. nov., has the pubescence described by Solereder and Sertorius as entirely characteristic of *Cornus*, but not mentioned by them as ever occurring in the genus *Viburnum;* certainly it is aberrant there. The fruits in their immature condition are, externally at least, as uncharacteristic of *Viburnum* as is the pubescence.—J. Francis Macbride.

## CURRENT LITERATURE

**Identification des plantes d'Haiti par leurs noms creoles.** Bull. No. 18, Service Technique du Dept. Agr. et de l'Enseignement Professionnel, Port-au-Prince, 1930. Pp. 23; 6 x 9.

This valuable check list of the native names for Haitian plants is based upon the plant collections of Dr. E. L. Ekman and of members of the department of botany during the past six years. It is issued in the form of a bulletin because of the delay in the publication of the Flora of Haiti. About 900 names are listed alphabetically, each with its corresponding scientific name for the species and family.

**The world's future lumberyard. Forests in Latin America cover an area larger than the United States proper.** By WILLIAM R. BARBOUR. *The Pan American Magazine* (Washington, D. C.) 43: 4: 267–274, Oct. 1930; illustrated.

"Something of the importance of the forested regions of Latin America may be grasped when it is realized that they cover well over three millions of square miles, an area larger than continental United States exclusive of Alaska, and four times as great as the forested portion of the United States. They contain at least six thousand billion board feet of standing timber, more than the total contents of our own forests. The annual rate of growth in the tropics is much higher than in temperate zones. Under proper silvicultural management the forests of Latin America could produce annually some six hundred billion board feet, an amount over twice as great as the present annual cut from American forests."

"Up until the present time, Latin America has done little along the lines of progressive forestry. The state of affairs has been that which prevailed until a few generations ago in the United States; the forests were in the way of the pioneers and were felled indiscriminately. It is well known that conditions have now changed in our country, and that every effort is being made to conserve what forests remain and to reforest denuded areas, in spite of which a timber famine looms in the imminent future. This condition is being reached in certain



portions of many Latin-American countries, where even firewood has become scarce and the bulk of the lumber used is imported from the United States. Inadequate transportation facilities and a scarcity of labor in the woods have made it easier for many coastal regions to import their lumber rather than to draw on their own hinterland.

"Several regions in tropical America, notably Porto Rico, Haiti, and the British colonies Trinidad, British Guiana, and British Honduras, have for a number of years maintained active Departments of Forestry, which are conserving existing forests and doing considerable replanting. More recently Brazil has started an ambitious forest program. Certain other countries have made a beginning. The countries of Latin America will in the future have to depend more and more upon their own forests as imported supplies become scarcer and more expensive, and they will find an increasing export demand developing. It behooves them, therefore, to inventory their forests, to promulgate and follow out conscientiously sound forest policies, and so to derive the greatest possible benefit from the natural resources with which they have been so bountifully blessed."

**Flora of Yucatan.** By PAUL C. STANDLEY. Pub. 279, Field Museum of Natural History (Chicago); Botanical series, Vol. III, No. 3, pp. 157–492, Sept. 11, 1930.

This valuable flora, with its wealth of information and including the scientific and vernacular names of the plants, "has been planned to cover all parts of the Yucatan Peninsula lying in Mexico, that is, the states of Campeche and Yucatan and the territory of Quintana Roo."

### GEOLOGY AND CLIMATE

"The Yucatan Peninsula consists properly of the states of Yucatan and Campeche and the territory of Quintana Roo, in Mexico, the Colony of British Honduras, and the Department of Petén, Guatemala. The present flora purports to deal only with the Mexican portion, which is remarkably uniform geologically and geographically.

"The Mexican region consists of a great plain having an area of about 55,000 square miles, approximately the same as that of the state of Illinois. It is formed by a vast sheet of Recent limestone rock of porous and friable character. The northern part of the Peninsula is a uniform, almost level plain, but farther south the surface is undulating, with alternating depressions and low hills, which in Yucatan and Quintana Roo do not exceed an elevation of 275 meters, and in Campeche but slightly more. There are no mountains and no eruptive rocks. The beds of sedimentary rocks, mainly coralline limestone, are horizontal or only slightly tilted.

"Data concerning climate are available only for Mérida, in northern Yucatan, where conditions doubtless are typical of those existing throughout the northern part of the Peninsula. The records which I have seen for this locality cover fifteen years. The annual mean temperature is 25.8° C. The highest temperature recorded was 40.8°, in March; the lowest 7.2°, in December, January, and February. The warmest months are March to October, the cooler ones November to February.

"The average annual rainfall is 80.7 cm. The wet months are June to October, followed by a prolonged dry season, from November to May. None of the months is altogether rainless, the lowest average rainfall being that of March, with only 14 mm. According to all writers upon the region, the southern part of the Peninsula has a substantially greater rainfall, and doubtless a higher mean temperature.

"Perhaps the most striking physiographic feature of Yucatan is the absence of surface streams. No permanent ones exist except in the extreme southwest and southeast. There are a few stream beds in which there is running water for a short time, but as soon as the rains cease the water quickly disappears. The limestone is so porous and the surface so level that rain water sinks immediately below the surface, where it forms underground reservoirs in the great caves which abound here.

