

DE PLANTIS TOXICARIIS E MUNDO  
NOVO TROPICALE COMMENTATIONES IV

BY  
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IN CONTINUATION of a series of articles on toxic plants of the New World tropics, this contribution will call attention to a number of species with miscellaneous interesting ethnobotanical notes as to their use but which, for the most part, have not been subjected to phytochemical examination.

Most of the data reported in the following pages were gathered during field work which I have carried out in the American tropics or which my students have reported as a result of their ethnobotanical studies in sundry parts of Latin America.

It will be clear to phytochemists that the analysis of some of the species enumerated may be of special interest, since a number of the plants belong to genera or even families from which biodynamic constituents have not hitherto been isolated.

The current phases of this research on toxic plants of the New World tropics, including the preparation and publication of most of the plates in this contribution, are supported by a grant from the National Institutes of Health (No. LM-GB 00071-01). The line drawings have been prepared by the late Mr. John Stanwell-Fletcher and by Mr. Gordon W. Dillon, Mr. Joshua B. Clark and Miss Irene Brady.

The enumeration of families follows the Engler-Prantl system.

#### GARRYACEAE

**Garrya laurifolia** (*Hartw.*) *Benth* var. **macrophylla** (*Hartw.*) *Wangerin* in *Pflanzenr.* 4, Fam. 56a (1910) 16.

MEXICO: Estado de Oaxaca, Cerro Zempoaltepetl, eastern slope. Alt. 2600 m. "Very large shrub along forest trails." May 26, 1939. *R.E. Schultes* 547.

The Mije Indians living near the base of Cerro Zempoaltepetl employ the leaves and stems in the form of a decoction as a febrifuge, but when taken in excess this medicine reputedly causes a burning sensation in the digestive tract and a strong trembling of the hands.

*Garrya laurifolia*, known in Mexico as *cuauhchichic*, is employed therapeutically in tincture or extract form in the treatment of chronic diarrhoea. Several analyses have been made, and it has been established that the bark infusion kills rabbits by paralysis of the respiratory centres (Martínez, M.: "Plantas medicinales de Mexico" ed. 4 (1959) 93-96). Amongst other constituents, it is said to contain a bitter alkaloid principle, garryine, a resin, tannic acid and a compound possibly of glycosidal nature. Several alkaloids have been isolated from the genus *Garrya*, including *G. laurifolia* var. *macrophylla* (Hérissey, H. and C. Lebas in *Journ. Pharm. Chim.* 2 (1910) 490; Oneto, J.F. in *Journ. Am. Pharm. Assoc.* 35 (1946) 204).

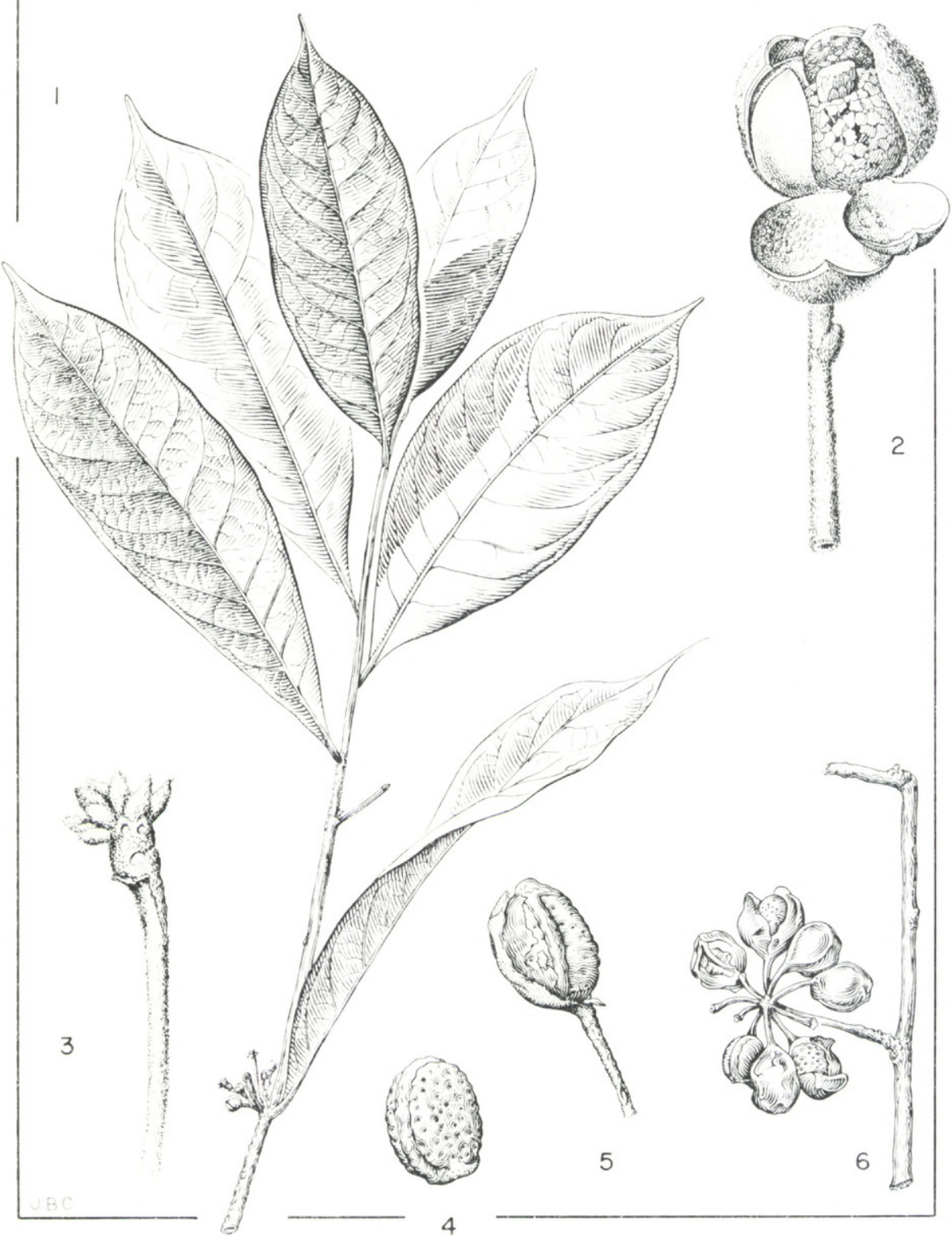
#### ANNONACEAE

**Unonopsis veneficiorum** (*Mart.*) *R.E. Fries* in *Acta Hort. Berg.* 12 (1937) 238.

COLOMBIA: Comisaría del Putumayo, Río Guamües, Santa Rosa. "Primary forest. Small tree more or less 20 ft. Bark of root is used in preparation of curare." November 26, 1966. *H.V. Pinkley* 558.



UNONOPSIS venificiorum (Mart.) R.E. Fr.



1, habit, approximately  $\frac{1}{4} \times$ . 2, flower, approximately  $2\frac{2}{3} \times$ . 3, immature fruit, approximately  $2\frac{2}{3} \times$ . 4 and 5, seed, approximately natural size. 6, fruit, approximately  $\frac{1}{2} \times$ .

Mr. Homer V. Pinkley, one of my graduate students who spent more than a year in ethnobotanical studies amongst the Kofán Indians of Ecuador and Colombia, reports that the root of this small tree, known in Kofán as *i-te-si-fan-di*, is the source of a curare preparation of the tribe.

This species was first reported as an arrow poison ingredient by Martius (Spix, J.B. and K.F.D. Martius "Reise in Brasilien" (1831) 1237), who stated that the Juri, Miraña and other Indians of the Rio Japurá (Río Caquetá) and Rio Negro of Colombia and Brazil so employed it. *Unonopsis veneficiorum* has been reported as containing bisbenzylisoquinoline alkaloids (Hegnauer, R. "Chemotaxonomie der Pflanzen" 3 (1964) 118).

