

of Minerals: *Fremontite* = *Natramblygonite* withdraws the name natramblygonite and substitutes for the mineral $\text{Na}(\text{AlOH})\text{PO}_4$ the name *fremontite*, after Fremont County, Colorado.

BOTANY.—*Acacia cornigera* and its allies. WILLIAM EDWIN SAFFORD, Bureau of Plant Industry.

In the course of a recent study of the myrmecophilous Acacias in the U. S. National Herbarium the author encountered a number of undescribed species, some of which differ fundamentally from any hitherto known. Much confusion was found also in the existing classification of these plants, due largely to the fact that, in describing species, the early authors had failed to designate definite types. Thus, under *Acacia cornigera* (*Mimosa cornigera* L.) several distinct species were cited by Willdenow as possible synonyms, a fact which was recognized by Schlechtendal and Chamisso in their study of certain specimens collected in Mexico by Schiede. But these authors in turn included under their *Acacia sphaerocephala* two, if not three species, one of which has recently been described by Dr. Heinrich Schenck, of Darmstadt, under the name *Acacia veracruzensis*. To make the confusion still greater, Bentham in his Revision of the Mimoseae,¹ "re-described" *Acacia sphaerocephala* and *A. spadicigera* but applied these names to species quite distinct from those so-called by Schlechtendal and Chamisso, while he dropped *Acacia cornigera*, a species distinct from both *A. sphaerocephala* and *A. spadicigera*, based upon a plant growing in the garden of George Clifford, a specimen of which exists in the Linnaean Herbarium (no. 4). The synonyms cited by Bentham are even more heterogeneous than those of Linnaeus.

The absence of flowers and fruits from the specimens of myrmecophilous Acacias described by the early botanists has been the chief cause of the mistakes of later authors. Fortunately the material in the U. S. National Herbarium includes specimens of fruits as well as of flowers of nearly all the species. The present writer recognized the fact that these fruits, which are of several distinct forms, offer a means of separating the species into a

¹ Trans. Linn. Soc. Lond. 30. 1875.

number of well defined natural groups. When it came to his notice that Dr. Schenck was also engaged in studying the myrmecophilous Acacias, the writer postponed the publication of his paper in deference to Dr. Schenck, from whom he received a most courteous acknowledgment.²

Dr. Schenck based his classification principally upon the venation of the leaflets and upon the general form of the inflorescence. In his material fruits of several species were lacking. On the receipt of photographs of further specimens of his newly established species, many of which included seed pods, Dr. Schenck realized the importance of using the latter as a basis for natural classification.³ As it has become necessary to defer the publication of the writer's monograph of the myrmecophilous Acacias, it is thought advisable to offer the present preliminary paper, in which a classification of the group is presented together with descriptions of nine new species.

KEY TO THE GROUPS

- Involucre situated near the base or at least below the middle of the peduncle; interfloral pedicelled bracteoles peltate; spines glabrous
 - Pericarp indehiscent, inflated, terminating in an acute spine-like beak. I. CERATOPHYSAE.
 - Pericarp dehiscent
 - Fruit a pod, opening by a dorsal and a ventral suture
 - Flowers in globose heads; pods sometimes very long and slender. . . II. GLOBULIFERAE.
 - Flowers in cylindrical spikes; pods short and relatively broad. III. LEGUMINIFERAE.
 - Fruit a follicle, opening by a single suture. IV. FOLLICULARES.
- Involucre situated at or above the middle of the peduncle, the latter pubescent or hirtellous; interfloral pedicelled bracteoles not peltate; spines puberulent when young. . . V. HEBACANTHAE.

² See H. Schenck, "Die myrmekophilen Acacia-Arten," Bot. Jahrb. Engler 50: 449-487. 1914.

³ "Die Beschaffenheit der Früchte dürfte vielleicht zur endgültigen Unterscheidung der Artengruppen der Ameisenakazien mindestens ebenso wichtige, vielleicht noch bessere Anhaltspunkte geben wie die Form der Inflorescenzen." Bot. Jahrb. Engler 50: 480. 1914.

GROUP I. CERATOPHYSAE⁴

Pericarp indehiscent, inflated, thin, fragile, terminating in a sharp spine-like beak. Nectar glands of the petiole and often of the lower rachis, elongated, crater-like, opening by a linear aperture with a raised (marginal) rim.

Section 1. *Spadicigerae* Schenck

Flowers in spadix-like cylindrical spikes, densely crowded on a fusiform receptacle; peduncles thickened, bearing a 4-parted calyx-like involucl near the base; minute interfloral pedicelled bracteoles with peltate, acuminate laminae, in form often resembling the leaf of an Arum. Midrib and upcurved lateral nerves of the leaflets usually conspicuous beneath.

