whereas, using the observed birthrates, we would find

$$b'L_o = 1.35$$

Thus Knibbs' figure gives at best, in this case, an estimate of the net fertility which is over 10 per cent too high.

In point of fact the omission of higher degree terms in (7) vitiates the figure 1.2 here obtained for R_o. The exact value of R_o is 1.168,[4] still further increasing the divergence from Knibbs' figure.

It should also be noted that Knibbs' measure of net fertility involves the existing age distribution, which, obviously, should not enter into an absolute measure of net fertility.

BOTANY.—*New plants from Central America.—V.*[1] PAUL C. STANDLEY, U. S. National Museum.

Except for two Cyperaceae, all the plants described as new in this paper are trees or shrubs. The most interesting are the three species of *Ilex* reported from Costa Rica, and two new members of the genus *Tetrathylacium*, of the family Flacourtiaceae, hitherto believed to consist of a single species. Besides the Central American plants, there is described a new *Vallesia* from southern Mexico.

Cyperus nubigenus Britt. & Standl., sp. nov.

Subgenus *Eucyperus*. Erect glabrous perennial, the culms 60–100 cm. high or taller, obtusely trigonous, smooth, stout, leafy below, the lowest sheaths without blades, purplish; leaf blades equaling the culms, 1–2 cm. wide, scabrous on the margins, many-nerved, with very numerous transverse nerves; umbel compound, the primary rays numerous, 4–12 cm. long, the secondary rays very numerous, 1–5 cm. long; bracts numerous, leaf-like, equaling the rays, 7–15 mm. wide, long-attentuate; spikelets few or numerous in dense glomerules at the ends of the smooth secondary rays, lance-oblong, about 1 cm. long, 3 mm. wide, persistent, strongly compressed; scales 8–11, oblong-ovate, acute or acuminate, oblique and rather lax, not closely appressed, deciduous (?), dull-vinaceous, the keel green; achene 1 mm. long, elliptic, trigonous, smooth, dull brownish; style branches 3, exserted.

Type in the U. S. National Herbarium, no. 1,152,733, collected on bank of small stream at Las Nubes, Province of San José, Costa Rica, altitude about 1900 meters, March 21, 1924, by Paul C. Standley (no. 38653). No. 38693, from Las Nubes, also belong to this species.

In aspect *C. nubigenus* is suggestive of *C. canus*, but it is conspicuously distinct from that and all other species known from Central America. It is a handsome, rather showy plant, frequent on grassy stream banks of the slopes of Irazú, about Las Nubes.

[4] See Journ. Amer. Statistical Association. *loc. cit.*

[1] Published by permission of the Secretary of the Smithsonian Institution. See this JOURNAL **15**: 457. 1925.

Rynchospora torresiana Britt. & Standl., sp. nov.

Plants erect, stout, forming large clumps, with thick, somewhat woody rhizomes; culms 1–2 m. high, multinodose; leaves elongate, very numerous, 9–13 mm. wide, pale green, glabrous, the margins scaberulous; spikelets sessile or nearly so, very numerous, in dense headlike cymes 2–2.5 cm. in diameter, the heads few, solitary on long, slender, axillary and terminal peduncles, rarely sessile, sometimes in clusters of 3 on the peduncle, the lateral heads then subsessile; bracts 1–3, elongate, resembling the leaves but narrower; spikelets 1 cm. long, with about 6 scales, these ovate, mucronate, firm, glabrous, pale greenish, often mottled with pale red-brown; bristles 4, usually slightly shorter than the achene, one of them sometimes slightly exceeding the achene, antrorse-scaberulous; achene obovoid-orbicular, plano-convex, rounded at apex, 2.5–3 mm. long, pale brownish, finely reticulate, the beak 4–5 mm. long, green, its base about one-third as broad as the achene.

Type in the U. S. National Herbarium, no. 1,152,725, collected in wet forest at El Muñeco, south of Navarro, Province of Cartago, Costa Rica, altitude about 1400 meters, Febr. 9, 1924, by Paul C. Standley (no. 33846). No. 33635, from the same locality, also represents the species.