"These underground tanks, or *cenotes*, have always been the chief source of drinking water for the inhabitants. Frequently, especially in the more hilly regions, there are depressions lined with marl in which pools or small lakes are formed during the rains, to remain sometimes almost throughout the dry season. There are several permanent lakes of small or medium size. The best known is Lake Chichankanab, near the center of the Peninsula, whose water is strongly alkaline. Farther south is Lake Bacalar, a salt-water lagoon about thirty-seven miles long and only one mile wide.



### Vegetation

"Notwithstanding the considerable number of plants collected in Yucatan, we have scant information regarding the general aspect of the vegetation. The nature of the plant covering of the coastal dunes, rocks, and beaches it is easy to picture, because it must be like that existing elsewhere along the warmer parts of the Gulf Coast. In the dry region of the northern plains there are few large trees, with only occasional palms. Where not under cultivation, the land is covered with shrubs or small scrubby trees, many of them spiny, and most of them shedding their leaves during the dry season. A few cactuses are plentiful. It is here that henequen is cultivated so extensively.

"In the central, undulating part of the Peninsula, where there is a substantially heavier rainfall, there are extensive forests, the trees, apparently, seldom of great size but often in dense stands. This part of the Peninsula, as well as the southern portion, is but sparsely inhabited, by Maya Indians who have little intercourse with the settlements of the north.

"The forests of Quintana Roo and Campeche yield many valuable woods and other products. They are the center of the Logwood trade, formerly, at least, an industry of great commercial importance. The region is also the center of chicle production, and chicle gum is now its chief natural article of export. Large amounts of Mahogany, Spanish Cedar, and Fustic have been exported, with smaller quantities of cacao, sarsaparilla, allspice, and rubber.

"The most important article now exported is henequen fiber. Most of it is grown on the plains of Yucatan, and to this state it has long been its principal source of wealth. Without henequen the farmers of the United States as well as those of many other countries would find it difficult to harvest their wheat, for no satisfactory substitute ever has been found for it in the manufacture of binder twine.

"Among the other agricultural products, maize still holds the eminent position which it has always held among the Mayas. There are grown, also, rice, beans, sugar cane, cotton, a great variety of tropical fruits, and many of the common vegetables of tropical and temperate climates.

### Relationships of the Yucatan Flora

"By its geological and physiographic features as well as by its human inhabitants the Yucatan Peninsula is sharply differentiated from the rest of Mexico. . . .

"Analytical study of the Yucatan flora confirms one's expectations that it should prove radically different from that of other portions of Mexico and Central America. . . .

"A glance at the map will explain why Yucatan, jutting far out beyond the rest of Mexico, and almost reaching Cuba, should possess many species in common with the latter country, especially since their geological conditions are so similar. . . .

"In the following list there are enumerated not only the native and naturalized plants but also those in cultivation. For one visiting or living in a region, the cultivated plants are almost or quite as interesting as the native ones, and usually they include a large proportion of the species of economic importance. On this account they deserve a place in every flora.

"This list includes 129 families, 667 genera, and 1263 species. Subtracting the introduced elements, the native Yucatan flora, as known at present, consists of 557 genera and 1068 species. The number of species certainly is not large, and compares very unfavorably with the flora of such a tropical region as the Panama Canal Zone, or a temperate area like the District of Columbia, each with only a fraction of the area of the Peninsula. The only conspicuously large Yucatan families are the following:

| | *Genera* | *Species* |
|---|---|---|
| Leguminosae | 44 | 119 |
| Compositae | 56 | 86 |
| Euphorbiaceae | 19 | 69 |
| Gramineae | 32 | 68 |



"Perusal of the systematic list will reveal a surprisingly large number of species endemic in Yucatan. The total number of such plants is 185, or 17 per cent of the native flora. Particularly noteworthy are the Euphorbiaceae, with 39 per cent of the species confined to the region. I have considered those species which occur in northern British Honduras as endemic to the Peninsula. No doubt further exploration in neighboring territory will reduce the percentage of endemism, but it will always remain high for a continental area."

**Sapodilla tapping in British Honduras.** By H. M. Heyder. *Empire Forestry Journal* 9: 1: 107–113, July 1930; illustrated.

"The sapodilla tree (*Achras Zapota L.*) is native in the forests of Central America and the northern part of South America. It is variously known as Sapodilla, Zapotillo, Nispero, and Naseberry. The tree is exploited for its yield of latex which in coagulated form is known as 'chicle,' and which has hitherto formed the basis of nearly all the chewing-gum of commerce.

"Sapodilla flourishes most abundantly on the calcareous marl and disintegrated limestones, which cover the Yucatan peninsula of Mexico, the Petén province of Eastern Guatemala, and the northern half of the Colony of British Honduras, all of which areas are contiguous. . . .

"The tapping season is during the wet months of the year, roughly from October to March, and it begins after the period of heaviest rain, which usually comes about mid-September. Tapping depends greatly upon climatic conditions and a dry year implies a very scanty yield of chicle. . . .