Mr. James W. Walker of the Gray Herbarium of Harvard University has identified the collection *Pinkley 558*.

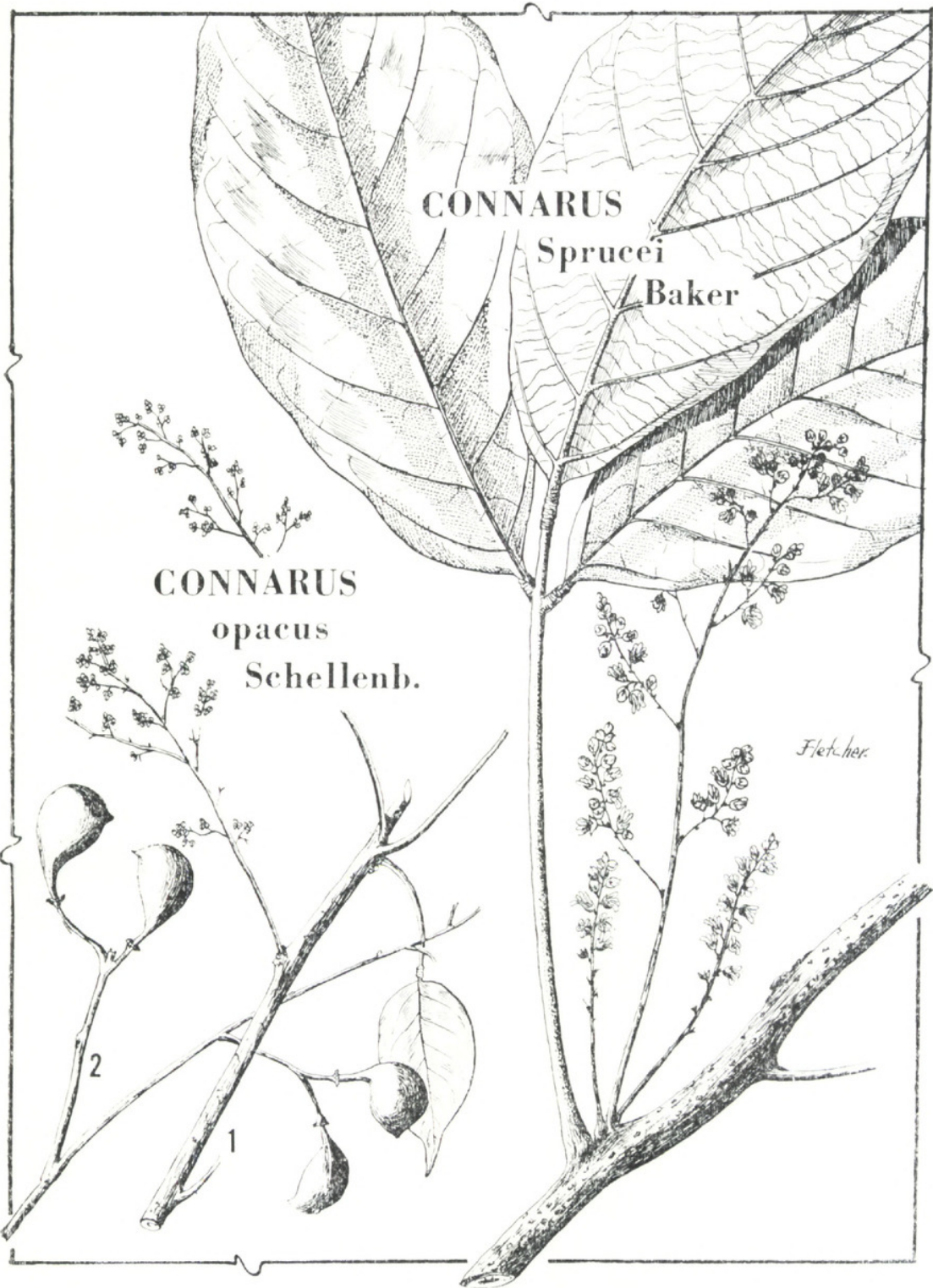
#### CONNARACEAE

The chemistry of the Connaraceae is very poorly known and most certainly represents one of the areas in the angiosperms where phytochemists should concentrate attention. Dye materials and balsamic resins are rather common in the family, and, although very poisonous substances have been reported from the fruit, seeds and bark of some species, their chemical nature is not yet clarified (Hegnauer, loc. cit.) 3 (1964) 545-546. As a family very closely allied to the Leguminosae, the Connaraceae should be expected to possess a good number of species employed as poisons in primitive societies.

My identification of the connaraceous species mentioned in this paper has been verified by Dr. Gilian T. Prance of the New York Botanical Garden.

**Connarus opacus** Schellenberg in Engler Pflanzenr. 4, Fam. 127 (1938) 244.





Habit, approximately  $\frac{1}{2} \times$ .

COLOMBIA: Comisaría del Vaupés, Río Kuduyarí, headwaters. "Liana. Fruits dull red. Bark and leaves used by Kubeo for fish poison." August 16, 1960. *R.E. Schultes 22719*.

This extensive vine, which is relatively abundant in the headwaters of the Río Kuduyarí as an element of the riverside vegetation, provides one of the usual fish poisons employed in still water by the Kubeo Indians. The root and stem bark and leaves are mixed together, crushed, placed in a bag and drawn slowly through the water.

A spot test for alkaloids, made on the dried leaves of this collection, was negative. Alkaloids have apparently never been reported from any species of the Connaraceae (Willaman, J.J. and B.G. Schubert: "Alkaloid-bearing plants and their contained alkaloids" Techn. Bull. No. 1234, U.S.D.A. (1961).

The collection *Schultes 22719* is apparently the first record of this species from Colombia. The type was collected in British Guiana by Schomburgk.

**Connarus Schultesii** *Standley* ex Schultes in Bot. Mus. Leaf., Harvard Univ. 9 (1941) 173, t. 4.

MEXICO: Estado de Oaxaca, San Juan Lalana, Distrito de Choapam. Alt. 700 m. "A tangled vine growing on large forest trees, mountain southeast of Lalana. Stems exude red sap upon breaking." May 9, 1939. *R.E. Schultes et B.P. Reko 833*.

Known only from the type collection, this species has been employed by the Chinantec Indians as a taenifuge. The extremely bitter red sap that exudes from the stems acts in the expulsion of certain intestinal parasites, but it is reputedly toxic in large doses. Since the species is reported by the natives to be local, its use in folk-medicine appears to be restricted. It is perhaps of interest that an African species is similarly employed (Heckel, E., and F. Schlagenhaußen in Ann. Fac. Sci. Marseilles 6, fasc. 2 (1897) 1-26). The only other species recorded from



CONNARUS  
*Schultesii*  
*Standley*

1

2

GORDON  
W.  
DILLON

1, fruiting branch, approximately  $\frac{1}{2} \times$ . 2, fruit, enlarged approximately  $1\frac{1}{2} \times$ .

Mexico—*Connarus lentiginosus* Brandg. of Chiapas—is not known to be utilized medicinally, but ethnobotanical studies have not been pursued in the region.

The red sap of *Connarus Schultesii* may contain coloring constituents, but the Chinantecs and neighboring Zapotecs apparently do not make use of them as a dye.

**Connarus Sprucei** Baker in Martius Fl. Bras. 14, pt. 2 (1871) 187.

COLOMBIA: Comisaría del Vaupés, Río Kuduyarí, near mouth. "Vine. Flowers white. Bark employed as fish poison." August 12, 1960. R. E. Schultes 22576.

The bark of the root and stem of this riverside liana is employed by the Kubeo Indians as a fish poison.

