# Rhodora

JOURNAL OF THE

NEW ENGLAND BOTANICAL CLUB

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The New England Botanical Club, Inc.

8 and 10 West King St., Lancaster, Pa.

Botanical Museum, Oxford St., Cambridge 38, Mass.

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JOURNAL OF THE

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**RHODORA.**—A monthly journal of botany, devoted primarily to the flora of the Gray's Manual Range and regions floristically related. Price, $4.00 per year, net, postpaid, in funds payable at par in United States currency in Boston; single copies (if available) of not more than 24 pages and with 1 plate, 40 cents, numbers of more than 24 pages or with more than 1 plate mostly at higher prices (see 3rd cover-page). Volumes 1–9 can be supplied at $4.00, 10–34 at $3.00, and volumes 35–46 at $4.00. Some single numbers from these volumes can be supplied only at advanced prices (see 3rd cover-page). Somewhat reduced rates for complete sets can be obtained on application to Dr. Hill. Notes and short scientific papers, relating directly or indirectly to the plants of the northeastern states, will be considered for publication to the extent that the limited space of the journal permits. Forms may be closed five weeks in advance of publication. Authors (of more than two pages of print) will receive 15 copies of the issue in which their contributions appear, if they request them when returning proof. Extracted reprints, if ordered in advance, will be furnished at cost.

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*Photo. B. G. Schubert.*

RUELLIA BRITTONIANA: FIG. 1, summit of plant, × 1; FIG. 2, summit of peduncle and calyx, × 4; FIG. 3, corolla, × 1; FIG. 4, calyx and capsule, × 2.

᾿Rhodora

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CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY—NO. CLIII

# RUELLIA IN THE EASTERN UNITED STATES

M. L. Fernald

(Plates 839–875)[1]

Always a difficult genus to understand, *Ruellia*, as it occurs in the eastern United States, is quite as baffling as elsewhere. Field-experience for several seasons in eastern Virginia has demonstrated to Mr. Bayard Long and me that too often plants growing side-by-side will differ very strikingly in the degree of pubescence or its length on stem or calyx and that, to some extent, the specimens from a single small colony have to be arbitrarily sorted in order that those of a single number may be tolerably uniform. The accumulated collections have been allowed to wait, with the hope that some ambitious student would care to hunt for stable characters. Finally, however, the familiar "let Fernald do it" has prevailed and I have found it necessary to seek fundamental characters in the plants of the "Manual range". In doing so it soon became evident that, since names originally given to plants of Georgia, Carolina, Virginia, Kentucky or Arkansas were being currently used for species growing only far from the type localities, it would be necessary to consider all species occurring from the Atlantic coast to Nebraska, Kansas and eastern Texas. Happily for me the polymorphic Mexican and Texan series centering about *R.*

[1]The cost of reproducing the plates defrayed through a gift from Mr. Bayard Long.

*nudiflora* does not extend into the area specially covered, and the relatively simple *R. Drummondiana* and *R. Parryi* are likewise excluded from the present study. I have been concerned only with the species which are definitely eastern or which extend eastward into the "Manual range".