This species is named for Prof. Rubén Torres Rojas, of Cartago, in whose company the specimens were collected. In its gross characters and general appearance the plant is very unlike any *Rynchospora* reported previously from Central America.

Neea orosiana Standl., sp. nov.

Shrub 1.5–2.5 m. high, the branches terete, pale, glabrous, or when young sparsely and minutely ferruginous-puberulent; leaves opposite, the petioles stout, 5–7 mm. long, glabrate; leaf blades mostly oblong-oblanceolate, sometimes oblong-obovate, 15–27 cm. long, 5.5–7.5 cm. wide, rather abruptly very long-acuminate, gradually narrowed from about the middle to the narrow obtuse base, thin, glabrous, the lateral nerves conspicuous beneath, about 10 on each side, arcuate, laxly and irregularly anastomosing near the margin; pistillate inflorescences axillary, few-flowered, cymose-paniculate or subracemose, the branches at first obscurely ferruginous-puberulent but soon glabrate, the peduncles in fruit 4–6.5 cm. long, the flowers on very short stout pedicels; fruit red, ellipsoid-oblong, 12 mm. long, 5 mm. thick, conspicuously striate.

Type in the U. S. National Herbarium, no. 1,228,760 collected in moist forest near Orosi, Province of Cartago, Costa Rica, March 30, 1924, by Paul C. Standley (no. 39738). No. 39801, from Orosi, is referable here.

Neea orosiana is related to *N. pittieri* Standl. and *N. psychotrioides* Donn. Smith, but in both those species the leaves normally are broadest at the middle, and in *N. psychotrioides* they are usually much smaller. The very short petioles and large fruit of *N. crosiana* also are noteworthy.

Hyperbaena smilacina Standl., sp. nov.

Slender woody vine, the branchlets terete, striate, glabrous; petioles slender, 3–4 cm. long, glaucescent; leaf blades subcoriaceous, ovate to rounded-ovate, 7.5–9 cm. long, 4.5–7 cm. wide, obtuse or rounded at apex and abruptly short-acuminate, at base broadly rounded or truncate or

somewhat concave, glabrous, 5 or 7-nerved at base, the lowest pair of nerves very close to the margin and almost confluent with it, the innermost pair of nerves arcuate and extending nearly to the apex; staminate panicles axillary, solitary, equaling or shorter than the petioles, many-flowered, the flowers partly sessile and partly pedicellate, the branches glabrous or nearly so, glaucescent; bractlets minutely hispidulous; sepals and petals glabrous.

Type in the U. S. National Herbarium, no. 1,206,159, collected at Arenal, Guanacaste, Costa Rica, altitude 600 meters, May 5, 1923, by Juvenal Valerio (no. 15).

In Diels' key to the species of *Hyperbaena*[2] this plant runs to *H. tonduzii* Diels, which also is a Costa Rican species, but a tree, and not at all closely related to this plant of Guanacaste. Sterile specimens collected by the writer (no. 36921) at La Colombiana, Province of Limón, Costa Rica, in March, 1924, are probably referable to *H. smilacina*.

In Mexico and Central America the family Menispermaceae (to which *Hyperbaena* belongs) is represented chiefly by the genus *Cissampelos*, *C. pareira* being one of the most abundant plants of the region. A few isolated species of other genera have been described, however, and the writer has material of several others, most of which are not in satisfactory condition for diagnosis. In several cases the generic position is uncertain and it will be necessary to await the collection of more complete material before the species may be described.

There are at hand sterile specimens of two Central American Menispermaceae which, with little doubt, are referable to the genus *Hyperbaena*. Although the description of new species from sterile specimens is not to be recommended, in the present instance it has been adopted as a means of calling attention to the plants involved, and for purposes of record. Excepting only *Cissampelos pareira*, it seems to be difficult in Central America to find plants of this family in flower, and it is probable that their flowering season is a very short one.

Hyperbaena panamensis Standl., sp. nov.