Spot tests for alkaloids, made on the bark of the species, proved to be negative.

**Rourea glabra** Humboldt, Bonpland et Kunth. Nov. Gen. et Sp. 7 (1825) 41.

COLOMBIA: Comisaría del Amazonas, Río Karaparaná, between the mouth and El Encanto. Alt. about 150 m. "Small tree. Fruit red with blackish blue husk." May 22-28, 1942. R. E. Schultes 3831.

The Witoto Indians use the root and stem bark of *Rourea glabra* as a fish poison. This small tree or vine is rather common in pockets along the flood-banks of the Río Karaparaná. Although it is a widespread species, occurring in Central America, the West Indies and tropical South America, no uses seem to have been reported for it beyond the employment of a decoction as a gargle in treating catarrhal conditions (Schellenberg, loc. cit. 214). Two vernacular names for the plant in Brazil—*mata cachorro* ("dog killer") and *mata negro* ("negro killer")—do, however, suggest poisonous properties. The fruit and root bark of *Rourea erecta* (Blanco) Merr., an Asiatic species, are reputedly poisonous to dogs and other car-





ROUREA glabra H.B.K.

Habit, approximately  $\frac{1}{2} \times$ .

nivorous animals (Brill, H.C. and A.H. Well in Philippine Journ. Sci. 12A (1917) 171). A steroidal sapogenine has been found in the leaves and twigs of *Rourea ligulata* Bak. of Brazil (Altman, R.F.A. in Nature 173 (1954) 1098).

#### EUPHORBIACEAE

**Phyllanthus lathyroides** *Humboldt, Bonpland et Kunth* Nov. Gen. et Sp. 2 (1817) 110.

MEXICO: Estado de Oaxaca, Distrito de Teotitlán, Huautla de Jiménez. August 3, 1938. *R.E. Schultes et B.P. Reko* 417.

This common roadside weed, called *shka-nin-du* ("eruption plant") in the Mazatec Indian language, has medicinal properties, according to the natives. A decoction of the leaves is used as a wash for eye infections, such as conjunctivitis. A poultice of moistened leaves is applied to boils, hence the Indian name of the plant. A strongly emetic tea is, likewise, prepared from the leaves.

#### FLACOURTIACEAE

**Lunania parviflora** *Spruce* ex Benth in Journ. Linn. Soc. 5, Suppl. 2 (1861) 90.

COLOMBIA: Comisaría del Amazonas, Trapecio Amazónico, Río Loretoyacu. September 1946. *R.E. Schultes et G.A. Black* 8316.

The Tikuna Indians report that the root of *Lunania parviflora* is toxic and was formerly powdered and added to cooked food for the purpose of killing enemies or unwanted visitors from foreign tribes.

#### THYMELAEACEAE

**Schoenobiblus peruvianus** *Standley* in Field Mus. Publ. Bot. 11 (1936) 169.

COLOMBIA: Comisaría del Putumayo, Río Sucumbíos (San Miguel), Conejo y alrededores, frente a la Quebrada Conejo. "Large shrub. Root furnishes one of the poisons for curare." April 2-5, 1942. *R.E.*



SCHOENOBIBLUS peruvianus Standl.



1, habit, approximately  $\frac{3}{8} \times$ . 2, leaf and bractlet, approximately  $2 \times$ . 3, flower, approximately  $4 \times$ . 4, flower, approximately  $6 \times$ . 5, fruit, approximately  $\frac{2}{3} \times$ .

*Schultes 3521*.—"Poison. Fruits used in making curare. Shrub." April 2-5, 1942. *Schultes 3655*.—Santa Rosa y alrededores. "Roots and fruits used in Kofán curare preparation." April 7-8, 1942. *Schultes 3613*.—Río Guamües, Santa Rosa. Alt. 990 ft. "Low and swampy area. Plant  $4\frac{1}{2}$  ft. tall. Fruit bright orange. Root and fruit used in arrow poison; also sometimes used as a fish poison." September 6, 1966. *H.V. Pinkley 435*.

In 1949, Schultes (in Bot. Mus. Leaflet Harvard Univ. 13 (1949) 285-289) reported the use of *Schoenobiblus peruvianus* as "a very important ingredient in the arrow-poisons of the Kofán Indians of the Putumayo" in Colombia along the Ecuadorian border. The roots and the fruits are employed.

Mr. Pinkley, as a result of his year-long ethnobotanical studies amongst the Kofán Indians, has been able to conclude a detailed study of the employment of this interesting toxic plant in the preparation of arrow poisons, a report of which will be published elsewhere. His record that the plant is sometimes utilized as a fish poison extends our knowledge of its toxic activity and may be of interest chemically, inasmuch as the identity of the active principle is, as yet, unknown.

The identification of the specimens cited above has been checked by Dr. Loren I. Nevling of the Arnold Arboretum.

