

ANOTHER CENTURY OF ADDITIONS TO THE FLORA OF VIRGINIA

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(Continued from page 553)

HYDRANGEA ARBORESCENS L. In southeastern Virginia two strikingly different extremes of the species occur: typical *H. arborescens*, with the principal leaf-blades broadly ovate to suborbicular, cordate to broadly rounded at base, the better developed ones two-thirds as broad to as broad as long (8–15 cm. broad); and var. *OBLONGA* Torr. & Gray, with the principal leaf-blades gradually rounded to tapering at base, narrowly ovate to lance-elliptic or -oblong, the better developed ones one-third to two-thirds as broad as long (3–8 cm. broad). The original Clayton material was of the first variety. The specimens before me (besides a tracing of the Clayton type) show typical *H. arborescens* in southeastern Virginia only from the calcareous area of the James River bluffs and ravines; var. *oblonga* more widely dispersed.

H. ARBORESCENS L. (typical). **SURRY COUNTY:** rich wooded gullies along James River, below Sunken Meadow Beach, nos. 8285 and 13,034. **ISLE OF WIGHT COUNTY:** seeping argillaceous and calcareous bluffs along Burwell's Bay, James River, below Rushmere (Fergusson's Wharf), nos. 12,662 and 13,032; similar habitat, west of Fort Boykin, no. 13,033. **Forma GRANDIFLORA** Rehder, with all the flowers sterile and showy, is cultivated; collected on rubbish near Emporia, no. 6601. See p. 523.

H. ARBORESCENS L., var. *OBLONGA* Torr. and Gray. **SURRY COUNTY:** rich woods on fossiliferous sandy slopes of gullies near Claremont Wharf, no. 7863; rich calcareous woods at head of Sunken Meadow Creek, south of Claremont, no. 8284. **ISLE OF WIGHT COUNTY:** seeping calcareous bluffs along Burwell's Bay, James River, below Rushmere (Fergusson's Wharf), no. 13,035; similar habitat, west of Fort Boykin, no. 13,036. **YORK COUNTY:** rich wooded ravine by York River, above Yorktown, nos. 12,093 and 12,094. **SOUTHAMPTON COUNTY:** rich wooded ravine by Nottoway River, near Davis School, northwest of Courtland, no. 11,697. **MIDDLESEX COUNTY:** wooded slope by Rappahannock River, Bay Port, no. 13,348.

AMELANCHIER IN SOUTHEASTERN VIRGINIA (PLATE 672).—In late March and early April *Amelanchier* is fully flowering in

southeastern Virginia; and the rather scanty or too often blasted fruits are mature in May or June. Three species are tall fastigiate shrubs from 1.5–5 m. high, one of these often becoming a fine tree up to 10 (or even 13) m. high; the fourth species is a low colonial shrub, spreading by stolons and forming loose colonies with flowering or fruiting stems only 0.2–1 m. high, suggesting but quite distinct from the northern *A. stolonifera* Wiegand. All four are readily matched with types or isotypes of species already described, but in at least two cases the types of Linnaeus and of Michaux have been so misinterpreted by recent students of the genus that it is necessary to start at the beginning!

Mespilus canadensis L. Sp. Pl. i. 478 (1753) was published with unusual lack of involving references, merely the plant of Linnaeus's herbarium described, with a single reference to a description of Gronovius. The original treatment follows:

canadensis. 5. MESPILUS inermis, foliis ovato-oblongis
glabris serratis, caule inermi.
Mespilus inermis, foliis subtus glabris
obverse-ovatis. Gron. virg. 54.
Habitat in Virginia, Canada. ♀

The late Dr. B. Daydon Jackson has indicated that Linnaeus had material of this species in his herbarium during the preparation of the first edition of *Species Plantarum*. That, therefore, is the type material; and Mr. Savage sent me some years ago photographs of these 3 sheets of *M. canadensis* which Linnaeus had prior to 1753: two sheets not marked by Linnaeus but conspecific with sheet no. 19, clearly marked by Linnaeus "5 K *canadensis*", i. e. species no. 5, collected by Kalm. This, the TYPE (because bearing the specific name in Linnaeus's hand and, as shown in the photograph, "foliis ovato-oblongis"), is here reproduced as PLATE 672, FIG. 1. That it is very characteristic *Amelanchier oblongifolia* (T. & G.) Roemer, based on *A. canadensis*, var. *oblongifolia* T. & G., can hardly be doubted, a conclusion independently reached by Mr. C. A. Weatherby when he looked up the material in the Linnean Herbarium. It is, therefore, unfortunate that, when he so clearly differentiated our species of *Amelanchier* and thus gave study of the genus a new

and stimulating interest, Wiegand¹ seems to have misunderstood the basis of *A. canadensis*. He had had a comparison made by a botanist not familiar with the eastern species and he then used the Linnean name for the largest member of the genus, the large shrub or tree with cordate, ovate or broadly ovate-oblong, sharply serrate leaves which, like those of true *A. canadensis* (*A. oblongifolia*), are pubescent beneath on unfolding, losing most of their pubescence with age. The latter tree has often been called *A. Botryapium* (L. f.) Borkh.; but this combination rests directly on *Pyrus Botryapium* L. f. Suppl. 255 (1781), which was based upon the *Mespilus canadensis* of Murray's ed. 13 of L. Syst. Veg. (1774). Murray altered the original Linnean account and omitted the Gronovian citation and, as in case of the other species, also the geographic source. Murray's alteration resulted in the following, under *Mespilus*:

canaden- 5 M. inermis, fol. ovato-oblongis glabris
sis. serratis acutiusculis. *Tenera lanata*;
adultior nuda. Racemi elongati.

The diagnosis of Linnaeus filius of his *Pyrus Botryapium* was compounded from the description by his father and that of Murray of *Mespilus canadensis*:

Botrya- PYRUS inermis, foliis ovato-oblongis serratis acu-
pium. tis, racemis simplicibus elongatis.
Mespilus canadensis. *Syst. veg. ed. 13. p. 388.*
Habitat in Virginia, Canada. *Ehrhart.* ♀

Mr. Savage sent me photographs of all the specimens in the Linnean Herbarium which were placed by Linnaeus and his later editors under *Mespilus canadensis*. These all belong to *M. canadensis* as above typified. I can see, therefore, no probability that, when Murray redescribed *M. canadensis*, he was defining a different species nor that the younger Linnaeus, under the name *Pyrus Botryapium*, was defining a species different from that originally diagnosed by his father. Neither Murray nor Linnaeus filius otherwise disposed of the original *Mespilus canadensis* of 1753. The fact that in the Supplement the latter did not cite *M. canadensis* as starting with Species

¹ Wiegand, *The Genus Amelanchier in eastern North America*, RHODORA, xiv. 117-161, plates 95 and 96 (1912).

Plantarum (1753) is of no significance, for it was his regular practice to cite the species there as starting not from Sp. Pl. but from the latest treatments: *Mespilus Amelanchier* from Syst. Veg. ed. 13, not Sp. Pl. ed. 1; *M. arbutifolia* from Syst. Nat. ed. 13, not Sp. Pl. ed. 1; etc., etc. The younger Linnaeus gave in addition to the brief diagnosis a somewhat detailed description of *Pyrus Botryapium*, but this is wholly consistent with sheet no. 21 in the Linnean Herbarium, also Kalm material, this in flower, of true *Mespilus canadensis*: a branch with unfolding white-felted leaves, racemes with lanate hypanthium, ascending calyx-lobes and relatively short petals (perfectly characteristic *Amelanchier oblongifolia*).

Under "*A. canadensis*" of his treatment Wiegand cites numerous synonyms besides *Pyrus Botryapium* and its resultant combinations. The first two are cited with doubt, and this doubt must still continue. The first is *Crataegus racemosus* Lam. Encyc. i. 84 (1783). Lamarck's account was very sketchy and he thought that the shrub cultivated in the Jardin du Roi might be *Mespilus canadensis*. It was a branching shrub 6–10 feet high, with oval-oblong, acute, dentate leaves white-felted beneath when unfolding but becoming glabrate. This account is too like that of *Mespilus canadensis*, then cultivated in European gardens; furthermore, Professor Humbert and M. Metman have been unable to locate any specimen of it preserved by Lamarck. In fact, they have informed me that apparently no herbarium specimens were preserved of many species described from living plants in the Jardin du Roi. It is, therefore, wholly unsafe to identify the large shrub and tree with cordate-ovate leaves, which Wiegand treats as *A. canadensis*, with *Crataegus racemosus* Lam. Similarly, *Mespilus nivea* Marsh. Arbust. 90 (1785) is altogether too vague, unless an original specimen of it can eventually be discovered. Its transfer into *Amelanchier* would merely lead to the doubt which surrounds so many names unfortunately taken up from Marshall's inadequate and often merely impressionistic accounts. *Crataegus amoena* Salisb. was illegitimate, merely a substitute for *Mespilus canadensis* L.

The first clear account of the tree or large shrub called by Wiegand *Amelanchier canadensis* was that of *Mespilus canadensis*

sis, var. *β. cordata* Michx. Fl. Bor.-Am. i. 291 (1803). Michaux divided *M. canadensis* into four varieties: Var. *α. obovalis*, the dwarf stoloniferous shrub of the Coastal Plain from Georgia to southeastern Virginia; var. "*β. cordata*: arborea: foliis cordato-ovalibus, conspicue acuminatis . . . a Canada ad Virginiam et in montibus Carolinae"; var. *γ. rotundifolia*: arborescens, etc. "in Canada"; and var. *δ. oligocarpa*: "in America boreali". In 1810, the younger Michaux, evidently taking the name from his father's first word of diagnosis, elevated *M. canadensis*, var. *cordata* to specific rank as *M. arborea* Michx. f. Hist. Arb. Am. Sept. iii. 68, t. 11 (1810). The beautiful plate, with cordate-oval serrate and acuminate leaves, flowers with long petals, and fruits with short and tightly reflexed calyx-lobes, is conclusive; so are the diagnosis, emphasizing the characters, "*foliis sub-ovalibus, acutissime serratis, subacuminatis; adultis glabris*", and the fuller account of its attaining in favorable situations "une élévation plus grande, mais qui cependant n'excède pas 35 à 40 pieds (11 à 13 mètres) sur 10 à 12 pouces (26 à 32 centim.) de diamètre" and "Les feuilles . . . dans le commencement de leur développement, couvertes d'une duvet argentin, très-épais, mais qui disparaît à mesure qu'elles deviennent plus grandes." Here, then, is the first perfectly clear name for *Amelanchier canadensis* sensu Wiegand. Most unfortunately the combination based upon the very appropriate name, *Mespilus arborea*, has to be here made.

AMELANCHIER **arborea** (Michx. f.), comb. nov. *Mespilus arborea* Michx. f. Hist. Arb. Am. Sept. iii. 68, t. 11 (1810). *Mespilus canadensis* L., var. *β. cordata* Michx. Fl. Bor.-Am. i. 291 (1803). *A. canadensis* sensu Wiegand in RHODORA, xiv. 150, pl. 96, fig. 6 (1912), not *Mespilus canadensis* L., basynym. A portion of the original plate of *M. arborea* is reproduced as our PLATE 672, FIG. 2.

In southeastern Virginia the expanding flowers of *Amelanchier arborea* are commonly suffused with pink, especially on the lower faces of the petals; farther north the petals are more definitely white.¹ Except for this color I can find no other difference.

The third species in southeastern Virginia with fastigiate shrubby habit is near *Amelanchier canadensis* (*A. oblongifolia*),

¹ In Va. Journ. Sci. ii. 118 (1941), Dr. Allard records the pink-flowered form from Loudon County.

but with short, oval to obovate leaves coarsely toothed at summit but less so along the margin below, and with compact and short racemes, the calyx-lobes in fruit spreading-ascending or scarcely recurved. This closely matches an isotype of *A. austro-montana* Ashe in Journ. Elisha Mitchell Soc. xxxiv. 138 (1918), described from the valley of French Broad River in extreme southwestern North Carolina.

Another tall shrub awaits better material. This is a shrub of pine-barren swamps, with nearly entire oblong leaves. Its flowers and fruits are unknown.

The last species to be considered illustrates as vividly as do *Amelanchier canadensis* and *A. arborea* the difficulty of undertaking monographic or revisionary work on a genus without most carefully checking the types or good photographs of the types. The dwarf stoloniferous and colonial shrub of southeastern Virginia, probably unknown to Wiegand in 1912, is superficially somewhat like *A. stolonifera* Wiegand (1912) of the northeastern states. The shrub of the Coastal Plain of southern Virginia, however, has very short and compact flowering racemes only 1–2.5 cm. long, with very short pedicels, which in fruit lengthen to only 3–8 mm. The calyx is tomentose during anthesis, the short calyx-lobes divergent after anthesis. The leaves are at first more or less white-pubescent beneath but soon glabrate, elliptic-oblong or oblong-oval to oblong-obovate, in maturity ranging from 2 cm. long and 1 cm. wide to 5.5 cm. long and 3 cm. broad and with small teeth extending along the margin. It ranges from Georgia to southeastern Virginia and was described by Michaux in his *Flora Boreali-Americana*, i. 291 (1803) as *Mespilus canadensis*, "Var. *α. obovalis*: humilior; foliis oblongiuscule obovalibus . . . in Carolina inferiore." Specimens before me from both North and South Carolina ("Carolina inferiore") are clearly Michaux's plant. The photograph of it, which I took at Paris in 1903 and which has been in the organized material in the Gray Herbarium for 38 years, shows it to bear Michaux's original label "*Mespilus canadensis α. obovalis*. Arbriss[eau] de deux pieds de haut. Carolines." This photograph¹ of Michaux's type of a Carolina shrub "2 feet high" was

¹ Like so many of Michaux's collections, material of different things was mounted (by someone else) unintelligently with one label; but most of the material clearly belongs with the label and with Michaux's description.

labeled by Wiegand during his revision of the genus in 1912, "May be an extreme form of *Amelanchier oblongifolia* (T. & G.) Roem."; but by Small (*Man.*) the southern dwarf and colonial species is merged with the dwarf and colonial northern *A. stolonifera* Wiegand (1912). If Small's merging of the two should seem to some correct, then Wiegand's name of 1912 must be set aside. Michaux's original diagnosis of his *M. canadensis*, var. *obovalis*, "humilior; foliis oblongiuscule obovalibus" for a shrub "2 feet high" was quite satisfactory and in sharp contrast with that of the next variety "*β. cordata*: arborea; foliis cordato-ovalibus, conspicue acuminatis," which soon became *Mespilus arborea* Michx. f.

Nevertheless, in discussing his all-inclusive *A. canadensis* in the *Silva* of North America (all-inclusive because uniting as a single species true *A. canadensis*, *Mespilus arborea* Michx. f., the boreal *A. Bartramiana* (Tausch) Roem., and others) Sargent made the new combination *A. canadensis*, var. *obovalis* Sargent, *Silva*, iv. 128 (1892),¹ based upon Michaux's South Carolina *Mespilus canadensis*, var. *α. obovalis*, the stoloniferous "shrub 2 feet high," Sargent saying "The most distinct of these forms is *Amelanchier Canadensis*, var. *obovalis*. This is a tree sometimes twenty-five or thirty feet in height, with a single stem or often with a cluster of spreading stems. . . . This variety is found in Nova Scotia and New Brunswick . . . and is abundant in Quebec and Ontario, extending northward to the valley of the Mackenzie River . . .; ranging southward along the Allegheny Mountains to Virginia . . . and occasionally occurs, much reduced in size, in the southern coast region from Bluffton, South Carolina, to the shores of the Bay of Mobile." Only the extreme southern "much reduced" shrub secondarily mentioned by Sargent belongs to var. *obovalis* sensu stricto!

¹ Although in 1892 Sargent made the combination *Amelanchier canadensis*, var. *obovalis* (Michx.) Sargent in correct form, citing the basynym with full bibliographic reference, the same combination, inadequately supported by reference to the basynym and with the wrong synonym cited, was published in their always doubtfully adequate bibliography by Britton, Stern & Poggenberg in their Preliminary Catalogue of Anthophyta and Pteridophyta, 17 (1888), as follows:

"*Amelanchier*, Lindl.

Canadensis, (L.), Medikus (fide Steudel.)

var. *obovalis*, (Michx.) (*var. oblongifolia*, T. & G.)"

Michaux's place of publication was not cited (that was left to others to hunt for), and "var. *oblongifolia*" was evidently meant to define the identity of var. *obovalis*.

Not until Ashe made the combination *Amelanchier obovalis* (Michx. f.) Ashe in Bot. Gaz. xxxv. 434 (1903), based upon *Mespilus canadensis*, var. α . *obovalis* Michx., did clarification of the species begin; but it merely began, for, although Ashe described a Coastal Plain "shrub 9–15 dm. high", he also included, somewhat like Sargent, "a small tree . . . attaining a maximum height of about 4.5 m." What the latter is I cannot say without access to Ashe's material. In southeastern Virginia such a tall shrub or small tree would be *A. austro-montana* Ashe (1915) which was originally described as up to 4 m. high. Whether the Clayton material described by Gronovius "foliis obverse-ovatis" and a secondary element of the Linnean species, belongs in *A. austro-montana* or in *A. obovalis* cannot just now be determined, the Gronovian plants being at present stored underground in England and practically inaccessible. Since no name was based on this material its identity is relatively unimportant, but the further account by Gronovius of it as "Frutex . . . humilis, . . . foliis subrotundis, eleganter serratis, & ad apicem rotundis", at least piques the imagination!

In southeastern Virginia the following species of *Amelanchier* are now recognized.

AMELANCHIER CANADENSIS (L.) Medicus, as to TYPE. *Mespilus canadensis* L., the TYPE shown in our PLATE 672, FIG. 1. *A. canadensis* β . *oblongifolia* Torr. & Gray. *A. oblongifolia* (Torr. & Gray) Roemer and later authors, including Wiegand in RHODORA, xiv. 147, pl. 96, fig. 5 (1912).—Common in eastern Virginia (many nos.).

**A. AUSTRO-MONTANA* Ashe. SURRY COUNTY: peaty thicket east of Surry Courthouse, no. 9948; dry pine and oak woods about 3 miles northwest of Surry Courthouse, no. 13,039; at foot of wooded bluff by James River, above Scotland, no. 13,041. SOUTHAMPTON COUNTY: dry woods north of Sebrell, no. 7869; wooded swamp about 7 miles south of Franklin, no. 9949; low woods southeast of Little Texas, no. 11,700. NANSEMOND COUNTY: sandy woods and thickets south of Cleopus, no. 13,040. See p. 486.

A. ARBOREA (Michx. f.) Fernald. Common (many nos.). A portion of the original plate of Michaux filius is shown in our PLATE 672, FIG. 2.

**A. OBOVALIS* (Michx.) Ashe, as to TYPE, *Mespilus canadensis*, var. α . *obovalis* Michx. PRINCE GEORGE COUNTY: dry sandy pine woods about 3 miles southeast of Petersburg, on head-

waters of Blackwater River, no. 5790; argillaceous and siliceous boggy depression southeast of Petersburg, at head of Poo Run, no. 9947. SUSSEX COUNTY: pinelands 3–4 miles northwest of Waverly, nos. 7072, 7870 and 13,042; dry sandy pine woods northwest of Homeville, no. 7073. SOUTHAMPTON COUNTY: moist peaty and sandy depressions in pine barrens, south of Franklin, no. 7448. GREENSVILLE COUNTY: argillaceous clearing near Readjuster Bridge over Nottoway River, north of Orion, no. 13,043; mossy pineland east of Slagle's Pond, north of Emporia, no. 11,847. ISLE OF WIGHT COUNTY: dry sandy pine barrens and open woods, south of Lee's Mill, no. 11,846. NANSEMOND COUNTY: low pineland east of Whaleyville, no. 7449; pine woods south of Suffolk, no. 7074. A flowering tip from no. 7072 and a fruiting branch from no. 9947, both $\times 1$, are shown in PLATE 672, FIGS. 3 and 4; my photograph of Michaux's type (quite like our FIG. 4) being too poor for reproduction. See p. 505.

**POTENTILLA MILLEGRANA* Engelm. HENRICO COUNTY: waste places and railroad ballast, Richmond, no. 12,363. See p. 510.

Native from the Prairie States westward; obviously adventive.

**P. REPTANS* L. ISLE OF WIGHT COUNTY: forming extensive carpets back of the beach of Burwell's Bay, James River, below Rushmere (Fergusson's Wharf), no. 12,664. See p. 525.

Extension south from New Jersey and Pennsylvania.

**RUBUS PROCERUS* P. J. Muell. HENRICO COUNTY: waste places and roadsides, Richmond, no. 12,111.

Spread abundantly from cultivation.

R. TRIVIALIS Michx. DINWIDDIE COUNTY: thicket bordering freight-yard of Atlantic Coast Line, Petersburg, no. 12,108.

Slight northwestern extension from easternmost counties. See p. 493.

R. BAILEYANUS Britton; See Bailey, Gent. Herb. ii. 324 (1932) and *ibid*, i. fig. 112 (1925). PRINCESS ANNE COUNTY: trailing in dry field, Virginia Beach, *Fernald & Griscom*, no. 4430.

Very similar to the Williamsburg material cited by Bailey.

**R. (§ PROCUMBENTES) plexus*, sp. nov., procumbens ramosissimus ramibus prolongatis valde implicatis; primocannis adscendentibus angulatis glabris remote aculeatis aculeis vix retrorsis; floricanis prostratis subteretibus duris glabris divergenter aculeatis, aculeis 5 mm. longis rectis subremotis (20–30 per dm.); primocannae foliis (immaturis) 3–5-foliatis juvenilibus strigoso-pilosis glabratis, foliolis anguste ovatis acuminatis;

floricannae foliis ternatis, foliolis lanceolato-ovatis membranaceis serrato-dentatis acuminatis glabris vel glabratiss; inflorescentiis corymbiformi-racemosis 3-5-floris rachi subglabra; pedicellis rectis filiformibus minute pilosis sparse setosis imis 3-4 cm. longis; calycis lobis reflexis ovatis minute pilosis 5 mm. longis; petalis roseis vel roseo-albidis obovatis 1.3 cm. longis 0.9 cm. latis.—Princess Anne County, VIRGINIA: trailing in wooded swamp, east of Little Creek, May 4, 1935, *Fernald & Griscom*, no. 4432 (distrib. as *R. flagellaris* Willd.), TYPE in Herb. Gray.

Rubus plexus, most absurdly distributed as *R. flagellaris* (for fear of describing a new species in the genus), has the very complicated branching suggestive of the northern *R. severus* Brainerd. Its true relationship is not clear and must await fuller material for elucidation. It abounds in the border of the wooded swamp south of the shore-road from Cape Henry westward, very near the large station of *Galax*. In early May it was attractive to look at (but not to collect) on account of its roseate petals; and subsequently Griscom and I saw it in a wooded swamp west of Pungo. It is not very closely related to any recognized species of § *Procumbentes*.

**R. INVISUS* (Bailey) Britton. SUSSEX COUNTY: trailing on dry roadside bank at border of woods west of Homeville, no. 11,860. SOUTHAMPTON COUNTY: arching and tip-rooting, steep wooded banks, ravines and clearings near Three Creek, northwest of Applewhite's Church, no. 11,857. GREENSVILLE COUNTY: trailing and tip-rooting at border of rich deciduous wooded slope by Three Creek, slightly above the "fall-line", northwest of Emporia, no. 11,849.

Extension south from central-western New York. The specimens seem inseparable from an isotype in the Gray Herbarium and from the illustration in Bailey, *Gent. Herb.* iii. 263, fig. 139 (1934).

R. CENTRALIS Bailey. DINWIDDIE COUNTY: thicket bordering waste ground and cinders of freight-yard of Atlantic Coast Line, Petersburg, no. 12,109.

Extension south from Stafford County and from the Eastern Shore of Maryland. See p. 493.

R. GRIMESII Bailey. Local range extended into SOUTHAMPTON COUNTY: dry sandy roadside thicket south of Sunbeam, no. 12,103.

Fruit ripe in early June, of rich flavor and very juicy; worth cultivating. See p. 512.

R. JANSSONII Bailey. To the single station in Sussex County, recorded in 1940, add one in ISLE OF WIGHT COUNTY: disturbed white sand of dry pine barrens, south of Lee's Mill, no. 12,370.