In studying these relatively few species it has become evident that much recent publication upon them has rather glibly passed by the need even to look up the original descriptions of the earlier recognized species. Thus, although *R. humilis* Nutt. was described from "rocks in the upland forests and prairies" of Arkansas, a plant with oblong-ovate and sessile leaves, the name has been transferred by Small and others to a species with rosulate and chiefly spatulate leaves occurring, to quote Small, in "Sandy soil, Coastal Plain, Fla. to Miss. and Ga."; and the latter author says "Stem 1–3 cm. tall" but correctly identifies as *R. humilis,* in his sense, specimens up to ten times that height! Again, *R. hybrida* Pursh came from Savannah, Georgia, but Small restricts it to "Pinelands, Fla." As striking a case as any is *R. parviflora* (Nees) Britton, given by Small the range "Sandy soil, Coastal Plain and adj. provinces, Fla. to Tex., Ind. and N. J."; the case striking because *Dipteracanthus ciliosus,* γ. *parviflorus* Nees, basis of Britton's binomial, came from far away from the Coastal Plain, "Ad Ky. fluvium, Julio (Short! in herb. Hook.)". Incidentally, Nees described it with petioles 3–6 inches long—"corollâ vix pollicari, foliis paulo longiori petiolo (3–6-pollicari)." Such a description can hardly apply to a plant with petioles rarely 1.5 cm. long! Nevertheless the misbegotten name, *R. parviflora* (Nees) Britton, promptly came into vogue for almost anything, with either petioled or sessile leaves and no matter where it grew, until Blake revived *R. caroliniensis* (Walt.) Steud., which was based in a roundabout way upon Walter's clear description of a characteristic Carolina plant. When *R. caroliniensis* came to the front it replaced *R. parviflora* as a blanket-name for anything, just as, still earlier, the name *R. strepens* L. had covered almost every species in the United States.

The greatest complexity is in the two series of variations which together make up the northernmost or, at least, the most northern-ranging species, *R. humilis* and *R. caroliniensis,* for a number of strictly southern species are relatively stable. The latter series of plants, relatively comforting to work with, includes *R. pedunculata* Torr., a clear-cut species radiating from the Ozarkian region southward into Louisiana and eastern Texas; two habitally similar but morphologically distinct new species, one of pine barrens of the Coastal Plain from South Carolina (possibly Virginia) to Louisiana, the other centering on the Blue Ridge and Alleghenies; another newly described species concentrated in southern Florida; *R. ciliosa* Pursh (as I interpret him), the characteristic rosulate-leaved plant of central Florida, north to South Carolina and west to Louisiana, the species treated erroneously by Small as *R. humilis* Nutt.; the fleshy plant of subtropical Florida, *R. succulenta* Small; and the local and amazingly clear long-flowered and large-fruited *R. noctiflora* (Nees) Gray, occurring from eastern Georgia to northwestern Florida, thence to southern Louisiana. There is no trouble in separating these relatively stable species nor in promptly recognizing the continental *R. strepens.*

The great difficulty is to find stable characters within the two polymorphous species, *R. caroliniensis* and *R. humilis.* The latter, characterized by somewhat uniform sessile or essentially sessile leaves, many flowering nodes and a strong tendency to bushy branching, is found through much of the prairie region, but in some of its variations it extends eastward to the Blue Ridge and in one variety even to northwestern Florida. In some areas the corolla may be only 2 cm. long, in others up to 8 cm. Whether the corolla is short or long the leaf-outlines present two parallel trends, on the one hand elliptic-oblong to oblong-lanceolate and (the larger ones) only 1–2.5 cm. broad, on the other hand ovate, oval-oblong or elliptic and 2–4 cm. broad. Furthermore, the pubescence varies from a copious wide-spreading hirsuteness to glabrescence (the latter especially on the Cumberland Plateau). Search at long and baffling periods through eight months have failed to bring to light any stable characters. The series is certainly an unstable one. I have, as the best I can yet do, suggested its recognition as a number of more or less segregated geographic varieties with some minor forms.