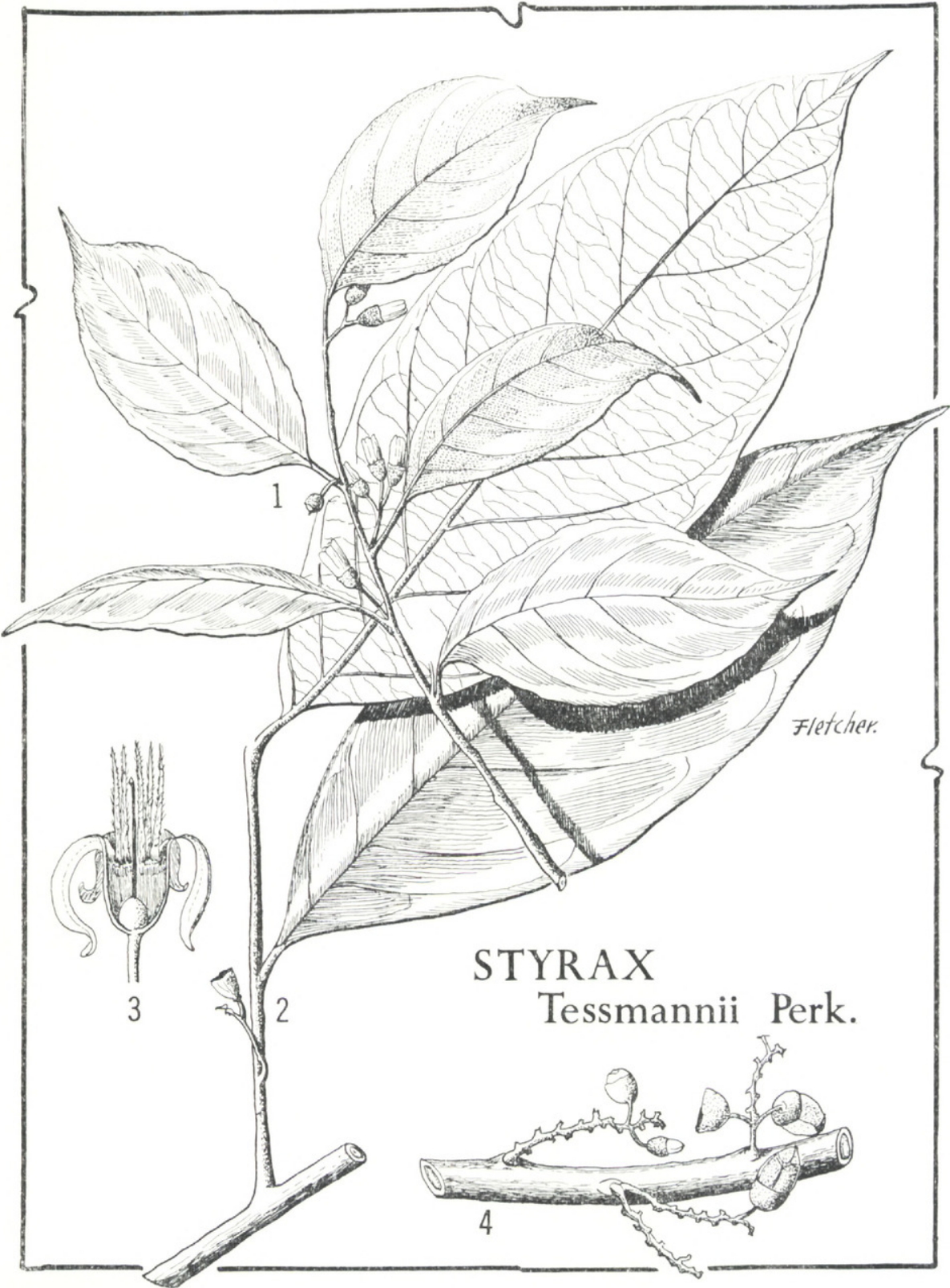
#### STYRACACEAE

***Styrax Tessmannii* Perkins** in Notizbl. 10 (1928) 459.

COLOMBIA: Comisaría del Amazonas, Trapecio Amazónico, Río Loretoyacu. Tikuna name: *mē-re-ta-kee*. March 1946. *R.E. Schultes 7144*.

According to Tikuna Indians living along the Río Loretoyacu, the aromatic resin from the stems of *Styrax Tessmannii* is poisonous when ingested. This has apparently not hitherto been reported, but, in view of persistent information to this effect, it bears phytochemical investigation.





STYRAX  
Tessmannii Perk.

1, habit of flowering branch, approximately  $\frac{1}{2} \times$ . 2, habit of fruiting branch, approximately  $\frac{1}{2} \times$ . 3, flower, approximately  $2\frac{1}{2} \times$ . 4, fruit, approximately  $\frac{1}{2} \times$ .

## GENTIANACEAE

***Chelonanthus alatus* (Aubl.) Pulle** Enum. Vasc. Pl. Surinam (1906) 376.

MEXICO: Estado de Oaxaca, Distrito de Cuicatlán, between San Juan Zautla and Teutila. June 30, 1939. *R.E. Schultes* 731.—Distrito de Choapam, San Juan Lalana. May 3, 1939. *R.E. Schultes et B.P. Reko* 785.

COLOMBIA: Comisaría del Amazonas, Río Karaparaná, between the mouth and El Encanto. May 22–28, 1942. *R.E. Schultes* 3805.—Comisaría del Vaupés, Río Vaupes, Mitú and vicinity. September 27–October 20, 1966. *R.E. Schultes, R.F. Raffauf et D. Soejarto* 24246a—*Schultes, Raffauf et Soejarto* 24346.

PERU: Departamento de Loreto, Río Napo, Negro Urco. August 16, 1966. *R.T. Martin et C.A. Lau-Cam* 1286.—*Martin et Lau-Cam* 1290.

The Chinantecs in the Districts of Choapam, Ixtlán and Cuicatlán, Oaxaca, state that the root of *Chelonanthus alatus* is bitter and is used in decoction as a febrifuge, for cramps and indigestion, and to treat sores in the mouth. It has uses similar to those of *Lisianthus nigrescens* reported below. Applications based on its bitter principles are recorded from French Guiana (Heckel, E. “Les plantes médicinales et toxiques de la Guyane Française” (1897) 57). Aublet, who described the concept, reported its employment in folk medicine in French Guiana as early as 1775 (Aublet, J.B.C.F. “Histoire des plantes de la Guiane Française” 1 (1775) 205), stating: “The whole plant is bitter. It is used to treat obstructions, and I have employed it for this purpose with success”.

The Witoto Indians of Amazonian Colombia, who refer to the plant as *ho-ko-so-gö-nö*, dry and pulverize the leaves and flowers for powdering clothing and bedding to ward off insects.

Field spot tests on fresh material in Colombia have indicated that no alkaloids are present in the plant.





Habit, approximately  $\frac{1}{2} \times$ . Flower dissected, approximately natural size.  
Anther, approximately  $6\frac{1}{4} \times$ .

Several specimens collected in eastern Peru (*Martin et Lau-Cam* 1286 and 1290) reported a vernacular name *amaraguña* which presumably refers to the bitter principles in this plant. Another name employed for this species in eastern Peru is *uña de tigre*. A Peruvian collection (*Mexía* 4153), referable to *Chelonanthus chelonoides* (L.) Gilg, records that the plant is "used as a remedy for worm-infested wounds in cattle".

***Lisianthus nigrescens*** Chamisso et Schlechtendahl  
in *Linnaea* 9 (1831) 388.

MEXICO: Estado de Oaxaca, Distrito de Choapam, Santiago Zacatepec. *R.E. Schultes* 514.—Between Choapam and San Juan Comaltepec. June 3, 1939. *Schultes* 573.—Tonanguilla. June 4, 1939. *Schultes* 591.—Estado de Oaxaca, Distrito de Choapam, San Juan Lalana. May 6, 1939. *R.E. Schultes et B.P. Reko* 772.—Between Latani and Choapam. May 13, 1939. *Schultes et Reko* 889.

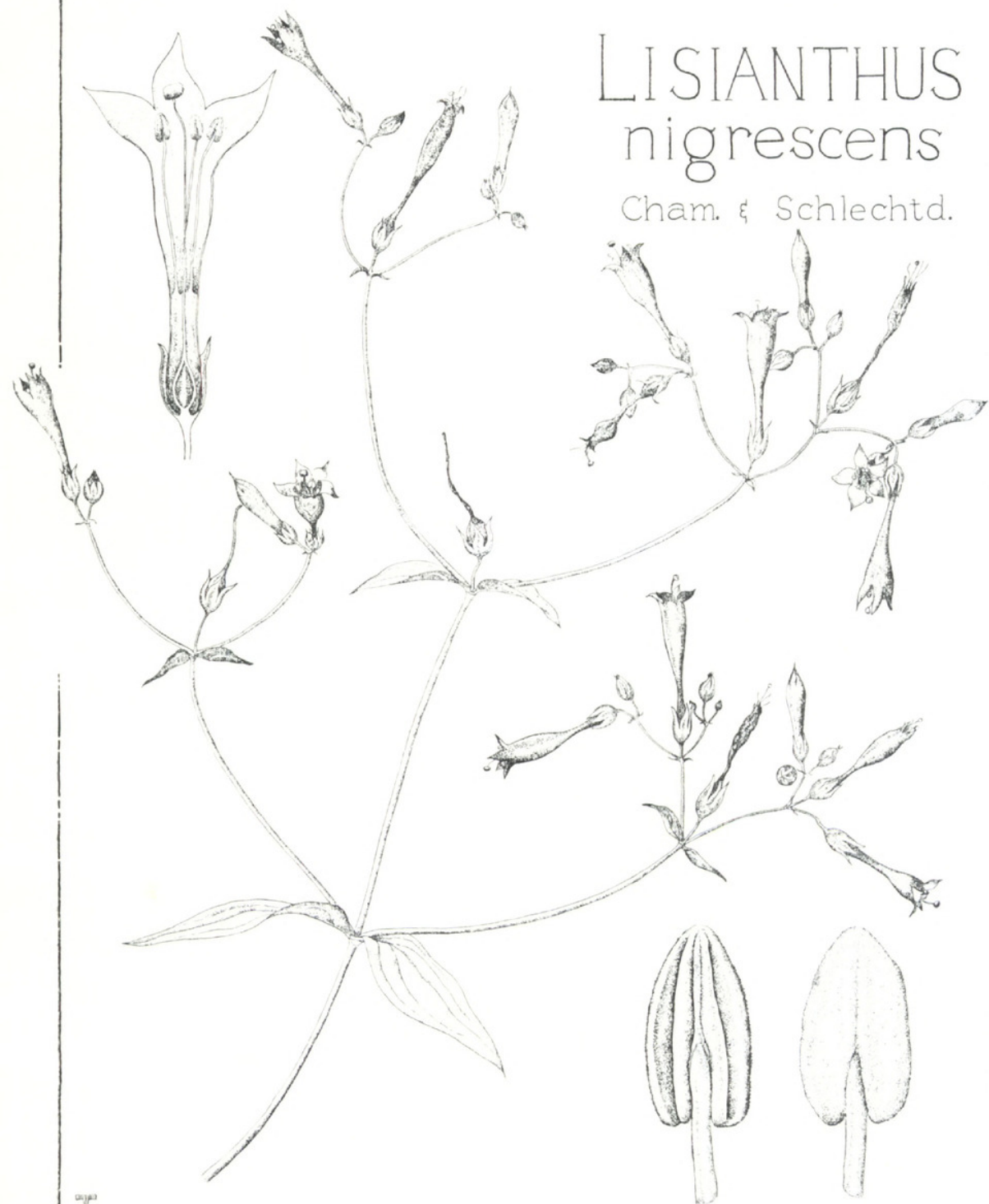
This striking, almost black-flowered herb occurs widely in northeastern Oaxaca, where it enjoys a variety of folk uses. Amongst the western Chinantecs, a decoction of the roots is employed to relieve indigestion and heartburn and as a febrifugal tonic. The neighbouring Mazatecs apparently utilize the plant medicinally only "contra el aire". The Mije Indians of Zacatepec apply a poultice of the leaves in the treatment of fungal infections of the skin of the feet, ankles and hands and value a decoction of the root as a bitter and febrifuge. Amongst the Zapotecs of Villa Alta and vicinity, the black, sticky flowers of this species are prepared in a wash employed to remove *pinolillos* (ticks) from the body, a use that is the basis of the Zapotec names *be-zia* and *o-zia* ("remedy against ticks").