"The natives who carry out the tapping are Spanish-Indians, that is, Maya Indians with a varying admixture of Spanish blood. . . .

"The equipment of the chicle tapper, or 'chiclero,' as he is called, consists only of his 'machete,' which is a keen-edged cutlass with a 28-in. blade, a long coil of stout rope, a dozen small canvas bags proofed with rubber obtained locally from rubber trees (*Castilla elastica*) which grow wild in certain parts

of the forest, and a few empty kerosene tins of about 5 gals. capacity. The chicleros generally work together in parties of four or five, and they form camps in the forest, temporary shelters of sticks and palm leaves. They bring with them flour and beans sufficient to last several weeks and supplement this ration by shooting peccaries, currasow, and other small game. As their work progresses they move camp every week or ten days and thus cover large areas allotted to the contractor for whom they are working.

"The method of tapping Sapodilla differs considerably from methods used in rubber tapping, and is more analagous to the tapping of gutta-percha. There is no continuous flow as in the case of rubber, and the healing of tapping cuts and replacement of latex is extremely slow. After one day's tapping the tree is usually allowed to rest for a period of three years or more, according to the area of bark which has been cut. The method which is used generally in Central America is to make zigzag cuts in the bark, about eighteen inches apart, all the way up the tree from about two feet above the ground to the first branch. The zig-zag pattern of the cuts originates from the fact that it can easily be made with the 'machete,' which every native carries in the forest in Central America. . . . Where the zig-zag cuts have been made for more than two-thirds way around the stem, or where the cuts have been made too deeply, as frequently happens, the cambium is killed, the bark loosens, and the tree slowly dies. A large percentage of the mature and middle-aged Sapodilla now standing in the forests, is in a moribund condition due to these causes.

"Tapping is generally done during the early part of the morning between 6 a.m. and 11 a.m., as the air is then still and humid in the forest. The latex coagulates very rapidly on exposure to sun or drying wind, and even without these adverse factors it generally ceases to flow within four to six hours from the time of cutting, so that the chicleros are usually back in their camp soon after midday with the result of their morning's work. Rain does not interfere with tapping, as the extra water can easily be evaporated from the latex. . . .

"During one morning a chiclero taps perhaps six to eight



trees, hunting for these more or less in a big circle around the camp. By the time he has cut his last tree he is able to return to the first one and remove the bag containing the latex, which will then have ceased to flow. The canvas bags containing the latex are emptied into large tins in the chicleros' camp, and when a sufficient quantity for the purpose has been collected, about 30 gallons or more, the chicle is 'cooked,' *i.e.*, it is boiled to extract as much of the water content as possible. . . . In cooking chicle, a large open cauldron holding about 40 gallons is used, and a small wood fire is placed below it. The chicle bubbles up, giving off a cloud of steam. All through the cooking process, a man stirs the chicle with a paddle to prevent it from scorching against the sides of the cauldron. When the moisture has been much reduced and the chicle has become a viscous mass which can hardly be moved with the paddle, it is dumped out of the cauldron on to a piece of canvas, previously rubbed with soap to prevent sticking, and there moulded into an oblong or oval block of about 20 lbs. weight. The blocks are set aside to harden for a few days and then packed into sacks, loaded on mules, and taken to the nearest river bank, whence they are despatched by boat to the export depot in Belize, the capital town of British Honduras. . . .

"By the method of tapping which has been described above, when the cuts have been made on one-half or less than two-thirds of the circumference of the tree it is generally possible after an interval of about three years to make a second tapping on the remaining area of stem, provided that the original cuts have healed well and the tree has regained vigor. After a much longer interval, another five years at least, it may be possible to do a re-tapping between the original cuts of the first tapping, but owing to the occlusion of vessels in the bark around these old wounds, the yield of latex will be much less than from the first two tappings. Under the most favorable conditions the first tapping of a tree at about the middle point of its life may possibly yield 4–5 lbs. of latex, a second tapping 2 lbs., and a re-tapping probably less than 2 lbs. Such yields are, however, things of the past in British Honduras. Practically speaking, every Sapodilla in the forests, above one foot diameter, and a great number of smaller trees, have been

tapped at least once, most of them twice, and a fair percentage have received re-tappings. This state of things is gradually becoming general in all the more accessible Sapodilla forests of Central America. In some tracts of Guatemala and Mexico there are areas which still yield well, but exhaustion can be visualized at no very distant date."

**A new cannon-ball tree from Panama.** By C. V. Morton. *Journ. Wash. Acad. Sci.* (Washington, D. C.) 20: 16: 396–8, Oct. 4, 1930; illustrated.

Contains a description of a new species, *Couroupita Cutteri* Morton Skutch, collected about 15 miles from Almirante, Panama. The specific name is "in honor of Mr. Victor M. Cutter, President of the United Fruit Company, in recognition of generous support of many projects relating to tropical American botany."

"The Cannon-ball trees are apparently very rare in Central America. The present species and the recently described *C. parviflora* Standl. bring the known number up to five, all represented by very few collections. Of these *C. Cutteri* is the largest-flowered and probably also the tallest. It is most closely related to *C. darienensis* Pittier, which has short racemes arising from the smaller branches, instead of panicles arising from the trunk. *C. darienensis* has, moreover, pinkish rather than cream-colored flowers, which also are rather smaller."