1. *Acacia spadicigera* Schlecht. & Cham. *Linnaea* **5**: 595. 1830; not *Acacia spadicigera* Benth. *Trans. Linn. Soc. London* **30**³: 514. 1875.

Type in the Halle Herbarium, collected near La Laguna Verde, State of Veracruz, Mexico, in March, 1820, by Schiede (no. 685). Photograph and fragments of type in the U. S. National Herbarium.

2. *Acacia cubensis* Schenck, *Repert. Nov. Sp. Fedde* **12**: 360. 1913.—*Bot. Jahrb. Engler* **50**: 460. 1914.

Type in the West Indian Herbarium of Krug and Urban, Berlin, collected in northern Cuba, April 21, 1863, by C. Wright (no. 2402); specimens collected by C. Wright, bearing the same number, in the Grisebach Herbarium, Göttingen, and in the Gray Herbarium.

3. *Acacia Hernandezii* sp. nov.⁵ Closely related to *Acacia spadicigera* Schlecht. & Cham. and *A. nicoyensis* Schenck, but readily distinguished from the former by the subsessile flower spikes, scabrous before anthesis owing to the recurved points of the bracteoles; and from the latter by the color of the spines and the fewer nectar glands. Large spines of the vegetative branches resembling the horns of a bull, subterete, widely spreading or incurved, sometimes fascicled and interlocking as in *A. spadicigera*, but never polished, at first pale brown or olivaceous, in age chestnut-colored or, when dead, grayish brown, the largest 8 to 10 cm. long, 1.8 cm. broad at the base. Spikes borne on axillary flowering branches like those of *A. spadicigera*, often subsessile, solitary or geminate, subtended by small leaves, these with subulate stipular spines; peduncles puberulent, 2 to 5 mm. long, 3 mm. thick, with 4-toothed basal involucl like that of *A. spadicigera*. Flowers before anthesis covered by the laminae of the bracteoles, these lanceolate, very long-acuminate, peltate, scabrous on the upper surface, the margin bearing a fringe of minute straight hairs, the pedicels usually somewhat hirtellous with fine white diaphanous hairs visible under the microscope; apices of the

⁴ *Acaciae americanae cornigerae siliquis in spinam abeuntibus*. See Hermann, Paul. *Paradisi Batavi Prodomus*, p. 303. 1689.

⁵ The Huitzmamaxalli ("forked-thorn") of the Aztecs, described and figured in 1576 under the name *Arbor cornigera* by Francisco Hernández.

bracteoles recurved. Calyx broadly tubular, resembling that of *A. spadicigera*, ferruginous, the upper portion sparsely hirtellous; corolla barely exceeding the calyx, the aperture splitting at anthesis into 5 or 6 divisions. Fruit inflated, indehiscent, terminating in a slender sharp beak, narrowed at the base into a stipelike neck, glabrous, smooth, olive green when young, at length bright wine-colored. Seeds 12, in 2 series, broadly ovoid, compressed, embedded in a mass of sweetish pulp; testa hard, smooth, dark brown. Leaves closely resembling those of *A. spadicigera*, those of the vegetative branches with 7 to 12 pairs of pinnae; elongated nectar gland on the petiole crater-like, placed at the base of the basal pair of pinnae, sometimes with a smaller raised cylindrical gland below it, and rarely with a second, somewhat elongated gland at the base of the second pair of pinnae; leaflets 17 to 29 pairs, linear-oblong, unequal at the base, the midrib and upcurving lateral nerves conspicuous beneath, as in *A. spadicigera*. Leaves of the inflorescence smaller; pinnae 2 to 5 pairs, the petiole bearing 1 or 2 raised glands, a gland often present also at the base of the second pair of pinnae.

Type in the U. S. National Herbarium, no. 692170, collected in the vicinity of Rascon, State of San Luis Potosí, Mexico, July 19 to 22, 1905, by Dr. Edward Palmer (no. 669).