*RUBUS (§ HISPIDI) **ambigens**, sp. nov., valde arcuans deinde prostratus; primocannis laxe adscendentibus retrorse aculeato-setosis vix glandulosis, aculeis subsparsis (100–200 per dm.) setis parvis intermixtis; floricanis prostratis ramosissimis apicibus radicanibus sparse aculeatis; primocannae foliis firmis vix coriaceis subtus griseo-pilosis supra sparse pilosis quinatis, petiolo 3–7 cm. longo piloso aculeato, foliolis obovatis abrupte breviterque acuminatis serrato-dentatis, foliolo terminali basi rotundo-subcuneato 5.5–8 cm. longo 3–4.5 cm. lato petiolulo piloso retrorse-aculeato eglanduloso 1–2 cm. longo; floricanae foliis ternatis, foliolis elliptico- vel rhomboideo-obovatis subacutis argute serratis utrinque pilosis; inflorescentiis corymbiformi-racemosis vel cymosis rhachi pedicellisque minute pilosis pedicellis plus minusve setosis; calycis lobis reflexis pilosis 3.5–5 mm. longis; fructibus vix 1 cm. diametro.—Norfolk County, VIRGINIA: wet, peaty clearings in woods of *Pinus serotina*, south of Grassfield, June 11, 1940, *Fernald & Long*, no. 12,098 (TYPE in Herb. Gray; ISOTYPE in Herb. Phil. Acad.).

Rubus ambigens, the fruiting canes of which form extensive prostrate carpets in the wet peat and clearing, is superficially so like *R. vigil* Bailey, Gent. Herb. i. 251, fig. 116 (1925) that, without examination, it would pass for that species. As originally described *R. vigil* is a plant with leaves glabrous except along the nerves beneath; "canes . . . so thickly beset with sharp stiff retrorse prickles . . . as to give them a shaggy look . . . bristles more or less gland-bearing". In Bailey's latest treatment, Gent. Herb. v. 71 (1941), the only way to reach *R. vigil* by his key is under the call "EE. Axis of primocanes conspicuously glandular-hairy", under which *R. vigil* is the first species. The detailed description of the species on p. 86, however, says "canes . . . glandless". It is very easy to understand Bailey's statement (p. 69) that "Species of the Hispidi are particularly difficult to place in a key of contrasts, for the easy aid of the student confronted with the problem of identification". However, the original description and the specimens cited show glabrous leaves, and all specimens which I have seen have

glandular canes. *R. ambigens*, although habitally resembling *R. vigil*, is, so far as we know, quite glandless, but its expanding primocane-foliage is whitish with dense pubescence, the mature foliage of both primocane and floricanes pilose on both surfaces, softly so beneath.

R. PERNAGAEUS Fernald. To the original station in Isle of Wight County (additional nos. 11,848 and 12,101) add one in SUSSEX COUNTY: border of dry woods near Assamoosick Swamp, about 2 miles northeast of Homeville, no. 11,852.

R. CUNEIFOLIUS Pursh.

Typical *R. cuneifolius*, with truly cuneate leaflets of the floricanes-foliage and the primocane-leaves with 5 cuneate leaflets subtruncate but abruptly short-pointed at summit, is rare in southeastern Virginia. There the primocane-foliage is mostly 3-foliolate and the leaflets are more curved on the sides. These plants form a transition to the more extreme variation noted below. I am temporarily leaving them in *R. cuneifolius*, as follows:

JAMES CITY COUNTY: opening in flat oak woods west of Williamsburg, *Grimes*, no. 3056. SUSSEX COUNTY: border of dry woods northeast of Homeville, no. 12,106; sandy, mossy swale northeast of Belsches, *Wiegand & Manning*, no. 1405.

Similar material is in the Gray Herbarium from Wake and Durham Counties, North Carolina. The most extreme departure from typical *Rubus cuneifolius* is

R. CUNEIFOLIUS* Pursh, var. **subellipticus, var. nov., primocannae foliis 3- vel 5-natis; floricanne foliolis elliptico-obovatis vix cuneatis.—Southeastern VIRGINIA: sandy pine woods along Wakefield Road, northeast of Sebrell, Southampton County, *Fernald & Long*, no. 10,675, distrib. as *R. cuneifolius* (TYPE in Herb. Gray).

R. LONGII Fernald. The common representative of *R. cuneifolius* in southeastern Virginia, the type-material with floricanes arched-ascending to trailing. New collections show it to vary from depressed or trailing shrubs to arching, and in dune-areas to be stiffly erect. All these nos. (from ELIZABETH CITY, YORK, JAMES CITY, PRINCESS ANNE, NORFOLK, SURRY, SUSSEX and SOUTHAMPTON COUNTIES) are consistent in the broadly ovate or obovate to suborbicular gradually acuminate leaflets of the primocane-foliage and the elliptic to ovate or rounded leaflets of the floricanes. See p. 512.



Photo. W. H. Hodge.

LESPEDEZA CAPITATA, var. VULGARIS: FIG. 1, summit of flowering stem, $\times 1$; FIG. 2, portion of flowering head, $\times 4$; FIG. 3, portion of fruiting head, $\times 4$; FIGS. 4 and 5, lower and upper surface of leaf, $\times 10$; FIG. 6, legumes, $\times 4$, from base of fruiting calyx.

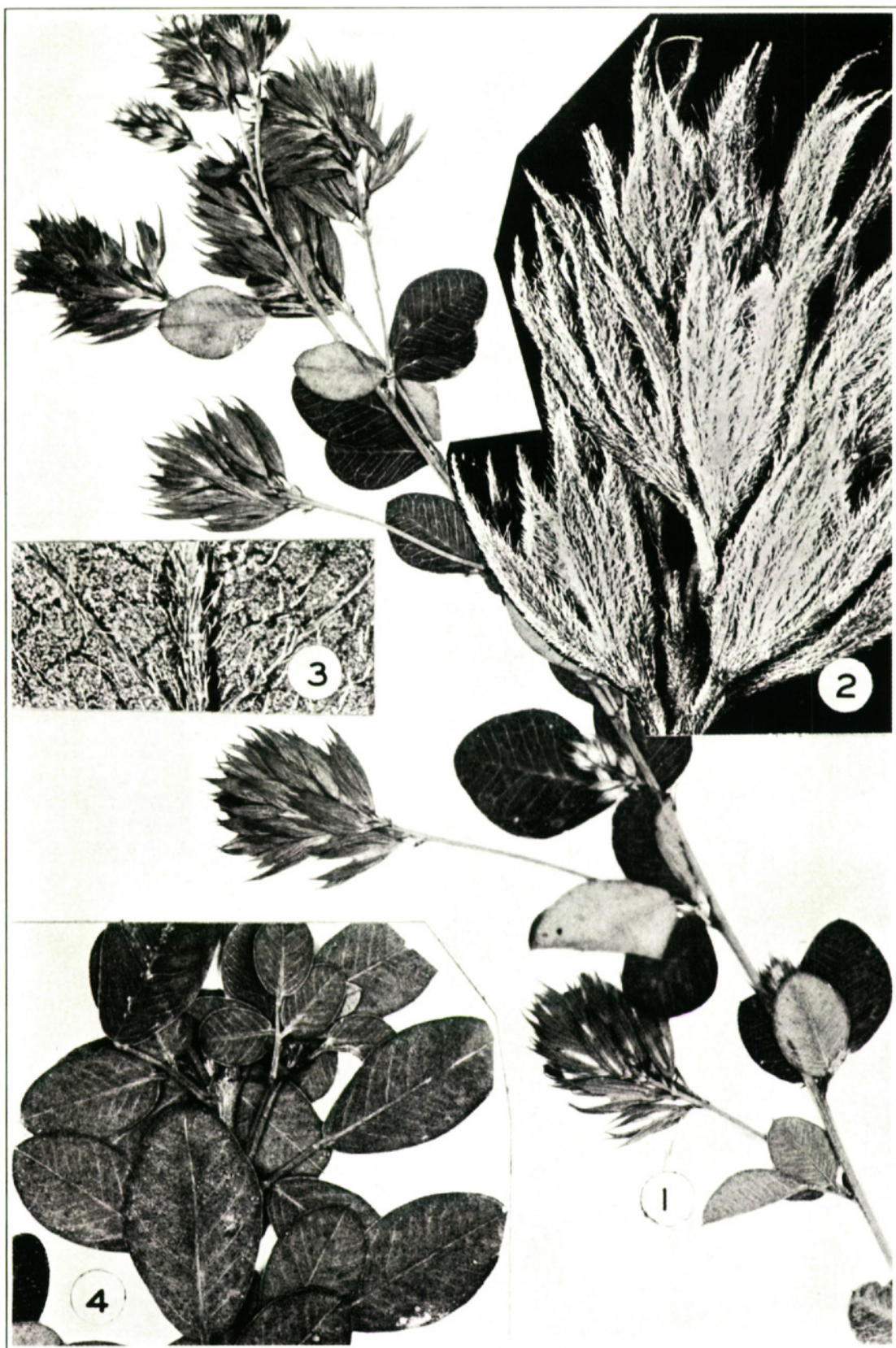


Photo. W. H. Hodge.

LESPEDEZA CAPITATA, var. CALYCINA: FIG. 1, summit of ISOTYPE, $\times 1$; FIG. 2, portion of fruiting spike, $\times 4$; FIG. 3, lower surface of leaf, $\times 10$; FIG. 4, median cauline leaves, $\times 1$.

**R. PROBABILIS* Bailey. SOUTHAMPTON COUNTY: sandy thicket southeast of Branchville, no. 10,284, shrubs freely branched, the tall canes arching and root-tipping.

Extension north from North Carolina.

**R. FLORIDUS* Tratt. NANSEMOND COUNTY: wooded bottom-land of a branch near Cathole Landing, west of Factory Hill, no. 11,854, erect to arching, very tall. SOUTHAMPTON COUNTY: dry sandy pine woods by Nottoway River, near Carey Bridge, no. 11,859. See p. 490.

Rubus floridus has been unknown except for the type described by Trattinnick from a collection made in the South by Enslen. According to Bailey, Gent. Herb. iii. 125, 126 (1933) it is otherwise unknown. Our collection of no. 11,854, from an extensive colony (within a mile of the North Carolina line), seems to be a very close match for the illustrations of Trattinnick's type published by Bailey in Gent. Herb. i. 194 and 195 as figs. 89 and 90. No. 11,859 has narrower floricanes-leaflets and glandless pedicels; it is, perhaps, not properly placed with no. 11,854.

ALCHEMILLA MICROCARPA Boiss. & Reut. To the few stations noted by me in 1938 add the following. SUSSEX COUNTY: ledges by foot-path in rich woods at the "fall-line" along Nottoway River, above Double Bridge, about 6 miles northwest of Jarratt, nos. 11,701 and 12,112 (mature plants up to 1.5 dm. high). SOUTHAMPTON COUNTY: weed in lawn of courthouse; Courtland, no. 11,861. GREENSVILLE COUNTY: lawns and grass-land, Emporia, no. 11,702. See p. 489.

**ROSA MULTIFLORA* Thunb. and its hybrids. Spread from cultivation to thickets, borders of woods, etc., several nos.

**TRIFOLIUM PRATENSE* L., forma *LEUCOCHRACEUM* Aschers. & Prantl. DINWIDDIE COUNTY: waste ground and cinders of freight-yard of Atlantic Coast Line, Petersburg, no. 12,375.

T. REFLEXUM L. SUSSEX COUNTY: open thickets and clearings near Nottoway River at Readjuster Bridge, south of Peanut, nos. 12,117 and 12,118. See p. 501 and MAP 5.

**MEDICAGO MINIMA* L., var. *LONGISETA* DC. ELIZABETH CITY COUNTY: Fortress Munroe, May 2, 1894, *J. R. Churchill* (distrib. as *M. maculata*).

**M. MINIMA* L., var. *COMPACTA* Neyraut. YORK COUNTY: abundant at intervals for several miles, sandy beach and open fields above Yorktown, no. 12,119. See p. 505.

**PSORALEA CANESCENS* Michx. SUSSEX COUNTY: dry white sand of woods and clearings near Chub, nos. 12,378 and 12,671.

Extension north from South Carolina; only a few plants. See p. 506 and MAP 6.

DESMODIUM GRANDIFLORUM (Walt.) DC. (*D. bracteosum* (Michx.) DC.). SURRY COUNTY: rich calcareous wooded ravines west of Claremont, no. 12,674. See p. 520.

Recorded by Merriman in his Flora of Richmond. Certainly very local in eastern Virginia. Although the name *D. grandiflorum* (Walt.) DC. has been taken up by Small and others on the basis of Blake's note in Bot. Gaz. lxxviii. 277 and 278 (1924), there is no material of this species in the Gray Herbarium from south of Virginia and the mountain-region of western North Carolina. It would be gratifying to see specimens from Walter's territory and to have the comparison with Walter's type made by some one familiar with the North American species. Blake's note was based upon a comparison made by the late E. G. Baker, who could hardly have known the intricacies of the genus.

SOME VARIETIES OF *LESPEDEZA CAPITATA* AND *L. HIRTA* (PLATES 673-682).—Although the purple-flowered series of American species of *Lespedeza* is perplexingly variable and often seems to cross indiscriminately, the whitish-flowered plants, especially *L. capitata* Michx. and *L. hirta* (L.) Hornem. are probably our most variable species. Each has a number of fairly recognizable varieties with pronounced geographic concentration; but the identifications in the herbarium show a large number of specimens with the characteristic racemes and fruits of *L. hirta* placed under *L. capitata* because of their relatively short peduncles. In attempting, rather unsatisfactorily, to clarify the group I have found it necessary to reassort the accumulated material in the Gray Herbarium and in the herbarium of the New England Botanical Club with regard for the rather definite characters of the raceme, calyx and legume, rather than by the names on the labels. True *L. capitata* (PLATE 673) has dense subcapitate spikes with the long calices closely overlapping and strongly ascending, so that the inner flowers of the head are quite hidden in maturity, and the legumes are greatly overtopped by the prolonged calyx-lobes; *L. hirta* (PLATE 678) has cylindric spiciform racemes, with the loosely ascending to divergent flowers not strongly imbricated, in fruit definitely separated, and

with the legume nearly equaling to overtopping the calyx-lobes. Unfortunately, in defining varieties under the two species authors have often failed to go back to original diagnoses and to types or isotypes, with the result that a realignment of varietal names becomes necessary. *L. angustifolia* (Pursh) Ell., at least as usually interpreted, for the type is not just now available, is closely allied to and sometimes united with either *L. hirta*¹ or with *L. capitata*. Although hybridizing with them, it seems to me almost as well defined as a species as most members of the genus; for this is a group in which interspecific hybridization is exceptionally frequent, associated as it is with the two types of inflorescence, showy petaliferous flowers and cleistogamous apetalous ones, with the result that crosses due to insect-pollination of the earlier and showy flowers seem to be carried on through the cleistogamous fruits, just as they are in *Viola*.

I am defining the three species as follows.

- a. Racemes capitate-spiciform, very dense; the strongly appressed calices 7–13 mm. long, closely overlapping, with the inner ones mostly hidden, greatly exceeding the legume; peduncles very short, usually much shorter than the subtending leaves*L. capitata*.
- a. Racemes cylindric, the ascending to divergent lower flowers not hiding those above; mature calyx 4–10 mm. long, nearly equaling to only slightly exceeding legume; peduncles shorter than to usually much longer than subtending leaves.
Principal leaves with petiolule of terminal leaflet 3–8 mm. long and conspicuously coarser and more pilose at summit; leaflets rounded-obovate to linear, 0.6–3.5 cm. broad; calyx 6–10 mm. long; bracteoles 2–4 mm. long*L. hirta*.
Principal leaves with petiolule of terminal leaflet 0.5–4 mm. long and not conspicuously modified at summit; leaflets linear, 2–6 mm. broad; mature calyx 4–6.5 mm. long; bracteoles 1–2 mm. long*L. angustifolia*.

Lespedeza capitata was first described by Michaux with an unequivocal diagnosis, as follows:

CAPITATA. *L. erecta*: foliis subsessilibus; foliolis oblongis: capitulis sessiliter conglomerato-terminalibus: legumine intra calycem multo majorem recondito.
Hab. in Virginia et Carolina.

—Michx. Fl. Bor.-Am. ii. 71 (1803).

¹ *L. hirta*, var. *angustifolia* (Pursh) Maxim. in Act. Hort. Petrap. ii. 379 (1873).

It has been customary to treat as typical *Lespedeza capitata* the wide-ranging plant (PLATE 674) with round-tipped or obtuse oblong leaflets appressed-pubescent beneath with opaque or only slightly lustrous hairs, and green above, the capitate spikes often overtopped by their subtending leaves, the plant occurring from west-central Maine to Minnesota and Nebraska, entering the southern corners of Quebec and Ontario, thence south through the northeastern and central states and locally to the mountains of North Carolina¹ and into Missouri, the plant called by Torrey & Gray *L. capitata*, β . *vulgaris*; while a plant of similar habit, but with leaves brilliantly silvery beneath and grayish to silvery and lustrous above and with the densely crowded upper spikes mostly overtopping their subtending leaves, was described from Louisiana as *L. capitata*, β . *sericea* by Hooker & Arnott in Hooker's Comp. to Bot. Mag. i. 23 (1835).

Var. *sericea* (PLATE 673) abounds on the Coastal Plain of the Southern States, from Texas to Georgia, thence northward to Nebraska, Iowa, Wisconsin and Indiana, and on the Atlantic Coastal Plain and outer Piedmont locally to Massachusetts, our representation of it from eastern North Carolina being 10 numbers, from eastern Virginia 5. The common northern and inland plant with only sublustrous to opaque foliage and rather leafy inflorescences (var. *vulgaris*) shows 2 collections from eastern Virginia, none from eastern North Carolina. It is, therefore, not surprising to find on inspection of the photograph of Michaux's type (taken by me in 1903) that his species from "Virginia and Carolina" is the common plant of the eastern sections of those states, i. e. var. *sericea* Hook. & Arn. (our PLATE 673). This interpretation is supported by Poiret's full description of the Michaux type. Renaming it *Hedysarum conglomeratum* Poir. in Lam. Encycl. vi. 416 (1804), he described the "folioles . . . oblongues, luisantes, soyeuses. . . . Les fleurs sont réunies, à l'extrémité des tiges & des rameaux, en petits paquets agglomérés & en tête, pourvues de pédoncules partiels très-courts." Michaux's material in *Lespedeza*, like that in many other groups, was mounted by some one else without much, if any, regard to the diagnoses. The sheet containing the label "*Lespedeza capitata*" has five stems mounted upon it. That at the

¹ In September, 1941, found in southeastern Virginia.

right closely matches the original diagnosis and must stand as the TYPE. To the left (in the middle of the sheet) are two stems of the extreme of *L. hirta* which has been called by different authors *L. longifolia* DC., *L. capitata* var. *longifolia* (DC.) Torr. & Gray, *L. hirta* var. *oblongifolia* Britton and *L. oblongifolia* (Britton) Stone; while at the extreme left are two stems of *L. angustifolia* (Pursh) Ell. That the mixture was not made by Michaux himself is evident from his very clear diagnosis.

It has been customary to recognize one of the extremes of *Lespedeza capitata* with narrowest leaflets as var. *longifolia* (DC.) Torr. & Gray. When, however, the basynym, *L. longifolia* DC. Prodr. ii. 349 (1825), is studied it is evident that DeCandolle had a southern Coastal Plain extreme of *L. hirta*. He correctly described *L. capitata* "spicis capitatis brevè pedunculatis axillaribus et conglobato-terminalibus, calycibus villosis longitudine corollae legumine multò longioribus"; but his new *L. longifolia*, with oblong leaflets, differed: "racemis [nec spicis] fasciculato-corymbosis multifloris axillaribus et subterminalibus, legumine calycis lobis acuminatis brevior." Although I have not examined the type of *L. longifolia*, DeCandolle's description so strongly suggests a rare Coastal Plain extreme of *L. hirta*, which occurs in Louisiana, that I do not see how to separate it from *L. hirta* var. *oblongifolia* Britton, described from the Pine Barrens of New Jersey.

The restoring of *Lespedeza capitata* var. *longifolia* (DC.) Torr. & Gray, as to basynym at least, to varietal rank under *L. hirta* necessitates finding a name for the rather rare extreme of *L. capitata* with narrowly oblong to lance-linear leaflets commonly silky beneath and often above. Although *L. capitata* var. *stenophylla* Bissell & Fernald in RHODORA, xiv. 92 (1912) was thought, when published, to be well separable from the plant then passing as var. *longifolia*, it may be extended to cover that variable series (PLATE 676).

The varieties of *Lespedeza capitata*, as I now see them, are as follows.

- a. Lower surfaces of leaves with closely appressed or sericeous pubescence . . . b.
- b. Leaflets oblong, elliptic, oval or obovate . . . c.
- c. Leaflets oblong to narrowly elliptic; heads crowded and very short-peduncled among the upper leaves.

- Leaves brilliantly silvery beneath, grayish and lustrous above; upper heads closely aggregated and mostly hiding the subtending leaves *L. capitata* var. *typica*.
 Leaves opaque or only slightly lustrous beneath, green above or soon becoming so; subtending leaves most often exceeding the heads; northern Var. *vulgaris*.
 c. Leaflets broadly elliptic-oval to rounded-obovate; some or all peduncles scattered and equaling or exceeding the subtending leaves; southern Var. *calycina*.
 b. Leaflets lance-oblong or lanceolate to lance-linear, usually sericeous, at least beneath Var. *stenophylla*.
 a. Lower surfaces of oblong to narrowly obovate leaflets densely velvety-pilose with dull to sublustrous cinereous to fulvous pubescence; inflorescence leafy; northeastern. Var. *velutina*.

L. CAPITATA Michx., var. **typica**. *L. capitata* Michx. Fl. Bor.-Am. ii. 71 (1803). Var. *sericea* Hook & Arn. in Hooker's Comp. to Bot. Mag. i. 23 (1835). *Hedysarum conglomeratum* Poir. in Lam. Encycl. vi. 416 (1804).—Eastern Texas to Georgia, north to Nebraska, Minnesota, Wisconsin, Tennessee and eastern Massachusetts. The following, selected from many numbers, are characteristic. MASSACHUSETTS: near Cottage Farm, Boston, August 7, 1879, C. E. Perkins; Dedham, August 22, 1903, A. W. Cheever; Blue Hill, Milton, September 1, 1887, Faxon; Darby Station, Plymouth, Fernald, Hunnewell & Long, no. 9746; Wareham, Fernald & Long, no. 9748; New Bedford, E. W. Hervey; Centerville, August 12, 1900, Clara Imogene Cheney; Yarmouth, Fernald & Long, no. 9747; Eastham, F. S. Collins, no. 528; Uncatena, Dukes Co., Fogg, no. 3129; Ludlow, September 9, 1922, Hunnewell. RHODE ISLAND: Meshanticut Park, Cranston, August 23, 1908, T. Hope; Watchaug Pond, Charlestown, Pease & Griscom, no. 24,010. CONNECTICUT: Vernon, September 23, 1888, Chas. Wright. NEW YORK: 2 miles northeast of Hicksville, Nassau Co., September 6, 1907, R. M. Harper. NEW JERSEY: Lakewood, Hunnewell, no. 6926; Cape May, Gershoy, no. 383. PENNSYLVANIA: mouth of Tucquan, Lancaster Co., Heller & Halbach, no. 528. VIRGINIA: Little Neck, Princess Anne Co., Fernald & Long, no. 4907; north of Factory Hill, Nansemond Co., Fernald & Long, no. 9586; west of Wiggins School, south of Franklin, Fernald & Long, no. 11,360. VIRGINIA or NORTH CAROLINA: TYPE of species, Michaux (photograph in Gray Herb.). NORTH CAROLINA: near Gatesville, Gates Co., Godfrey, no. 7045; near Williamstown, Martin Co., Godfrey, no. 7023; Middlesex, Nash Co., Godfrey & Kerr, no. 6637; near Edward, Beaufort Co., Godfrey & White, no. 6881; near Grantsboro, Pamlico Co., Godfrey & White, no. 6810; near Ft. Barnwell, Craven Co., Godfrey & White, no. 6781. SOUTH CAROLINA: 5 miles south of Andrews, Georgetown Co., Godfrey, no. 8186. GEORGIA: Nacooche Valley, Habersham Co., September 17, 1883,

J. D. Smith. TENNESSEE: Knoxville, *Ruth*, no. 312. ALABAMA: Perdido, *Blanton*, no. 7082; northeast of Autaugaville, Autauga Co., *Harper*, no. 3128. MISSISSIPPI: Ocean Springs, *Skehan*, no. 2422. WISCONSIN: Fountain City, Buffalo Co., *Fassett & Wilson*, no. 4392. ILLINOIS: Evanston, August 16, 1911, *Sherff*; Champaign, *Pease*, no. 12,413; north of Princeville, August 18, 1896, *V. H. Chase*; Sugar Creek Ravine, *Robert Ridgway*, no. 92. ARKANSAS: northwestern Arkansas, September, 1882, *F. L. Harvey*. LOUISIANA: without stated locality, *Hale*. MINNESOTA: west of Brainerd, Crow Wing Co., *Hotchkiss & Jones*, no. 472. IOWA: Ames, *Ball*, no. 16. NEBRASKA: Halsey, Thomas Co., *Rydberg*, no. 1746. KANSAS: Riley Co., *Norton*, no. 114 (transition to next var.). OKLAHOMA: Shattuck, Ellis Co., *G. W. Stevens*, no. 2929. TEXAS: west of Alvin, Brazoria Co., *Cory*, no. 11,390. PLATE 673.