**Nos bois coloniaux (Guyane). Manil (*Symphonia globulifera* L.) et Parcouri (*Platonia insignis* Mart.).** Pub. by Assn. Colonies-Sciences et Comité Natl. des Bois Coloniaux, Paris, 1930. Pp. 4; 5¼ x 7¼; 2 plates; 2 veneer samples.

One of a series of leaflets describing French colonial woods. (See p. 48 of this issue of *Tropical Woods*.)

**Charcoal from British Guiana.** *Bulletin of the Imperial Institute* (London) 28: 2: 138–146, July 1930.

Contains the results of tests of samples of charcoal from four British Guiana trees, namely, Yaruru (*Aspidosperma* sp.), Soft Wallaba (*Eperua falcata*), Ituri Wallaba (*E. Jenmani*), and Mora (*Dimorphandra Mora*), to determine their suitability for use as fuel in gas producers.



"The results of the analyses and technical trials of the Yaruru, Soft Wallaba, Ituri Wallaba, and Mora wood charcoals show that they would be suitable for use in gas producers adapted to work with charcoal fuel.

"When used in a portable 'gazogene' producer, satisfactory results were obtained in all instances, those given by the Mora wood charcoal being the best. Its superiority over the other charcoals is evidently due mainly to its better preparation, as indicated by the low percentage of volatile matter present.

"The Yaruru and Wallaba charcoals, particularly the Ituri Wallaba, which contained the highest percentage of volatile matter, could doubtless be improved considerably by somewhat better burning."

**British Guiana. Report on the Forest Department for the year 1929.** By B. R. Wood. Georgetown, 1930. Pp. 6; 8½ x 13.

"Field work for the period March–April consisted of the detailed survey of the forests and topography of that portion of the North West District bounded by the Barima, Aruka, Aruau, and Yarikita Rivers, comprising an area of 156 square miles. . . . The forests of this area are of the miscellaneous type, no particular species being dominant, and they are of little commercial value at the present time. . . .

"On this area 102 square miles consisted of swamp lands which are covered with forest in which the Truli Palm largely predominates and in which occur scattered swamp trees such as Manni (*Symphonia globulifera*), White Cedar (*Tabebuia longipes*), and Kirikowa. The remaining 54 square miles comprise low hills consisting of brown sand, hills on which the soil is a stiff clay, and a small area of lateritic hills. The forests on these areas are also of a miscellaneous type in which the principal species are Kakaralli (*Eschweilera*), Kautaballi (*Licania venosa*), Haiariballi (*Diplotropis*), Kuraka (*Protium guianense*), Kabukalli (*Goupia glabra*), Balata (*Mimusops globosa*), Yaruru (*Aspidosperma*), Baramalli (*Catostemma*

*fragrans*), Barataballi, Crabwood (*Carapa guianensis*), Marishiballi (*Licania*), and Maho (*Sterculia*). The larger part of these forests are composed of secondary growth, probably as the result of former cultivation by aboriginal Indians."

**Un nuevo arbusto ornamental, *Citharexylum Herrerae* Mansf.** By FORTUNATO L. HERRERA. *Revista Chilena de Historia Natural* 34: 25–30, 1930.

A descriptive account of a large shrub found growing at elevations between 3200 and 3500 meters near Cuzco, Peru. The aboriginal name for the plant is Huairuru.

**O côco babassú e o problema do combustivel.** By S. FRÓES ABREU. Pub. by Ministerio da Agr. Ind. & Comm., Rio de Janeiro, Brazil, 1929. Pp. 94; 6½ x 8½; fully illustrated.

An interesting report based on an investigation of the Babassú industry in the state of Maranhão and on subsequent laboratory study of the distillation products and fuel obtained from the husks. The general conclusions are summed up in an introduction by the director of the station, E. L. da Fonseca Costa, *viz.*, that the exploitation of Babassú remains a matter of kernel-oil production rather than a problem of by-products, especially in the nature of fuel. As to distillation products from the husks, the yield of methyl alcohol is very low, as is that of acetate, and does not warrant elaborate installations, while the tar incidental to charcoal-making is about sufficient to serve as a binder in the fabrication of briquettes.

The author sketches the general distribution of the Babassú palm in Brazil and then deals in some detail with its occurrence in Maranhão where at present it is of greater commercial importance than elsewhere, the Babassú zone occupying about one-fourth of the entire area of the state. He estimates the number of palms in the area in question at 10,000 per km², or 865 millions in the state, capable of producing 8 million tons of kernels or 5 million tons of oil per year, while the present total annual export of Babassú kernels from the whole of Brazil does not exceed 22,000 tons, proceeding almost entirely from Maranhão and the adjoining state of Piauhy. He discusses categorically the topography of Maranhão and



the means of transportation in that state (chiefly by river), the limited labor supply, the prevailing primitive method of kernel extraction (opening the palm nuts by pounding on them against the upturned edge of an ax), wages and cost of production by manual labor and by such machinery as exists.