Slender woody vine, the branchlets slender, terete, green, thinly puberulent; petioles slender, 1–2.2 cm. long, terete, puberulent; leaf blades oblong-ovate or ovate, 8–13 cm. long, 4.5–6 cm. wide abruptly and shortly obtuse-acuminate, rounded or shallowly emarginate at base, subcoriaceous, somewhat lustrous, glabrous above, the costa impressed, the other nerves prominulous, beneath very sparsely and minutely puberulent, 5-nerved at base, the basal nerves slender and inconspicuous, remote from the margin at first but finally anastomosing with it, the inner pair of nerves very prominent, extending nearly to the apex, the few and irregular lateral nerves divergent from the costa nearly at right angles.

Type in the U. S. National Herbarium, no. 1,218,122, collected in moist forest near Gamboa, Canal Zone, Panama, Dec. 26, 1923, by Paul C. Standley (no. 28417).

[2] In Engl. Pflanzenreich IV. **94**: 199. 1910.

Hyperbaena panamensis resembles *H. smilacina*, but in that species the leaves are relatively much broader, and their venation different.

A sterile specimen collected by the writer (no. 39638) at Orosi, Province of Cartago, Costa Rica, is perhaps referable to *H. panamensis*, having the same pubescence and nearly, but not quite, similar leaves.

Hyperbaena guatemalensis Standl., sp. nov.

Tree 9 m. high, the branchlets striate, at first densely puberulent but soon glabrate; petioles stout, 1.5–2 cm. long, striate, puberulent; leaf blades oblong, 10–14 cm. long, 3.5–6 cm. wide, acute or acutish, obtuse or rounded and slightly unequal at base, thick-coriaceous, thinly and finely puberulent above or glabrate, slightly rough to the touch, the costa and lateral nerves prominent, beneath rather densely soft-pubescent, pinnate-nerved, the lateral nerves 6 or 7 on each side, arcuate, laxly and irregularly anastomosing near the margin.

Type in the U. S. National Herbarium, no. 1,080,620, collected at Barranquillo, Department of El Progreso, Guatemala, altitude 540 meters, March 15, 1920, by Wilson Popenoe (no. 965).

Perhaps related to *H. phanerophlebia* Standl., of Salvador, but in that species the leaves are glabrous, narrow at base, and with different venation. The vernacular name of *H. guatemalensis* is given as "bailador."

Capparis lankesteri Standl., sp. nov.

Small tree, glabrous throughout; petiole 10 cm. long, terete; leaf blade rounded-ovate, 30 cm. long, 21 cm. wide, broadly rounded at base, at apex rounded and abruptly short-acuminate, the tip 1.5 cm. long, thin, lustrous above, the lateral nerves 9 pairs, arcuate, anastomosing near the margin; pedicels 8–9 cm. long; sepals imbricate, broadly ovate, 4 mm. long, rounded at apex; petals oblong, about 2 cm. long and 8 mm. wide, rounded at apex, obtuse and sessile at base; stamens very numerous, 5 cm. long or more; ovary globose-ovoid, verrucose, much longer than the gynophore.

Type in the U. S. National Herbarium, no. 1,207,618, collected at sea level, along the Reventazón River, Costa Rica, in dense woodland, December, 1922, by C. H. Lankester (no. 697).

The flowers are said to be pink. Although known only from incomplete material, consisting of a leaf and detached flowers, this plant is evidently distinct from any species of *Capparis* known previously from Central America. It is related perhaps to *C. discolor* Donn. Smith, also of Costa Rica, which has linear-oblong leaves.

Lonchocarpus trifoliolatus Standl., sp. nov.