Similarly with *R. caroliniensis,* trials of first one character, then another, from June to February, have led to optimistic moments, these always followed by despair. At one time the reactions of the seeds in the diverse trends within the mass of material looked like a hopeful character. In *Ruellia* (at least in all of ours) the thin and discoid seeds are superficially very similar. When soaked for a few seconds in water they give an immediate reaction. They promptly send out from the margin a continuous film of mucilage and the flat surfaces become covered with minute processes. When watched for a minute or two they broaden the marginal band of mucilage and the minute processes prolong as flexuous mucilage-spiracles, these visibly shooting out (as seen by a microscope) and often suggesting slender flames. Eventually (after many minutes) the whole surface is plush-like and the marginal band breaks up (on drying) into innumerable slender spiracles; and finally the spiracles somewhat collapse, fall together as domes and eventually subside. During a full week of soaking and watching the behavior of seeds, with thousands of objects to study, I had great hopes that the different species and varieties would yield in the behavior of moistened seeds something diagnostic. When, however, the whole series was compared I was forced to give up; the possibility that, in spite of its history and development, taxonomy, through *Ruellia,* was entering the field of experimental physiology, was discouragingly abandoned. I have, then, as the best I can do, treated the polymorphous *Ruellia caroliniensis* as a series of geographic varieties, some with pretty definite areas of development, others overlapping, and within these varieties, minor local forms in which the abundance, scarcity or length of pubescence strikingly differ.

In this unusually protracted study, in view of the small number of species involved, I have had not only the accumulated material of the Gray Herbarium but that of several of the larger herbaria and of a number of smaller ones, to the officers or owners of which I extend my cordial thanks for the use of their material. Throughout the work, both in bibliographic details and in making the plates I have had the unlimited and most valuable aid of Dr. BERNICE G. SCHUBERT. Even if the keys and descriptions fail to convey my ideas of a still perplexing group her photographs will make quite clear the chief diagnostic characters.

In the citations, specimens which are in the Gray Herbarium are rarely designated as being there, then by G. The other herbaria cited are as follows:

E. Lucy Braun (Braun)
Duke University (Duke)
F. W. Hunnewell (F. W. H.)
Missouri Botanical Garden (Mo)
New York Botanical Garden (NY)
University of North Carolina (NC)
University of Pennsylvania (Pa)
Philadelphia Academy of Sciences (Phil)
Dr. P. O. Schallert (Schallert)
United States National Arboretum (USNA)
United States National Herbarium (US)
Virginia Polytechnic Institute (VPI)

As I understand these species they are as follows.

Key to Ruellia in the Eastern United States

*a.* Main axis terminating in a prolonged flowerless leafy tip, with flowers 1–few at leafy-bracted summits of branches or on peduncles from the median or lower axils, or the cymose inflorescence much branched. . . . *b.*

*b.* Leaves chiefly elongate-linear; bracts of loose cyme linear or linear-lanceolate; garden-escape in the Gulf States. 1. *R. Brittoniana.*

*b.* Leaves lanceolate, oblong, elliptic or ovate; peduncles terminated by dilated bracts; indigenous. . . . *c.*

*c.* Calyx-segments lanceolate to lance-linear, flat to the tip, 2–4 mm. broad; ovary and capsule glabrous; larger leaves with blades 7–18 cm. long and 3–9 cm. broad. . 2. *R. strepens.*

*c.* Calyx-segments narrowly linear, tapering to prolonged linear-acicular tips, the segments 0.5–1.2 mm. wide at base; larger leaf-blades 2–11 cm. long and 0.8–5 cm. broad. . . . *d.*

*d.* Stem usually divergently branching, the branches simple or forking, or stem simple to but slightly branched; peduncles or glomerules from axils of main stem or branches; calyx-segments 0.5–1 mm. wide, tapering from base to very slender tips.

Calyx, ovary and capsule pilose with slender-tipped but short spreading pubescence; plant of Ozarkian and adjacent areas. . . . . . . . . . . . . . . . . . . . 3. *R. pedunculata.*

Calyx closely covered with appressed and partially immersed slender cystoliths; ovary and capsule glabrous; plant of southeastern Coastal Plain 4. *R. pinetorum.*

*d.* Stem simple or with few ascending branches; peduncles 1-flowered, from 1 or 2(–4) nodes; calyx-segments linear, 0.7–1.2 mm. wide to near middle, tapering thence to apex, minutely canescent-pilose; capsule pilose-hirtellous; Appalachian and eastern Piedmont species. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 5. *R. Purshiana.*