4. *Acacia furcella* sp. nov. Related to *Acacia spadicigera* and *A. Hernandezii*, but having polished black or dark brown, forklike spines with subcuneiform base and erect, slightly diverging or subparallel prongs, much abbreviated or suppressed flowering branchlets, and spikes crowded in clusters. Base of spines 12 to 16 mm. broad, the prongs terete, 50 to 60 mm. long, long-acuminate at the apex. Flowers densely crowded, resembling those of *A. spadicigera*, but more densely hirtellous. Spikes cylindrical 30 to 40 mm. long; receptacle (axis of spike) fusiform, 6 to 8 mm. thick when mature; peduncles 10 to 14 mm. long, 2 to 4 mm. thick; involucre basal, 4-toothed, similar to that of *A. spadicigera*. Calyx ferruginous, 1.4 mm. long, 0.6 mm. broad at anthesis, thickly covered with minute short straight projecting hairs; corolla 4 to 6-lobed, slightly longer than the calyx. Interfloral bracteoles brown, the laminae ovate-acuminate, peltate, sagittate at the base, scabrous above, edged with minute short straight marginal hairs. Fruit wanting. Leaves of vegetative branches not observed; those of flowering branches with 3 to 5 pairs of pinnae; rachis puberulent, 4 to 6.5 cm. long; nectar glands similar to those of *A. Hernandezii*; leaflets 13 to 24 pairs, 9 mm. long, 2 mm. broad, reddish brown when dry, the midrib and lateral nerves prominent beneath as in *A. spadicigera*.

Type in the U. S. National Herbarium, no. 692166, collected on the shore of Lake Catemaco, southern Veracruz, Mexico, at an elevation of 1000 feet, April 26, 1894, by E. W. Nelson (no. 427).

5. *Acacia nicoyensis* Schenck, Repert. Nov. Sp. Fedde 12: 360. 1913.—Bot. Jahrb. Engler 50: 463. 1914.

Type in the Berlin Herbarium, collected on the shore of the Gulf of Nicoya, Costa Rica, in February, 1900, by A. Tonduz (no. 13538); duplicate of type in the U. S. National Herbarium, no. 577752.

Section 2. Dolichocephalae

(Sphaerocephalae Schenck, in part)

Flowers in spheroid or oblong heads having a thick peduncle and ovoid or oblong receptacle; interfloral bracteoles with glabrous pedicels and ovoid, obtuse, usually ciliate laminae. Leaflets usually with only the midrib conspicuous beneath. Nectar glands of the petiole resembling those of the Spadicigerae.

6. *Acacia sphaerocephala* Schlecht. & Cham. *Linnaea* **5**: 594. 1830; not *Acacia sphaerocephala* Benth. *Trans. Linn. Soc. London* **30**³: 514. 1875.

Type in the Berlin Herbarium, collected at Actopan, State of Veracruz, Mexico, in March, 1820, by Schiede (no. 684), with flowers and leaves; photograph and fragments of the type in U. S. National Herbarium.

7. *Acacia cornigera* (L.) Willd. *Sp. Pl.* **4**: 1080. 1806 (excl. synonyms).

Type in the Linnaean Herbarium⁶ from a cultivated plant growing in the garden of George Clifford, between Haarlem and Leyden, Holland, collected by Linnaeus (no. 4) and bearing his label, "*Mimosa cornigera*."

8. *Acacia veracruzensis* Schenck, *Repert. Nov. Sp. Fedde* **12**: 362. 1913.—*Bot. Jahrb. Engler* **50**: 477. 1914.

Type in Herb. Mex. Schenck, collected on sand dunes south of the city of Veracruz, Mexico, October, 1908, by H. Schenck (no. 916); fragments of the type in the U. S. National Herbarium.

GROUP II. GLOBULIFERAE

(SPHAEROCEPHALAE Schenck, in part)

Pericarp dehiscent, coriaceous or woody, more or less compressed, sometimes very long and slender, opening by ventral and dorsal sutures. Flowers in long-peduncled globose heads, with spheroid receptacle.

Section 3. Ramulosae

Flower heads borne in the axils of small subulate stipular spines on special flowering branchlets.

9. *Acacia globulifera* sp. nov. Flowers in small globose heads not exceeding 5 mm. in diameter at anthesis, clustered in 2's or 3's on solitary axillary branchlets 4 to 6 cm. long; peduncles in each cluster graduated in length, the longest at anthesis about twice as long as the diameter of the head; receptacle spheroid or broadly ovoid, not sharply constricted

⁶The writer is indebted to Dr. Alfred Barton Rendle of the British Museum of Natural History for a photograph of the type of *Acacia cornigera* (L.) Willd. A careful comparison of this with photographs and portions of the types of *A. spadicigera* and *A. sphaerocephala* proves that Linnaeus's original plant is specifically distinct from both. It resembles an *Acacia* collected on the shore north of the city of Veracruz, January 24, 1906, by Dr. J. M. Greenman (no. 87), allied to *A. sphaerocephala* Schlecht. and Cham., but differing from that species in its extrafloral nectaries and in the shape of the flower heads.