*Lisianthus nigrescens* has apparently not hitherto been reported as a useful plant, although other species, known to possess the bitter properties characteristic of the Gentianaceae, find medicinal employment in various



LISIANTHUS  
nigrescens

Cham. & Schlechtd.



Habit, approximately  $\frac{1}{2} \times$ . Flower dissected, approximately natural size.  
Anthers, approximately  $10 \times$ .





parts of tropical America. The Brazilian *Lisianthus pendulus* Mart., for example, is valued as a bitter tonic and febrifuge; several other species are similarly used in French Guiana (Heckel, loc. cit., 57). The insectifugal properties of *Lisianthus nigrescens* seem not to have been recorded, and, in view of a similar use of a species of the closely allied genus *Chelonanthus* (see above), they would appear to be worth investigating.

In northeastern Oaxaca, this plant is known amongst the Chinantecs as *lee-the*. The Mazatecs of Huautla refer to it as *shka-tee-tso*. The Mije call it *yerk*.

#### GESNERIACEAE

##### **Nautilocalyx** sp.

COLOMBIA: Comisaría del Vaupés, Río Vaupés, savannah at base of Cerro de Mitú. September 27–October 20, 1966. *R.E.Schultes, R.F. Raffauf et D. Soejarto 24211*. "Flowers white. Terrestrial."

A spot test for alkaloids, given on fresh material in the field, was positive. This result is noteworthy in view of the fact that evidence of alkaloids in this family is almost wholly negative. An unknown alkaloid has been reported from the European *Ramondia pyreaica* Rich. Alkaloid spot tests made on several species of *Besleria* (*B. ignea* Fritsch: *Schultes, Raffauf et Soejarto 24053*) and *Alloplectus* (*A. semicordatus* P. et E.: *Schultes, Raffauf et Soejarto 24225*) from the Colombian Amazon were negative.

The collection *Schultes, Raffauf et Soejarto 24211* is sterile. It has been identified to genus by Dr. H. Emery Moore of the Bailey Hortorium.

#### RUBIACEAE

##### **Duroia** *L. fil.*

Although this genus has apparently not been recorded as toxic, the number of reports from natives affirming

the poisonous properties of the seeds of several species, all reports from widely separated localities, calls attention once again to the need for phytochemical studies guided by ethnobotanical observations.

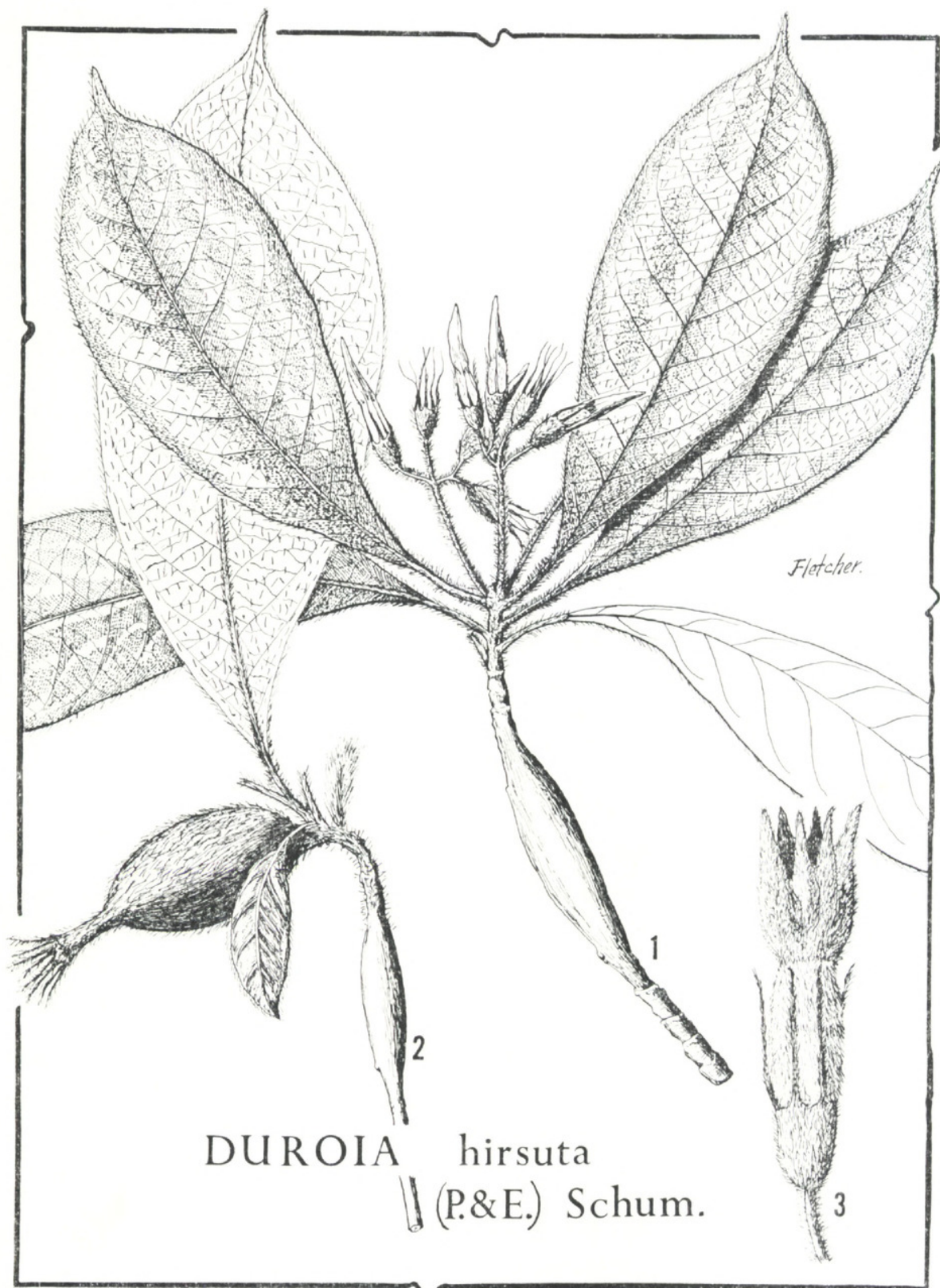
***Duroia hirsuta* (P. et E.) K. Schumann** in Martius Fl. Bras. 6, pt. 6 (1889) 367.