*a.* Main axis with sessile or very short-peduncled glomerules or flowers in the axils of the upper (sometimes median and lower) leaves, or the terminal pairs of leaves crowded and approximate to the upper fertile axils. . . . *e.*

*e.* Calyx-segments flat, lanceolate, 2–4 mm. wide, shorter than to but slightly exceeding capsule; flowers chiefly or wholly cleistogamous, with small closed corollas; wide-ranging erect simple or but slightly erect-branching continental plant. . . . . . . . . . . . . . . . 2a. *R. strepens*, forma *cleistantha.*

*e.* Calyx-segments narrowly linear, with prolonged and slender to almost bristleform tips mostly overtopping the capsules; flowers rarely cleistogamous (except in nos. 5a and 6), mostly showy and expanding. . . . *f.*

*f.* Plant strongly dimorphic or heteromorphic; the vernal (sometimes later) stems erect and simple or slightly branched, with 1–3 showy flowers from axils of 1–3 pairs of upper leaves; later trailing or decumbent branches prolonged and bearing dense glomerules of mostly closed tubular cleistogamous flowers and abundant glabrous capsules; leaves elliptic, oblong, oblanceolate or narrowly obovate, 1.5–5.5 cm. long, definitely short-petioled, firm, with one or both faces often closely covered with slender cystoliths; expanded corolla 2.5–6 cm. long; calyx 1.5–2.5 cm. long; plant of Florida. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 6. *R. heteromorpha.*

*f.* Plant not strongly or not at all dimorphic; flowers all or nearly all with expanded corollas or, if most or all flowers cleistogamous (in no. 5a), the plant erect and simple or nearly so and the capsules pilose-hirtellous. . . . *g.*

*g.* Principal leaves spatulate-oblong or spatulate-obovate, with prolonged bases and rounded or blunt tips; stem very short and with the crowded basal leaves subrosulate, or stem elongate and erect, with the 2–5 pairs of spatulate leaves remote, these 0.3–3 cm. broad; veins of leaves and usually the uppermost internodes white-villous; species of southern Costal Plain. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 7. *R. ciliosa.*

*g.* Principal leaves ovate, lanceolate, elliptic or oblong, not appearing rosulate (if slightly subspatulate and round-tipped in no. 8, then with only minutely pilose to glabrescent fleshy stems). . . . *h.*

*h.* Stem fleshy, often hollow, glabrescent, erect, simple or with strongly ascending branches; leaves fleshy, purple-tinged, oblanceolate, narrowly obovate or oblong, essentially glabrous; calyx shorter than to one third longer than the glabrous capsule; plant of Everglades region of southern Florida. . . . 8. *R. succulenta.*

*h.* Stem not fleshy, solid, firm, pubescent to rarely glabrous; leaves membranaceous to firm, not fleshy, rarely purplish, linear-lanceolate to broadly lanceolate, oblong, elliptic or ovate, pubescent to glabrate or glabrous; calyx exceeding capsule. . . . *i.*

*i.* Leaves sessile or barely petioled but often with narrowed bases, nearly uniform or the upper but slightly reduced, erect or ascending.

Simple or with erect branches (divergently branched only after injury); primary axis with 3–10 remote pairs of narrowly lanceolate to lance- or elliptic-oblong submembrana-


*Photo. B. G. Schubert.*

Ruellia Tweediana: figs. 1 and 2, portions of branching plant, × 1; fig. 3, summit of peduncle and base of calyx, × 4; fig. 4, tip of calyx-segment, × 10; fig. 5, corolla, × 1.