Branchlets terete, with numerous large pale lenticels, the young shoots densely pubescent with short spreading hairs; leaves 3-foliolate, the petiole 1.5–3.5 cm. long, the rachis 1–1.5 cm. long, densely pubescent; terminal leaflet broadly ovate or rounded-ovate, 9–14.5 cm. long, 7–9 cm. wide, acute or short-acuminate, rounded at base, densely velutinous-pubescent on both surfaces; lateral leaflets broadly ovate to orbicular-ovate, acute or subobtuse, 3.5–7 cm. long, racemes axillary, solitary, the rachis in fruit about 8 cm. long, densely pubescent, many-flowered flowers neary sessile, the calyx

turbinate-campanulate, 2.5 mm. long, minutely sericeous; legume 1-seeded, elliptic, the stipe about 7 mm. long, the body 4–4.5 cm. long and 2 cm. wide, glabrous or nearly so, glaucous, the valves very thin, thin on both margins but with a slender elevated nerve close to the dorsal margin, the apex of the pod obtuse or acute and short-beaked.

Type in the U. S. National Herbarium no. 1,208,138 collected in the Department of Chalatenango, El Salvador, in 1924, by Salvador Calderón (no. 2162).

Among the known Central American species this may be recognized readily by its trifoliolate leaves.

Lonchocarpus calderoni Standl., sp. nov.

Branchlets slender, terete, brown, furnished with numerous pale lenticels; petiole and rachis together 7–11 cm. long, slender, glabrous; leaflets usually 11, oblong or lance-oblong, 2–4 cm. long, 0.8–1.6 cm. wide, narrowed to the broad emarginate apex, the terminal leaflet acute at base, the lateral ones obtuse or acute and very unequal, obscurely puberulent above along the costa, beneath densely short-barbate at base of costa, elsewhere glabrous; racemes axillary, solitary, 7–15 cm. long, many-flowered, glabrous, the flowers partly solitary but mostly on 2-flowered peduncles, the peduncles about 3 mm. long, the pedicels equaling or shorter than the peduncles, glabrous; calyx broadly campanulate, 3–3.5 mm. long, glabrous, the margin minutely ciliolate, with very short, broad, remote teeth; standard 1 cm. long, sparsely and minutely sericeous outside near the base; ovary linear, the sides glabrous, the margins minutely appressed-pubescent.

Type in the U. S. National Herbarium, no. 1,169,951, collected on Cerro del Guayabal, El Salvador, January, 1924, by Salvador Calderón (no. 2022).

So far as I know, no species of *Ilex* has ever been reported from Central America. It was, therefore, with some surprise that I found trees of this genus frequent in the humid forest about La Estrella, Costa Rica, in March, 1924. Later, specimens of *Ilex* were collected at Las Nubes, and specimens taken earlier on La Carpintera also represent the genus, although their identity was not recognized at the time of collection. Study of these collections has revealed the fact that not one but three specimens are represented. It is remarkable that the genus was not discovered by some of the earlier collectors in Costa Rica.

Ilex lamprophylla Standl., sp. nov.

Shrub or tree 2–7.5 m. high, glabrous throughout; branchlets subterete, blackish when dry, bearing scattered large pale lenticels; petioles stout, 4–7 mm. long; stipules pale, trangular-subulate, 1 mm. long; leaves persistent the blades elliptic or rarely oblong-elliptic, broadest at the middle, 5–10 cm. long, 2.5–5 cm. wide, obtuse at base, acute at apex or abruptly short-acuminate, with obtuse tip, subcoriaceous, coarsely crenate or crenate-serrate nearly to the base, the crenations about 10 on each side, each with a short incurved mucro; upper surface of blades very lustrous, blackish when dry, the lower surface paler, the lateral nerves about 10 pairs, divergent at an angle of about 65°, straight, laxly anastomosing remote from the margin; pistillate flowers axillary, in fascicles of 3–8; pedicels stout, 6–10 mm. long,

the bractlets ovate-triangular, borne near the base of the pedicel; calyx 2.5 mm. broad, shallowly 4-lobate, the lobes broadly triangular, acutish, spreading, glabrous; fruit (immature?) green, lustrous, oval, 5 mm. long, 3.5 mm. thick, conspicuously costate; nutlets 4, 5–costate dorsally.