at its union with the thickened upper extremity of the peduncle. Flowers about 2.2 mm. long when mature, funnel-shaped, the calyx with usually 5 shallow rounded lobes, glabrous near the base, puberulous about the margin; corolla about one-fourth longer than the calyx and distinctly separate from it, usually acutely 6-lobed, coarsely puberulent outside. Interfloral pedicelled bracteoles with orbicular peltate laminae. These subentire or the margin shallowly and obtusely toothed. Fruit not observed. Large spines ivory white or ecru, **V**-shaped or spreading like the horns of an ox, terete, 4 to 5 cm. long, 7 mm. broad at the base. Small spines of the flowering branchlets acicular or subulate, 7 mm. long. Vegetative leaves with 6 to 10 pairs of pinnae, the rachis 6 cm. long or less (in the type material), puberulent, bearing a row of 2 to 7 conoid nectar glands below the basal pair of pinnae, the glands having a porelike opening surrounded by a smooth, whitish, circular or elliptical, annular margin; pinnae 15 mm. long or less; leaflets of the longer pinnae 18 to 26 pairs, 3.5 mm. long, 0.8 mm. broad, drying dark green. Leaves of the flowering branchlets much smaller, with 2 to 4 porelike glands at the base of the rachis and occasionally a gland at the apex; pinnae 2 to 5 pairs, consisting of 6 to 12 pairs of leaflets.

Type in the herbarium of the Field Museum of Natural History, no. 58707, collected at the port of Silam (Tsilam), north coast of Yucatan, April, 1895, by Dr. G. F. Gaumer (no. 1909). A second specimen from the same locality is in the same museum, no. 36458, collected by Gaumer (no. 655), apparently at the same time and from the same plant. Photographs and fragments of the type are in the U. S. National Herbarium.

10. *Acacia Donnelliana* sp. nov. Closely related to the preceding, but easily distinguished by its dark-colored polished spines and much longer vegetative leaves. Flower heads globose, long-peduncled, borne in clusters on special flowering branchlets very much as in *A. globulifera*, but with relatively longer and more slender peduncles, the diameter of the heads at anthesis 8 mm., length of longest peduncles 20 mm. Flowers and interfloral bracteoles also much as in the latter species. Fruit not observed. Large spines **V**-shaped, terete, 40 mm. long, sharply acuminate, those of the type material blackish or dark mahogany-colored, polished. Small spines subtending the flower clusters acicular, much like those of *A. globulifera*, 5 to 7 mm. long. Vegetative leaves with 14 to 18 pairs of pinnae, these 42 to 52 mm. long, composed of 30 to 40 pairs of approximate leaflets; leaflets linear-oblong, very unequal at the truncate base, rounded or subacute at the apex, slightly curved, dark reddish or bronze when dry; leaf rachis 10 to 20 cm. long, puberulent, bearing at its base 4 conoid nectar glands, each opening by a small elliptical pore with a smooth reddish margin, and in addition to these a similar gland at the base of each pair of pinnules. Leaves of flowering branches with several pores at the base of the rachis and a pore at the base of each of the 6 to 15 pairs of pinnae; these leaves sometimes rudimentary or even lacking, in such cases the flower clusters subtended by a pair of small **V**-shaped acicular spines.

Type in the herbarium of Captain John Donnell Smith, collected at San Pedro de Sula, Department of Santa Bárbara, Honduras, alt. 600 feet, March, 1888, by Dr. Carl Thieme (no. 5216); photograph of type in U. S. National Herbarium.

Section 4. Glomeratae

Flower heads crowded in clusters in the axils of large forked or horn-like stipular spines. Basal nectar gland solitary, much elongate, sunk in the grooved rachis.

11. *Acacia Cookii* Safford, Science, N. S. **31**:677. 1910.

Type in the U. S. National Herbarium, collected at the Finca Trece Aguas, near Secanquím, Alta Verapaz, Guatemala, March 8, 1907, by G. P. Goll (no. 102), supplemented by specimens in alcohol from the same region, collected by O. F. Cook.

12. *Acacia bucerophora* B. L. Robinson, Proc. Am. Acad. **49**:502. 1913.

Type in the Gray Herbarium, collected in British Honduras, in 1907, by Prof. Morton E. Peck (no. 632). Photograph and fragments of the type are in the U. S. National Herbarium.

GROUP III. LEGUMINIFERAE

(SPICATAE Schenck)

Pericarp dehiscent along both the ventral and the dorsal sutures, coriaceous or woody, relatively short; seeds embedded in a mass of pulp-like aril. Flowers crowded in long spikes on a linear axis, this thicker than the peduncle. Extrafloral nectar glands beadlike, with a round central pore, often present on the rachises of the terminal pinnae as well as upon the petiole of the leaf, but not at the base of each pair of pinnae.