*Photo. B. G. Schubert.*

Ruellia strepens: fig. 1, flowing median node, × 1; fig. 2, corolla, with one basal bract removed, × 1; fig. 3, flower, showing broad calyx-segment, × 1; fig. 4, long-peduncled fruit, × 1.

ceous puberulent or minutely hirtellous leaves tapering to apex; flowers 1–few from 1–4 upper nodes; calyx 2.5–4.5 cm. long, cinereous-puberulent or minutely hispidulous; corolla 6–11 cm. long, its slender tube 4.5–8 cm. long; capsule cinereous-puberulent, 2.25–3.5 cm. long; species of southern Coastal Plain. . . . 9. *R. noctiflora.*

Branching, rarely simple, the elongate arched-ascending to widely divergent branches often reclining at base, decumbent or with bushy habit; leaves narrowly oblong-lanceolate to broadly oval or ovate, coriaceous, with blunt or rounded tips, often hirsute to coarsely villous, 4–12 pairs on well developed primary axis equaling or longer than internodes, 4–10 nodes floriferous; calyx 1.5–2.5 cm. long, usually hirsute- to villous-ciliate; corolla 2–8 cm. long, its tube 0.7–5 cm. long; capsule glabrous, 1.2–1.5 cm. long; plant of Great Plains, eastward to Blue Ridge and, rarely, northwestern Florida. . . . . . . . . . . . . . . . . . . 10. *R. humilis.*

*i.* Leaves, or at least the principal ones, tapering to definite petioles (up to 2 cm. long), spreading to ascending; primary axis with 1–4 flowering nodes or, if more, with leaves often undulate-dentate.

Upper internodes greatly abbreviated, villous, hirsute, puberulent or glabrescent; upper pairs of leaves approximate or crowded; corolla usually showy and expanding, the flowers only exceptionally cleistogamous; calyx-segments linear-setaceous, attenuate from near the base; capsules glabrous (or, if pilose, the plant with copiously villous upper internodes, leaves and calyces). . . . . . . 11. *R. caroliniensis.*

Upper internodes elongate, minutely pilose-puberulent; upper pairs of leaves distant; corolla usually clavate, inconspicuous, unexpanding, the flowers cleistogamous; calyx-segments linear up to the middle, tapering above; capsules pilose-strigose

5a. *R. Purshiana*, forma *claustroflora.*

1. Ruellia Brittoniana Leonard, emended and validated.[1] Stems usually several, subligneous, 3–10 dm. high, subterete, nearly or quite glabrous, soon branching, subcorymbosely

[1] Validated by the following Latin diagnosis:

Ruellia **Brittoniana** Leonard, caulibus subligneis adscendentibus 3–10 dm. altis, deinde ramosis supra subcorymbosis; foliis plerumque lineari-lanceolatis utrinque valde attenuatis petiolatis, subtus lineolatis supra glabris, majoribus 0.8–2.8 dm. longis 0.5–2 cm. latis integris vel obscure undulatis; inflorescentiis subcorymbiformibus foliosis pedunculis rigide adscendentibus quam foliis subtendentibus 1/3–1/2 brevioribus; bracteis bracteolisque lineari- vel anguste lanceolato-subulatis; calycis segmentis subrigidis anguste lanceolatis attenuatis ad apicem obtusum glabris vel sparsissime hirtellis supra cystolithos gerentibus, segmentis maturis 5–10 mm. longis; corollis 2.5–4 cm. longis fauce infundibuliforme extus glabro vel sparse piloso supra 0.9–1.5 cm. lato, limbo (expanso) 2.5–5 cm. lato; capsulis lanceolato-fusiformibus glabris 2–2.7 cm. longis, retinaculis 14–24; seminibus suborbicularibus 2–2.5 mm. diametro.