Incidentally the phytogeographic zones of the state are given as follows:

1. Grassy lowlands along the lower river courses—flooded at times or covered with brackish water and often fringed with *Avicennia*.

2. The Babassú zone where this and other palms, *Astrocaryum*, etc., predominate, accompanied by shrubs and small trees. This zone generally borders the rivers, but sometimes departs from them, spreading between the river courses and beyond.

3. Caatingas—generally "caatingas altas," *i.e.*, with tall trees, xerophil and shedding their foliage in the dry season. Characteristic are *Tecoma*, *Lecythis*, *Piptadenia*, *Spondias*, *Caesalpinia*, *Hymenæa*, and *Bombax*, with scattered groves of Babassú.

4. Plains—sandy and dry, with grasses, low palms, and sparse arboreal vegetation, floristically similar to that of Central Brazil, but with certain typically North Brazil elements, *e.g.*, *Bactris*, *Platonia*, *Caryocar*, *Hancornia*, and *Stryphnodendron*.

5. The Hylæa or Amazonian forest type of vegetation which extends eastward from the state of Pará into Maranhão.—B. E. DAHLGREN.

**A bracaatinga ou abaracaatinga.** By F. C. HOEHNE. Pub. by Secretaria da Agr., Ind. e Com. do Estado de São Paulo, Brazil, May 1930. Pp. 47; 6¼ x 9; illustrated.

Contains descriptions of a new species and a new variety, namely, *Mimosa bracaatinga* Hoehne and *M. bracaatinga* Hoehne, var. *aspericarpa* Hoehne. These are slender trees, producing natural thickets in places in the States of Paraná and St. Catherina and lending themselves readily to propagation for fuel. The name "bracaatinga" is derived from "aba-rá-caá-tinga," a Guarany descriptive term meaning

"tree of many white plumes" (aba = many; rá = plumes; caá = tree; tinga = white).

**Notes sur le genre *Hevea* Aubl.** By ADOLPHO DUCKE. *Revue de Botanique Appliquée et d'Agriculture Tropicale* (Paris) 9: 98: 623–630, 1929; illustrated.

Contains a key to 17 species of *Hevea*, with notes on each species.

**Relatorios das commissões desempenhadas pelo chefe da secção de botanica, Adolpho Ducke, na região amazonica durante os annos de 1919 a 1928.** By ADOLPHO DUCKE. *Archivos do Jardim Botanico do Rio de Janeiro* 5: 3–75, July 1930.

These accounts of excursions through the Amazon region are rich in notes on the forests and trees, and contain a great many common and scientific names.

**Enumeração das plantas amazonicas cultivadas no Jardim Botanico e introduzidas pelo chefe de secçao, Adolpho Ducke de 1920 a 1928.** *Archivos do Jardim Botanico do Rio de Janeiro* 5: 79–98, July 1930.

A briefly annotated list of the Amazonian plants in cultivation in the Botanic Garden of Rio de Janeiro, Brazil. The arrangement is by families, and the vernacular names are given so far as known.

**Plantes nouvelles ou peu connues de la région amazonienne (IVe série).** By ADOLPHO DUCKE. *Archivos do Jardim Botanico do Rio de Janeiro* 5: 101–187, July 1930; illustrated.

Contains notes on little-known species and descriptions of many new ones, mostly trees. The latter are illustrated with 23 excellent plates portraying critical features.

**As leguminosas do Estado do Pará (supplemento).** By ADOLPHO DUCKE. *Archivos do Jardim Botanico do Rio de Janeiro* 5: 191–199, July 1930.

A supplement to the list published in volume IV of the *Archivos*. The number of leguminous species reported from the State of Pará is brought up to 559, of which 547 have been verified by the author.



**Nos bois coloniaux (Indochine). Sao (*Hopea odorata* Roxb.).** Pub. by Assn. Colonies-Sciences et Comité Natl. des Bois Coloniaux, Paris, 1930. Pp. 4; 5¼ x 7¼; 2 plates; 1 veneer sample.

One of a series of leaflets describing French colonial timbers. (See p. 48 of this issue of *Tropical Woods*.)

**The forests of the north-east frontier of India.** By F. KINGDON WARD. *Empire Forestry Journal* 9: 1: 11–31, 1930; illustrated.

**Products of the Dutch East Indies. Gum copal and gum damar.** Pub. by Div. of Commerce, Dept. of Agr., Ind. & Commerce, Buitenzorg, Java, 1930. Pp. 14; 5¾ x 9; illustrated.

**Australia. Report for the year 1929–30 of the Division of Forest Products of the Council for Scientific and Industrial Research.** A mimeograph, pp. 8.

A report of exceptional interest throughout, dealing with organization and program and with the work of the following sections: utilization, wood technology, seasoning, preservation, tannin extract, wood chemistry, and standards.

### WOOD TECHNOLOGY

"The microscopical examination of timbers for identification has proceeded at the Federal Forestry School. Under the coöperative arrangement this Division has provided an assistant to the investigator, Mr. Carter, and also some apparatus necessary for the work. The Inspector-General of Forests, under whose direction this work began and who has continued to control it, has been of the greatest assistance to the related work on chemical methods of identification.