Section 5. Orthocarpae

Pods straight, abruptly pointed or obtuse, tumid or subterete; seeds alternate in 2 rows. Spines usually slender, straight or curved, slightly broadened and compressed at the base.

13. *Acacia yucatanensis* Schenck, Repert. Nov. Sp. Fedde **12**:361. 1913.—Bot. Jahrb. Engler **50**:468. 1914.

Type in the Berlin Herbarium, collected in the forest near Chichen Itza, Yucatan, in May, 1911, by Caec. and Ed. Seler (no. 5549 [470]).

14. *Acacia Collinsii* Safford, Science, N. S. **31**:677. 1910.

Type in U. S. National Herbarium, no. 692159, collected between Chicoasen and San Fernandino, State of Chiapas, southern Mexico, January 14, 1907, by G. N. Collins (no. 180).

Section 6. Acinaceae

Pods scimitar-shaped, or straight along the dorsal and curved along the ventral suture, the apex more or less retrocurved, usually compressed

laterally; seeds in a single row. Spines more or less flattened and broadened at the base, lunate or broadly subdeltoid.

15. *Acacia Nelsonii* sp. nov. Plant with leaves much like those of *A. Collinsii*, but easily distinguished from that species by its light-colored, broadly spreading, upcurved, more or less flattened stipular spines, these about 4 cm. long, 10 mm. broad at base, sometimes lunate or lyre-shaped, smooth, pale olivaceous to tan-colored or buff, with reddish brown tips, becoming gray or whitish when dead. Small spines on flowering branchlets 2 mm. long. Vegetative leaves with 4 to 8 pairs of pinnae; rachis 7 to 12 cm. long, without interpinnal nectar glands but with a row of 3 or 4 glands at the base; pinnae 4.5 to 5.5 cm. long, the leaflets 14 to 19 pairs, uniformly brown when dry, linear-oblong, 8 to 10 mm. long, 2.8 mm. broad, those bearing apical bodies at length retuse or truncate; rachis of pinnae sometimes with a minute solitary terminal gland at the base of the uppermost pair of leaflets. Leaves of flowering branchlets with 1 to 5 pairs of pinnae; rachis bearing at its base a row of 3 glands. Flower spikes 32 to 36 mm. long, including the peduncle, the latter 11 to 13 mm. long, about equal in thickness to the axis of the spike. Interfloral pedicelled bracteoles with orbicular peltate laminae, these imbricated over the flowers before anthesis like the scales of a fish, after anthesis their margins everted and concealed by the mass of anthers. Flowers tubular-funnelform, obovoid, or broadly subcylindrical; calyx 1.2 to 1.3 mm. high, subentire or obtusely 4 or 5-lobed; corolla one-fourth to one-third longer than the calyx, acutely 5 or 6-lobed, the divisions sometimes irregularly cleft; stamens very numerous, the filaments flesh-colored, the anthers straw-colored; style filiform. Legumes small, 2-valved, at length dehiscent by ventral and dorsal sutures, glabrous, dark brown or blackish, compressed, nearly straight along the dorsal suture, curved along the ventral suture, tapering at the base and slightly retrocurved at the apex. Seeds ovoid or elliptical, somewhat compressed but not flattened; testa hard, smooth, dark brown.

Type in the U. S. National Herbarium, no. 399366, collected at Aca-pulco, State of Guerrero, Mexico, April 30, 1903, by E. W. Nelson (no. 7024), with flowers and fruit. Cotype in the same herbarium, no. 692158, collected in the same locality, in 1895, by Dr. Edward Palmer (no. 390a), without flowers and with a single legume.

16. *Acacia costaricensis* Schenck, Repert. Nov. Sp. Fedde 12: 361. 1913.—Bot. Jahrb. Engler 50: 465. 1914.

Type in the Berlin Herbarium, collected near Lepanto, Costa Rica, in January, 1857, by Dr. Carl Hoffmann (no. 275), without fruit. Specimens collected by C. Wright in Nicaragua (U. S. North Pacific Explor. Exped. 1853-56), cited by Schenck as conspecific, are in the Grisebach Herbarium at Göttingen, the Gray Herbarium, and the U. S. National Herbarium (no. 692165), the last with broad flat pods terminating in a sharp retrocurved point.