branched at flowering summit: lowest leaves linear-oblong to -spatulate; principal and rameal leaves narrowly linear-lanceolate or linear, long-attenuate to callous apex and to ascending petiole, pale green, glabrous above, often lineolate beneath, the larger (primary) ones 0.8–2.8 dm. long and 0.5–2 cm. broad, entire or obscurely undulate: inflorescence corymbiform, leafy, often equaled or exceeded by upper leaves, the stiffly ascending peduncles one third to half as long as the subtending leaves and cymosely forking: bracts and bractlets linear- to narrowly lance-subulate: calyx-segments subrigid, narrowly lance-attenuate to obtuse tips, glabrous, glabrescent or barely hirtellous, usually covered with pale cystoliths; the mature segments becoming 5–10 mm. long: corolla blue-violet, 2.5–4 cm. long; cylindric tube 8–13 mm. long; the broadly infundibuliform throat glabrous to but sparsely pilose without, 1.2–2 cm. long, 0.9–1.5 cm. broad at summit; limb (laid open) 2.5–5 cm. broad, with broad rounded lobes; capsule lance-fusiform, glabrous, 2–2.7 cm. long; retinacula 14–24; seeds suborbicular, 2–2.5 mm. in diameter.—Journ. Wash. Acad. Sci. xxxi. 96, fig. 1 (1941) without diagnosis but accepted and here validated as to type, *Cryphiacanthus angustifolius* Nees in DC. Prodr. xi. 199 (1847) in part (the Galeotti specimen from Jalapa); not *R. angustifolia* Swartz, Prodr. Veg. Ind. Occ. 93 (1788). *R. spectabilis* Britton in Ann. N. Y. Acad. Sci. vii. 192 (1893), without diagnosis, only as the Mexican plant was included in his citation of the type, *Cryph. angustifolius* Nees, l. c. but not as to Paraguayan plant cited; not *R. spectabilis* Nicholson, Gard. Dict. iii. 334 (1886). *R. malacosperma* sensu Small, Man. Se. Fl. 1229 (1933), not Greenman in Proc. Am. Acad. xxxiv. 572 (1909).—Native of eastern Mexico; cultivated and spread to disturbed soils, roadsides, cultivated ground, borders of ditches, etc., from Texas to Florida. Florida: open places, Arcadia, 1918, *Small*, no. 9010 (NY) as *R. malacosperma;* Glen St. Mary, June, 1923, *C. R. Stevens* (Mo); roadsides, Ft. Myers, Aug., 1921, *W. M. Buswell* (NY) as *R. malacosperma.* Louisiana: low sandy soil, Houma, Aug. 31, 1913, *E. C. Wurzlow* (Mo and US) as *R. spectabilis*, Oct. 10, 1913, *Wurzlow* (NY), identified by Small as *R. malacosperma*, by Leonard as *R. Tweediana* Griseb. Texas: escaped from gardens, San Antonio, Sept. 20, 1901, *Bush*, no. 864 (Mo); damp places near Polytechnic, Oct. 10, 1916, *A. R. Drumm* (US) as *R. spectabilis;* Houston, July 10, 1934, *Cory*, no. 11,330, as *R. Tweediana.* San Luis Potosi: wet ledges by river, Micos, July 31, 1891, *Pringle*, no. 5043, as *R. Tweediana;* gravelly and rocky sand near river, alt. 200 feet, near Axtla, June 27, 1942, *J. N. Weaver*, no. 658, as *R. Tweediana*, corrected to *R. Brittoniana.* Vera Cruz: in the bed of the Colobozo near Tantoyuca, April, May, 1858, *Ervendberg*, no. 104, identified by Asa Gray as *Cryphiacanthus angustifolius*, by Leonard as *R.*

*Tweediana;* along streams, Tenera, Zacuapan, Dec., 1912, *Purpus,* no. 6162, identified by Leonard as *R. Tweediana;* Barranca de Panoya, Sept., 1919, *Purpus,* no. 8409, identified by Leonard as *R. Tweediana.* GUATEMALA: cultivated, vicinity of Quiriguá, Dept. Izabel, *Standley,* no. 24,307, as *R. malacosperma,* another number (72,225) cited by Leonard as *R. Brittoniana* in publishing that unclarified name. N. B. The Mexican material in the Gray Herbarium only here cited. PLATE 839.