*Var. VULGARIS Torr. & Gray, Fl. N. Am. i. 368 (1840), as to description and plant of "Canada and New England States!"—West-central Maine and southern Quebec to Minnesota and Nebraska, south to North Carolina and Missouri. The following from about ten times as many specimens examined are characteristic. QUEBEC: Ottawa River, Baie Sherley, *Rolland-Germain*, no. 19,282. MAINE: Moose Hill, Livermore, 1894, *Kate Furbish*; Topsham, August 28, 1913, *Furbish*; Limington, *Fernald, Long & Norton*, no. 13,964. NEW HAMPSHIRE: Lake Ossipee, Freedom, Carroll Co., *Pease*, no. 25,827; Dover, *Hodgdon*, no. 2374; Derry, Rockingham Co., August 30, 1916, *C. F. Batchelder*; Hollis, Hillsborough Co., August 21, 1932, *Batchelder*; Hinsdale, Cheshire Co., August 23, 1919, *Batchelder*; Hampton, August 31, 1902, *Williams*. VERMONT: Brattleboro, September 16, 1912, *L. A. Wheeler*. MASSACHUSETTS: Newbury, *Pease*, no. 25,761; Lexington, November 13, 1892, *W. Deane*; Carlisle, August 23, 1884, *C. W. Jenks*; Bellingham, *Hunnewell*, no. 4982; Darby Station, Plymouth, *Fernald, Hunnewell & Long*, no. 9744; Edgartown, Martha's Vineyard, *Bicknell*, no. 5110; Sutton, *Anderson, Smith & Weatherby*, no. 2492; Grafton, September 22, 1921, *Knowlton*; Green Pond, Montague, *F. C. Seymour*, no. 3326; Southwick, *F. C. Seymour*, no. 226; Springfield, August 27, 1913, *Bissell & Weatherby*. RHODE ISLAND: Cumberland, September 13, 1903, *Williams*; Warwick, *Collins, Fernald & York*, no. 11,361; Great Salt Pond, Block Island, *Fernald, Hunnewell & Long*, no. 9742. CONNECTICUT: Franklin, September 29, 1906, *Woodward*; Waterbury, *Blewitt*, no. 1332; Milford, October 10, 1909, *H. S. Clark*; Stratford, *A. E. Carpenter*, no. 756. NEW YORK: Patten's Mills, between Washington and Warren Cos., August 9, 1896, *Burnham*; Narrows Island, Black Lake, St. Lawrence Co., *Fernald, Wiegand & Eames*, no. 14,362; east of Owego, Tioga Co., *Wiegand*, no.

12,337. NEW JERSEY: Delaware Valley, Sussex Co., September 15, 1917, *E. B. Bartram*; Manahawkin, Ocean Co., *Long*, no. 13,495; Somerdale, Camden Co., September 23, 1921, *Meredith*. PENNSYLVANIA: Keller's Church, Bucks Co., August 24, 1923, *Benner*. DELAWARE: south of New Castle, *Tidestrom*, no. 11,515; near Centreville, September 28, 1875, *A. Commons*; Rehoboth, September 6, 1908, *Churchill*. DISTRICT OF COLUMBIA: Washington and vicinity, September 7, 1896, *Steele*. VIRGINIA: southeast of Stony Creek, *Fernald & Long*, no. 13,650. NORTH CAROLINA: near Biltmore, *Biltmore Herb.* no. 586a; Great Smoky Mts., alt. 3000 ft., Swain Co., August 25, 1891, *Beardslee & Kofoid*. INDIANA: Miller's, September 4, 1897, *Umbach*. WISCONSIN: Hertel, Burnett Co., *Fassett*, no. 16,486; south of Wautoma, Waushara Co., *Fassett*, no. 16,707; southeast of Mauston, Juneau Co., *Fassett*, no. 17,143. ILLINOIS: Catlin, Vermilion Co., *Lansing*, no. 3512 (transition to var. *typica*); Peoria, September, 1904, *McDonald*; Decatur, *Gleason*, no. 749. MINNESOTA: Center City, August, 1892, *B. C. Taylor*; Morrison Lakes, Clearwater Co., *M. L. Grant*, no. 3082 (transition to var. *typica*). IOWA: Fayette, August, 1894, *Fink*; West Branch, *Pennell*, no. 713. MISSOURI: Green Co., Sept. 7, 1893, *Blankinship* (transition to var. *typica*); Newton Co., *Bush*, no. 66 (transition to var. *typica*). PLATE 674.

Var. **calycina** (Schindler), comb. nov. *L. hirta* var. *β. calycina* Schindler in Engler, Bot. Jahrb. xlix. 624 (1913). *L. capitata* var. *hirtiformis* Fernald in RHODORA, xl. 437, t. 524 (1938).—Southeastern Virginia to Florida, west to eastern Texas. VIRGINIA: northwest of Whaleyville, Nansemond Co., *Fernald & Long*, no. 7481 (type of var. *hirtiformis*). NORTH CAROLINA: near Ft. Barnwell, Craven Co., *Godfrey & White*, no. 6826. SOUTH CAROLINA: cited without specified locality by Schindler, l. c. collected by *Cabinis*. FLORIDA: Jacksonville, *Curtiss* (cited by Schindler). LOUISIANA: without stated locality, *Hale*. TEXAS: Dallas, *Reverchon*, no. 288 (TYPE). PLATE 675.

Schindler placed this extreme from the southern Coastal Plain under *Lespedeza hirta* because of the shape of the leaflets and the peduncled spikes; but he noted that it differed in the only sparsely pilose or subglabrous and elongate calyx overtopping the sparsely pilose legume and in the whole plant being less pubescent than in the villous-stemmed *L. hirta*, all characters of *L. capitata*. I placed it under *L. capitata*, as var. *hirtiformis*, because, with the technical characters of spike, calyx and short legume of that species, it has the peduncles and outline of leaflets of *L. hirta*! Since Schindler designated no type of his

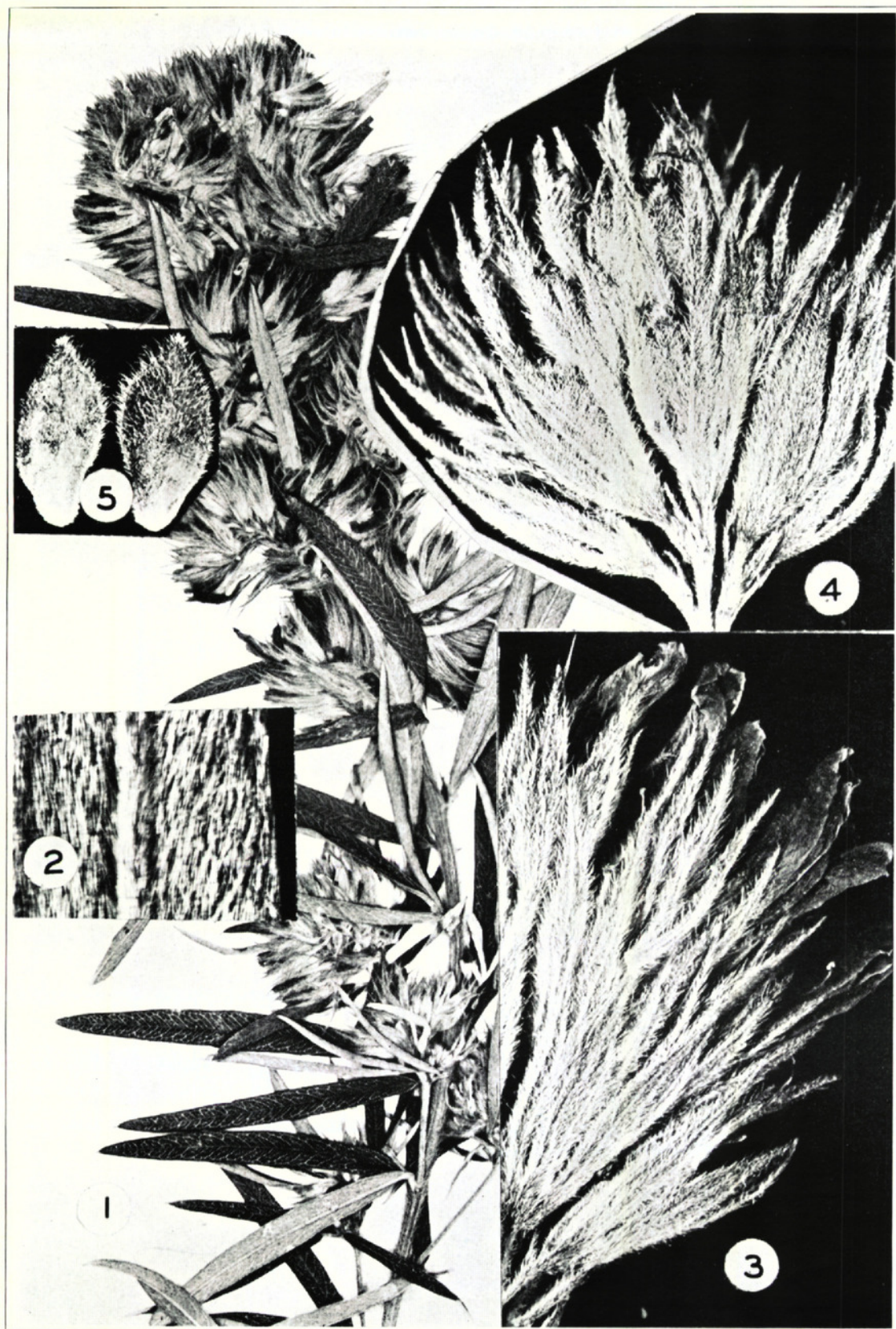


Photo. W. H. Hodge.

LESPEDeza CAPITATA, var. *STENOPHYLLA*: FIG. 1, summit of TYPE, $\times 1$; FIG. 2, lower surface of leaf, $\times 10$; FIG. 3, portion of flowering head, $\times 4$; FIG. 4, fruiting head, $\times 4$; FIG. 5, legumes from bases of fruiting calices, $\times 4$.

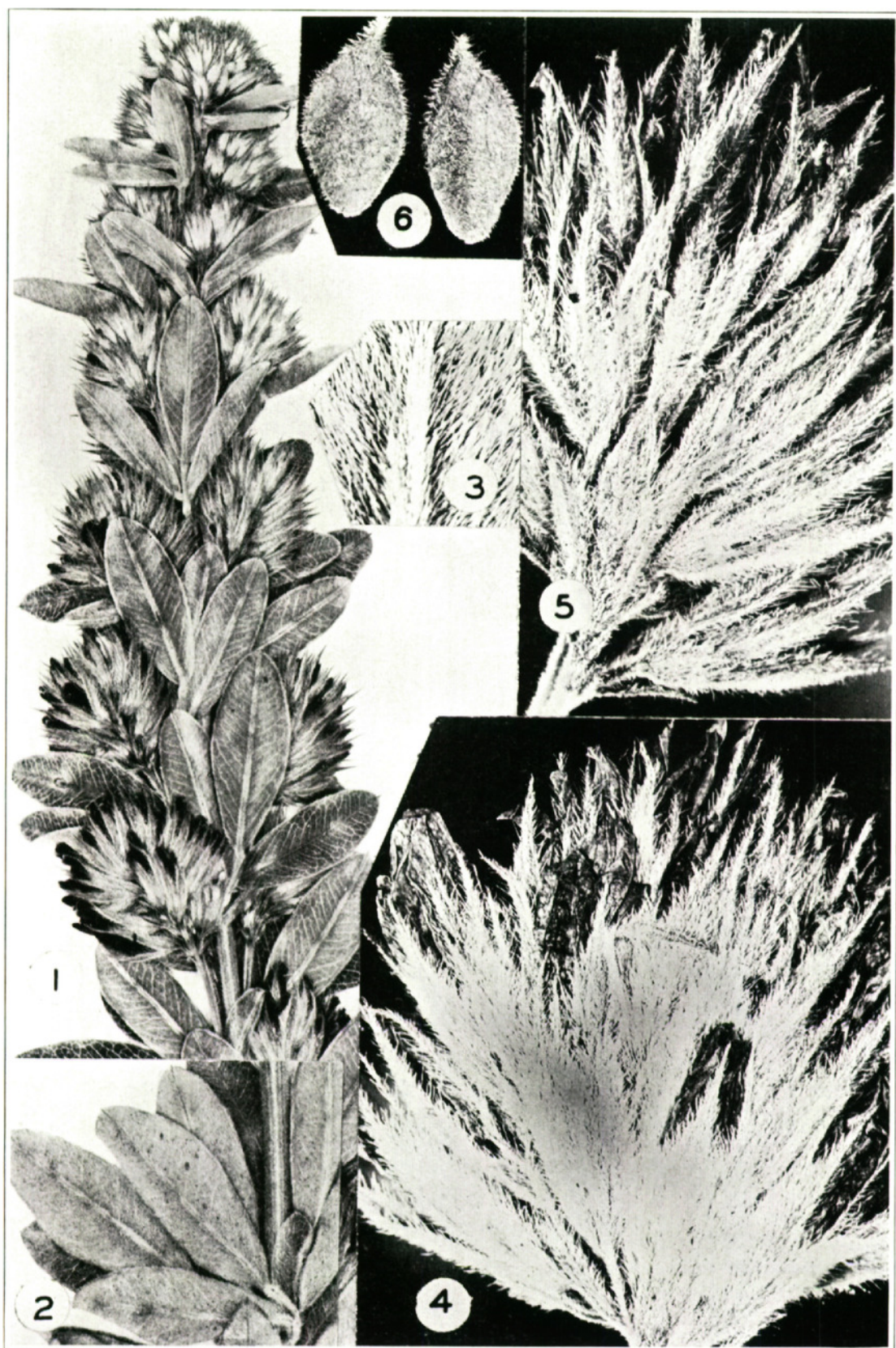


Photo. W. H. Hodge.

LESPEDeza CAPITATA, var. *VELUTINA*: FIG. 1, flowering summit, $\times 1$; FIG. 2, median cauline leaves, $\times 1$; FIG. 3, lower surface of leaf, $\times 10$; FIG. 4, flowering head, $\times 4$; FIG. 5, portion of fruiting head, $\times 4$; FIG. 6, legumes from bases of fruiting calyx, $\times 4$.

L. hirta var. *calycina*, the varietal name earlier than mine, I am designating as its TYPE Reverchon's no. 288 (our PLATE 675, FIGS. 1-3), which seems to have been the plant he had before him.

*Var. STENOPHYLLA Bissell & Fernald in RHODORA, xiv. 92 (1912). Leaflets linear-oblong, lanceolate or lance-linear, mostly sericeous beneath, green and glabrous or promptly glabrate above, acute or blunt; heads mostly scattered. Var. *longifolia* sensu most authors, not *L. longifolia* DC., basynym.—Local, Massachusetts to Virginia; southern Wisconsin and northwestern Indiana to northern Missouri. The following are characteristic. MASSACHUSETTS: summit of Blue Hill, Milton, September 8, 1891, *Faxon*, September 22, 1895, *Kennedy*. RHODE ISLAND: north of Ashaway, Hopkinton, September 1, 1919, *Fernald*, *Woodward & Collins*. CONNECTICUT: Franklin, August 22, 1914, *Woodward*; Glastonbury, September 17, 1911, *Bissell*; near Trading Cove Bridge, Norwich, September 15, 1904, *Graves*. NEW JERSEY: Borderville, Passaic Co., *Mackenzie*, no. 3889 (transitional). VIRGINIA: southeast of Stony Creek, *Fernald & Long*, nos. 13,646 and 13,649. WISCONSIN: north of Ridgway, Iowa Co., *Fassett & Graeber*, no. 16,711. INDIANA: Dune Park, *Greenman*, no. 2671; south of Fair Oaks, Jasper Co., *Deam*, no. 51,267; White Co., *Heimlich*, no. 739. ILLINOIS: Peoria, September, 1904, *F. E. McDonald* (TYPE), leaflets long-attenuate; Havana, August 17, 1903, *Gleason*; Champaign, *Pease*, no. 12,413 (leaflets blunt); Beardston, August, 1842, *Geyer*. MISSOURI: south of Graysville, Putnam Co., *Drouet*, no. 1830. PLATE 676.

Var. STENOPHYLLA, forma **argentea**, forma nov. foliis utrinque sericeo-argenteis.—ILLINOIS: sand dunes, Havana, August, 1903, *Gleason* (TYPE in Herb. Gray).

In var. *stenophylla* the head is often more elongated and more inclined to become spicate-racemose than in the other varieties. It thus approaches *Lespedeza hirta* and in immature specimens it is often difficult to be quite certain whether the plants are *L. capitata* var. *stenophylla* or the northern extreme of *L. hirta* (described below), which has almost the identical habit. Fully developed inflorescences and, preferably, fruit are important in distinguishing these two plants.

Var. VELUTINA (Bickn.) Fern. in RHODORA, x. 51 (1908). *L. velutina* Bicknell in Torrey, i. 102 (Sept., 1901), not Dunn (Feb., 1901). *L. Bicknellii* House in Torrey, v. 167 (1905). *L. Schindleri* Lévl. Cat. Pl. Yun-Nan, 159 (1916).—Central

Maine to eastern New York and northern New Jersey. The following, selected from many specimens, are characteristic. MAINE: Orono, September 14, 1897, *Fernald*; Rumford, September 7, 1889, *Parlin*; Brunswick, September, 1903, *Furbish*; Cumberland, *Chamberlain*, no. 277; Wells, September 17-21, 1898, *Furbish*; North Berwick, September 13, 1894, *Parlin*. NEW HAMPSHIRE: by Connecticut River, Bath, Grafton Co., *Fernald*, no. 15,548; Haverhill, *Fernald*, no. 15,547; Pemigewasset River, Plymouth, *Fernald*, no. 11,789; Hooksett, Merrimack Co., August 16, 1925, *C. F. Batchelder*; Pelham, Hillsboro Co., October 11, 1902, *Knowlton*; Hinsdale, Cheshire Co., August 22, 1931, *Weatherby & Griscom*. VERMONT: Colchester, *Blake*, no. 2103; Connecticut River, Vernon, *Raup & Weatherby* in Pl. Exsicc. Gray, no. 561; Pownal, *Eggleston*, no. 1111. MASSACHUSETTS: Lynnfield, August 18, 1880, *H. A. Young*; Horn Pond Mt., Winchester, October 20, 1901, *E. F. Williams*; Westwood, October 6, 1901, *B. L. Robinson*; Pembroke, September 6, 1920, *Churchill*; Wood's Hole, Falmouth, *Fernald & Weatherby*, no. 16,992; West Tisbury, *Fernald & Fogg*, no. 935; Chilmark, *F. C. Seymour*, no. 1427; Worcester, September, 1878, *E. W. Sargent*. RHODE ISLAND: Warwick, *Collins, Fernald & York*, no. 11,362. CONNECTICUT: Beach Pond, Voluntown, September 22, 1902, *Harger* (transition to var. *vulgaris*); Groton, October 10, 1901, *Graves*; Milford, October 18, 1896, *Eames*. NEW YORK: Little Neck, Long Island, July 31, 1853, *Hexamer & Maier*. NEW JERSEY: Ringwood Junction, Passaic Co., *Mackenzie*, no. 3902 (unusually narrow leaves). PLATE 677.

Typical *Lespedeza hirta*, at least as usually interpreted, for I cannot now secure a photograph of the type which was collected by Clayton in Virginia, is very definite: a tall plant (PLATE 678) with spreading pubescence on the stem, long-petioled leaves with rounded-obovate to rounded-oval or broadly oblong large leaflets pubescent, at least on the veins, beneath with spreading or loosely ascending hairs, its long-peduncled cylindric racemes spiciform but with the mature flowers and fruits only loosely ascending or spreading, not crowded into closely imbricated heads, and the legume nearly equaling or even exceeding the calyx. In the Southeastern States, from Florida to eastern North Carolina, and less characteristically into southeastern Virginia, var. *appressipilis* Blake is habitally like typical *L. hirta* but with the consistently small and thick leaflets cinereous beneath (often silvery) with minute appressed puberulence.

Of wider but interrupted range on or near the Coastal Plain, from Louisiana to southern New Jersey, there occurs a plant habitally like *L. hirta* and with quite similar racemes and flowers but with narrowly oblong leaflets. This is, as noted on p. 575, *L. longifolia* DC., described from Louisiana, the Louisiana plant seeming scarcely separable from *L. hirta* var. *oblongifolia* Britton, described from southern New Jersey. Whether the plant is of hybrid origin, as Britton suggested in Ill. Fl. ed. 2, ii. 407 (1913), can be determined only by further observation, for I have seen no fruit. The late Dr. Witmer Stone thought it a good species.

In southeastern Virginia there is an extreme with the long-peduncled open racemes and flowers of *Lespedeza hirta* but with leaflets nearly as narrow as in *L. angustifolia*. Its large calyx and long bractlets are those of *L. hirta*, its minute sericeous pubescence is that of *L. hirta* var. *appressipilis*, its leaflets nearly those of *L. capitata* var. *stenophylla*. It is possible to think, as Britton suggested regarding his *L. hirta* var. *oblongifolia*, that it is a hybrid of *L. angustifolia*; but that little species (PLATE 681, FIGS. 5 and 6), if correctly identified, with much smaller flowers and shorter and more compact spikes, has not been found at most of our known stations for the coarser plant. The latter might, likewise, be looked upon as a connecting link between *L. angustifolia* and *L. hirta*. Even so, *L. hirta*, having priority of specific epithet, it will serve convenience to give the large plant of Virginia a varietal name under that species.

Not only does *Lespedeza hirta* in one extreme strongly simulate *L. angustifolia* and possibly grade into it in the South; north of or at the northern outposts of any known form of *L. capitata* it strongly simulates that species. In New England typical *L. capitata*, with erect densely imbricated long fruiting calices, glistening sericeous foliage and short legumes, reaches very locally northward only into eastern Massachusetts; var. *vulgaris* is on the most sterile and arid soils northward to Androscoggin County, Maine, the Ossipee region of east-central New Hampshire and the southeastern corner of Vermont; while the strictly northeastern var. *velutina* alone reaches central Maine, northern New Hampshire and northern Vermont, and var. *stenophylla* reaches its isolated northeastern limit on a

weathered and leached sterile crest in Norfolk County, Massachusetts. In New England, furthermore, typical *L. hirta* is quite unknown northeast of the extreme southwestern corner of Maine and southernmost counties of New Hampshire. It is, consequently, noteworthy that along the richer river-valleys of northern and western New England there should be a velutinous and sericeous plant (PLATE 682) strongly suggestive of *L. capitata* var. *velutina* (PLATE 677) in its short-peduncled and compact spiciform racemes scattered in interrupted virgate and leafy inflorescences, but with the short calyx, less overlapping flowers and the nearly or quite exserted legume of *L. hirta*. In aspect it stands midway between *L. hirta* var. *longifolia* and *L. capitata* var. *velutina*, but it can hardly be a recent cross of these two, for the former doubtfully fertile plant reaches its northern limit in southern New Jersey. This singular plant of northern New England, standing somewhat between *L. hirta* var. *longifolia* and *L. capitata* var. *velutina*, is on the relatively rich terraces and banks of the Penobscot, Kennebec, Connecticut and Housatonic systems, and it apparently extends locally southward to Nantucket and Cape Cod. It seems also to occur in Wisconsin. On account of its flowers and fruit I am placing it tentatively under *L. hirta*, as an anomalous variety. It needs close attention in the field, for as yet we know only one fruiting collection.