"So far 1175 samples have been received from various State Forest Services; 850 have been sectioned and mounted for

examination and 50 have been partly or completely examined. Samples examined are accompanied by botanical material, so that the vexatious errors due to wrong determination of species can be avoided, as far as is possible, in the present state of knowledge of the *Eucalyptus* genus.

"Although identification is the first object of this work, it will gradually extend into an investigation of the relation between microscopical structure and use properties of timbers. A further extension will be to coöperate with the sections of seasoning, preservation, and mechanics into the physical cause of behavior of timbers in experimental operations. The chemists' work on identification has proved to be of great assistance to that of the microscopist and indeed seems to offer the best chance of splitting the Eucalypt groups into which the microscope seems able to divide the genus."

### Wood Chemistry

"The work in this section is directed to a study of the fundamental chemistry of Australian timbers. This means the collection of an enormous amount of data from many samples of each of the hundreds of species. This will naturally take many years. Meanwhile, the special application of chemical methods to problems of identification is being studied. In this direction two objectives are kept in mind:

"1. The establishment of definite chemical tests that will enable the certain identification of many species of timber which are readily mistaken for others. The microscope often fails to do this. In fact with Eucalypts its limit seems to be the separation into certain well-marked groups. So far as the work has gone there is definite proof in some cases that chemical methods can be relied upon to make the necessary distinction, *e.g.*, between Jarrah and Karri. It has not before been possible to swear to a piece of timber being one or the other of these two. Various groups are being studied and indications point to similar success with other pairs of similar timbers.

"2. The development of simple qualitative tests that can readily be applied in the field. So far it appears as if it is possible to find these in many cases. The Ironbarks, for instance, can be divided into two groups. Tallowwood (*E. microcorys*) can readily be distinguished from Blackbutt (*E. pilularis*). Much remains to be done before anything like a key can be furnished to many of the problems of identification. A year's work has, however, shown considerable advance and pointed the way for further work."



**Die Vegetation der Erde. XIV: The vegetation of New Zealand.** By L. Cockayne. 2nd ed., almost entirely rewritten, thoroughly revised, and enlarged. Leipzig, 1928. Pp. 456; 6½ x 9½; 107 half-tones; 3 maps.

**The cultivation of exotic conifers in South Africa.** By C. E. Legat. *Empire Forestry Journal* 9: 1: 32–63, July 1930; illustrated.

**The growth of Eucalypts in the sub-tropical plantations of the Northern Transvaal and Zululand.** By J. J. Kotzé and C. S. Hubbard. *Empire Forestry Journal* 9: 1: 64–100, July 1930; illustrated.

**Note au sujet des santals de Madagascar.** By H. Perrier de la Bâthie. *Revue de Botanique Appliquée & d'Agriculture Tropical* (Paris) 10: 107: 590–592, July 1930.

Until recently the so-called Sandalwood exported from Madagascar to British India for use in burial rites has been obtained from two shrubby species of *Santalina* (Rubiaceae), especially old stumps and dead wood. Another timber is now being used for the same purpose and this has been discovered to be a species of *Brachylaena* (Compositae).

"It is not surprising that the Sandalwood of Tuléar should be produced by a *Brachylaena*. All of the indigenous species of this genus supply beautiful and more or less scented timber for cabinet work. They are all splendid trees, particularly *B. Merana* Baker, which frequently attains a height of 30 to 40 meters and is without doubt the largest representative of the Compositae in the world. As in the case of most of the precious species of Madagascar, these trees are unfortunately becoming scarcer and scarcer, and are even threatened with extinction as the remnants of the virgin forests are being destroyed by fire. It is too late to think of exploiting these interesting

trees, but perhaps the species can be preserved by planting them in appropriate and protected places. The exportation of the Sandalwoods of Madagascar never attains large proportions, and the poor condition of the remaining forest will prevent extension of the trade, despite a rather active demand."

The article concludes with a comparative account of the anatomical features which distinguish the woods of *Brachylaena* and *Santalina madagascariensis*.

**Beschreibung einiger tropischer Hölzer aus Westafrika nach ihren handwerkstechnischen Eigenschaften.** By F. JENTSCH and H. MEYER. *Der Tropenpflanzer* (Berlin) 33: 8: 313–325, Aug. 1930.

Descriptions of 17 West African timbers with particular reference to their working qualities, such as sawing, planing, mortising, boring, splitting, etc. There are also notes on color, grain, density, and uses. Scientific and vernacular names are given so far as known. The whole comprises a very useful report, though it is to be regretted that the identity of some of the specimens could not be definitely determined.

**La nécessité d'une politique forestière coloniale.** By ANDRÉ AUBREVILLE. *Le Monde Colonial Illustré* (Paris) 8: 83: 180–1, July 1930; illustrated.

Emphasizes the urgency for the adoption of a comprehensive and far-sighted forest policy to arrest the constant diminution of the West African forests with its consequent deleterious effect upon the climate, water supply, and fertility of the region.