So far as I can find the specific characters of *Ruellia Brittoniana* have never been clearly stated, except partially by Nees who, under the name *Cryphiacanthus angustifolius,* had two quite distinct but by him undifferentiated species, and partially by Small, who described and had before him *R. Brittoniana* but misidentified it as *R. malacosperma.* In fact, the entire history of the names and the recognition of specific lines in the two plants, inadequately treated by Nees in 1847 as a geographically bi-centric species, *Cryph. angustifolius,* is one of discreditably opportunist shiftings, without any evident attempt at clarification. The original treatment of the two confused species by Nees in DC. Prodr. xi. 199 (1847) was

5. C. ANGUSTIFOLIUS, caulescens, foliis lanceolato-linearibus acutis integerrimis sessilibus glabris, pedunculo subbifloro folio breviore, calycis laciniis subulatis scabris. ♃ Ad Xalapa (Galeotti! in h. Hook.), Entre Rios (Tweedie!). Corolla pollicaris. Capsula 9 lin. longa, lanceolata, 16–20-sperma. (v. in h. Hook.)

The first separation of the Mexican (Xalapa or Jalapa, *Galeotti*) plant and the Argentinian (*Tweedie*) elements was in 1879 when Grisebach, in his *Symbolae ad Floram argentinam,* in die Abhandlungen Königlichen Gesellschaft der Wissenschaften zu Göttingen, xxiv. 259 (1879), took out the Argentinian element, as *Ruellia Tweediana* Griseb.:

1597. R. Tweediana Gr.—Syn. Cryphiacanthus angustifolius Tweedianus Ns. Folia variant lineari-lanceolata et inferiora breviora lanceolate v. ovato-lanceolata.—E [i. e. Prov. Entrerios, as explained by Grisebach on his p. 4, Nees having originally cited "Entre Rios"].

In other words, Grisebach, concerned only with the flora of Argentina and not the Galeotti specimen from Xalapa (or Jalapa) in the state of Vera Cruz, Mexico, based his *Ruellia Tweediana* (without adequate description) on the Tweedie specimen cited by Nees. Since Grisebach did not use trinomials but regularly designated varieties as "var." (see the synonym of *R. geminiflora*

Kunth given by him on the same page as "R. geminiflora var. humilis Gr.") it may reasonably be inferred that his typonym of *R. Tweediana* "Syn. Cryphiacanthus angustifolius Tweedianus Ns." was intended to mean the Tweedie element of *C. angustifolius,* Grisebach thus leaving out the Galeotti plant, which, by the very sensible but commonly ridiculed "doctrine of residues" remained as true *C. angustifolius.* If it be argued otherwise the result is somewhat the same, for there was already a *Ruellia angustifolia* Swartz (1788), so that *R. Tweediana* is the first valid name under *Ruellia.* Hemsley, in his monumental Biologia Centrali-Americana (Botany), ii. 508 (1882), seems to have suspected that the Jalapa (Mexican) plant was not identical with the Argentinian element, for he entered

**Ruellia tweediana,** Griseb. Symb. ad Fl. Arg. p. 259?
*Cryphiacanthus angustifolius,* Nees in DC. Prodr. xi. p. 199, saltem pro parte.
SOUTH MEXICO, Jalapa (*Galeotti*). Hb. Kew.
The Argentine plant may be a different species.

But Hemsley did not note any specific differences. Neither have those who have rather easily and very carelessly rushed into print with substitute-names. Thus, when, in 1893, in an enumeration of plants of Paraguay, Britton substituted for *Cryphiacanthus angustifolius* Nees the name *Ruellia spectabilis,* he obviously intended the plant of temperate eastern South America, not the Mexican element, but Britton's item was so hastily prepared that it is evident that he did not stop to gain a clear understanding of specific lines, nor had he gone carefully into the literature. His treatment was as follows:

**Ruellia spectabilis,** Britton.
*Cryphiacanthus angustifolius,* Nees in D.C. Prod., xi, 199, not *Ruellia angus[t]ifolia,* Sw.
Caballero (461). January.
This species has branching stems 10–12 cm. high, linear, sessile leaves, and flowers larger than in no. 323 [*Ruellia Morongii* Britt., new name for *Cryphiacanthus acaulis* Nees, not *R. acaulis* R. Br.], otherwise much the same. Occurs on the railway track.