Type in the U. S. National Herbarium, no. 1,228,657, collected in wet forest at La Estrella, Province of Cartago, Costa Rica, March 27, 1924, by Paul C. Standley (no. 39440) The following collections also belong here: COSTA RICA: La Estrella, *Standley* 39297, 39367. Orosi, Province of Cartago, *Standley* 39666.

Ilex carpinterae Standl., sp. nov.

Tree 6 m. high with dense rounded crown, glabrous throughout, the branchlets subterete, pale brownish, the lenticels few and inconspicuous; stipules triangular-subulate, 1 mm. long, pale, persistent; petioles stout, 5–8 mm. long; leaves persistent, the blades oblong or elliptic-oblong, 3.5–6 cm. long, 1.5–2 cm. wide, acute or acutish at base, acute at apex, the tip obtuse, coriaceous, practically entire, but faint crenations indicated by remote minute mucros; blades dark green and slightly lustrous above, the nervation faint and inconspicuous, beneath paler, the lateral nerves 8 or 9 pairs, divergent at an angle of 60° or more, nearly straight, laxly anastomosing near the margin, the costa very stout and prominent; pistillate flowers axillary, in few-flowered fascicles; pedicels stout, 4–5 mm. long, the bractlets broadly triangular, borne near the base of the pedicel; calyx 2 mm. broad, shallowly 4-lobate, the lobes very broadly rounded, appressed; fruit (immature) ovoid-globose, 2.5 mm. long, lustrous.

Type in the U. S. National Herbarium, no. 1,226,682, collected in moist forest on Cerro de la Carpintera, Province of Cartago, Costa Rica, altitude about 1800 meters, February, 1924, by Paul C. Standley (no. 34491).

This may be only a form of *I. lamprophylla*, but it seems to differ sufficiently from that in its narrower subentire leaves, short pedicels, and rounded calyx lobes.

Ilex vulcanicola Standl., sp. nov.

Shrub about 1 m. high, the branchlets subterete, ochraceous, densely pubescent with minute spreading hairs; stipules triangular, pale, scarcely 0.5 mm. long; leaves persistent, the petioles stout, about 3 mm. long, puberulent; leaf blades broadly elliptic to nearly orbicular, 15–23 mm. long, 12–17 mm. wide, broadly cuneate at base, rounded or very obtuse at apex, coriaceous, remotely and shallowly crenate in the upper two-thirds, the teeth tipped with a minute incurved mucro; blades deep green and somewhat lustrous above, with priminulous venation, beneath paler, sparsely and minutely puberulent, especially on the costa, sparsely dark-punctate, the lateral nerves 4 or 5 pairs, divergent at an angle of about 45°, laxly anatomosing near the margin; pistillate pedicels in axillary fascicles of 2 or 3, 4–5 mm. long, sparsely and minutely pubescent or glabrous; calyx glabrous, 2 mm. broad, shallowly 4-lobed, the lobes obtuse; fruit sub-globose, 4 mm. in diameter, lustrous, glabrous; nutlets smooth.

Type in the U. S. National Herbarium, no. 1,228,373, collected in wet forest at Las Nubes, Province of San José, Costa Rica, March 21, 1924, by Paul C. Standley (no. 38729).

According to my notes, the shrub was epiphytic upon a tree, but this may be an error.

Sloanea faginea Standl., sp. nov.

Large tree, the branchlets terete, with scattered coarse lenticels, minutely tomentose; stipules early deciduous; petioles stout, 1.5–3.5 cm. long, minutely tomentose or glabrate; leaf blades obovate or elliptic-obovate, 12–21 cm. long, 7–12 cm. wide, narrowed to an obtuse base, at apex obtuse or rounded, subcoriaceous, with sinuate or subentire margins, sparsely and very minutely tomentose along the costa, elsewhere glabrous or nearly so, the lateral nerves about 10 pairs, slightly arcuate, divergent at an angle of about 50°, irregularly and indistinctly anastomosing close to the margin; flowers in axillary simple racemes, or the pedicels solitary, simple, and axillary, the racemes mostly 3 or 4-flowered, the rachis about 3 cm. long, the pedicels stout, 1.8–2.5 cm. long, finely tomentose; sepals about 7, linear-oblong, 4 mm. long; capsule globose-ovoid, 2.5 cm. long, the 4 valves hard and woody, densely covered with stiff spines, these 3.4 mm. long, stout, unequal, antrorse-scaberulous.