COLOMBIA: Departamento del Cauca, Puerto Limón, bosques en el lado caucano del Río Caquetá. Alt. 300 m. "Small tree. Bark, tied on arm, forms blisters, *Solimán*." February 28–29, 1942. *R.E. Schultes* 3320.—Comisaría del Putumayo, Río Sucumbíos, Conejo and vicinity. "Kofán = *sha-ka-ker-ná-sě*" April 2–5, 1942.—Comisaría del Amazonas, Río Caucaya, between Puerto Jaramillo and Río Putumayo. May 16, 1942. *R.E. Schultes* 3712.—Comisaría del Vaupés, Río Apaporis, near confluence of Ajaju and Macaya. *Solimán*. "January 1944. *G. Gutiérrez et R.E. Schultes* 612.—Intendencia del Meta, Sabanas de San Juan de Arama, margen izquierda del Río Gúejar, alrededores de aterrizaje Los Micos." Alt. about 500 m. "Arbolito de 3 m. de alto. Común en bosque." December 5–20, 1950. *J.M. Idrobo et R.E. Schultes* 594.

The type collection of *Duroia hirsuta* was made in Villavicencio, Colombia. *Idrobo et Schultes* 594, consequently, from near the town of Villavicencio, may be considered topotypical.

Amongst many Indians of the Colombian Amazon and Putumayo—especially the Kofán, Siona, Witoto and Tikuna—the caustic bark of this small tree is employed to make bluish black markings on arms and legs. Strips of the freshly removed, pliable bark are tied onto the arm or leg with the inner surface of the bark touching the skin. After several hours or half a day, it is removed. Blisters and a localized red swelling result in another two to three hours. When this condition disappears, a dark band persists and lasts for several weeks, even occasionally for several months. There have apparently been no chemical analyses directed towards a discovery of the caustic principle in *Duroia hirsuta*.





1 and 2, habit, approximately  $\frac{1}{2} \times$ . 3, flower, approximately  $1\frac{1}{4} \times$ .

This small tree, known throughout eastern Colombia as *solimán*, is believed by the Indians to "poison" other plants. It is found usually in colonies of up to twenty individuals in the forest, and invariably nothing grows underneath the tree, except perhaps *Selaginella* (see photograph, Plate XVIII, lower figure, in Bot. Mus. Leaf., Harvard Univ. 15 (1951)). The natives explain this curious ecological phenomenon of the absence of vegetation by saying that the roots of *Duroia hirsuta* "poison" the other plants. The real reason may be connected with the presence in *Duroia hirsuta* of swollen internodes which are always inhabited by ants.

***Duroia kotchubaeoides*** *Steyermark* in Mem. N. Y. Bot. Gard. 12 (1965) 201.

COLOMBIA: Comisaría del Vaupés, Río Guainía, Puerto Colombia (opposite Venezuelan town of Maroa) and vicinity. Alt. about 800-850 ft. "Small tree. Flowers white." October 31-November 2, 1952. *R. E. Schultes, R. E. D. Baker et I. Cabrera 18211*.

Amongst the inhabitants of the Río Guainía, the seeds of *Duroia kotchubaeoides* are held to be poisonous when eaten.

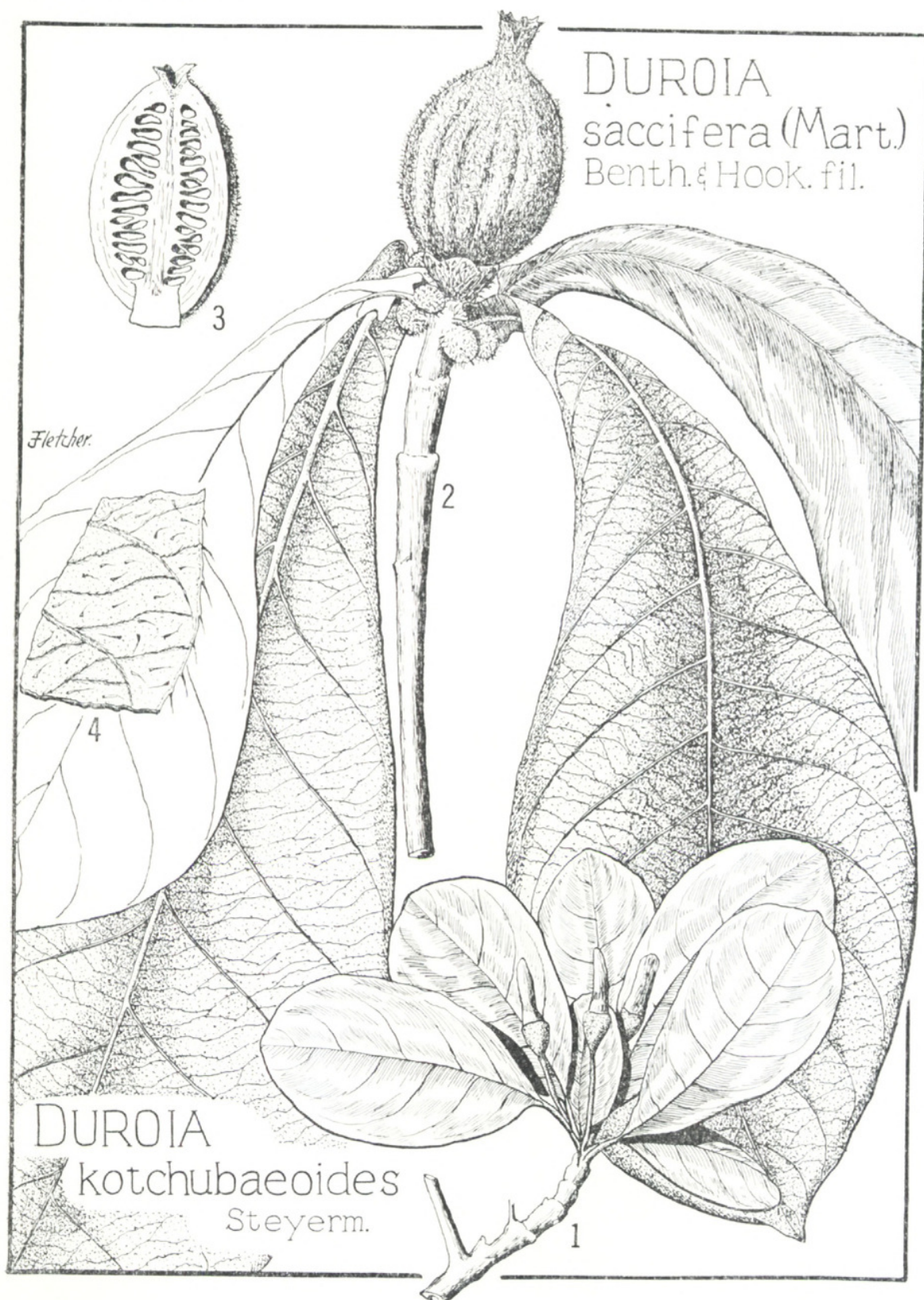
*Schultes, Baker et Cabrera 18211* is the type collection of this curious species. It is known only from one other collection made from the upper Orinoco in Venezuela. The species appears to be a restricted endemic.