**Sur des plantes à huiles chaulmoogriques du Congo belge.** By É. DE WILDEMAN. *Bulletin des Séances, Institut Royal Colonial Belge*, Brussels, 1930. pp. 94–111; illustrated.

Contains notes on various Flacourtiaceae and an enumeration of the different African species of *Caloncoba*.

**Matériaux pour la flore forestière du Congo Belge.** By É. DE WILDEMAN. *Annales de la Société Scientifique de Bruxelles* 50 (ser. B): 1: 70–72, Jan. 30, 1930.

Contains a description of *Guarea alatipetiolata* De Wild., a new species collected by V. Goossens (No. 4514) at Eala in November 1923.



**Shea nuts from Nigeria.** *Bulletin of the Imperial Forestry Institute* (London) 28: 2: 123–131, July 1930.

"In connection with an investigation of Shea butter which is in progress at the Imperial Institute in conjunction with the Advisory Committee on Oils and Oilseeds, a request was made to the Government of Nigeria that arrangements should be made to collect and forward botanical specimens and samples of nuts from representative Shea trees growing in different localities, in order to determine whether any definite varieties of the trees exist in the country and whether there are any differences in the yield and quality of the fat. . . .

"The botanical specimens . . . were transmitted by the Imperial Institute to the Director of the Royal Botanic Gardens, Kew, who furnished the following observations regarding them:

"'Though a careful examination of the botanical material of the Shea tree (*Butyrospermum Parkii*) from Nigeria has been made, there is insufficient evidence to assume that distinct varieties, in the purely morphological sense, exist. . . .

"'It must be pointed out that while the five sets of specimens from different parts of Nigeria cannot be separated on taxonomic grounds, it is nevertheless quite probable that there may be different physiological varieties or strains present. In varieties of this sort differences would be observable in such factors as yield and oil content, though the varieties could appear identical from herbarium material'."

The tests on the oil content of the two lots of seeds indicated differences, but the results are not considered sufficient for definite conclusions.

**Sur l'avenir de l'exploitation de l'Okoumé au Gabon.** By HEITZ. *Actes & Comptes Rendus de l'Association Colonies-Sciences* (Paris) 6: 183–190, Aug.–Sept. 1930.

Consideration of the problems confronting the Forest Service in exploiting Okoumé in Gabon, with suggestions for the conservation of enough growing stock to assure a perpetual supply of this valuable timber.

**Some notes on the Benin forests of Southern Nigeria.** By R. A. Sykes. *Empire Forestry Journal* 9: 1: 101–106, July 1930.

**Nos bois coloniaux (Côte d'Ivoire, Cameroun, Gabon et Moyen Congo). Acajou d'Afrique (*Khaya ivorensis* A. Chev.).** Pub. by Assn. Colonies-Sciences et Comité Natl. des Bois Coloniaux, Paris, 1930. Pp. 4; 5¼ x 7¼; 2 plates; 2 veneer samples.

**Nos bois coloniaux (Côte d'Ivoire). Avodiré (*Turreanthus africana* [Welw.] Pellegrin).** Pub. by Assn. Colonies-Sciences et Comité Natl. des Bois Coloniaux, Paris, 1930. Pp. 4; 5¼ x 7¼; 2 plates; 2 veneer samples.

This and the preceding publication are parts of a series of leaflets prepared by the Association Colonies-Sciences, 60 Rue Taitbout, Paris (IX$^{e}$), to acquaint the public and trade with the more important timbers of the French colonies. (For references to others in this series see pp. 38 and 43 of this issue of *Tropical Woods;* also No. 15, pp. 52–53, and No. 19, pp. 44, 47, and 68.)

**Le teck et sa propagation en Afrique tropicale.** By Jean Méniaud. *Actes & Comptes Rendus de l'Association Colonies-Sciences* (Paris) 6: 62–63: 179–182, Aug.–Sept. 1930.

A general discussion of Teak and its commercial importance is followed by a report on plantations of this tree in Togo and Cameroon and the results of tests on the physical, mechanical, and chemical properties of timber from those plantations.

**De quatre acajous de la Côte d'Ivoire.** By F. Pellegrin. *Bull. Soc. Bot. France* 76: 731–7, Dec. 20, 1929; illustrated.

The four species described are *Entandrophragma Candollei, E. cylindricum, E. macrophyllum,* and *E. utile.*

**Les Sterculiacées de la Côte d'Ivoire.** By [André] Aubreville. *Actes & Comptes Rendus de l'Assn. Colonies-Sciences* (Paris) 6: 61: 164–168, July 1930.

Contains a brief account of the principal anatomical characteristics of the woods of the Sterculiaceae, short descriptions of and a key to 10 representatives of this family in Ivory Coast.



**Das Bongosiholz und seine Abstammung.** By Hans W. Thieme. Reprinted from *Botanisches Archiv* 26: 1–2: 164–223, 1929; illustrated.

This report, prepared at the Institut für angewandte Botanik at Hamburg, contains a full account of the morphology, anatomy, and properties of *Lophira alata* Banks and *L. procera* A. Chev., two West African trees of the family Ochnaceae. The Bongosi-wood of commerce is produced by the latter species, a typical component of the rain forest, and not by *L. alata,* which is a savanna tree. The principal anatomical distinctions between the woods of the two species are in the width of the parenchyma bands and the size and shape of the rays. The illustrations include a range map, drawings of the leaves, and photomicrographs of leaves and woods.