Type in the U. S. National Herbarium, no. 1,166,464, collected at Peralta, Costa Rica, in 1923 by H. E. Stork (no. 483). The following collections also are referable here:

Costa Rica: Peralta, *Stork* 481. EL Muñeco, south of Navarro, Province of Cartago, altitude 1400 m., *Standley* 33685.

Sterile material collected in British Honduras by H. C. Kluge (no. 6) in December, 1924, may represent the same species.

The only related species known from Costa Rica is *S. medusula* Schum. & Pittier, which has larger and more numerous flowers. From *S. faginea*, as well as from the two species described below, *S. medusula* is distinguished by its very large leaves, which are densely covered beneath with a fine pale tomentum.

Sloanea guapilensis Standl., sp. nov.

Tree 6 m. high, the branchlets slender, terete, thinly hirtellous; stipules linear-subulate, 3–4 mm. long, persistent; petioles slender, 1–2 cm. long hirtellous; leaf blades obovate-oblong, 12–17.5 cm. long, 4.5–6 cm. wide narrowed to the rounded base, acute or abruptly short-acuminate at apex irregularly and shallowly sinuate, especially toward the apex, thin, green above, glabrous or nearly so, beneath paler, sparsely hirtellous along the costa and principal nerves, elsewhere glabrous or nearly so; raceme axillary 2-flowered, the rachis 1.5 cm. long, the pedicels scarcely 1 cm. long; capsule about 2 cm. long, very densely setose, the setae slender, unequal, the longer 1.5–2 cm. long, densely antrorse-scaberulous.

Type in the U. S. National Herbarium, no. 1,227,904, collected in wet forest near Guápiles, Province of Limón, Costa Rica, altitude about 500 meters, March 12, 1924, by Paul C. Standley (no. 37352).

Easily distinguishable from *S. faginea* by the different pubescence, and by the long bristles of the fruits.

Sloanea macropoda Standl., sp. nov.

Medium-sized tree, the branchlets stout, finely and densely tomentose; stipules deciduous; petioles slender, terete, 9–11 cm. long, minutely brownish-tomentose; leaf blades oblong-elliptic, about 35 cm. long and 14 cm. wide, obtuse at base, short-acuminate at apex, thin, irregularly sinuate finely tomentose along the costa and lateral nerves, elsewhere glabrous or

nearly so; racemes axillary, solitary, 15–22 cm. long, several-flowered, maturing 1 or 2 fruits, the pedicels about 3 cm. long, tomentose; capsule globose-ovoid, 2.5 cm. long, densely covered with slender spines 2–2.5 cm. long, these stiff, sharp-pointed, minutely puberulent; capsule valves hard and woody, 2.5 mm. thick.

Type in the U. S. National Herbarium, no. 578466, collected in forests of Boca Culebra, Pacific coast of Costa Rica, altitude 50 meters, Jan. 21, 1898, by H. Pittier (no. 12168). Vernacular name, "abrojo."

This collection has been determined as *S. macrophylla* Spruce, but the latter, according to description, differs in several details. The fruit of *S. macropoda* is much like that of *S. guapilensis*, but the leaves are much larger, of different shape, and on longer petioles, while the pubescence is quite unlike in the two species.

The genus *Tetrathylacium* Poepp. & Endl. is a member of the family Flacourtiaceae. The original species, and the only one recognized heretofore, is *T. macrophyllum* Poepp. & Endl., of Peru. However, Seemann later described as the type of a new genus, *Edmonstonia*, another plant which has been recognized as congeneric with *Tetrathylacum*, and his species has been considered as synonymous with *T. macrophyllum*. Notes furnished by Mr. I. Hutchinson would indicate that Seemann's plant probably represents a distinct species, for which the proper name is the following:

Tetrathylacium pacificum (Seem.) Standl.