***Duroia petiolaris*** (*Spr.*) *Hooker fil.* ex K. Schumann in Martius Fl. Bras. 6, pt. 6 (1889) 364.

COLOMBIA: Comisaría del Amazonas, Trapecio Amazónico, Río Loretoyacu. Alt. about 100 m. "Bush. Flowers white." October, 1945. *R. E. Schultes 6727*.—November 2, 1946. *G. A. Black et R. E. Schultes 46-295*.

The Tikuna Indians and the Brazilian rubber tappers of the Trapecio Amazónico assert that the seeds of this bush or small tree are extremely dangerous when eaten.





1 and 2, habit, approximately  $\frac{1}{2} \times$ . 3, fruit dissected, approximately  $\frac{1}{2} \times$ .  
4, section of leaf greatly enlarged.

***Duroia saccifera* (Mart.) Hooker fil.** ex K. Schumann in Martius Fl. Bras. 6, pt. 6 (1889) 362, t. 146, fig. 1.

COLOMBIA: Comisaría del Amazonas, Río Apaporis, Soratama and vicinity. "Tree 10 m. tall." March 26, 1952. *R.E. Schultes et I. Cabrera 16063*.

The natives in the middle course of the Río Apaporis state that the seeds of this small forest tree are toxic when ingested.

This collection extends the known range of *Duroia saccifera* into the Amazonian basin of Colombia; it has hitherto been known from Amazonian Brazil and the Río Guainía area of Venezuela.

***Duroia Sprucei* Rusby** Descr. New Sp. S. Am. Pl. (1920) 133.

COLOMBIA: Comisaría del Amazonas, Trapecio Amazónico, Río Loretoyacu. "Small tree. Flood bank." May, 1946. *R.E. Schultes 7127*. — Río Apaporis, Soratama, above mouth of Río Kananarí. June 18, 1951. *R.E. Schultes et I. Cabrera 12645*.

The seeds of this small tree have the reputation amongst the natives of the Río Apaporis of being poisonous to eat.

The type of *Duroia Sprucei* was collected in Venezuela. The collections cited above extend the known range of the species significantly southwestward.

### ***Psychotria* L.**

So far as the available chemical literature is concerned, there is little if any indication that the seeds and fruits of species of *Psychotria* would be toxic when ingested by man. Reports to this effect, however, are so frequent and are scattered over such a wide area that phytochemical studies based upon these ethnobotanical observations are justified.





DUROIA  
petiolaris  
Hook. fil.

1, habit, approximately  $\frac{1}{2} \times$ . 2, flower in bud, approximately  $3\frac{1}{2} \times$ . 3, flower opened, approximately  $3\frac{1}{2} \times$ .

***Psychotria carthaginensis* Jacquin** Enum. Pl. Carib. (1760) 16.

COLOMBIA: Comisaría del Amazonas, Río Apaporis, Raudal Yaya-copi (La Playa) and vicinity. Quartzite base. Alt. about 800 ft. "Bush. Flowers white." April 15, 1952. *R.E. Schultes et I. Cabrera 16203*.—"Bush. Fruit red. On rocks of bank. Makuna name *wy-soo-dö*." August 18, 1952. *Schultes et Cabrera 16890*.

The Makuna Indians assert that the fruits of this shrub, if eaten, cause a poisoning that results in several days of weakness, fevers, nausea and disturbed vision.

***Psychotria involucrata* Swartz** Prodr. Veg. Ind. Occ. (1788) 45.

COLOMBIA: Comisaría del Amazonas, Río Amazonas, Leticia and vicinity. September 1946. *R.E. Schultes 8231*.—Río Apaporis, Soratama, between Río Pacoa and Río Kananari. "Bush, Highland." August 20, 1946. *R.E. Schultes et I. Cabrera 13629*.

The Tikuna Indians of the Leticia region and the Makunas of the Río Apaporis both consider the fruits of *Psychotria involucrata* poisonous when ingested.

***Psychotria nudiceps* Standley** in Field Mus. Publ. Bot. 8 (1931) 378.

COLOMBIA: Comisaría del Amazonas, Trapecio Amazónico, Río Loretoyacu. October 1946. *R.E. Schultes 8408*.

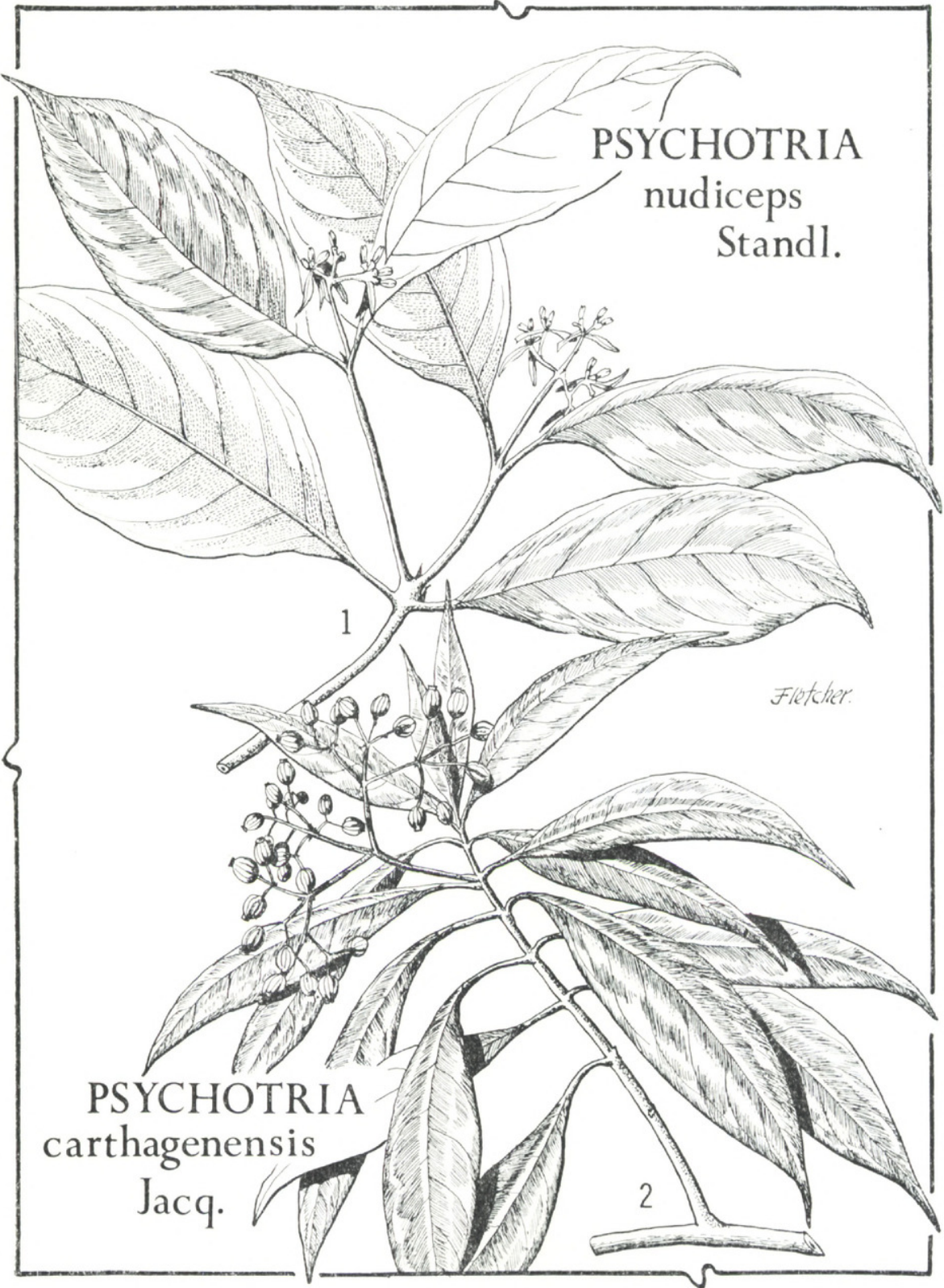
It is a commonly accepted belief amongst the rubber tappers in this part of Colombia and adjacent Peru and Brazil that the fruits of *Psychotria nudiceps* are toxic when eaten.