The varieties of *Lespedeza hirta*, as I now interpret them, are as follows.

- a. Peduncles mostly overtopping their subtending leaves; racemes relatively open, in fruit 1.5–4.5 cm. long . . . b.
- b. Leaflets rounded-obovate to oblong-ovate, the terminal one of the primary leaves 1–3.5 cm. broad.
 Stem villous or copiously pilose; leaves pubescent beneath, at least on the veins, with spreading or spreading-ascending hairs; terminal leaflet of primary leaves 2–6 cm. long, 1.5–4 cm. broad. Var. *typica*.
 Stem densely short-pubescent; leaves grayish, silvery beneath and sometimes above with minute sericeous puberulence; terminal leaflet of primary leaves 1–2.7 cm. long, 1–2 cm. broad; southeastern. Var. *apressipilis*.
- b. Leaflets narrowly oblong to linear, 6–10 mm. broad; southern.
 Leaflets oblong, the larger 2–3 cm. long and 7–10 mm. broad; calyx 6–8 mm. long. Var. *longifolia*.
 Leaflets narrowly linear, the larger 3–7 cm. long and 6–8 mm. broad; calyx 8–10 mm. long. Var. *intercursa*.



Photo. W. H. Hodge.

LESPЕDEZA HIRTA, var. TYPICA: FIG. 1, summit of flowering stem, $\times 1$; FIG. 2, summit of petiolule of terminal leaflet, $\times 10$; FIG. 3, portion of flowering raceme, $\times 4$; FIGS. 4 and 5, portions of fruiting racemes, $\times 4$.

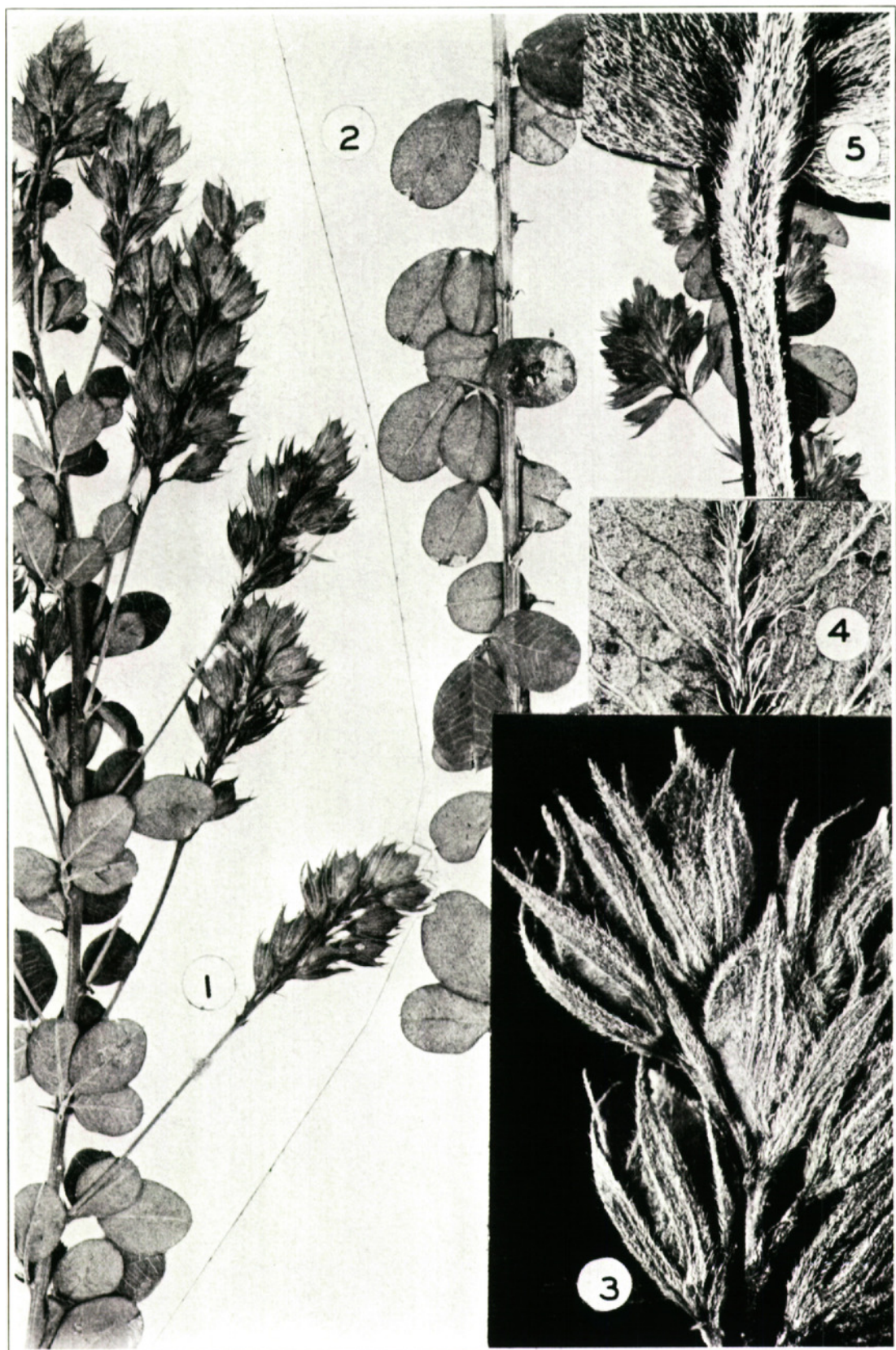


Photo. W. H. Hodge.

LESPEDEZA HIRTA, var. *APPRESSIPILIS*: FIG. 1, summit of fruiting plant (ISOTYPE), $\times 1$; FIG. 2, median cauline leaves and (at right) flowering raceme, $\times 1$; FIG. 3, portion of fruiting raceme, $\times 4$; FIG. 4, lower surface of leaf, $\times 10$; FIG. 5, summit of petiolule of terminal leaflet, $\times 10$.

- a. Peduncles mostly much shorter than their subtending leaves, producing a virgate leafy inflorescence; racemes relatively compact in fruit, only 1–2.5 cm. long; leaflets oblong, velutinous or sericeous, the larger ones 3–6 cm. long and 1–2 cm. broad; northern.....Var. *dissimulans*.

L. HIRTA (L.) Horneman., var. *TYPICA* Schindler in Engler, Jahrb. xlix. 623 (1913). *Hedysarum hirtum* L. Sp. Pl. 748 (1753). *L. polystachya* Michx. Fl. Bor.-Am. ii. 71, t. 40 (1803). *L. hirta* (L.) Hornem. Hort. Reg. Bot. ii. 699 (1815). *L. hirta*, var. *sparsiflora* Torr. & Gray, Fl. N. Am. i. 368 (1840).—Dry soils, southwestern Maine to southern Ontario, south to Georgia (Florida?), Alabama, Arkansas and eastern Texas. The following, selected from ten times as many specimens, are characteristic. MAINE: Alfred, July 23, 1936, *Knowlton*; South Berwick, September 11, 1896, *Parlin*. NEW HAMPSHIRE: Lee, Strafford Co., *Hodgdon*, no. 660; Hooksett, Merrimack Co., July 26, 1921, *C. F. Batchelder*; Hollis, Hillsboro Co., July 30, 1896, *Grout*. VERMONT: Vernon, August, 1895, *Grout*; Castleton, September 12, 1897, *Eggleston*. MASSACHUSETTS: Andover, *Pease*, no. 1516; Ayer, *Pease*, no. 23,990; Winchester, September, 1884, *Mrs. P. D. Richards*; West Roxbury, August and September, 1911, *F. F. Forbes*; Plymouth, *Fernald, Hunnewell & Long*, no. 9735; Falmouth, *Fogg*, no. 2449; Yarmouth, *Fernald & Long*, no. 9741; West Tisbury, *F. C. Seymour*, no. 1426; Nantucket, August, 1901, *Dame*; Douglas, *Weatherby et al.*, no. 3009; Sunderland, *F. C. Seymour*, no. 3733; Deerfield, *Day*, no. 97; Great Barrington, August 3, 1911, *Hoffmann*. RHODE ISLAND: Cumberland, September 13, 1903, *Williams*; Tiverton, *E. A. Mearns*, no. 187; South Kingston, *Collins & Fernald*, no. 11,360. CONNECTICUT: Franklin, August 22, 1914, *Woodward*; Southington, *Bissell*, no. 166; Waterbury, *Blewitt*, no. 768; Lyme, *Graves*, no. 305; Washington, September 1, 1919, *A. W. Evans*; Huntington, August 12, 1902, *Eames*. NEW YORK: north of Patten's Mills, Washington Co., August 9, 1896, *Burnham*; Bethlehem, Albany Co., *House*, no. 10,799; Black Rock Forest, Orange Co., *Raup*, no. 7856; Southampton, Suffolk Co., *St. John*, no. 2771; Sandy Ridge, northeast of Phoenix, Oswego Co., *Fernald, Wiegand & Eames*, no. 14,361; Ithaca, *Eames*, no. 6741. NEW JERSEY: Manchester, 1854, *Hexamer & Maier*; Atsion, August 10, 1926, *Benner, Long & Bassett*; Cold Spring, Cape May Co., *Gershoy*, no. 381. PENNSYLVANIA: Wayne, Delaware Co., *E. B. Bartram*, no. 1161; near Rohrerstown, Lancaster Co., September 19, 1901, *Heller*; Franklin, Green Co., August 3, 1922, *S. S. Dicky*; Treichler, Lehigh Co., August 25, 1923, *Churchill*. DELAWARE: near Wilmington, *R. R. Tatnall*, no. 3509. MARYLAND: College Park, *C. P. Smith*, nos. 2609 and 2767; Clinton, September, 1921, *Holm*. WEST VIRGINIA: Roland Park, Cabell Co., *Gilbert*, no.

795; White Sulphur Springs, *Hunnewell*, no. 7092. VIRGINIA: below Aldie, Fauquier Co., *Allard*, no. 890; Elko Station, Henrico Co., *Fernald & Long*, no. 9352. NORTH CAROLINA: Swain Co., August 16, 1891, *Beardslee & Kofoid*; near Biltmore, *Biltmore Herb.*, no. 587^a; Middlesex, Nash Co., *Godfrey & Kerr*, no. 6615; south of Aberdeen, Scotland Co., *Godfrey*, no. 6906. SOUTH CAROLINA: Pendleton, Anderson Co., *Wiegand & Manning*, no. 1603. ONTARIO: Queenstown Heights, *J. Macoun*, no. 474; London, *Burgess*; Leamington, *J. Macoun*, no. 34,273. OHIO: Newell Ledge, Portage Co., September 6, 1905, *R. J. Webb*; Cleveland, *Greenman*, no. 956; Friendship, Scioto Co., *Demaree*, no. 10,825. INDIANA: Bedford, *Kriebel* no. 2815; Mineral Springs, *Lansing*, no. 3356; Dune Park, *Greenman*, no. 2661. KENTUCKY: Kuttawa, Lyon Co., *Eggleston*, no. 5318; Pine Mt., Harlan Co., *Kearney*, no. 127. TENNESSEE: Cumberland Co., August 24, 1890, *Coffman*; east of Crossville, *Svenson*, no. 4195; southeast of Hollow Rock Junction, Carroll Co., *Svenson*, no. 454. ALABAMA: Auburn, September 8, 1897, *Earle & Tracy*. ILLINOIS: Cobden, *Earle*, no. 1500. MISSOURI: Green Co., 1880, *E. M. Shepard*; Swan, *Bush*, no. 3423. ARKANSAS: Booneville, Logan Co., *Demaree*, no. 8118; Hot Springs, *Scully*, no. 68; Murfreesboro, *Demaree*, no. 9404. OKLAHOMA: Page, LeFlore Co., *G. W. Stevens*, no. 3413. TEXAS: near Texarkana, Bowie Co., *Heller & Heller*, no. 4202. PLATE 678.

Lespedeza hirta is usually stated to occur from New England to Minnesota, south to Florida, etc. In the representation which has accumulated in the Gray Herbarium I find no specimens which I can refer to var. *typica* from Michigan, Wisconsin and Minnesota. If it is in those states it must be local. Similarly, I find no material of var. *typica* from Florida, where var. *appressipilis* probably takes its place.

*Var. APPRESSIPILIS Blake in RHODORA, xxvi. 32 (1924).—Florida to eastern North Carolina and, in less extreme development, to southeastern Virginia. VIRGINIA: Cedarville, Norfolk Co., *Fernald & Griscom*, no. 2843; south of Sebrell, Southampton Co., *Fernald & Long*, no. 11,057; south of Skipper's, Greensville Co., *Fernald & Long*, no. 9587. NORTH CAROLINA: near Rocky Mount, Nash Co., *Godfrey*, no. 6988; near Goldsboro, Wayne Co., *Godfrey*, no. 6573; near Sanford, Lee Co., *Godfrey*, no. 6935; near Ft. Barnwell, Craven Co., *Godfrey & White*, no. 6831; near Grantsboro, Pamlico Co., *Godfrey & White*, no. 6809. SOUTH CAROLINA: 5 miles south of Georgetown, *Godfrey*, no. 8126. GEORGIA: east of Eastman, Dodge Co., *Harper*, no. 1978. FLORIDA: specimens cited by Blake, l. c. PLATE 679.

*Var. **longifolia** (DC.), comb. nov. *L. longifolia* DC. Prodr. ii. 349 (1825). *L. capitata* var. *longifolia* (Michx.) Torr. & Gray, Fl. N. Am. i. 368 (1840). *L. hirta* var. *oblongifolia* Britton in Trans. N. Y. Acad. Sci. xii. 66 (1893). *L. oblongifolia* (Britton) Stone, Pl. So. N. J. 509 (1912).—Local, on Coastal Plain, southern New Jersey to Louisiana. NEW JERSEY: besides the original material cited by Britton and another collection cited by Stone there is a Torrey & Gray sheet without stated locality. VIRGINIA: open pineland near Mason's Siding, about 1 mile north of Henry, Sussex County, *Fernald & Long*, no. 13,654. NORTH CAROLINA: pineland near Goldsboro, Wayne Co., *Godfrey*, no. 6565. FLORIDA: dry barrens near Jacksonville, *A. H. Curtiss* (without no.). LOUISIANA: without locality, *Drummond*. PLATE 680. See discussion on p. 575.

*Var. **intercursa**, var. nov. (TAB. 681, FIG. 1–4), caulibus ad 1.5 m. altis cinereo-velutinis; foliis breviter petiolatis; foliolis linearibus obtusis subtus albido-sericeis, supra viridibus, longioribus 3–7 cm. longis 6–8 mm. latis; racemis ad 3 cm. longis; calycibus 8–10 mm. longis.—VIRGINIA: roadside, Pleasant Ridge, Princess Anne County, September 9, 1935, *Fernald, Long & Fogg*, no. 4908; clearing in wet woods near Great Bridge, Norfolk County, August 4 and 5, 1934, *Fernald & Long*, no. 3974; argillaceous and siliceous swales and swaley thickets south of Zuni, Isle of Wight County, August 20 and 22, 1936, *Fernald, Griscom & Long*, no. 6622 (TYPE in Herb. Gray); swaley clearing north of Emporia, August 19, 1936, *Fernald, Griscom & Long*, no. 6617 (most slender extreme); sphagnous bog about 1 mile northwest of Dahlia, Greensville County, August 20, 1938, *Fernald & Long*, no. 9076 (as *L. angustifolia*); all, unless noted, distributed as *L. capitata* var. *longifolia*. See discussion on p. 581.

Var. **dissimulans**, var. nov. (TAB. 682), caulibus ad 1.3 m. altis velutinis; foliolis oblongis velutinis vel velutino-sericeis, longioribus 3–6 cm. longis 1–2 cm. latis; inflorescentiis elongatis virgatis valde foliosis; pedunculis perbrevibus 0.5–1 (rarissime –3) cm. longis arcuatis adscendentibus; racemis compactis 1–2.5 cm. longis; calycibus 6–8 mm. longis; siliquis plus minusve exsertis.—Northern and western New England, south to southeastern Massachusetts; Wisconsin. The following are characteristic. MAINE: sunny gravelly bank, Orono, August 19, 1897, *Fernald*; dry thickets on clay terraces of Penobscot River, Veazie, September 6, 1916, *Fernald & Long*, no. 13,966 (TYPE in Herb. New England Bot. Club); roadside, Chesterville, August 16, 1902, *L. O. Eaton*. NEW HAMPSHIRE: dry open ground, Walpole, August 21, 1916, *C. F. Batchelder*. MASSACHUSETTS: Groveland, Essex County, *C. N. S. Horner*; moors, Nantucket, August 18, 1917, *Churchill*; Stockbridge, August 12, 1904, *Hoffmann*;

dry sandy ground, Sheffield, August 13, 1920, *Churchill*. WISCONSIN: sand-bank, Shawano, August 24, 1934, *Wadmond & Fassett*, no. 17,199; Fayette, Lafayette Co., August 22, 1889, *L. S. Cheney*.

A very puzzling plant, discussed on p. 582. Other New England specimens, collected very young and others from Wisconsin may belong here. Fully mature material is needed before the plant can be finally evaluated. The TYPE is the only collection seen with good fruit.

PLATE 673 shows details of *LESPEDEZA CAPITATA* var. *TYPICA* (var. *sericea* Hook. & Arn.): FIG. 1, summit of fruiting stem, $\times 1$, from Perdido, Alabama, *Blanton*, no. 7082; FIG. 2, fruiting head, $\times 4$, from no. 7082; FIG. 3, legumes, $\times 4$, from base of fruiting calyx of no. 7082; FIGS. 4 and 5, upper and lower surfaces of leaf, $\times 10$, from no. 7082.

PLATE 674 shows *L. CAPITATA* var. *VULGARIS* Torr. & Gray: FIG. 1, summit of flowering stem, $\times 1$, from Limington, Maine, *Fernald, Long & Norton*, no. 13,964; FIG. 2, portion of flowering head, $\times 4$, from no. 13,964; FIG. 3, portion of fruiting head, $\times 4$, from Lexington, Massachusetts, November 13, 1892, *Deane*; FIGS. 4 and 5, lower and upper leaf-surfaces, $\times 10$, from no. 13,964; FIG. 6, legumes, $\times 4$, from bases of calyx of fig. 3.

PLATE 675 is of *L. CAPITATA* var. *CALYCINA* (Schindler) Fernald: FIG. 1, summit of ISOTYPE, $\times 1$; FIG. 2, portion of fruiting spike, $\times 4$, from ISOTYPE; FIG. 3, lower leaf-surface, $\times 10$, from ISOTYPE; FIG. 4, median cauline leaves, $\times 1$, from Louisiana, *Hale*.

PLATE 676 is of *L. CAPITATA* var. *STENOPHYLLA* Bissell & Fernald: FIG. 1, summit of TYPE, $\times 1$; FIG. 2, lower leaf-surface, $\times 10$, from TYPE; FIG. 3, portion of flowering head, $\times 4$, from White County, Indiana, *Heimlich*, no. 739; FIG. 4, fruiting head, $\times 4$, from Jasper County, Indiana, *Deam*, no. 51,267; FIG. 5, legumes, $\times 4$, from bases of calices of FIG. 4.

PLATE 677 shows *L. CAPITATA* var. *VELUTINA* (Bickn.) Fernald: FIG. 1, flowering summit, $\times 1$, from Little Neck, Long Island, July 31, 1853, *Hexamer & Maier*; FIG. 2, median cauline leaves from same specimen; FIG. 3, lower leaf-surface, $\times 10$, from Groton, Connecticut, October 10, 1901, *Graves*; FIG. 4, flowering head, $\times 4$, from West Tisbury, Massachusetts, *Fernald & Fogg*, no. 935; FIG. 5, portion of fruiting head, $\times 4$, from Winchester, Massachusetts, October 20, 1901, *E. F. Williams*; FIG. 6, legumes, $\times 4$, from bases of calices of FIG. 5.

PLATE 678 shows *L. HIRTA* (L.) Hornem, var. *TYPICA*: FIG. 1, flowering top, $\times 1$, from Southington, Connecticut, September 2, 1901, *Bissell*; FIG. 2, summit of petiolule of terminal leaflet, $\times 10$, from Winchester, Massachusetts, September, 1884, *Mrs. P. D. Richards*; FIG. 3, portion of flowering raceme, $\times 4$, from Clinton, Maryland, September, 1921, *Holm*; FIG. 4, portion of a lax fruiting raceme, $\times 4$, from Hammond Pond, Brookline, Massachusetts, September 22, 1886, *Faxon*; FIG. 5, portion of compact fruiting raceme, $\times 4$, from Nottingham, New Hampshire, 1896, *A. A. Eaton*.

PLATE 679 is of *L. HIRTA* var. *APPRESSIPILIS* Blake: FIGS. 1 and 2, summit and median foliage, $\times 1$, from ISOTYPE; FIG. 3, portion of fruiting raceme, $\times 4$, from ISOTYPE; FIG. 4, lower leaf-surface; from ISOTYPE; FIG. 5, summit of petiolule of terminal leaflet, $\times 10$, from ISOTYPE.

PLATE 680 shows *L. HIRTA* var. *LONGIFOLIA* (DC.) Fernald: FIG. 1, flowering top, $\times 1$, from Louisiana, *Drummond*; FIG. 2, flowering raceme, $\times 4$, from Goldsboro, Wayne County, North Carolina, *Godfrey*, no. 6565; FIG. 3, petiolule of terminal leaflet, $\times 10$, from the *Hale* specimen.

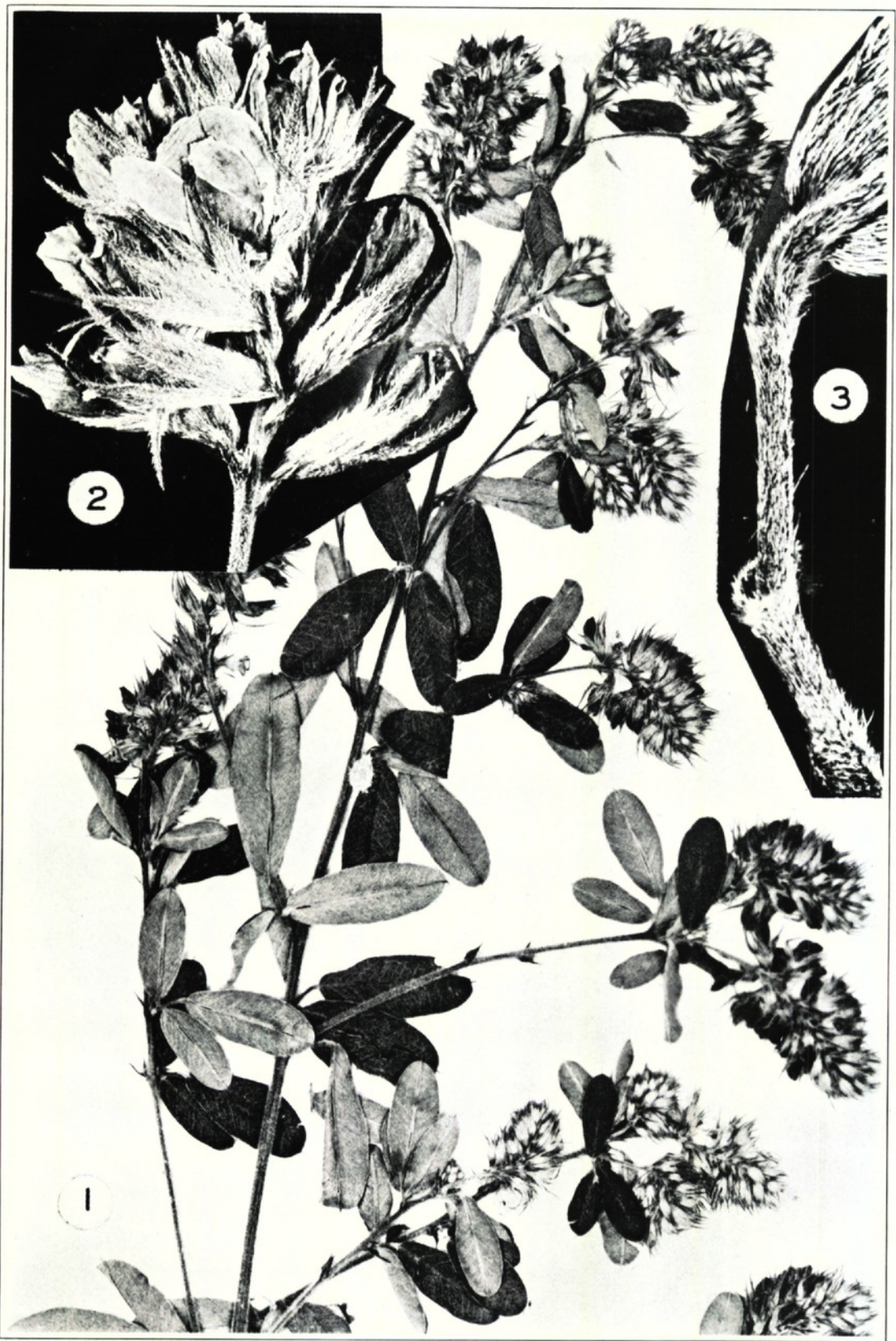


Photo. W. H. Hodge.