Edmonstonia pacifica Seem. Bot. Voy. Herald 98. *pl. 18*. 1853.

Edmonstonia pacifica was described in Seemann's "Flora of the Isthmus of Panama," and the type locality was given as "Cape Corrientes, Darién," but this locality is in Colombia. The genus *Tetrathylacium* has not been reported heretofore from Central America, but it is now possible to record the two species described below.

Tetrathylacium johanseni Standl.

Tree 6 to 30 m. high the branchlets brown, somewhat puberulent when young; stipules foliaceous, green, deciduous, 8-17 mm. long, lanceolate to oblong, somewhat falcate, conspicuously nerved; petioles 3–5 mm. long; leaf blades oblong or elliptic-oblong, 13–24 cm. long, 4–8 cm, wide, cuspidate acuminate (acumen often falcate), often somewhat narrowed toward the rounded or subcordate, slightly unequal base, subcoriaceous, lustrous, bright green, glabrous, remotely low-crenate or nearly entire, the venation prominent on both surfaces, the lateral (secondary) nerves 6–8 pairs, arcuate-ascending, gradually anastomosing with the margin, the tertiary nerves very numerous, divaricate at a right angle from the costa and oblique to the secondary nerves, finely reticulate; spikes subsessile, 3.5–4.5 cm. long, the rachis puberulent, very densely flowered, the flowers crowded, compressed by the crowding and 4 or 5-angled; corolla 2 mm. long, glabrous, not gibbous below; fruit (immature) obovoid-globose, 1 cm. long, glabrate, apiculate, many-seeded.

Type in the U. S. National Herbarium, no. 690299 collected near Gatún, Canal Zone, Panama, February 10, 1911, by E. A. Goldman (no. 1863). The following specimens also represent this species:

PANAMA: Río Indio de Gatún, Canal Zone, *Pittier* 2772. Mount Hope Cemetery, Canal Zone, *Standley* 28767. Río Tecumen, Province of Panama, *Standley* 29408. Canal Zone, July, 1923, *Johansen* 4. Puerto Obaldía, San Blas coast, *Pittier* 4300.

The species is named for Mr. Holger Johansen, Director of the Plant Introduction Garden at Summit, Canal Zone, to whom the writer is indebted for many favors while engaged in botanical work in Panama. Mr. Johansen's recently (February, 1925) published "Handbook of the Principal Trees and Shrubs of the Ancon and Balboa Districts" is the only publication ever issued devoted wholly to the plants of the Canal Zone.

Tetrathylacium johanseni is easily separable from *T. costaricense* and *T. pacificum* by the short, densely flowered spikes, which strongly resemble those of the genus *Piper*. The crowding of the flowers, resulting in a 4 or 5-angled corolla, does not occur in the other species. The flowers are quite as tightly packed as in *Piper* spikes, and give the same effect of a pavement or mosaic. The nervation of the leaves in *T. johanseni* is like that of *T. costaricense*.

Tetrathylacium costaricense Standl., sp. nov.

Large tree, the branchlets brownish, conspicuously lenticellate; petioles stout, 5–10 mm. long; leaf blades oblong, 18–28 cm. long, 5–8 cm. wide, abruptly acuminate, deeply cordate at base, subcoriaceous, glabrous, remotely and very obscurely crenate, the nervation prominent on both surfaces, the lateral (secondary) nerves 10–12 pairs, arcuate-ascending, gradually merging with the margin, the tertiary nerves numerous, nearly straight, divergent at a right angle from the costa and oblique to the secondary nerves, closely reticulate; spikes about 7 cm. long, much interrupted, the flowers remote, solitary or in clusters along the minutely puberulent rachis; corolla glabrous, 3 mm. broad, deeply 4-lobed, much broader than high.

Type in the U. S. National Herbarium, no. 579332, collected on plains of Currís, along the Río Diquís, Costa Rica, altitude 100 meters, March 4, 1898, by H. Pittier (no. 11968). The vernacular name is said to be "sapote."