***Psychotria psychotriaefolia* (Seem.) Standley** in Contrib. U.S. Nat. Herb. 18 (1916) 133.

COLOMBIA: Comisaría del Putumayo, Mocoa and vicinity. "Leaves used with yajé." No date. *C. Naranjo s.n.*

ECUADOR: Provincia del Napo, Río Aguarico, Dureno. Alt. about 800 ft. "Area near river and flood region. Shrub leaves and fruit used in preparation of the yajé narcotic as an admixture with *Banisteriopsis*." Alt. 800 ft. May 29, 1966. *H.V. Pinkley 225; 235*.





PSYCHOTRIA  
nudiceps  
Standl.

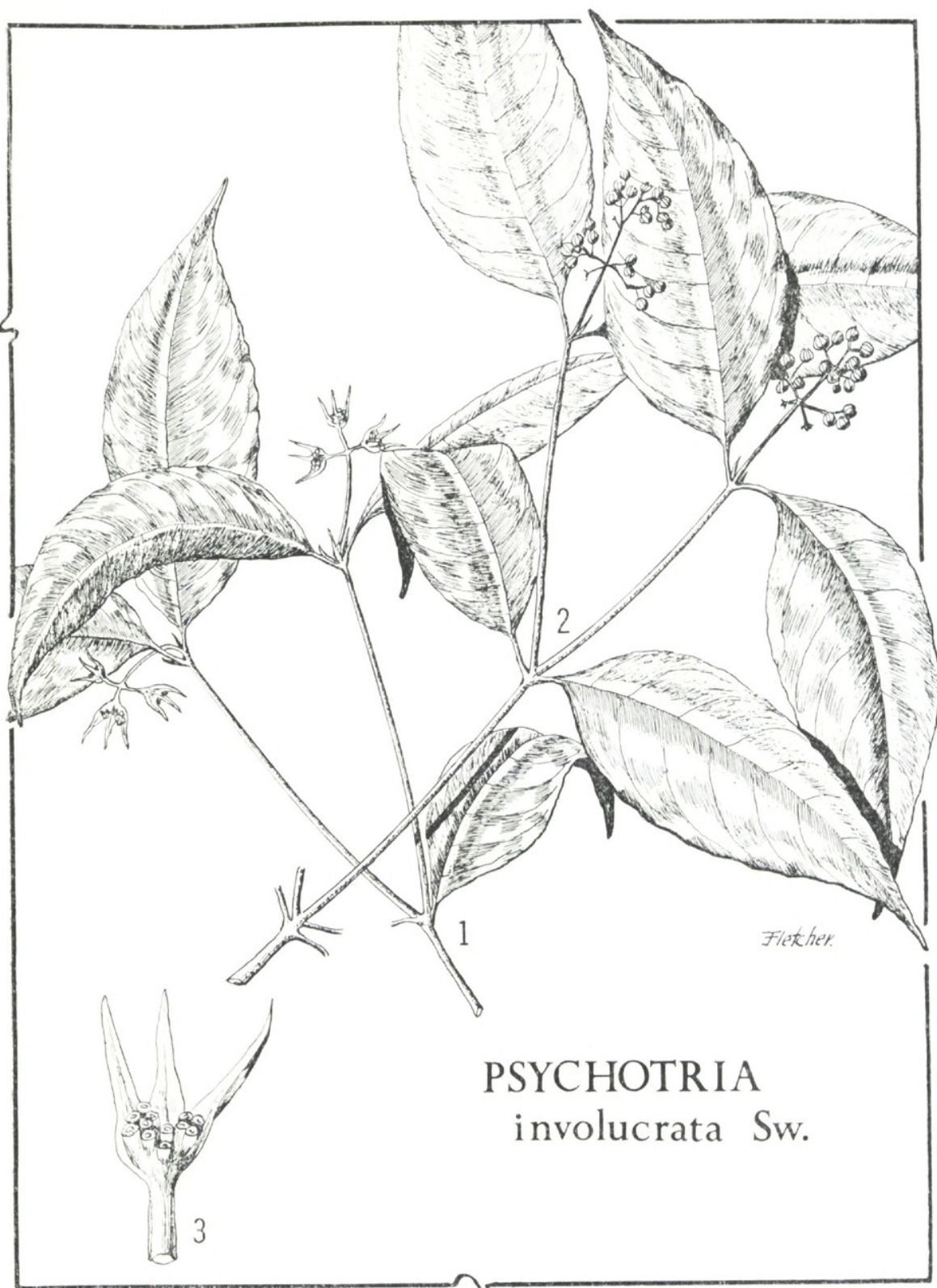
*Fletcher.*

PSYCHOTRIA  
carthagenensis  
Jacq.

1 and 2, habit, approximately  $\frac{1}{2} \times$ .







1 and 2, habit, approximately  $\frac{1}{2} \times$ . 3, dried inflorescence, approximately  $3\frac{1}{2} \times$ .





PSYCHOTRIA  
*psychotriaefolia*

(Seem.) Standl.



I.

Habit, approximately natural size. Flower, approximately 5 ×. Dissected corolla, approximately 5 ×. Fruit, approximately 4 ×. Cross section of fruit, approximately 4 $\frac{1}{4}$  ×.

The earliest report of the use of a *Psychotria* as an additive to "fortify" the hallucinogenic yajé drink prepared basically from *Banisteriopsis Caapi* or *B. inebrians* was made in 1967 (Schultes, R. E. in Efron (ed.) "Ethnopharmacologic search for psychoactive drugs" (1967) 51). At that time, the identification could be made only to genus. Now, as a result of the field work of Mr. Pinkley amongst the Kofán Indians, it is possible to assign the species with certainty to *Psychotria psychotriaefolia*. Pinkley has, furthermore, been able to determine the sterile collection *Naranjo s.n.* to this species.

In the morning, after one of the all-night yajé-sessions which he attended amongst the Kofáns, Pinkley found, in the dregs at the bottom of the clay pot which had held the narcotic drink, a sediment containing leaves of *Banisteriopsis* and small rubiaceous fruits. These dregs might not have attracted the notice of an untrained observer. Since, however, Pinkley was especially interested in the complexities of yajé-preparation, these specimens raised his curiosity and, pursuing the problem ethnobotanically, he established the fact that *Psychotria psychotriaefolia* is not an uncommonly used additive in this region.

The Kofáns call *Psychotria psychotriaefolia* by the name *o-pri-to*. One of Pinkley's interesting observations indicates that these Indians refer to the "heavenly people", with whom they commune during the yajé intoxication, by the same term *o-pri-to*. He further reports that Mr. M.B. Borman, a missionary-linguist studying the Kofán language, states in a letter that both *Banisteriopsis Rusbyana* and *Psychotria psychotriaefolia* are added to the yajé drink prepared from *B. Caapi* to "increase the visions and make them of longer duration".

These observations serve to emphasize long felt urgency for a thorough chemical study of *Psychotria* and very closely related genera, such as *Palicourea*.

The collections *Pinkley 225* and *235* were identified by Dr. John D. Dwyer of the Missouri Botanical Garden.





Schultes, Richard Evans. 1969. "De Plantis Toxicariis e Mundo Novo Tropicale Commentationes IV." *Botanical Museum leaflets, Harvard University* 22(4), 133–164. <https://doi.org/10.5962/p.295199>.

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