**Timbers from the Gold Coast. III.** *Bulletin of the Imperial Institute* (London) 28: 2: 131–138, July 1930.

This report completes the work conducted at the Imperial Institute on the timbers of this Gold Coast series, as further investigations of empire timbers has been transferred to the Forest Products Research Laboratory at Princes Risborough. The first report dealt with seven species (see *Tropical Woods* 9: 29, March 1, 1927), the second with four additional (see *Tropical Woods* 17: 61, March 1, 1929). The present report deals with two leguminous woods and includes results of mechanical and working tests.

12. **Denya** (*Cyclodiscus gabunensis* Harms).—A large tree found throughout Ashanti and in the north of the Colony; reported to be of common occurrence and to have an average girth of 8 feet. Timber said to have been sold in Liverpool under the name of Greenheart. Heartwood greenish brown, darkening upon exposure to a rich reddish brown; sapwood salmon pink, about 3 inches thick. A hard, heavy, coarse-textured, tough wood, difficult to work and to finish smoothly; "unlikely to find an outlet on the European market."

13. **Samanta** (*Bussea occidentalis* Hutch).—A medium-

sized tree, apparently rather uncommon in the Colony. Heartwood dark reddish brown, with pencil striping of parenchyma lines; sapwood whitish brown, about 2 inches thick. A very heavy and very hard wood, exceedingly difficult to work with nearly all hand tools, but fairly readily machined; extremely strong and very stiff. "It could not be used as a cabinet or joinery wood and would not be suitable for ordinary flooring or flooring blocks. A member of the committee, however, expressed the view that if Samanta could be offered cheaply as a secondary timber, it might be possible to find an outlet for it for special purposes."

"It may be mentioned that the botanical identity of certain of the woods described in previous articles now appears to be somewhat doubtful. Specimens of the woods were sent to Professor S. J. Record of the School of Forestry, Yale University, who states that Nos. 6 and 10, *viz.*, Penkwa and Kwabohora, described by the Forestry Department, Gold Coast, as *Entandrophragma* spp., are in his opinion *Guarea* sp. and that they seem to match exactly his samples of *Guarea cedrata* (A. Chev.) Pellegrin (=*Trichilia cedrata* A. Chev.). No. 3, Baku, described as *Mimusops* sp. (*loc. cit.*, 1926, 24, 418) he considers agrees exactly with some commercial specimens of Sapeli, and he is confident that it is *Entandrophragma* sp. He is also of the opinion that No. 7, Konkruma, which was believed to be *Morinda citrifolia* (*loc. cit.*), is a member of the Meliaceae, probably *Carapa procera* DC.

"Professor Record's views regarding the identity of the specimens of Baku and Konkruma were transmitted to the Imperial Forestry Institute at Oxford for their opinion, as specimens of the woods had previously been furnished to them. Dr. L. Chalk, in reply, confirmed Professor Record's views, and reported further that No. 8, Achin, is certainly not *Blighia sapida* (*loc. cit.*, 1928, 26, 275), though he cannot at present identify it.

"The Imperial Institute is informed that the Forestry Department in the Gold Coast have arranged for the collection of specimens of timber and suitable botanical material of the trees in question, in order that their identity may be definitely established."



**Trade names of timber.** By L. Chalk. *Empire Forestry Journal* 9: 1: 114–115, July 1930.

After briefly reviewing the arguments against limiting the application of well-known trade names of timber, Dr. Chalk concludes as follows:

"The names of most well-known timbers, however, are associated with definite physical and mechanical properties, and it is in the use of names which suggest the appearance but not the properties of the wood that the practice is most open to criticism. To use 'African Teak' as a name for *Chlorophora excelsa*, which possesses none of the special properties of Teak, is not only misleading but definitely harmful, as it leads to improper use of the wood and consequent dissatisfaction. . . .

"It would seem, therefore, that the application of existing names to new timbers should at least be limited to cases where the similarity implied in the name applies to properties as well as to appearance, and that botanical relationship may ultimately prove the most practical means of limitation. If the movement in this direction, as exemplified by America, continues, it is likely that the systematists may have some awkward problems thrust on them as to the validity of some of their generic distinctions, particularly where geographical distribution has contributed to the original distinction. This opens up a wide field for coöperation with the wood technologists, which should eventually prove of considerable value."

**Botanical notes on Empire trees.** By J. Burtt Davy. *Empire Forestry Journal* 9: 1: 116–124, July 1930; illustrated.

**Jahresbericht (1929) des Instituts für angewandte Botanik Hamburg.** Hamburg, Germany, 1930. Pp. 149; 6¾ x 9½.

Those concerned with forest products will find much of interest in the reports of the various investigations made at the Hamburg Institute of Applied Botany under the capable direction of Professor Bredemann. Among these are reports on the determination of commercial woods and on tests of pulp and paper by Dr. Hans Meyer, a highly competent authority on these subjects.

# GENERAL INDEX

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