This species is distinguished from *T. johanseni* by the interrupted spikes and 4-lobed, not compressed corollas. It is closely related to *T. pacificum* but, as indicated by Mr. I. Hutchinson (in letter of September, 1910) and in Seemann's plate of his new species, it differs in the venation of the leaves. In *T. pacificum* the lateral nerves anastomose at some distance from the margin to form an intramarginal nerve; also, the tertiary nerves are almost at right angles with the secondary ones, and not perpendicular to the costa. The dimensions given by Seemann for the leaves of the Colombian plant are much larger than in the Costa Rican specimen. Mr. Hutchinson states, further, that the leaf venation of *T. macrophyllum* is different from that of the Costa Rican tree.

Vallesia conzattii Standl., sp. nov.

Branchlets densely whitish-tomentose; petioles stout, 3–5 mm. long, tomentose; leaf blades narrowly lance-oblong, 7–9 cm. long, 2 cm. wide,

acute or acutish, at base rounded or truncate, above glabrous except along the costa, beneath densely tomentose; peduncles 10–18 mm. long, simple or bifid, tomentulose, the flowers numerous, umbellate, the pedicels about 4 mm. long, glabrous; calyx lobes 1 mm. long, glabrous, triangular-ovate, acutish; corolla glabrous, the tube 6 mm. long, strongly enlarged slightly above the middle over the anthers, the lobes narrowly oblong, obtuse, 4 mm. long; fruit narrowly obovoid, sessile, 1.5 cm. long, 6–7 mm. thick, rounded at apex.

Type in the U. S. National Herbarium, no. 1,208,306. collected at Tlacolula, Oaxaca, Mexico, altitude 1600 meters, June 11, 1925, by C. Conzatti (no. 4626). Collected also in the Valley of Oaxaca in 1918 by Blas P. Reko (no. 3945).

Vallesia conzattii is a very distinct species, differing from the three others known from Mexico in the dense tomentum of the leaves and branches.

Aegiphila valerii Standl., sp. nov.

Branchlets obtusely quadrangular, stout, covered with a pale-ochraceous tomentum of short appressed hairs, the leaf scars large and elevated; petioles about 1 cm. long, pubescent like the stems, the blades cuneate-obovate, 11–17 cm. long, 5–7.5 cm. wide, acute or short-acuminate, cuneately narrowed to the petiole, entire, green above and sparsely and minutely puberulent, beneath somewhat paler, rather densely covered with very minute, appressed hairs, the lateral nerves about 10 pairs; flowers in small dense short-pedunculate axillary cymes 1.5–2 cm. long, the whole inflorescence densely and minutely appressed-tomentose, the flowers sessile or short-pedicellate; calyx obconic, 4–5 mm. long, truncate, in age verruculose, subglobose and enclosing the fruit (5–6 mm. in diameter), with only small aperture at apex; corolla glabrous, the tube equaling the calyx, the 5 lobes oblong, 3 mm. long; fruit globose, 4 mm. in diameter.

Type in the U. S. National Herbarium, no. 1,206,252, collected at Tilarán Guanacaste, Costa Rica, altitude 750 meters, June 27, 1923, by Juvenal Valerio (no. 148).

Related to *A. anomala* Pittier, also of Costa Rica, in which the flowers and fruit are twice as large. The vernacular name of *A. valerii* is "tabaquillo."

ENTOMOLOGY.—*Three sawflies from Japan.* S. A. ROHWER. Bureau of Entomology.

The two new species of *Dolerus* described below are of some economic importance. The descriptions are published at this time so that the names will be available for use in a paper dealing with the habits and biology of these forms.

Dolerus hordei, new species.

Female.—Length 9 mm. Anterior margin of the clypeus with a broad, deep, U-shaped emargination, the lobes broad and roundly truncate; front coarsely punctato-reticulate; vertex shining, with large, distinct punctures, the punctures in the postocellar area being smaller; vertical furrows straight,