17. *Acacia penonomensis* sp. nov. Closely related to *Acacia costaricensis*, but with falcate pods, spikes of pale yellow flowers borne on very

slender puberulent peduncles, and relatively broader and shorter leaflets with minute marginal hairs. Spikes before anthesis covered with the pale flesh-colored, scalelike, imbricated, suborbicular limbs of the pedicelled interfloral bracteoles, after anthesis bright lemon yellow from the mass of stamens, 23 to 26 mm. long, 4 to 5 mm. thick, the axis not exceeding in thickness the slender peduncle, this straight and rigid, about 8 mm. long and 0.5 mm. thick, pale brownish, clothed with white puberulence, and bearing a 4-toothed basal involucre, this puberulent outside. Flowers crowded; calyx flesh-colored, broadly ovoid or ellipsoid, inflated, 1.25 mm. high, 1 mm. broad, minutely puberulent about the margin, obscurely 6-lobed or subentire; corolla pale yellow, puberulent, 6-lobed, exceeding the calyx by about one-fourth its length; filaments and anthers pale yellow; style filiform. Legume 2-valved, dehiscent by both dorsal and ventral sutures, curved, compressed, 4.5 cm. long, 1 cm. broad, tapering at the base into a stipe like neck, terminating at the apex in a point. Seeds about 12, in a single row, embedded in a sulphur-yellow pulpy aril, broadly ovoid, 5 mm. long, 4 mm. broad, somewhat compressed into a thick oblique ovoid disk, the testa hard, smooth, glossy dark brown. Large stipular spines reddish brown, becoming blackish, broadly V-shaped or deltoid, 2.6 to 3.2 cm. long, 9 to 11 mm. broad at the base, this inflated and usually compressed, the apex abruptly acuminate and terminating in a very slender, fine point. Spines of the flowering branchlets minute, subulate. Vegetative leaves not observed. Leaves of the flowering branches sometimes rudimentary, the perfect ones composed of 1 to 6 pairs of pinnae; rachis pubescent, 3 to 4.5 cm. long, without interpinna glands, but with 1 to 3 contiguous pubescent porelike basal glands and usually a similar but smaller terminal gland on the pubescent rachises of the pinnae just beneath the last pair of leaflets, very much as in *A. Collinsii*. Leaflets oblong-obovate, fringed with short hairs.

Type in the Herbarium of the New York Botanical Garden; duplicate in U. S. National Herbarium, no. 677927, collected in the vicinity of Penonomé, Panama, February 23 to March 22, 1908, by R. S. Williams (no. 113).

GROUP IV. FOLLICULARES

Pericarp a follicle, dehiscing by a single suture; seeds in a single row. Leaf rachis with a beadlike nectar gland at the base of each pair of pinnae; nectar glands of the petiole 1 to several, or wanting.

Section 7. *Bursariae* Schenck

Large stipular spines of vegetative branches much flattened and very broad, their bases connate and pocket-like, often resembling an inverted bicornate chapeau. Flowers distinct, not closely crowded, forming a lax linear spike with a slender, often flexible rachis. Pods slender, falcate or curved, compressed, the seeds approximate, inclosed in a thin, whitish or brownish, feltlike aril.

18. *Acacia Hindsii* Benth. Lond. Journ. Bot. 1: 504. 1842.

Type in the Kew Herbarium, collected on the shore of Manzanillo Bay, State of Colima, Mexico, 1836-39, by Dr. Richard B. Hinds, Surgeon of H. M. S. *Sulphur* (no. 248).

19. *Acacia bursaria* Schenck, Repert. Nov. Sp. Fedde 12: 363. 1913. —Bot. Jahrb. Engler 50: 485. 1914.

Type in the Berlin Herbarium, collected near San Felipe, Guatemala, February, 1878, by Bernouilli and Cario (no. 1129).

20. *Acacia sinaloensis* sp. nov. Closely related to *A. Hindsii* Benth. and *A. bursaria* Schenck, but distinguished by its lighter-colored, broadly V-shaped or Y-shaped spines, these alternate, regularly disposed at intervals of 3 or 4 cm. along the slender, straight, terete, glabrous, reddish brown branches; length of spines 30 to 40 mm., breadth along the suture formed by the connate flattened bases 12 to 14 mm.; extremities terete, tapering into a very sharp point; color of spines usually olivaceous or yellowish green, turning brownish or buff-colored when old and dead. Vegetative leaves fernlike, elliptical or oblong in outline; main rachis grooved above, sparsely pubescent (under the microscope), bearing a raised porelike gland at the base of each pair of pinnae; base of the rachis (petiole) with 1 to 3 similar glands; pinnae 12 to 18 pairs, linear, approximate, their rachises 30 to 34 mm. long, sparsely pubescent; leaflets 5.2 mm. long, 1.4 mm. broad, thin and membranaceous when young, at length subcoriaceous, many of them bearing caducous amber-colored apical bodies, those without the latter acuminate at the apex, the margins of the leaflets bearing very short fine hairs (under the microscope) from the base to the apex, the base very oblique, the midrib conspicuous beneath, the lateral nerves scarcely visible even with the microscope. Leaves of the small axillary branchlets smaller, with fewer pairs of pinnae, these composed of fewer, relatively broader, more rounded leaflets, their rachises provided at the base with a pair of subulate stipular spines, usually without a basal nectar gland, but with one of these at the base of each pair of pinnae. Flowers wanting, but apparently borne in a lax spike. Fruit a falcate or retrocurved follicle dehiscing along the ventral suture, 11 mm. broad near the middle, acuminate at the apex, tapering at the base; seeds 8 to 10, in a single row, embedded in a yellowish white, thin aril, crowded and compressed, oblong or clavate, 8 or 9 mm. long, 4 mm. broad, 2 mm. thick, tapering toward the base into a rounded point, the testa dark brown, hard and polished, with an oblanceolate area enclosed by a raised line on each side.