LESPEDEZA HIRTA, var. LONGIFOLIA: FIG. 1, summit of flowering plant, $\times 1$; FIG. 2, small flowering raceme, $\times 4$; FIG. 3, summit of petiolule of terminal leaflet, $\times 10$.



Photo. W. H. Hodge.

LESPEDEZA HIRTA, var. *INTERCURSEA*: FIGS. 1 and 2, portions of TYPE, $\times 1$; FIG. 3, summit of petiolule of terminal leaflet, $\times 10$; FIG. 4, portion of flowering raceme, $\times 4$.

L. ANGUSTIFOLIA: FIG. 5, portion of fruiting raceme, $\times 4$; FIG. 6, summit of petiolule of terminal leaflet, $\times 10$.

PLATE 681, FIGS. 1-4, shows *L. HIRTA* var. *INTERCURSA* Fernald: FIGS. 1 and 2, portions of TYPE, $\times 1$; FIG. 3, summit of petiolule of terminal leaflet, $\times 10$, from TYPE; FIG. 4, portion of flowering raceme, $\times 4$, from TYPE. FIGS. 5 and 6, details of *L. ANGUSTIFOLIA* (Pursh) Ell. (as here interpreted): FIG. 5, portion of fruiting raceme, $\times 4$, from Plymouth, Massachusetts, Fernald & Svenson in Pl. Exsicc. Gray, no. 463; FIG. 6, summit of petiolule of terminal leaflet, $\times 10$, from Egg Harbor, New Jersey, September 3, 1891, J. B. Brinton.

PLATE 682 is of *L. HIRTA* var. *DISSIMULANS* Fernald: FIG. 1, summit of TYPE, $\times 1$; FIG. 2, flowering raceme, $\times 4$, from Chesterville, Maine, August 16, 1902, L. O. Eaton; FIG. 3, fruiting raceme, $\times 4$, from TYPE; FIGS. 4 and 5, upper and lower leaf-surfaces, $\times 10$, from TYPE.

ZORNIA BRACTEATA (Walt.) Gmel. To the very few known stations in Virginia add one in HENRICO COUNTY: railroad ballast, Atlantic Coast Line Railroad freight-yard, Richmond, no. 12,381. See p. 516.

**VICIA GRANDIFLORA* Scop. NORTHAMPTON COUNTY: side of road to Savage Neck, 1 mile east of Eastville, R. R. Tatnall, no. 3381. GREENSVILLE COUNTY: near foot-path on rich deciduous wooded slope by Three Creek, slightly above the "fall-line", northwest of Emporia, no. 11,863.

A handsome European species. See p. 490.

CENTROSEMA VIRGINIANUM* (L.) Benth., var. **ellipticum (DC.) comb. nov. *Clitoria virginiana*, β . *elliptica* DC. Prodr. ii. 234 (1825), as to diagnosis. SUSSEX COUNTY: dry white sand of woods and clearings near Chub, nos. 12,690 and 13,368. JAMES CITY COUNTY: sandy border of field south of Norge, no. 13,369. First from north of South Carolina. See p. 519.

Centrosema virginianum consists, in the United States, of three varieties. The typical plant, described by Linnaeus from Virginia, has the principal well developed leaves with narrowly to broadly ovate leaflets tapering gradually to a subacuminate apex. This occurs from the West Indies and Florida to Texas and eastern Mexico, northward to southern New Jersey, Tennessee and Arkansas. It is the common plant of eastern Virginia. Var. *ellipticum* has most or all of the well developed leaves with elliptic-oblong to oblong-ovate and blunt or gradually round-tipped leaflets. DeCandolle's original diagnosis of *Clitoria virginiana*, var. *elliptica* was clear: "foliolis ovato-oblongis aut ellipticis", as contrasted with his γ . *ovata* (typical *C. virginiana*) "foliolis ovatis". Under his var. *elliptica* DeCandolle cited plate 76 of Dillenius. That, however, seems to me referable to typical *Centrosema virginianum* and not to agree with DeCandolle's diagnosis. Var. *ellipticum* is relatively

rare. We have it from northern Florida to Louisiana, north to southeastern Virginia and Wayne Co., Kentucky (*Smith & Hodgdon*, no. 3878). Extremes with narrowest leaflets grade into the more southern *Centrosema virginianum*, var. *angustifolium* (DC.) Griseb. Fl. Brit. W. Ind. 193 (1860) = *Clitoria virginiana* a. *angustifolia* DC. l. c. (1825), with linear leaflets. Var. *angustifolium* occurs from the West Indies and Florida to eastern Texas and into Mexico. I have seen no material from north of Florida and Texas; and, whereas the common Virginian plant has leaflets mostly ovate, Small, thinking of the Florida plants, describes *Bradburya virginiana* (L.) Kuntze (*Centrosema virginianum*) with "Leaflets . . . linear, often narrowly so and elongate, to ovate", with primary emphasis on "linear". In the region where Clayton collected the type no plants with linear leaflets have been found.

ZANTHOXYLUM CLAVA-HERCULIS L. Range extended inland from the outer coast to ISLE OF WIGHT COUNTY: thicket back of sand-beach of Burwell's Bay, James River, below Rushmere (Fergusson's Wharf), no. 12,696, abundant. See p. 523.

*CROTON MONANTHOGYNUS Michx. SOUTHAMPTON COUNTY: waste ground, Franklin, no. 12,396.

Extension north from North Carolina. See p. 514.

STILLINGIA SYLVATICA L. Range extended northward. SUSSEX COUNTY: dry open sandy woods and thickets near Chub, nos. 12,125 and 12,397. See p. 498.

EUPHORBIA POLYGONIFOLIA L. Range extended up the James to SURRY COUNTY: sand-beach of Cobham Bay, James River, northwest of Chippokes, no. 12,702.

E. AMMANNOIDES HBK. To the first station north of Florida recorded in RHODORA, xli. 548 (1939) add the following. YORK COUNTY: sandy beach of York River above Yorktown, no. 12,703. SURRY COUNTY: inner border of sand-beach of Cobham Bay, James River, northwest of Chippokes, no. 12,705. ISLE OF WIGHT COUNTY: inner border of sandy beach of Burwell's Bay, James River, below Rushmere (Fergusson's Wharf), no. 12,706; similar habitat, Ragged Island, northeast of Carrollton, no. 12,704. See pp. 517, 518, 522 and 523, and Wheeler in RHODORA, xliii. 128, map 39 (1941).

*E. HUMISTRATA Engelm. HENRICO COUNTY: railroad-ballast, Richmond, Fredericksburg and Potomac Railroad, Richmond, no. 12,708; similar habitat, South Richmond, no. 12,709. See p. 515 and Wheeler in RHODORA, *ibid*, 261 and map 40 (1941).

Adventive from west of the Appalachians.

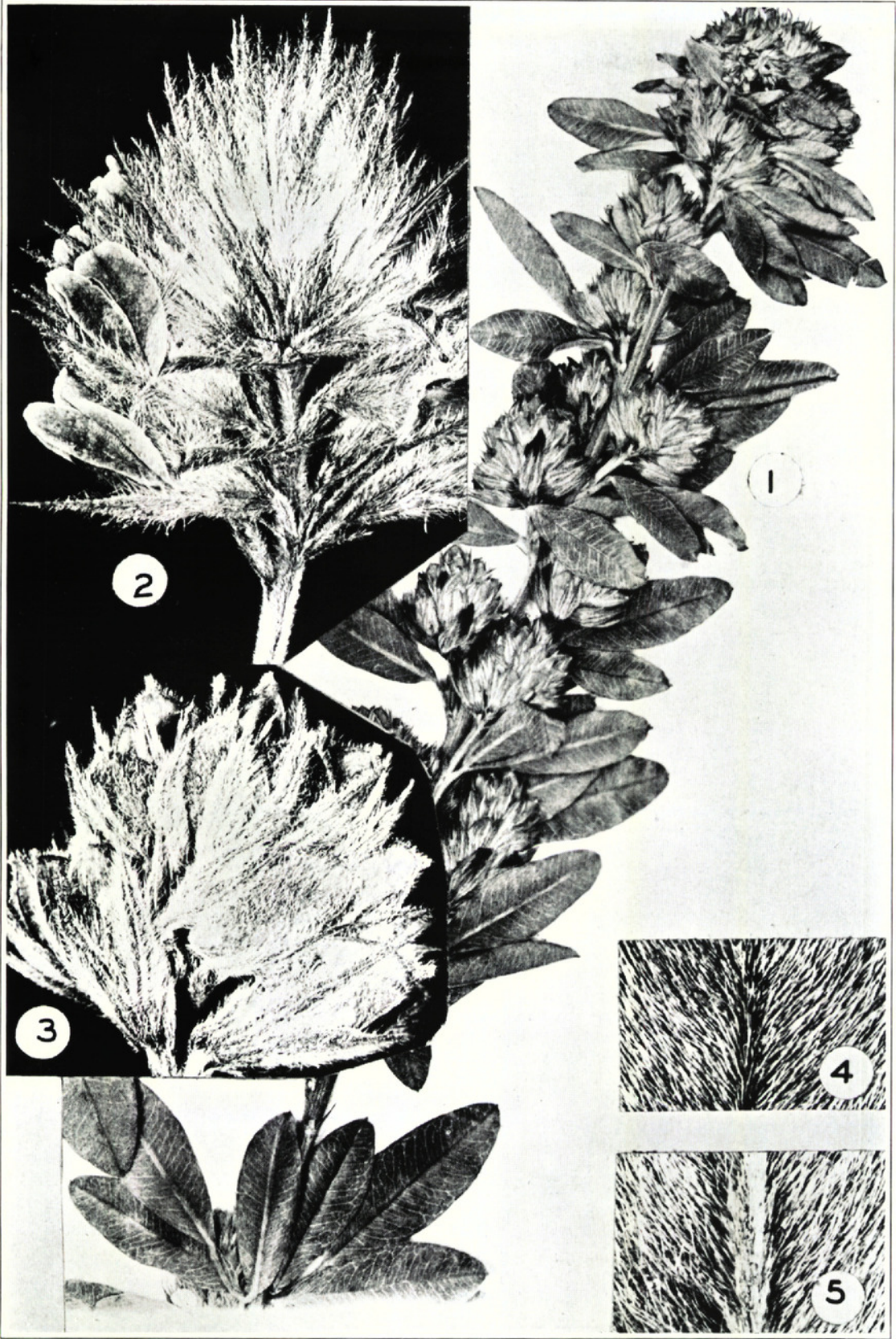


Photo. W. H. Hodge.

LESPEDeza HIRTA, var. DISSIMULANS: FIG. 1, summit of TYPE, $\times 1$; FIG. 2, flowering raceme, $\times 4$; FIG. 3, fruiting raceme, $\times 4$; FIGS. 4 and 5, upper and lower surfaces of leaf, $\times 10$.



Photo. W. H. Hodge.

RHUS RADICANS: FIG. 1, portion of TYPE. $\times 1$, from Linnean Herbarium.

R. RADICANS, var. RYDBERGII: specimen of Hortus Cliffortianus, referred by Linnaeus to *R. radicans*.

**E. MARGINATA* Pursh. SOUTHAMPTON COUNTY: waste ground, Franklin, no. 12,395. ISLE OF WIGHT COUNTY: waste ground, Lee's Mill, no. 12,394. See p. 514.

E. DENTATA Michx. To the few recorded stations add from HENRICO COUNTY: waste places and railroad ballast, Richmond, nos. 12,313, 12,712 and 12,713; leaves varying from narrowly lanceolate to elliptic-ovate.

CALLITRICHE DEFLEXA A. Br., var. *AUSTINI* (Engelm.) Hegelm. To the few recorded stations add one in SUSSEX COUNTY: argillaceous fallow field south of Stony Creek, no. 11,869. See p. 491.

Those who take up for this barely separable variety of the South American *Callitriche deflexa* the name *C. terrestris* Raf. have evidently overlooked the statements of Hegelmaier. In his *Monographie der Gattung Callitriche*, 55 (1864) Hegelmaier stated that *C. terrestris* Raf. was the terrestrial state of *C. verna*. Later, in his critical paper, *Zur Systematick von Callitriche* in *Verhandl. d. Bot. Vereins f. Brand.* ix. 16 (1867), Hegelmaier definitely said: "Was in den Herbarien unter dem Namen *C. terrestris* Raf. liegt, sind Landformen verschiedener Species, namentlich auch von *C. verna* und *heterophylla*"; and he went on to state that DeCandolle had material from Rafinesque. Rafinesque's account was as follows:

"1. *Callitriche terrestre*, terrestrial callitriche; stem procumbent spreading, leaves entire, thick, petiolated, oblong, obtuse flowers monoicous; it is found in some moist grounds in New-Jersey and Pennsylvania".—Raf. in *Med. Repos.* hex. 2, v. 358 (1808).

It might easily be the terrestrial state of one of the amphibious species and in view of Hegelmaier's comments the name can hardly be maintained for *C. deflexa*, var. *Austini*.

SOME VARIETIES AND FORMS OF *RHUS RADICANS* AND *R. TOXICODENDRON* (PLATES 683–685).—It is now quite clear that the specimen in the Linnean Herbarium which was the primary basis of *Rhus Toxicodendron* is the low and simple to only sparsely branching, erect and slender plant, with obtuse and strongly pubescent leaflets, characteristic of the Coastal Plain from New Jersey to Texas and called by Michaux *R. Toxicodendron*, var. *quercifolia*; and that the often coarser species with usually more bushy to high-climbing habit and with acuminate leaflets and less pubescence is *R. radicans* L. Photographs of the two types in the Linnean Herbarium make this clear. Within these two

major species Greene, Nieuwland and some others have proposed more than thirty of their species; though Barkley,¹ following them in treating *Rhus*, § *Toxicodendron* (Mill.) Gray as a genus *Toxicodendron*, recognizes only one departure from type in the two species in eastern North America. For many years, puzzled by the great variation of these species in eastern Virginia, Mr. Long and I have been accumulating material. This, with the large series already in the Gray Herbarium and in the herbarium of the New England Botanical Club, shows that each of the two primary species has well defined forms (some of them treated by others as species or varieties) and that in *R. radicans* we have within the Gray's Manual range three series which have sufficiently individual geographic ranges as to be apparently worthy recognition as geographic varieties. These eastern varieties and forms of *R. radicans* I distinguish as follows:

- a. Stems strongly woody and prolonged, bushy and much-branched, erect, leaning, trailing or high-climbing and then forming aerial clinging roots; leaves alternately scattered along the branches; terminal leaflet narrowly to broadly ovate, scarcely rotund, gradually acuminate . . . b.
- b. Leaves firm to subcoriaceous, on petioles 2–10 (rarely –18) cm. long; leaflets mostly entire, the terminal one 3.5–10 (–14) cm. long; fruiting panicles dense, 1.5–5 (–7) cm. long; erect, leaning or climbing . . . c.
- c. Fruit glabrous.
 - Leaves glabrous or pilose or hispid only along the midrib and bases of veins . . . *R. radicans* (typical).
 - Leaves pilose on the lower surface . . . *Forma hypomalaca*.
- c. Fruit pubescent; leaves as in typical form. *Forma malacotrichocarpa*.
- b. Leaves membranaceous, on petioles mostly 0.65–2 dm. long; leaflets coarsely dentate or lobate, undulate or entire, the terminal one 1.1–2 dm. long; fruiting panicle more open, 3.5–8 cm. long; high-climbing . . . d.
- d. Lower leaf-surfaces and petioles glabrous . . . *Var. vulgaris*.
- d. Lower leaf-surfaces soft-pubescent.
 - Petioles glabrous . . . *Forma intercursa*.
 - Petioles villous-tomentose . . . *Forma Negundo*.
- a. Stems woody for only 0.5–6 dm. above creeping subterranean stoloniferous bases, simple or very sparsely upright-branched, with no aerial roots; leaves approximate at summit of stem and branches, thus appearing falsely verticillate, on erect petioles 0.5–2.3 dm. long; leaflets membranaceous or subcoriaceous (in exposed habitats), dentate, undulate or entire, the terminal one broadly ovate to suborbicular (rarely narrower) and abruptly acuminate, 0.4–1.5 dm. long, the veins and veinlets of the lower surface often hirtellous . . . *Var. Rydbergii*.

¹ Barkley in Ann. Mo. Bot. Gard. xxiv. 417–441 (1937).

R. RADICANS L. Sp. Pl. i. 266 (1753), photograph of TYPE in Gray Herb., our PLATE 683, FIG. 1. *R. Toxicodendron*, var. *γ. microcarpa* Michx. Fl. Bor.-Am. i. 163 (1803), photograph in Gray Herb.¹ *R. radicans*, var. *microcarpa* (Michx.) DC. Prodr. ii. 69 (1825). *Toxicodendron radicans* (L.) Ktze. Revis. Gen. i. 153 (1891). *R. Toxicodendron*, var. *radicans* (L.) Dippel, Handb. Laubholz. ii. 376 (1892). *R. Blodgettii* Kearney in Bull. Torr. Bot. Cl. xxi. 486 (1894). *T. Blodgettii* (Kearney) Greene, Leaf. i. 126 (1905). *R. Toxicodendron*, forma *radicans* (L.) McNair in Field Mus. Bot. Ser. iv. 68 (1925). *T. radicans*, var. *microcarpum* (Michx.) Farwell in Am. Midl. Nat. xii. 125 (1930).—Thickets, open woods, sandy or rocky places and fencerows, southern Quebec to Minnesota, south to Nova Scotia, New England, Long Island, Florida, Kentucky and Illinois. Among many specimens examined, the following are characteristic. QUEBEC: Ste.-Geneviève, Ile de Montréal, *Adrien*, no. 1439. NOVA SCOTIA: East Jordan, Shelburne Co., *Fernald & Long*, no. 24,095; Yarmouth, *Pease & Long*, no. 21,785; Vaughan (Tusket) Lake, Gavelton, Yarmouth Co., *Fernald & Long*, no. 24,048. MAINE: Northfield, Aug. 15, 1931, *Knowlton*; Rockland, *Fernald*, no. 1994; Bowdoinham, *Fassett*, no. 352. NEW HAMPSHIRE: Gorham, *Pease*, no. 10,711; Plymouth, *Fernald*, no. 11,800. MASSACHUSETTS: Hyannis, Barnstable, *Fernald*, *Butters & St. John*, no. 15,269; Brewster, *Fernald & Long*, no. 17,053; Harwich, *Fernald & Long*, no. 17,055. RHODE ISLAND: Warren, *Sanford*, no. 10,121; Wickford, June 18, 1908, *E. F. Williams*. CONNECTICUT: Bethlehem, *Weatherby*, no. 4956; Oxford, June 8, 1889 and July 24, 1896, *Harger*. NEW YORK: Montezuma, Cayuga Co., *Eames*, *Wiegand & Randolph*, no. 12,399; Greenport, Long Island, August 22, 1858, *E. S. Hoar*. NEW JERSEY: New Brunswick, *F. L. Stevens* in Halsted's Am. Weeds, no. 119; east of Cedar Grove, Ocean Co., *Fogg*, no. 4832. PENNSYLVANIA: West Philadelphia, *J. W. Adams*, no. 619.

¹ I am purposely refraining from guesses as to the identities of the species of Miller in his Gardeners Dictionary, ed. 8 (1768). Many authors, including Barkley, have assumed, apparently without studying Miller's types (if they exist), that his *Toxicodendron vulgare*, *pubescens*, *glabrum* and *volubile* are all referable to typical *Rhus radicans* L. The latter, as shown by a photograph of the type (our PLATE 683, FIG. 1) is the shrub with relatively small, firm and entire ovate to ovate-lanceolate leaflets with rounded bases, the petioles rarely 1 dm. long. *T. vulgare*, as described by Miller, had "foliolis obo cordatis, glabris, integerrimis . . . The foot-stalks of the leaves . . . near a foot long" and he cited as the only synonym of this shrub with glabrous and entire leaflets the *Toxicodendron triphyllum*, *folio sinuato pubescente* of Tournefort. Similarly, under his *T. pubescens*, "foliolis ovatis inciso-angulatis pubescentibus", Miller gave as the only synonym *T. triphyllum*, *glabrum* of Tournefort. In the modern slang, Miller's diagnoses and synonymy were a "mess." Without clarification of his names by means of accurate photographs they cannot safely be interpreted. For similar reasons I am omitting several additional names, listed by others without question. In so plastic a group their identity, merely from the vague descriptions, can only be assumed.

DELAWARE: south of New Castle, *Tidestrom*, no. 11,547; east of Leipsic, Kent Co., *E. L. Larsen*, no. 714. WEST VIRGINIA: Hendricks, Tucker Co., *A. H. Moore*, no. 2115. VIRGINIA: False Cape, *Fernald & Long*, no. 4016; Bedford Co., June and Sept., 1871, *A. H. Curtiss*. SOUTH CAROLINA: type of *R. Toxicodendron*, var. γ *microcarpa* Michx. (photo. in Gray Herb.). FLORIDA: Alva, Lee Co., *Hitchcock*, no. 39; Sykes Hammock, Dade Co., *Small & Mosier*, no. 5482; Manatee, June, 1845, *Rugel*; Pine Key, *Blodgett* (tracing of type of *R. Blodgettii*). WISCONSIN: Milwaukee Co., 1907, *Howland Russell*. ILLINOIS: Ottawa, *J. W. Huett*. MINNESOTA: near Houston, Houston Co., *Butters & Rosendahl*, no. 3614.

When he published *Rhus Blodgettii* Kearney took as *R. radicans* the southern shrub with large, membranaceous and pubescent leaves which I am treating as a form under var. *vulgaris*. Kearney, with this interpretation of *R. radicans*, said that *R. Blodgettii* "may easily be distinguished by the smaller . . . thick and coriaceous leaflets, the upper surface shining and perfectly smooth, the lower surface pubescent only in the axils of the veins and at the base of the midrib", while his "*R. radicans* has the upper surface of the leaf almost always pubescent at least on the midrib, the lower surface pubescent all over."

*Forma **hypomalaca**, f. nov., foliorum paginis infernis pilosis. NEW YORK: along south wall, Vaughns, north of Hudson Falls, Washington Co., August 22, 1912, *S. H. Burnham*; on fence, 2 miles east of Vaughns, September 23, 1897, *Burnham*. WEST VIRGINIA: dry upland woods, Berea, Ritchie Co., August 23, 1922, *L. F. & F. R. Randolph*, no. 1385 (TYPE in Herb. Gray). VIRGINIA: woods and thickets at base of calcareous bluffs along James River, above Chippokes, June 10, 1941, *Fernald & Long*, no. 13,064. KENTUCKY: Iroquois Park, May 16, 1932, *H. Bishop*, no. 56.