Type in the U. S. National Herbarium, no. 636818, collected in the vicinity of Villa Unión, State of Sinaloa, Mexico, growing about a pond, April 2, 1910, by Rose, Standley, and Russell (no. 13972).

Section 8. *Leiocerates*

Large stipular spines of vegetative branches resembling polished subterete spreading horns, somewhat compressed at the connate bases. Smaller spines of the very short axillary branchlets subulate. Leaf

rachis pubescent, bearing a raised nectar gland at the base of each pair of pinnae but (in the type) none on the petiole. Pods of the same general form as in the preceding section but broader and thicker, the seeds enveloped in a thicker aril.

21. *Acacia tepicana* sp. nov. General outline of the bipinnate leaves narrowly oblanceolate or oblong, the pinnae short and the leaflets closely crowded. Rachis 6 to 8 cm. long, reddish brown, pubescent, bearing about 14 pairs of pinnae, with a pubescent beadlike or truncate conoid gland at the base of each pair of pinnae, but none at the base of the petiole; pinnae 10 to 18 mm. long, the shortest ones near the base; leaflets 9 to 17 pairs, very small, 4.5 to 6 mm. long, 1.5 mm. broad, oblong, unequal and truncate at the base, acute or short-acuminate at the apex, subcoriaceous, the midrib and lateral nerves inconspicuous, the margins contiguous or overlapping and bearing minute short straight hairs (as seen under the microscope); lowest leaflets much smaller, sometimes rudimentary, bearing a long tapering amber-colored waxlike apical body. Large connate stipular spines broadly V-shaped, subterete, somewhat compressed and broadened at the base, 27 mm. long, 8 or 9 mm. broad at the base, brown, the surface smooth and hornlike. Small spines of the abbreviated rudimentary axillary branchlets subulate, reddish brown. Spikes borne on very short axillary branchlets; peduncles (only those of mature fruiting specimens observed) 8 mm. long, bearing a basal involucl; axis of spike not exceeding the peduncle in thickness. Flowers not observed; interfloral bracteoles short-pedicelled, with a circular disklike peltate limb 1.2 mm. in diameter. Pericarp coriaceous, glabrous, without a definite dorsal suture but sometimes splitting down the back, brown and glabrous outside, reddish and feltlike on the inner surface, compressed, retrocurved, 13 mm. broad in the middle, narrowed at the base into a stipelike neck, long-acuminate at the apex. Seeds 10 to 12, in a single row, ovoid, slightly compressed, about 5.2 mm. long, 4.2 mm. broad, and 4 mm. thick, approximate, embedded in a yellowish white aril having the taste of dried apples; testa olivaceous, hard, smooth and glossy, bearing a raised oval ridge on each side.

Type in the U. S. National Herbarium, no. 637234, collected in the vicinity of Acaponeta, Territory of Tepic, western Mexico, April 10, 1910, by Rose, Standley, and Russell (no. 14357).

GROUP V. HEBACANTHAE

Involucl borne at or above the middle of the peduncle. Large spines puberulent when young, never becoming smooth or polished. Interfloral pedicelled bracteoles not peltate, but with an ovate or fan-shaped limb with a hairy margin.

Section 9. Clavigerae

Flowers crowded in club-shaped, cylindrical, or oblong spikes, covered before anthesis with the imbricated ovoid limbs of the pedicelled brac-

teoles. Peduncles long, straight, slender, puberulent or hirtellous, borne upon axillary flowering branches, solitary or clustered. Large stipular spines straight or nearly so, widespreading, at first puberulent, except at the smooth glossy reddish point, sometimes glabrate in age, but the surface dull and never polished.