Forma **malacotrichocarpa** (*A. H. Moore*), comb. nov. *R. littoralis* Mearns in Proc. Biol. Soc. Wash. xv. 148 (1902), isotype in Gray Herb. *R. Toxicodendron*, forma *malacotrichocarpum* *A. H. Moore* in RHODORA, xi. 163 (1909), TYPE in Gray Herb. *Toxicodendron radicans*, var. *littoralis* (Mearns) Barkley in Ann. Mo. Bot. Gard. xxiv. 434 (1937).—Scattered in the range of the glabrous-fruited plant, from Maine to Florida and Indiana.

Barkley, l. c., cites many specimens, to which many more might be added. He also includes in the synonymy *Toxicodendron aboriginum* Greene, Leaflet i. 125 (1905), from Okla-

homa, which I have not seen. Greene's description calls for "thin" leaflets and "fruit . . . sparsely muriculate", whereas forma *malacotrichocarpa* has subcoriaceous leaves and distinctly pilose or villous fruit.

Var. *VULGARIS* (Michx.) DC. Prodr. ii. 69 (1825), at least as to basynym. *R. Toxicodendron*, var. *α. vulgare* Michx. Fl. Bor.-Am. i. 183 (1803), photograph of TYPE in Gray Herb.—Swampy woods and bottomlands, Florida to eastern Texas, north to southern Maine, Massachusetts, New York and Oklahoma. The following, selected from many specimens, are typical. MAINE: Fairfield, *Fernald & Long*, no. 14,017. MASSACHUSETTS: Andover, *Pease*, no. 836; Lexington, May 30, 1896, *Churchill*; New Marlboro, July 3, 1912, *Hoffmann*. RHODE ISLAND: Johnston, June 13, 1912, *Thos. Hope*. NEW YORK: Ithaca, *Wiegand*, no. 12,402. PENNSYLVANIA: Conewago, May 28, 1889, *Heller*; Northampton, August 21, 1923, *Churchill*. DELAWARE: west of Wilmington, *Tidestrom*, no. 11,500. MARYLAND: Horse Point, Tuckahoe River, *Tidestrom*, no. 11,977. SOUTH CAROLINA: northeast of Pineville, Berkeley Co., *Godfrey & Tryon*, no. 579; TYPE of variety, *Michaux* (photograph). FLORIDA: near Kissimmee, Osceola Co., *Hunnewell*, no. 8693. OKLAHOMA: Tishomingo, Johnston Co., *H. W. Houghton* in distrib. *G. W. Stevens*, no. 3559; Boss, McCurtain Co., *Houghton* in distrib. *Stevens*, no. 3718; Commerce, *Bush*, no. 10,142. TEXAS: Lake Como, Tarrant Co., *Ruth*, no. 941. PLATE 684.

It should be noted that in publishing *Rhus Toxicodendron*, var. *vulgaris* Michaux made no reference to the wholly dubious or confused *Toxicodendron vulgare* Mill. His var. *vulgaris* cannot, therefore, be held as a mere transfer of Miller's name. If it be urged that Michaux intended his var. *vulgaris* in the sense of typical *R. Toxicodendron*, it should be kept in mind that the specimen he described from South Carolina and Georgia is very different from the type of *R. Toxicodendron* L. I am, therefore, taking up Michaux's varietal name for the variation of *R. radicans* which he had.

*Forma **intercursa**, f. nov., var. *vulgari similis*, foliolis subtus velutino-pilosis, petiolis glabris.—PENNSYLVANIA: Neshaminy, Bucks Co., June 10, 1928, *Fred McDowell*. VIRGINIA: deciduous woods, Curles Neck Farm, Henrico Co., June 21, 1936, *Fernald, Long & Smart*, no. 5832 (TYPE in Herb. Gray); wooded bottomlands and swampy woods near Nottoway River, east of Stony Creek, Sussex Co., June 9, 1938, *Fernald & Long*, no. 8349.

*Forma **Negundo** (Greene), comb. nov. *Toxicodendron Negundo* Greene, Leaflet i. 117 (1905). *R. Toxicodendron Negundo* (Greene) F. C. Gates in Trans. Kans. Acad. Sci. xli. 106 (1938).—Distinguished by the large mostly membranaceous leaflets villous-tomentose beneath, the petioles also tomentose.—Wooded swamps and bottomlands, Florida to eastern Texas, north to Virginia, Ohio, Indiana, Illinois and Iowa. The following are characteristic. VIRGINIA: Matoaka Park, James City Co., *Baldwin*, no. 362; seeping calcareous wooded bluffs by Burwell's Bay, James River, below Rushmere (Fergusson's Wharf), Isle of Wight Co., *Fernald & Long*, no. 13,065; Claremont Wharf, Surry Co., *Fernald & Long*, no. 8350; Blacksburg, Montgomery Co., *Adams & Wherry*, no. 2230; Pembroke, Giles Co., *Fogg*, no. 14,773. NORTH CAROLINA: Tryon, Polk Co., May 18, 1899, *Churchill*. OHIO: Yellow Springs, Greene Co., *Demaree*, no. 11,455. INDIANA: Ingalls, Madison Co., *H. H. Smith*, no. 5619. TENNESSEE: Maryville, Blount Co., May 3, 1934, *R. K. Godfrey*. ILLINOIS: Starved Rock, La Salle Co., *Greenman, Lansing & Dixon*, no. 66. ARKANSAS: Lake City, Craighead Co., *Demaree*, no. 7218; West Memphis, Crittenden Co., *Demaree*, no. 11,118; Natural Steps, Pulaski Co., *Demaree*, no. 8569; Norman, Montgomery Co., *Demaree*, no. 9563; War Eagle, Benton Co., *Demaree*, no. 6784. LOUISIANA: near Alexandria, *Ball*, no. 429. KANSAS: Riley Co., *J. B. Norton*, no. 79, ISOTYPE of *Toxicodendron Negundo*. TEXAS: San Antonio, *Jermy*, no. 326.

*Var. **RYDBERGII** (Small) Rehder in Journ. Arn. Arb. xx. 416 (1939). *R. Rydbergii* Small ex Rydb. Mem. N. Y. Bot. Gard. i. 268 (1900). *Toxicodendron Rydbergii* (Small) Greene, Leaflet i. 117 (1905). *T. macrocarpum* Greene, l. c. (1905). *T. coriaceum* Greene, *ibid.* 120 (1905). *T. pumilum* Greene, *ibid.* 124 (1905). *T. punctatum* Greene, *ibid.* 125 (1905). *R. Toxicodendron*, var. *Rydbergii* (Small) Garrett, Spring Fl. Wasatch Reg. ed. 3: 69 (1917).—Woods, rocky slopes and wet peat, Gaspé County, Quebec, to southern British Columbia, south to Nova Scotia, northern, central and western New England, mountains of western Virginia, northern Indiana, northern Illinois, western Kansas, Texas, New Mexico and Arizona. The following, selected from abundant specimens, are characteristic. QUEBEC: Cape Rosier, Gaspé Co., July 14, 1932, *Pease*; Milniké, Matapeia R., *Rousseau*, no. 32,417; Montmorency Falls, *J. Macoun*, no. 66,814. NEW BRUNSWICK: gorge of Aroostook River, Victoria Co., Aug. 17, 1901, *E. F. Williams*; Woodstock, *Fernald & Long*, no. 14,016. NOVA SCOTIA: Port Bevis, Victoria Co., *Fernald & Long*, no. 21,792; Five-mile River, Hants Co., *Pease & Long*, no. 31,789; Bridgewater, *Fernald & Long*, no. 24,093. MAINE: Fort Fairfield, *Fernald*, no. 1995; Winn, *Fernald & Long*,



Photo W. H. Hodge.

RHUS RADICANS, var. *VULGARIS*: characteristic terminal leaflet, $\times 1$.



Photo. W. H. Hodge.

RHUS TOXICODENDRON: FIGS. 1 and 2, TYPE, $\times 1$, from Linnean Herbarium.
R. TOXICODENDRON, forma *ELOBATA*: FIG. 3, TYPE (including fruit), $\times 1$.

no. 14,014; Pembroke, *Fernald*, no. 1993; Camden, *Rossbach*, no. 532. NEW HAMPSHIRE: Stark, *Pease*, no. 17,465; Randolph, *Pease*, no. 16,705; Shelburne, *Pease*, no. 12,249. VERMONT: Willoughby Lake, June 5, 1895, *Churchill*; Shelburne Point, June 25, 1913, *Knowlton*; Halifax, June 28, 1939, *Knowlton*. MASSACHUSETTS: Bradford, June 17, 1914, *Churchill*; Stony Brook Reservation, Suffolk Co., June 7, 1919, *Kidder*. NEW YORK: Trenton Falls, *Haberer*, no. 197; Selkirk, Oswego Co., *Fernald*, *Wiegand & Eames*, no. 14,374; Lansing, *Wiegand*, no. 12,401; Ithaca, *E. L. Palmer*, no. 768. VIRGINIA: north of Hopewell Gap, Bull Run Mts., Fauquier Co., *Allard*, no. 462; at 3600 ft. alt., near Luray, *Steele & Steele*, no. 151. ONTARIO: Stokes Bay, Bruce Peninsula, *Krotkov*, no. 9192. MICHIGAN: Charity Island, Saginaw Bay, Huron Co., September 25, 1911, *C. K. Dodge*; Agricultural College, June 9, 1894, *Skeels*. WISCONSIN: Minong, Washburn Co., *Fassett*, no. 8528; Milwaukee Co., 1907, *Howland Russell*. MINNESOTA: Spring Grove, *Rosendahl*, no. 280; Schoolcraft Island, Itasca Park, *M. L. Grant*, no. 2976. MANITOBA: Lake Winnipeg Valley, 1857, *Bourgeau*. NORTH DAKOTA: Devil's Lake, July 17, 1902, *Lunell*. SOUTH DAKOTA: Deadwood, *Rydberg*, no. 83. KANSAS: at 3500 ft. alt., Syracuse, Hamilton Co., *C. H. Thompson*, no. 102, isotype of *Toxicodendron macrocarpum* Greene. OKLAHOMA: Knowles, Beaver Co., *G. W. Stevens*, no. 516 (the specimen, showing the base broken off at ground-level, is less than 3 dm. high and characteristic var. *Rydbergii*; the memorandum on the label, "Climbing trees and shrubs", must have belonged to some other number). SASKATCHEWAN: without definite locality, 1857–8, *Bourgeau*. IDAHO: Lake Pend d'Oreille, *Sandberg*, *MacDougal & Heller*, no. 963. WYOMING: Hartville, *A. Nelson*, no. 557; Pole Creek, *A. Nelson*, no. 154; Sheridan, *Rollins*, no. 558. COLORADO: at 5000 ft., Poudre R., Larimer Co., *J. H. Cowen*, no. 126; Norwood Hill, San Miguel Co., *E. P. Walker*, no. 498. UTAH: Wahsatch Mts., *S. Watson*, no. 218; Farmington Cañon, alt. 4300–4500 ft., *Pammel & Blackwood*, no. 3630; Farmington, June 11, 1908, *Mrs. Joseph Clemens*; Jackson Draw, alt. 7000 ft., Uinta Basin, *E. H. Graham*, no. 8115. NEW MEXICO: Kingston, alt. 6600 ft., *O. B. Metcalfe*, no. 1088, isotype of *Toxicodendron punctatum* Greene; Mogollon Mts., at 7500 ft., *O. B. Metcalfe*, no. 339; Winsor's Ranch, alt. 8400 ft., Pecos River National Park, *Standley*, no. 4011. ARIZONA: vicinity of Flagstaff, alt. 7000 ft., *MacDougal*, no. 28, isotype of *Toxicodendron pumilum* Greene; Navaho Reservation, *C. T. Vorhies*, no. 62; Chaperon Canyon, Chiricahua Mts., alt. 7500 ft., *Blumer*, no. 1325. WASHINGTON: Spokane, *Suksdorf*, no. 264 (*Toxicodendron coriaceum* Greene), *Kreager*, no. 538; Waitsburg, *Horner*, no. R 113 B 129; Coulee City, Grant

Co., Thompson, no. 9115. OREGON: The Dalles, Thos. Howell; Pendleton, June, 1886, Henderson. PLATE 683, FIG. 2.

Var. *Rydbergii* is more distinct from typical *Rhus radicans* than the other varieties and forms here considered, but altogether too many specimens are found which cannot be clearly identified. They seem to be quite transitional. There is no question that it was included by Linnaeus in his *R. radicans*. Although the sheet which Linnaeus had in his own herbarium at the time of preparing Species Plantarum is *R. radicans*, as here interpreted (PLATE 683, FIG. 1), the specimen in the Clifford herbarium (PLATE 683, FIG. 2) cited by him (Hort. Cliff. 110) is characteristic *R. radicans*, var. *Rydbergii*. The variety, I am told by some who have watched it in the field, rather rarely fruits as compared with the frequent and abundant fruiting of typical *R. radicans*. This scarcity of fruiting may, perhaps, be correlated with the highly perfected vegetative reproduction by subterranean stolons. There is no satisfaction in trying to separate the firm-leaved plants of open and more xerophytic habitats from the thinner-leaved plants of mesophytic areas. Greene indulged freely in an attempt to set up as species such responses to aridity and moisture, but the most extraordinary of his propositions is his *Toxicodendron pumilum*, based upon specimens collected on June 2, with the shattered fruit of the preceding year persisting and the new leaves not yet expanded.¹

¹ In ordering up the material in the Gray Herbarium I find it necessary to have satisfactory names for the following:

RHUS RADICANS, var. *laetevirens* (Greene), stat. nov. *Toxicodendron laetevirens*, *phaseoloides* and *Arizonicum* Greene, Leaf. i. 123 (1905).

Isotypes of all three are in the Gray Herbarium, all from the same phytogeographic area, and show no difference which I can detect. They have very pale and narrow leaflets as compared with the other varieties of *R. radicans*.

R. RADICANS, var. *verrucosa* (Scheele), comb. nov. *R. verrucosum* Scheele in Linnaea, xxi. 592 (1848). *Toxicodendron verrucosum* (Scheele) Greene, Leaf. i. 124 (1905). *T. radicans*, var. *verrucosa* (Scheele) Barkley in Ann. Mo. Bot. Gard. xxiv. 435 (1937).

R. RADICANS, var. *divaricata* (Greene), comb. nov. *Toxicodendron divaricatum* Greene, Leaf. i. 122 (1905). *R. divaricata* (Greene) McNair in Field Mus. Publ. Bot. iv. 69 (1925), not Eckl. & Zeyh. (1834). *R. Greenei* McNair, ibid. as Correction (1925). *T. radicans*, var. *divaricata* (Greene) Barkley in Ann. Mo. Bot. Gard. xxiv. 433 (1937).

R. RADICANS, var. *pubens* (Engelm. ex Wats.), comb. nov. *R. Toxicodendron*, var. *foliis ramulisque molliter pubentibus*. Thickets, New Braunfels [Texas], Engelm. ex Gray in Bost. Journ. Nat. Hist. vi. 295.—Pl. Lindh. pt. ii. 159 (1850). *R. Toxicodendr.*, var. *pubens* Engelm. ex Wats. Bibl. Index, 185 (1878), interpretable through reference to descr.

The sheet of the type or isotype in the Gray Herbarium has Lindheimer's label with the data: "247. High in thickets, not climbing, fl. odorous. New Braunfels, Texas.

True *Rhus Toxicodendron* is a relatively constant species. Although the name was early tossed about, the specimen in the Linnean Herbarium (our PLATE 685, FIGS. 1 and 2) which Linnaeus had in preparing *Species Plantarum* is quite definite. It was properly interpreted by many of the earlier authors (Nuttall, DeCandolle and others) and recently by Britton and by Rehder as the small nonclimbing shrub of the southeastern Coastal Plain which was called by Michaux *R. Toxicodendron*, var. *quercifolia*. Barkley has given the synonymy under *Toxicodendron quercifolium* [as *quercifolia*] (Michx.) Greene in *Ann. Mo. Bot. Gard.* xxiv. 420 (1937) and it need not here be repeated, except to exclude as altogether doubtful the *T. pubescens* Mill. and the resultant combination *R. pubescens* (Mill.) Engler. As to the specific name, it is somewhat singular that most, if not all, monographers cite the original binomial, *Rhus Toxicodendron*, without qualification as published by Linnaeus in *Species Plantarum*, ed. 1 (1753), except when, as in DeCandolle's *Prodromus* (ii. 69) and in Engler's treatment in DeCandolle's *Monographiae*, iv. 393 (1883), they start it from p. 381, which was in ed. 3 (1766) of *Species Plantarum*, where, as in his ed. 2 (1762), Linnaeus definitely called it *R. Toxicodendrum*. Barkley (p. 426), to be sure, says "*R. Toxicodendrum* L., *Sp. Pl.* 1: 266. 1753, in part; Torr. & Gray, *Fl. N. Am.* 1: 218. 1838, as *R. Toxicodendron*", thus implying that, first, the name was spelled *Toxicodendrum* by Linnaeus in 1753 and, second, that the change to *Toxicodendron* started with Torrey & Gray in 1838. Since there is no justification for either of these inferences and since the citation in *Index Kewensis* is inadequate, it seems important to attempt a clarification of the name. As I see the facts they are embodied in the following paragraph.

RHUS TOXICODENDR L. *Sp. Pl.* i. 266 (1753). *R. Toxicod.* L. *Syst. Nat.* ed. 10, ii. 964 (1759). *R. Toxicodendron* L. *Syst. Nat.* ed. 11, ii. 964 (1760). *R. Toxicodendrum* L. *Sp. Pl.* ed. 2, i, 382 (1762) and ed. 3, i. 381 (1766). *R. Toxicodendr.* L. *Syst. Nat.* ed. 12, ii. 218 (1767) and ed. 13, ii. 218 (1770).

F. L. Aug. '46" and in Engelmann's hand "*Rhus Toxicodendron* ? var. *pubens*". The larger and flowering specimen has very pale bark, the young growth cinerous-puberulent, the panicle very long and lax, the firm leaflets densely velvety-puberulent. This I take as TYPE or ISOTYPE. With it is a small sterile sprig of var. *verrucosa*.

It is evident that Linnaeus and the space-regulations of his printers caused some doubt as to the ending of the name, a borrowing of the earlier generic name *Toxicodendron*. Fortunately, however, the first time the full spelling was used (unless, unhappily, I may have overlooked a case) for the species, in 1760, Linnaeus conformed to the long-established usage.

Typical *Rhus Toxicodendron* has lobulate or coarsely toothed leaves suggesting oak-leaves, whence the colloquial POISON OAK. They are crowded near the tip of the slender ascending stem and thus appear somewhat falsely verticillate. Their lower surfaces are velvety to the touch with dense pilosity, and the fruit is commonly very pubescent. The lobes or teeth vary from rounded to deltoid but there seems to be no clear character to separate such variations. In adding to the synonymy Greene published several names. One of his proposed species, *Toxicodendron compactum* Greene, Leaflet i. 126 (1905), of which an isotype is before me, had leaflets which "recall strongly those of some oaks of the black oak series; though the lobes are all obtuse." On the next page it was said of *T. quercifolium* (Michx.) Greene that "Its leaflets are patterned always after the black-oak type, i. e. are acutangular, while in . . . *T. compactum* they have sinuate and rounded lobes, imitating the white-oak type".

Scattered through the range there are colonies with more or less elliptic and almost entire to barely undulate leaflets. These are so definite that I am calling them

R. TOXICODENDRON*, forma **elobata, f. nov. (TAB. 685, FIG. 3), foliolis ellipticis subintegris. NEW JERSEY: 1½ miles southeast of Bridgeton, Cumberland County, July 20, 1909, S. S. Van Pelt (TYPE in Herb. Gray.). VIRGINIA: dry sandy woods south of Petersburg, June 8, 1938, Fernald & Long, no. 8346 (transitional); dry sandy pine and oak woods north of Orion, Greenville County, Fernald & Long, no. 13,675. LOUISIANA: without statement of locality, Hale.

Throughout its broad range, from New Jersey and Maryland to Texas, the fruit of *Rhus Toxicodendron* is usually quite pubescent. At one of our stations in Sussex County, Virginia, however, the fruit is essentially glabrous. This plant I am calling

R. TOXICODENDRON*, forma **leiocarpa, f. nov., fructibus glabris vel glabratis.—VIRGINIA: dry open sandy pine and oak thickets near the County Line, south of Jarratt, June 8, 1938, *Fernald & Long*, no. 8347 (TYPE in Herb. Gray, ISOTYPE in Herb. Phil. Acad.).

In PLATE 683, FIG. 1 is from the TYPE of *RHUS RADICANS* L.; FIG. 2, the Hortus Cliffortianus specimen included by Linnaeus with the other and here interpreted as *R. RADICANS*, var. *RYDBERGII* (Small) Rehder.

PLATE 684 shows a characteristic terminal leaflet, $\times 1$, of *RHUS RADICANS*, var. *VULGARIS* (Michx.) DC., from Tishomingo, Oklahoma, *H. W. Houghton* in distrib. *G. W. Stevens*, no. 3559 (quite like the TYPE of *R. Toxicodendron*, var. *vulgare* Michx.—photograph too weak for reproduction).

In PLATE 685, FIGS. 1 and 2 are from the TYPE of *RHUS TOXICODENDRON* L.; FIG. 3 from TYPE, $\times 1$, of *R. TOXICODENDRON*, forma *ELOBATA* Fernald.

THE VARIATIONS OF *RHUS AROMATICA* IN THE GRAY'S MANUAL RANGE (PLATES 686 and 687).—

RHUS AROMATICA Ait., var. **arenaria** (Greene), comb. nov. *Schmaltzia arenaria* Greene, Leaflet i. 130 (1905). *R. trilobata*, var. *arenaria* (Greene) Barkley in Ann. Mo. Bot. Gard. xxiv. 408 (1937); *Schmaltzia trilobata*, var. *arenaria* (Greene) Barkley in Am. Midl. Nat. xxiv. 660 (1940).

The small-leaved extreme of *Rhus aromatica* which centers on the dunes at the head of Lake Michigan has the characteristic fruits and stones of *R. aromatica*, not those of *R. trilobata* Nutt. The latter, described from "the central chain of the Rocky Mountains" has, as originally described, "the nut flat". In his treatment of the group, originally in *Rhus*, when, under conservative influence, he followed the broad and mature judgment of DeCandolle, Torrey, Gray, Endlicher, Bentham & Hooker, Engler and many others (including even Rydberg and Small in their later years) in maintaining the subgenus within *Rhus*, and in his latest paper, preferring the procedure of Desvaux, Rafinesque and Greene in keeping it apart, Barkley places the small-leaved shrub of the dunes of Lake Michigan under *R. trilobata* or *Schmaltzia trilobata* because of its small leaves, with flabelliform terminal leaflet.

That the group is most complex every one knows; and Rafinesque, Greene and Rydberg proposed nearly half a hundred specific names for its variations in the United States alone. The shrub of "the central chain of the Rocky Mountains", from Alberta to New Mexico, described by Nuttall as *R. trilobata* (PLATE 686, figs. 1–5) has the fruit pruinose with waxy or glandular

atoms and without or with only remote nonglandular villi. The stone (FIGS. 4 and 5) is 4.5–6 mm. long and strongly flattened, the sides almost plane.