22. *Acacia Standleyi* sp. nov. Flower spikes club-shaped, at anthesis, thicker at the apex than at the base, 18 to 22 mm. long, 7 to 8 mm. thick, pubescent before anthesis; peduncles in clusters of 2 to 5, the longest 27 mm. long at anthesis, minutely pubescent below the involucl, the latter 4-toothed, pubescent outside, situated at or above the middle of the peduncle; axis of spike slightly thicker than the peduncle. Flowers with pale yellowish brown or buff, broadly tubular, obtusely lobed calyx and tan-colored, acutely 6-lobed corolla, the latter exceeding the calyx by one-half its length; stamens very numerous, yellow; style filiform. Large spines pubescent at first, with glabrous reddish points, at length dull gray or blackish, 3 to 3.5 cm. long, 6 to 8 mm. broad at the base, very widely divergent, the pair separated by a thickened ridge (the persistent base of the petiole) adnate to the branch. Vegetative leaves with about 25 pairs of pinnae; main rachis pubescent above, about 10 cm. long, with 1 to 3 conspicuous glands at the base and a gland just below each of the 2 or 3 terminal pairs of pinnae, these glands usually with a smooth, light brown, annular margin; pinnae about 2.5 cm. long, those of a pair sometimes not quite opposite; rachis of pinnae pubescent above; leaflets about 30 pairs, approximate, relatively thick and coriaceous, scarcely showing the venation even under the microscope, oblong-linear, 3.2 mm. long, 0.8 mm. broad, unequal at the base, rounded at the apex, sometimes mucronulate or tipped with an apical body, the margin at first bearing a fringe of minute hairs, at length glabrate. Leaves of the axillary flowering branches with 4 to 8 pairs of pinnae composed of 12 to 16 pairs of leaflets, these 2 mm. long, 0.6 mm. broad, when young fringed with hairs, many of them tipped with apical bodies; main rachis bearing a conspicuous annular nectar gland at the base of each pair of pinnae and usually one on the petiole, just below the lowest of these; stipular spines subulate, 4 mm. long.

Type in the U. S. National Herbarium, no. 637251, collected in the vicinity of Acaponeta, Territory of Tepic, western Mexico, April 11, 1910, by Rose, Standley, and Russell (no. 14374).

23. *Acacia hirtipes* sp. nov. Flower spikes oblong or cylindrical, 11 to 15 mm. long, 6 mm. thick, covered before anthesis by the tomentulose laminae of the bracteoles; peduncles densely hirtellous, in clusters of 2 or 3, 14 to 20 mm. long; involucl 4-toothed, hirtellous, situated above the middle of the peduncle; axis scarcely thicker than the peduncle. Flowers with reddish brown or tan-colored calyx resembling that of *A. Standleyi* but narrower at the base and pubescent about the shallowly lobed margin; corolla dark purple or blackish, exceeding the calyx by one-half or three-fourths its length, pubescent with whitish hairs around the 5- or 6-lobed margin; filaments reddish brown; anthers pale tan-

colored; interfloral bracteoles tomentose on the upper surface. Fruit not observed. Largest stipular spines broadly **V**-shaped, cinereous, puberulent except at the points, 3 to 4.2 cm. long, 10 mm. broad at the cuneate base, the latter flattened but not adnate to the branch as in *A. Standleyi*. Spines of the flowering branches subulate, 3 to 6 mm. long, when young strigose except at the polished red tips. Vegetative leaves not observed. Leaves of the flowering branches with 5 to 12 pairs of pinnae composed of 9 to 18 pairs of leaflets, these 2.4 mm. long, 0.8 mm. broad, similar in shape to those of *A. Standleyi* but with a persistent marginal fringe of stiff short straight hairs; rachis persistently and densely hirtellous, clothed with minute stiff whitish hairs; nectar glands dark purplish, circular, bowl-shaped, with a thick annular magin, one in the smaller leaves of the short branchlets one borne at the base of each pair of pinnae and an additional one on the petiole; on the larger leaves of the longer branches similar glands borne at the base of each pair of pinnae of the upper half of the leaf, but none in the lower half except a solitary gland on the petiole.

Type in the U. S. National Herbarium, no. 694036, collected on the Río de las Cañas, Department of Santa Rosa, Guatemala, altitude 3000 feet, April, 1892, by Heyde and Lux (no. 3299, in part; mixed with specimens of *A. bursaria*) under the name of "*A. spadigera*."

Acacia hirtipes is a shrub with densely cinereous-hirtellous young growth, closely related to *A. Standleyi* but easily distinguished by the dark purplish corolla, the more densely hirtellous indument of the peduncles and leaf rachis, and the persistent marginal hairs of the leaflets.



Safford, William Edwin. 1914. "Acacia cornigera and its allies." *Journal of the Washington Academy of Sciences* 4, 356–368.

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