The more eastern *Rhus aromatica* Ait. (*R. canadensis* Marsh., not Mill.) has larger leaves than in *R. trilobata* and the fruit is very densely long-villous, so densely that the surface of the fruit is almost hidden (PLATE 687, FIG. 9); and the relatively plump (though compressed) stones (FIGS. 10 and 11) have somewhat rounded to subumbonate sides and are 3.8–4.5 mm. long. It is, therefore, significant that the small-leaved shrub of the dunes of Lake Michigan described by Greene as a species, *Schmaltzia arenaria* (PLATE 686, FIGS. 6 and 8–10), and treated by Barkley as an isolated eastern variety of the western *Rhus* or *Schmaltzia trilobata*, should have the densely long-villous fruit (FIG. 8) and the relatively plump and small stone (FIGS. 9 and 10) of the eastern *R. aromatica*. Although in his recent *Flora of Indiana* Deam follows Barkley, it is quite reassuring that, in his detailed account of the small-leaved shrub of the Indiana dunes in his earlier *Shrubs of Indiana* (1924), he should have said: "It appears to be a dwarf form [of *Rhus canadensis*, i. e. *R. aromatica*] with puberulent branchlets. All specimens from the dune area belong to this form, and specimens from Porter County were referred to this species by Nieuwland. A study of the branchlets of specimens from thirteen counties shows that those from the dune area of Lake Michigan, and from Clark and Harrison Counties are puberulent. The remainder are smooth or nearly so. It is believed that the smoothness or pubescence of the branchlets is a character not sufficient to divide the species, on account of the intergrading forms."¹

Consideration of the lines, if there are any, between *Rhus aromatica* and *R. trilobata*, as the latter is reputed to occur in the Gray's Manual range, leads one to *Schmaltzia serotina* and *S. lasiocarpa* Greene. Their treatment by different authors is as follows:

SCHMALTZIA SEROTINA Greene, *Leaf.* i. 131 (1905). *S. lasiocarpa* Greene, *ibid.* 141 (1905). *Rhus canadensis*, var. *serotina* (Greene) Palmer & Steyermark in *Ann. Mo. Bot. Gard.* xxii. 591 (1935). *R. trilobata*, var. *serotina* (Greene) Barkley in

¹ Deam, *Shrubs of Indiana*, 173 (1924).

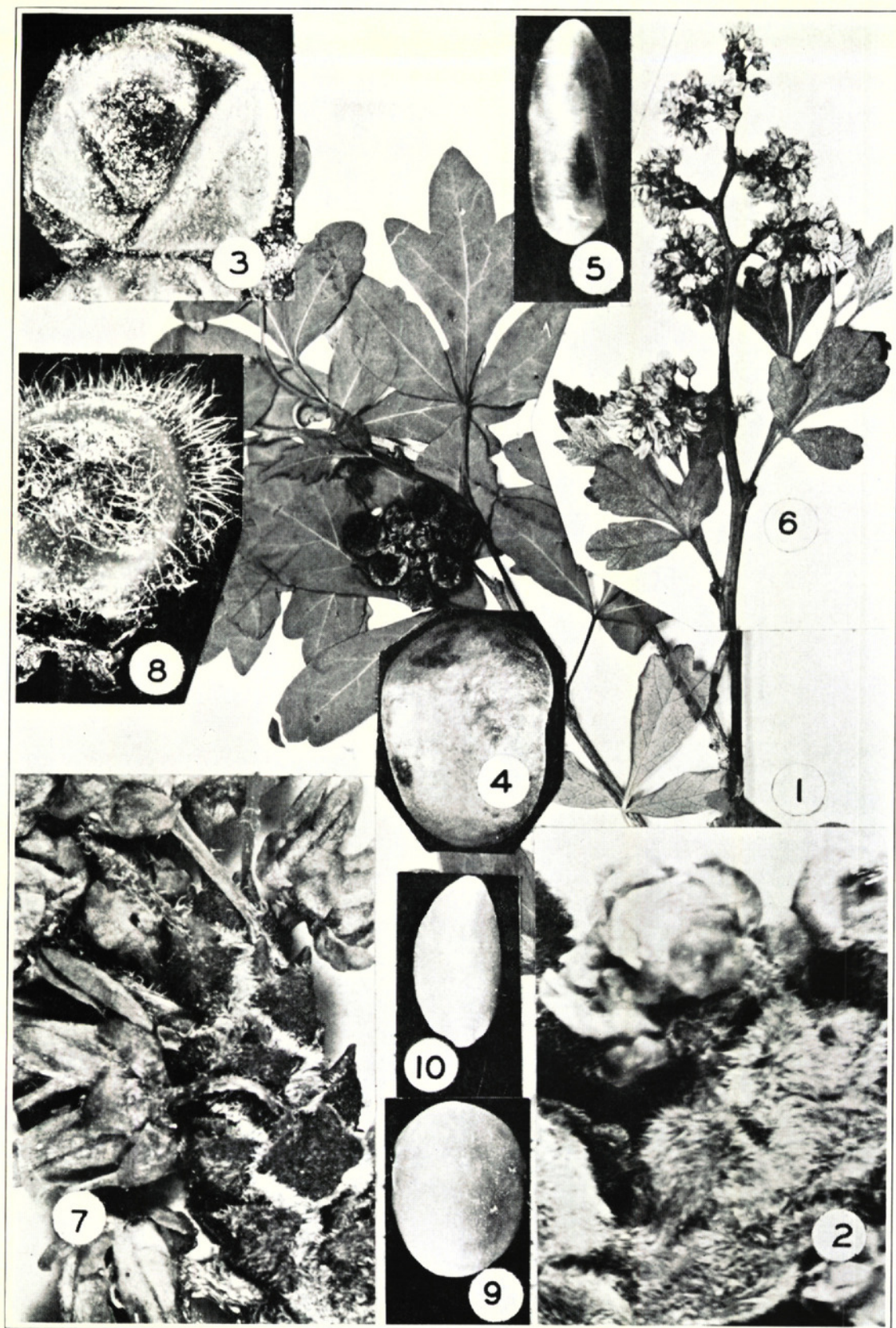


Photo. W. H. Hodge.

RHUS TRILOBATA: FIG. 1, fruiting branch, $\times 1$; FIG. 2, portion of inflorescence, showing pubescent bracts, $\times 10$; FIG. 3, drupe, $\times 5$; FIGS. 4 and 5, stone, $\times 5$.

R. AROMATICA: FIG. 7, portion of inflorescence, showing glabrous backs of bracts, $\times 10$.

R. AROMATICA, var. *ARENARIA*: FIG. 6, flowering branch, $\times 1$; FIG. 8, drupe, $\times 5$; FIGS. 9 and 10, stone, $\times 5$.

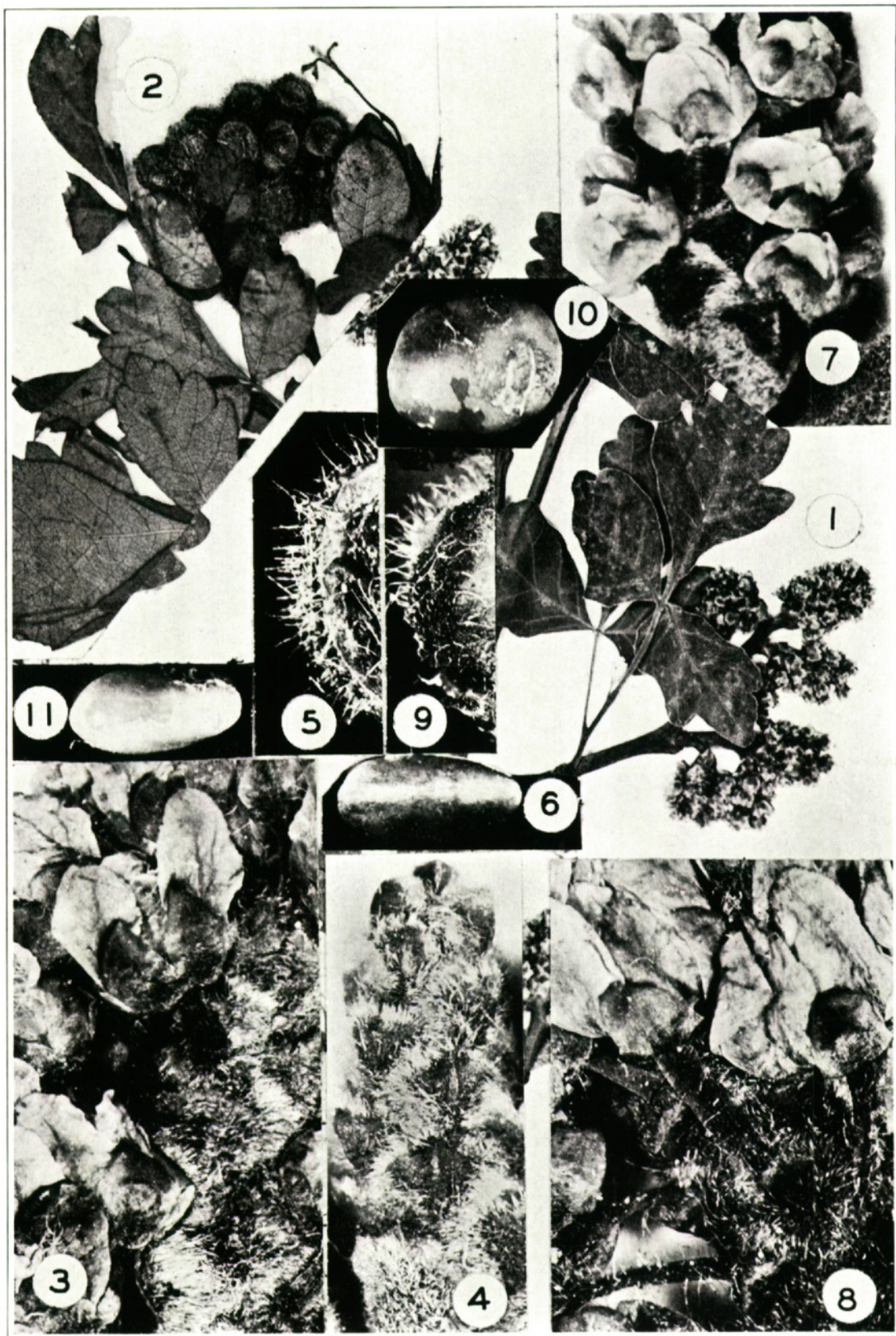


Photo. W. H. Hodge.

RHUS AROMATICA: FIGS. 7 and 8, portions of inflorescences, $\times 10$; FIG. 9, portion of drupe, $\times 5$; FIGS. 10 and 11, stone, $\times 5$.

R. AROMATICA, var. *SEROTINA*: FIG. 1, flowering branch, $\times 1$; FIG. 2, fruiting branch, $\times 1$; FIG. 3, portion of inflorescence, $\times 10$; FIG. 4, young ament, $\times 10$; FIG. 5, portion of drupe, $\times 5$; FIG. 6, stone, $\times 5$.

Ann. Mo. Bot. Gard. xxiv. 406 (1937). *Rhus aromatica*, var. *serotina* (Greene) Rehder in Journ. Arn. Arb. xx. 415 (1939). *Schmaltzia trilobata*, var. *serotina* (Greene) Barkley in Am. Midl. Nat. xxiv. 661 (1940).

I have before me many of the numbers cited by Barkley, including nine sheets from the original collector of *Schmaltzia serotina* and an isotype of Greene's *S. lasiocarpa*, treated, correctly, by Barkley as inseparable from *S. serotina*. It is, then, important to note that these have heavily long-villous fruit (PLATE 687, FIGS. 2 and 5) as in *Rhus aromatica* and the relatively plump stone (FIG. 6) as in the eastern species. Their terminal leaflets were described by Barkley under *R. trilobata*, var. *serotina* as "4-9 cm. long, 5-8 cm. broad", and he considered them "a fairly uniform variety with fruit characters similar to the species, and with leaf characters between those of the species and *R. aromatica*." The variety, as it occurs from Iowa and eastern Nebraska to Arkansas and eastern Oklahoma, is nearly uniform, but in the many sheets before me the terminal leaflets are only 2.5-6 cm. long and 2-4 cm. broad. Greene's original description of his *Schmaltzia serotina*, from Missouri, said "terminal leaflet 2 inches [5.7 cm.] long or more, 1½ [3.8 cm.] wide; his account of his *S. lasiocarpa*, from Kansas, said "terminal leaflet 1¼ to 1¾ inches [3.18-4.45 cm.] long". I am unable to reconcile Greene's original measurements or my own with those given by Barkley in his monograph. Neither do I find the "uniform variety with fruit-characters similar to the species [*R. trilobata*]", at least as shown by the series from Nuttall's type-area of *R. trilobata*, "the central chain of the Rocky Mountains"; for typical *R. trilobata*, as already noted, has pruinose and only sparsely if at all villous fruit and flattened stones, *R. aromatica*, var. *serotina* densely long-villous fruit and smaller and plumper stones.

Two other characters seem to me wholly to justify Palmer & Steyermark and Rehder in treating *Schmaltzia serotina* as a variety of *Rhus aromatica*, rather than of *R. trilobata*. These are the bracts of the ament, and the relatively short pedicels. In typical *R. trilobata* the loosening bracts (PLATE 686, FIG. 2) of the ament are densely villous over the back; in *R. aromatica* they (PLATE 686, FIG. 7 and PLATE 687, FIG. 7) have a nearly

or quite glabrous area within the densely ciliate margin. In *R. aromatica*, var. *serotina* the bracts (PLATE 687, FIG. 4) show the bare area as in true *R. aromatica*.

Barkley characterizes the eastern *Rhus aromatica*¹ as having "flowers almost sessile", while his description assigns *R. trilobata* "pedicels about 2.5 mm. long." PLATE 686, FIG. 7 and PLATE 687, FIG. 8 show portions of flowering aments, $\times 10$, from Natural Bridge, Virginia, of typical *R. aromatica*; PLATE 687, FIG. 3, a similar portion, also $\times 10$, of an ament from Greenwood, Missouri (cited by Barkley), of *R. aromatica*, var. *serotina*. That the flowers in PLATE 686, FIG. 7 and in PLATE 687, FIG. 8 are not "almost sessile" and that the pedicels in PLATE 687, FIG. 3 do not approach "2.5 mm." is sufficiently evident.

I am fortunate that all the variations of the *Schmaltzia*-series within the Gray's Manual range are so clearly referable to *Rhus aromatica*, for farther west the complex generally referred to *R. trilobata* or its varieties shows many unfortunate transitions. *R. canadensis*, var. *serotina*, with leaflets too large and fruit too densely villous for typical *R. trilobata*, passes insensibly, it would seem, into the very small-leaved but villous-fruited shrub of Kansas, Oklahoma and Texas which Greene called *Schmaltzia pulchella*, *S. quercifolia* and *S. tridophylloides*, all of which are unequivocally placed by Barkley under *R. trilobata* (typical) or one of its varieties. These seem to merge westward and northwestward into the shrub with sparsely villous to non-villous fruit; and the old-fashioned treatment of them all as geographic varieties of a single specific type may prove to be the sound one.

In PLATE 686 FIGS. 1-5 are of *RHUS TRILOBATA* Nutt.: FIG. 1, fruiting branch, $\times 1$, from Leucite Hills, Wyoming, *Merrill & Wilcox*, no. 704; FIG. 2, portion of inflorescence showing pubescent backs of bracts, $\times 10$, from Blue Grass Hills, Wyoming, *A. Nelson*, no. 322; FIG. 3, drupe, $\times 5$, from Twin Falls and Shoshone Falls, Idaho, *Nelson & Macbride*, no. 1350; FIGS. 4 and 5, stone, $\times 5$, from Howe's Gulch, Colorado, *Crandall*, no. 124. FIGS. 6, 8, 9 and 10, *R. AROMATICA* Ait., var. *ARENARIA* (Greene) Fernald:

¹ *Rhus aromatica* is cited by Barkley from but two stations in Canada: Ile Lemieux, which is in the lower Ottawa River, not far from Ottawa; and Shannonville, which is slightly north of the eastern end of Lake Ontario. Nevertheless, his map, with only two dots in Canada, indicates the species as growing from Nippissing District to Algoma, north of Lake Huron and 300-400 miles northwest of its cited Canadian stations. He also cites and maps it from the Arnold Arboretum in Boston, where, of course, it is cultivated. There is no evidence of it as a native of New England outside of western Vermont and southern Connecticut.

FIG. 6, flowering branch, $\times 1$, from Pine, Indiana, *Lansing*, no. 2711; FIG. 8, drupe, $\times 5$, from Port Chester, Indiana, July 19, 1920, *D. C. Peattie*; FIGS. 9 and 10, stone from same collection. FIG. 7, portion of inflorescence of *R. AROMATICA* Ait., to show glabrous-backed bracts and long pedicels, $\times 10$, from Natural Bridge, Virginia, May 8, 1887, *Kennedy*.

In PLATE 687 FIGS. 1-6 are of *RHUS AROMATICA* Ait., var. *SEROTINA* (Greene) Rehder: FIG. 1, flowering branch, $\times 1$, from Greenwood, Missouri, *Bush* no. 6676; FIG. 2, fruiting branch, $\times 1$, from Louisa County, Iowa, June 26, 1909, *Shimek*; FIG. 3, portion of inflorescence, showing glabrate backs of bracts, $\times 10$, from no. 6676; FIG. 4, young ament showing glabrous backs of bracts, $\times 10$, from Vale, Missouri, *Bush* no. 4929; FIG. 5, portion of drupe, $\times 5$, from *Shimek*; FIG. 6, stone, turned edge up, $\times 5$, from *Shimek*. FIGS. 7-11, *R. AROMATICA* Ait.: FIG. 7, portion of expanding inflorescence, showing glabrous backs of bracts, $\times 10$, from Guilford, Connecticut, May 1, 1905, *G. H. Bartlett*; FIG. 8, portion of expanded inflorescence, showing long pedicels, $\times 10$, from Natural Bridge, Virginia, May 8, 1887, *Kennedy*; FIG. 9, portion of drupe, $\times 5$, from Lansing, New York, *MacDaniels*, no. 4508; FIGS. 10 and 11, stone, $\times 5$, from Middleburg, New York, *Svenson*, no. 7841.

CELASTRUS ORBICULATUS Thunb. To the station recorded in Caroline County add one in HENRICO COUNTY: thickets and borders of woods, Richmond, no. 12,717.

C. SCANDENS L. ISLE OF WIGHT COUNTY: thicket back of sand-beach of Burwell's Bay, James River, below Fort Boykin, no. 12,716. SURRY COUNTY: rich calcareous wooded ravines along James River, Claremont, no. 13,680 (plants weak and sterile). See p. 520.

Our first records from the Coastal Plain of Virginia.

STAPHYLEA TRIFOLIA L. To the few Coastal Plain stations recorded add one in DINWIDDIE COUNTY: wooded bottomland of Appomattox River below Petersburg, no. 12,127. See p. 492.

ACER FLORIDANUM (Chapm.) Pax. Local range extended northward and northeastward. YORK COUNTY: rich wooded ravine by York River, above Yorktown, no. 12,128. ISLE OF WIGHT COUNTY: rich calcareous wooded slopes by Burwell's Bay, James River, below Rushmere (Fergusson's Wharf), no. 12,718; wooded bluffs along James River below Fort Boykin, no. 13,070; seen in great abundance west of Fort Boykin. SUSSEX COUNTY: alluvial woods along Nottoway River at Readjuster Bridge, south of Peanut, no. 12,399. See pp. 505, 510 and 523.

**A. RUBRUM* L., var. *DRUMMONDI* (Hook & Arn.) Sargent. SUSSEX COUNTY: dry white sand of woods and clearings near Chub, no. 12,720; swampy woods near Nottoway River, above Readjuster Bridge, south of Peanut, no. 13,072. SOUTHAMPTON COUNTY: dry woods and clearings south of Berlin, no. 7526. NANSEMOND COUNTY: open wet pineland southwest of Marsh Hill School, south of South Quay, no. 12,721.

Range extended north from South Carolina.

**IMPATIENS BIFLORA* Walt., forma *PEASEI* A. H. Moore. KING WILLIAM COUNTY: fresh tidal marsh of Pamunkey River, Sweet Hall, no. 12,724.

**I. BIFLORA*, forma *IMMACULATA* Weatherby. KING AND QUEEN COUNTY: fresh tidal marsh of Mattaponi River, Walkerton, no. 12,723.

**PARTHENOCISSUS INCERTA* (Kern.) K. Fritsch, forma *MACROPHYLLA* (Lauche) Rehder. DINWIDDIE COUNTY: waste place, Petersburg, no. 12,408; spread from cultivation.

AMPELOPSIS ARBOREA (L.) Koehne. To the few recorded stations add the following. PRINCESS ANNE COUNTY: climbing high in trees, Cedar Island, no. 12,406. ISLE OF WIGHT COUNTY: waste ground near Lee's Mill, no. 12,407. See pp. 513 and 514.

**VITIS LABRUSCANA* Bailey. HENRICO COUNTY: waste places and railroad ballast, Richmond, no. 12,405; obviously from seed thrown from car-window.

V. AESTIVALIS Michx., var. *ARGENTIFOLIA* (Munson) Fernald. SURRY COUNTY: thicket back of sand-beach of Cobham Bay, James River, northwest of Chippokes, nos. 12,728 and 12,729. ISLE OF WIGHT COUNTY: similar habitat, Burwell's Bay, James River, below Rushmere (Fergusson's Wharf), no. 12,730.

The common northern and upland extreme with petioles and new branchlets glabrous. See p. 524.

V. CINEREA Engelm. Local range extended northward to the James River. ISLE OF WIGHT COUNTY: thickets and borders of cypress and gum swamps back of beach of Burwell's Bay, James River, below Rushmere (Fergusson's Wharf), no. 12,731; Bailey's Beach (MacKimmie's Wharf), near Rushmere, no. 12,734.

V. BAILEYANA Munson. ISLE OF WIGHT COUNTY: thicket back of sand-beach of Burwell's Bay, James River, at Bailey's Beach (MacKimmie's Wharf), near Rushmere, no. 12,732; border of cypress and gum swamp back of beach of Burwell's Bay, below Rushmere (Fergusson's Wharf), no. 12,733. See p. 524.

First record east of the upland of western Virginia.

**TILIA FLORIDANA* (V. Engler) Small. SURRY COUNTY: rich woods on fossiliferous sandy slopes of gullies near Claremont Wharf, no. 7897 (as *T. Michauxii* Nutt.).

Extension north from North Carolina.

Tilia, as it occurs along the lower James, is as baffling as elsewhere. I find myself incapable of applying with satisfaction the keys and descriptions of Sargent's revision of the American species in Bot. Gaz. lxvi. 421-438, 494-511 (1918). But, judging by specimens so identified, our no. 7897 seems to be *T. flori-*



Photo. W. H. Hodge.

KOSTELETZKYA VIRGINICA, var. TYPICA: FIG. 1, flowering branch, $\times 1$; FIG. 2, fruit, $\times 3$.
Var. AQUILONIA: FIG. 3, flowers, $\times 1$, from TYPE; FIG. 4, fruit, $\times 3$.
Var. ALTHEAEFOLIA: FIG. 5, fruit, $\times 3$.



Photo. W. H. Hodge.

HELIANTHEMUM CAROLINIANUM (type-species of *Crocanthemum*): FIG. 1, flowering plant, $\times 1$; FIG. 2, mature inflorescence, $\times 1$; FIG. 3, ovary and sessile stigma, $\times 10$.

H. GUTTATUM (*Tuberaria guttata*): FIG. 4, plant, $\times \frac{1}{2}$, after Reiche and Janchen.

H. GLOBULARIFOLIUM (*Tuberaria*): FIG. 5, ovary and stamens, $\times 5$, after Grosser.

dana (V. Engler) Small, Fl. Se. U. S. 761 and 1335 (not "Ashe, Fl. Southern U. S.," as cited by Sargent).

Near the station for no. 7897 there are handsome trees with the leaves heavily white-felted beneath when mature, our no. 8365, which I have already reported as *T. heterophylla* Vent. It is a close match for many specimens from the Appalachian Upland but perhaps not for "*T. heterophylla*" as interpreted by Sargent, op. cit. 423. There, in his key, he assigns "*T. heterophylla*" "petioles not more than 4 cm. long; . . . flowers 3.5–5 mm. long", as contrasted with his proposed new *T. monticola*: "petioles up to 7 cm. in length; . . . flowers 10–12 mm. long". On p. 504, however, he describes his "*T. heterophylla*" with "Flowers 6–7 mm. long"; and under *T. heterophylla*, with "petioles not more than 4 cm. long", Sargent (p. 509) retains as var. *Michauxii* (Nutt.) Sarg. the cordate-leaved tree occurring from "southern and western New York . . . to Missouri and northwestern Arkansas, . . . Southward through Kentucky and Tennessee . . . , Georgia and . . . Alabama". If *T. heterophylla* has "petioles not more than 4 cm. long", it is most disconcerting that so many specimens from western New York, Pennsylvania, Ohio, Kentucky and Tennessee (Sargent's *T. heterophylla*, var. *Michauxii*) should have them often 5–8 cm. long: Ithaca, New York, *Palmer & Eames*, no. 792, up to 5 cm.; Alexandria, Huntingdon County, Pennsylvania, *Porter*, up to 6.5 cm.; New Bloomfield, Perry County, Pennsylvania, *Adams*, no. 1394, up to 5.3 cm., with flowers 8 mm. long; near Cincinnati, Ohio, *C. G. Lloyd*, up to 5 cm.; Garner Creek, Kentucky, *McCoy*, no. 136, up to 8.2 cm.; Anchorage, Kentucky, *Le Constant et al.*, no. 137, up to 5 cm.; etc. These, although in the range given by Sargent for his *T. heterophylla*, var. *Michauxii* and outside the range assigned by him to his *T. monticola*, can scarcely be separated from specimens cited by him under the latter. Until those who see different species in this group give us a statement of characters which really separate them it is quite unsatisfactory to attempt differentiation.

A word should be said regarding *Tilia americana* L. and *T. neglecta* Spach. Sargent (p. 424), stating that *T. americana* was based by Linnaeus upon a specimen from Kalm "not in the Linnaean Herbarium", rejected the name, since it had been used

for the northern species (*T. glabra* Vent.) and because "both *T. neglecta* and *T. heterophylla Michauxii* are more common in the part of the country which he [Kalm] visited than the tree which recent authors have called *T. americana*." The latter occurs generally from western New Brunswick across Maine and Quebec to Manitoba, thence southward, Victorin, Fl. Laurent. 382, saying of its occurrence in Quebec "Général, sauf dans le nord-est", Dole and others, Fl. Vt. 187, citing it as "common" in Vermont, and House saying of it in New York "Common in most sections of the State". Stone (Pl. So. N. J. 548) said of it in New Jersey "Common in the northern counties, and occasional southward" but he knew of no other species there; and Porter (Fl. Penn. 208) cited it from most counties of eastern Pennsylvania and no other species there. *T. neglecta* is said by Sargent (p. 492) to reach its northern limit near Montreal, though Victorin (Fl. Laurent. 382) was doubtful of its occurrence anywhere in the province of Quebec. From the doubted station near Montreal *T. neglecta* was given a range "to the coast of Massachusetts and New York, to the valley of the Potomac River and along the Appalachian Mountains to those of North Carolina and to . . . Mississippi" etc. Now, re-examination of Kalm's routes shows that he spent much time in eastern Pennsylvania, New Jersey and northern Delaware and that he went up the Hudson, through Lake Champlain, thence to Montreal and eastward to Quebec and beyond, also to the Ontario Basin of New York State, always within the area of *T. americana* as generally understood and mostly outside the ranges of the other two species. The identity of Kalm's specimen can hardly be doubted. It is, furthermore, certainly not without significance that in September, 1748, in an enumeration of the trees of the Philadelphia region, Kalm listed as no. 52 "Die Linde, in guter Erde".¹ This could have been only *T. americana* as regularly interpreted.

As to *T. neglecta* Spach (*T. Michauxii* sensu Sargent, not Nutt.), it is a baffling series with little constancy. Theoretically it should have the leaves green or merely grayish beneath, with loosely scattered stellate hairs and simple pilosity. In fact, however, few different collections can be closely matched one

¹ Kalm, Reise, i. 221 (1757).

with another. It seems to be a series very close to glabrous *T. americana*, but with some stellate or mixed pubescence. As now interpreted it is surely not a satisfactory species. I have temporarily placed here our no. 8763 from Eastover, Surry County, and our no. 13,083 from banks of the James west of Fort Boykin, Isle of Wight County. These have permanent pubescence like that of the tree of "the coast of Massachusetts" (Harwich, *Fernald & Long*, nos. 17,083 and 18,742) which Sargent (p. 495) refers to *T. neglecta*. Since, however, his key (p. 423) calls for "tufts of axillary hairs not conspicuous" and his fuller description (p. 494) says "furnished with conspicuous tufts of axillary hairs", the would-be interpreter is left high and dry. Furthermore, at the station for no. 13,083 three trees side-by-side are referable to (1) the narrow-leaved extreme of *T. heterophylla*, (2) the broader-leaved extreme of *T. heterophylla* and (3) the green-leaved *T. neglecta*. It is most difficult to imagine seeds of three different species landing on the shore of the James at this point and then producing three large trees of different species side-by-side.

SIDA RHOMBIFOLIA L. To the single Virginian station recorded (in Southampton County) add one in ISLE OF WIGHT COUNTY: roadside, Lee's Mill, no. 12,738, a single healthy plant, obviously of recent introduction.

KOSTELETZKYA VIRGINICA (L.) Presl, var. **aquilonia**, var. nov. (TAB. 688, FIG. 3 et 4), var. *typicae* simillima; calycibus floriferis 6–10 mm. altis, bracteolis 2.5–6 mm. longis; petalis 1.8–3 cm. longis 1–1.6 cm. latis; columna 0.65–1.5 cm. longa; carpellis sparse hispido-setosis, setis 0.5–1.5 mm. longis.—Long Island, New York, to Virginia. TYPE: Hudson County, New Jersey, *D. C. Eaton* in Herb. Gray.

Kosteletzkya virginica is represented in Virginia by three varieties. Typical *K. virginica* (L.) Presl, for want of better knowledge of the Linnean type of *Hibiscus virginicus* L. (which must await the present war), I am taking in the sense of the Sprague drawings published when the specific combination was ascribed to Presl by Gray in his Gen. ii. 80, pl. 132 (1849). Sprague's published plate and the drawings which form its basis were of the southern extreme which occurs from the Gulf States and Florida north to southeastern Virginia. Whereas the northern var. *aquilonia* has the leaves mostly angulate-rotund to

-ovate, with only the upper and bracteal ones becoming narrowly ovate to lanceolate and hastate, var. *typica*¹ has the narrowly ovate to lanceolate and hastate blades extending farther down the stem. In var. *typica* (FIGS. 1 and 2) the flowering calyx (FIG. 1) is 8–13 mm. high, with linear-subulate bractlets 6–10 mm. long, the expanded flower (FIG. 1) with petals 3.2–4.5 cm. long and 2–3 cm. broad, with the column of stamens and the styles 1.5–2.5 cm. long. In var. *typica*, furthermore, the carpels (FIG. 2) are copiously villous-hirsute with hairs 1.5–2 mm. long. The smaller-flowered var. *aquilonia* has the flowering calyx 6–10 mm. high, the bractlets 2.5–6 mm. long, the expanded corolla (FIG. 3) with petals only 1.8– (rarely) 3 cm. long and 1–2 cm. broad, the column 0.65–1.5 cm. long, the carpels (FIG. 4) more sparsely hispid-setose with straight setae only 0.5–1.5 mm. long.

The third variety in Virginia is var. *altheaefolia* Chapm., coarser, with copious rough tomentum on stem and foliage giving a paler and plush-like appearance, the leaves often without divergent basal lobes, the thick pedicels rarely equaling their subtending leaves (in vars. *typica* and *aquilonia* the more slender pedicels frequently overtopping the subtending leaves), the flower much as in var. *typica* but with more hispid-tomentose calyx, the carpels (FIG. 5) very heavily villous-hirsute.

Characteristic Virginia specimens of the three varieties are cited below.

KOSTELETZKYA VIRGINICA (L.) Presl. JAMES CITY COUNTY: tidal marsh along Chickahominy River west of Toano, *R. W. Menzel*, no. 270. PRINCESS ANNE COUNTY: open clay at border of woods, east of Little Creek, no. 4029. ISLE OF WIGHT COUNTY: cypress and gum swamp back of the beach of Burwell's Bay, James River, below Rushmere (Fergusson's Wharf), no. 12,737. SURRY COUNTY: swale back of sand-beach of James River, Claremont, no. 13,691. See p. 525.

*Var. AQUILONIA Fern. PRINCESS ANNE COUNTY: border of salt marsh, arm of Lynnhaven Bay, at Third Street Bridge, Great Neck, no. 4937. NORFOLK COUNTY: brackish marsh near Kempsville, *Fernald & Griscom*, no. 2851. SURRY COUNTY: springy swale by Cobham Bay, James River, northeast of Chipokes, no. 12,736.

¹ KOSTELETZKYA VIRGINICA (L.) Presl, var. *typica*. *Hibiscus virginicus* L., Sp. Pl. ii. 697 (1753). *K. virginica* (L.) Presl ex Gray, Gen. ii. 80, pl. 132 (1849).

*Var. *ALTHEAEFOLIA* Chapm. PRINCESS ANNE COUNTY: brackish to fresh marsh along Back Bay, margin of Cedar Island, no. 12,409. See p. 513.

In PLATE 688 FIGS. 1 and 2 are of *KOSTELETZKYA VIRGINICA* (L.) Presl, var. *TYPICA*: FIG. 1, flowering branch, $\times 1$, from below Rushmere (Ferguson's Wharf), Virginia, *Fernald & Long*, no. 12,737; FIG. 2, fruit, $\times 3$, from east of Jacksonville, Onslow County, North Carolina, *Godfrey*, no. 6397. FIGS. 3 and 4, var. *AQUILONIA* Fernald: FIG. 3, flowers, $\times 1$, from the TYPE; FIG. 4, fruit, $\times 3$, from south of Hancock's Bridge, Salem County, New Jersey, *Fogg*, no. 9916. FIG. 5, var. *ALTHEAEFOLIA* Chapm.: fruit, $\times 3$, from Lake Okeechobee, Florida, *Small*, no. 8218.

**HYPERICUM DENTICULATUM* Walt. GREENSVILLE COUNTY: argillaceous clearing in swampy woods near Readjuster Bridge, northeast of Orion, no. 12,132. See p. 500.

H. MUTILUM L., var. *LATISEPALUM* Fernald. To the single recorded station add the following. KING WILLIAM COUNTY: fresh tidal marsh of Pamunkey River, Sweet Hall, no. 12,740; fresh muddy and sandy tidal shore of Mattaponi River, northwest of King William Courthouse, no. 12,739. KING AND QUEEN COUNTY: fresh tidal marsh of Mattaponi River, Walkerton, no. 12,741. NEW KENT COUNTY: fresh tidal marsh of Chickahominy River, Lanexa, no. 13,698; similar habitat, Lacey Creek, west of Walker, no. 13,697.

CROCANTHEMUM; HAS IT REALLY STABLE GENERIC CHARACTERS? (PLATES 689 and 690).—In Engler & Prantl, *Die natürlichen Pflanzenfamilien*, iii. Abt. 6: 304–306 (1895), Reiche followed the conservative and conventional course and held *Helianthemum* as a single genus, with several subgenera, throwing all American species, no matter what their habit, inflorescence and style-characters, into an all-inclusive subgenus *Lecheoides* (Dunal) Reiche (§ *Lecheoides* Dunal). In this course Reiche followed the best students of the past. Shortly thereafter, again in one of the Englerian series, *Halimium* (Dunal) Willk. and *Tuberaria* (Dunal) Spach were taken out of *Helianthemum*, this time by Grosser in Engler, *Das Pflanzenreich*, iv¹⁹³. 9 and 10 (1903). Grosser defined the three genera recognized by him as follows.

- "1. Stigma stylo brevi, recto, basi nunquam geniculato vel flexuoso suffultum. Sepala 5 vel 3. Flores aut omnes homomorphi, chasmogami, aut dimorphi, chasmogami petaliferi, multistaminei, cleistogami aut petalis minutis praedita, aut omnes apetalii, oligandri. Embryo circinatus vel subcircinatus, non plicatus. Funiculi filiformes. Genus gerontogaeum et americanum.....1. *Halimium* (Dunal) Willk.

2. Stigma sessile vel stylo brevissimo suffultum. Sepala
5. Embryo periphaericus triangulariter flexus aut
curvatus, non plicatus. Funiculi validi media parte
inflati. Genus gerontogaeum.....2. *Tuberaria* (Dunal) Spach.
3. Stigma stylo elongato basi saepius geniculato vel sig-
moideo-curvato suffultum. Embryo simpliciter vel
biplicatus. Funiculi obconici, validi, non filiformes.
Genus gerontogaeum.....3. *Helianthemum* Adans."

Although Grosser's statement of the characters differentiating *Halimium* clearly said "Stigma stylo brevi, recto . . . suffultum", his fuller description of *Halimium* (on his p. 33) allowed it to have "stigma subsessile", which is precariously close to his "Stigma sessile vel stylo brevissimo suffultum" for *Tuberaria*. Furthermore, although in his contrasting statements *Helianthemum* was described "Stigma stylo elongato basi saepius geniculato vel sigmoideo-curvato suffultum", Grosser allowed detailed drawings to be published, showing quite straight styles (in *Helianthemum Strickeri* Gross., in his fig. 15D; in *Helianthemum Schweinfurthii* Gross. (his fig. 16C) and in *Helianthemum aegyptiacum* (L.) Mill., his fig. 18I—our PLATE 690, FIG. 4).

All North and South American species were placed in two sections of *Halimium*, the third section being of the Old World. The first, *Halimium* § *Spartioides* Grosser, is Pacific American, plants with broom-like habit, no cleistogamous flowers, and seeds said to be numerous ("Capsula polysperma"), such species as *Helianthemum Greenei* Robinson (*H. occidentale* Greene, not Nym.), *Helianthemum scoparium* Nutt. (our PLATE 690, FIG. 5) and *Helianthemum spartioides* Presl. The second section recognized by Grosser was *Halimium*, § *Euhalimium* Grosser, Old World plants with isomorphic flowers and few or many seeds. The third of his sections was the polymorphic American *Halimium* § *Lecheoides* (Dunal) Grosser, with habit not broom-like, the flowers either uniform and showy or the later ones cleistogamous and with few ovules.

This section included such dissimilar plants as *Helianthemum carolinianum* (Walt.) Michx. (our PLATE 689, FIGS. 1–3), the type-species of *Crocanthemum* Spach, with broad rosulate leaves much as in *Tuberaria guttata* (L.) Grosser or *Helianthemum guttatum* (L.) Mill. (our PLATE 689, FIG. 4), with cleistogamous flowers so rare that, in revising *Helianthemum* for Small's *Flora of the Southeastern States*, ed. 2: 793 (1913), Barnhart sepa-

rated it from the other eastern American species by "Flowers all alike and petaliferous", and with the broad stigma (FIG. 3) nearly or quite as sessile as in the most extreme members of Old World *Tuberaria* (as in *Tuberaria globularifolia* (Lam.) Willk.¹, our FIG. 5), in some of which the cauline leaves are opposite or the upper alternate (PLATE 690, FIG. 1) and the flowers are "nicht selten kleistogam und dann manchmal apetal" —Janchen; *Helianthemum brasiliense* (Lam.) Pers. (our PLATE 690, FIGS. 2 and 3) with lower leaves sometimes opposite; *Helianthemum glomeratum* Lag., clearly illustrated by Grosser, l. c. fig. 11A, with opposite (instead of alternate) leaves, the petaliferous flowers (our PLATE 690, FIGS. 6 and 8) with definite styles as defined for the group, the cleistogamous flowers abundant; *Helianthemum corymbosum* Michx., which has both showy petaliferous and apetalous and cleistogamous flowers in the same corymb; *H. canadense* (L.) Michx., with the cleistogamous flowers in separate inflorescences, the broad stigma (our FIG. 10) essentially sessile; *H. propinquum* Bicknell, with slender style (fig. 11); and *H. capitatum* Nutt. (FIG. 9) and *H. rosmarinifolium* (fig. 7) also with slender styles.

In a third of the Englerian series, *Die Pflanzenfamilien*, Aufl. 2, Bd. 21: 300 et seq. (1925), Janchen took his turn at revising the generic lines, here following his *Bemerkungen zu der Cistaceen-Gattung Crocanthemum*.² Janchen felt that all the American plants ought to be treated as a single genus, because they had long been segregated geographically from the Old World ones, a type of wishful thinking too frequently taking the place of detailed studies and careful taxonomy. *Halimium* of Grosser's treatment in *Das Pflanzenreich* was forthwith split, throwing out all species which occur in the Americas as a separate genus, *Crocanthemum* Spach. The chief differences between *Halimium*, *Tuberaria* and Old World *Helianthemum* were given much as they had been by Grosser; but strictly American *Crocanthemum* was contrasted with Old World *Halimium* as having spirally arranged (instead of opposite) leaves, cleisto-

¹ On his p. 53 Grosser cited the species as *Tuberaria "globulariifolia* (Lam.) Willk.", based upon *Cistus "globulariaefolius"* Lam.; but on his p. 55 it appeared as *T. "globulariifolia* (Spach) Willk." The specific name started with Lamarck, not with Spach, and as *Cistus globularifolius*, not "*globulariaefolius*".

² Janchen in *Osterr. Bot. Zeitschr.* lxxi. 266-270 (1922).

gamous flowers in some of the species (instead of in none), sepals 5 (instead of 3 or 5) and in being native of the Americas (instead of the Old World). If development in the New World, as contrasted with the Old World, is alone a generic character, then several of our sections of *Viola* (either with or without cleistogamous flowers) are genera; so are scores of other American subgenera, sections and series in genera also represented in the Old World. In his paper in 1922 Janchen noted that *Crocanthemum* had been taken up by Britton and by Bicknell. In regard to Britton's subscribing to *Crocanthemum* as a genus I wrote in 1917: "It is noteworthy in this connection that even Dr. Britton, under *Crocanthemum* in the *Illustrated Flora*, inserts after *C. majus* a newly recorded species for the region, not as *Crocanthemum* but as *Helianthemum georgianum*, thus indicating that the change to *Crocanthemum* was made at the last moment and apparently without very careful study of the question".¹ If the segregation of amphigean genera is justified merely because Britton or his follower, Bicknell, segregated them, then the sections of *Polygonum* must be treated as genera and we must take up *Persicaria*, *Bistorta*, *Tracaulon*, *Tiniaria*, &c. It is doubtful if Britton and Bicknell (who was an intensive and keenly observant local amateur) gave the thorough world-wide study to *Polygonum* that it has received from Meisner and others who have viewed it in relation to all the genera in the family and have kept it intact. It is also evident, from the above quotation, that Britton did not go extensively into the generic constancy of *Crocanthemum*.

Rehder, following the latest German treatment, that of Janchen, gives in the second edition of his *Manual of Cultivated Trees and Shrubs*, 644-649 (1940) the conventional Germanic characterization of *Helianthemum*, with "Style elongated, curved or bent at base; sepals 5"; leaves "mostly opposite, or the upper ones alternate, rarely all alternate". No mention is made by him of cleistogamous flowers in his *Helianthemum*, though Grosser recognized 12 species of *Helianthemum* § *Eriocarpum* with "Flores saepissime cleistogami"; and, as already noted, the

¹ Fernald in RHODORA, xix. 59 (1917). At the same time I pointed out that when Spach published *Crocanthemum* as a genus, based on *Helianthemum carolinianum*, he explicitly said "Flores omnes 5-petali"; Spach at the same time setting up for the American series with apetalous cleistogamous flowers another genus which he called *Heteromeris*.

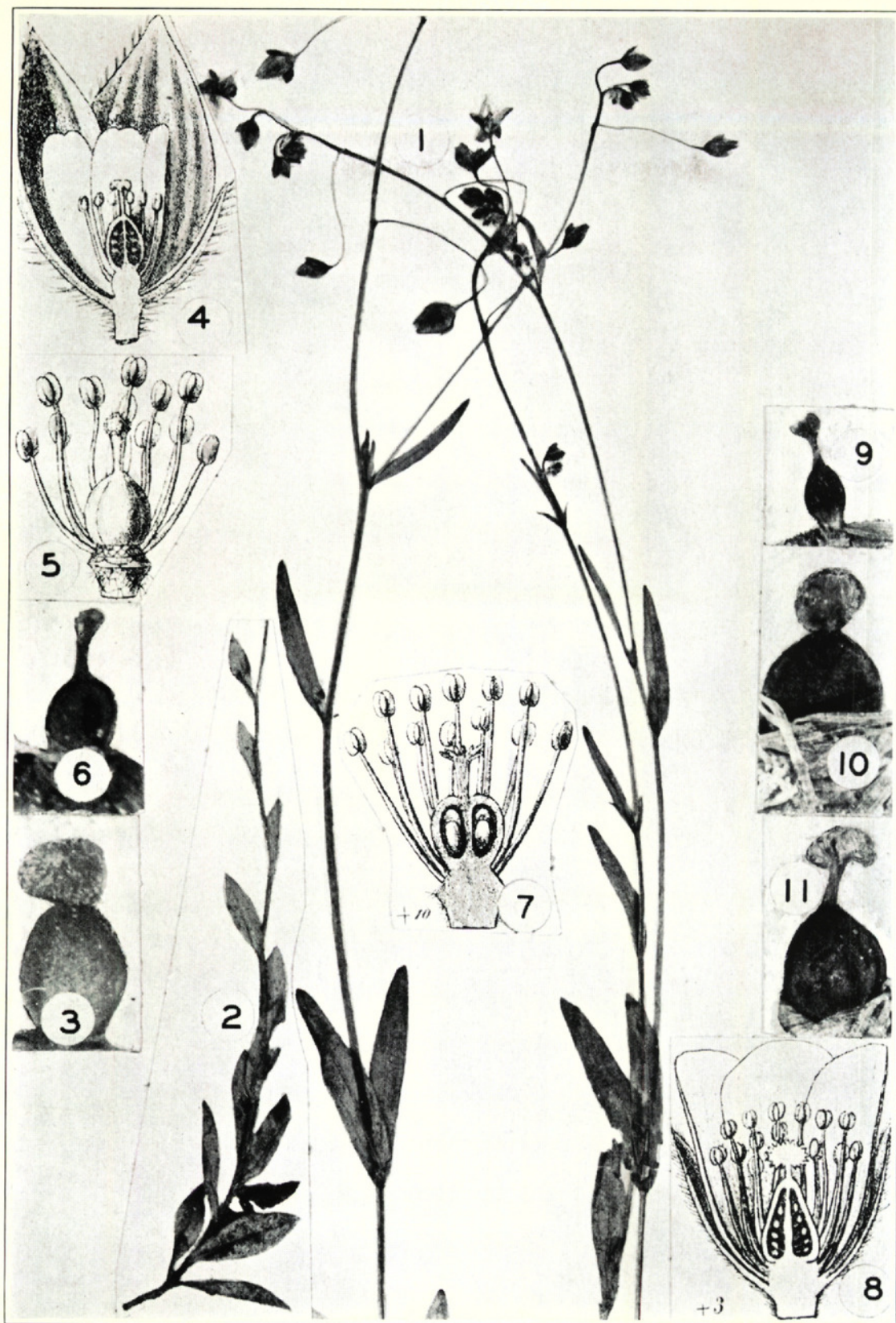


Photo. W. H. Hodge.

HELIANTHEMUM GUTTATUM (*Tuberaria*): FIG. 1, 3 fruiting stems, showing ALTERNATE leaves, $\times 1$.

H. BRASILIENSE (*Crocanthemum*): FIG. 2, base of a stem, showing OPPOSITE lower leaves, $\times 1$; FIG. 3, ovary and sessile stigma, $\times 10$.

H. AEGYPTIACUM: FIG. 4, section of flower, showing STRAIGHT style, $\times 3$, after Janchen.

H. SCOPARIUM (*Crocanthemum*): FIG. 5, ovary and stamens, $\times 8$, after Grosser.

H. GLOMERATUM (*Crocanthemum*): FIG. 6, ovary and style, $\times 10$; FIG. 8, vertical section of flower, $\times 3$, after Janchen.

H. ROSMARINIFOLIUM (*Crocanthemum*): FIG. 7, vertical section of flower, $\times 10$, after Grosser.

H. CAPITATUM (*Crocanthemum*): FIG. 9, ovary and style, $\times 10$.

H. CANADENSE (*Crocanthemum*): FIG. 10, ovary and subsessile stigma, $\times 10$.

H. PROPINQUUM (*Crocanthemum*): ovary, style and stigma, $\times 10$.



Photo. W. H. Hodge.

HELIANTHEMUM CANADENSE: FIG. 3, fruiting stems, $\times 1$.

Var. SABULONUM: FIG. 1, portion of TYPE; FIG. 2, portion of plant from Massachusetts.



Fernald, Merritt Lyndon. 1941. "ANOTHER CENTURY OF ADDITIONS TO THE FLORA OF VIRGINIA (Continued)." *Rhodora* 43, 559–630.

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