Since *Cryphiacanthus angustifolius* (in its inclusive sense) consists of erect, caulescent plants up to 1 m. high, with remote pairs of linear-lanceolate to broadly lanceolate leaves and glabrescent to only minutely glandular-hirtellous calyx about half the length of the capsule or shorter, while *Cryphiacanthus* *acaulis* Nees, basis of *Ruellia Morongii*, is, as described by Nees and partly by Britton and as shown by all specimens, acaulescent, "Habitus *Primulae*" (Nees), with the basal rosulate leaves oblong-ovate, -obovate or subspatulate, and the calyces copiously villous-hirsute and equaling to exceeding the capsule, Britton's characterization of the two as "much the same" indicates a rather offhand understanding of a few conspicuously different species. Dr. Britton also overlooked the fact that, in his well known Dictionary of Gardening, iii. 334 (1886), George Nicholson had published a *R. spectabilis* (Hook.) Nicholson, based on *Dipteracanthus spectabilis* Hook. Bot. Mag. t. 4494 (1850), an Andean plant of a different section, with flowers sessile in the axils of ovate leaves, etc. Furthermore, Britton evidently overlooked *R. Tweediana* Griseb. (1879), the name he should have taken up for the Paraguayan as well as Argentinian *Cryphiacanthus angustifolius*. Had he looked up Grisebach's Symbolae he would not, on the same page with his *R. spectabilis*, have published as new *R. Tweedyi* (Nees) T. Anderson in Herb. Kew., based on *Blechum Tweedyi* Nees, for, by the rules promulgated and followed by Britton, the substantive-genitive personal names (such as *Tweedyi*) and the adjectival forms (such as *Tweediana*) could not both be used. By the International Rules, vigorously fought by Britton, his combination *R. Tweedyi* (Nees) T. Anderson ex Britton is rescued. Whether the type of *R. Tweedyi* is a *Ruellia* is much more doubtful. The genus *Blechum* is so very different from *Ruellia* that it would be surprising if Nees, who monographed both genera, did not know it. Incidentally, but of real importance, the original *Blechum Tweedyi* came from Panama. It would be very surprising, to say the least, if the same species (even if not a *Blechum*, a genus apparently unknown in Paraguay) were found also in Paraguay.

The next step in the tortuous history of the much abused typonym, *Cryphiacanthus angustifolius* Nees, was when Leonard, noting that Britton had slipped in publishing a second *Ruellia spectabilis*, gave, in Journ. Wash. Acad. Sci. xxxi. 96, fig. 1 (1941), another name:

**Ruellia brittoniana** Leonard, nom. nov. Fig. 1

*Cryphiacanthus angustifolius* Nees in DC. Prodr. **11**: 199. 1847. Not *R. angustifolia* Sw., 1788.

*Ruellia spectabilis* Britton, Ann. New York Acad. **7**: 192. 1893; not Nichols, 1886.

A single cultivated plant, from Guatemala, was cited and a very characteristic figure of the Mexican plant, with long-attenuate upper leaves inclined to overtop the subcorymbiform inflorescence, was given as fig. 1. Leonard gave no statement of characters nor any indication as to whether he was accepting *Cryphiacanthus angustifolius* in the original inclusive sense of Nees or whether he restricted it to the Mexican element left to stand for it when Grisebach withdrew the Argentinian element as *Ruellia Tweediana*. It is unfortunate, if he intended *R. Brittoniana* (Britton having published only on the Paraguayan plant) to stand exclusively for the quite different North American species, that he did not give any word of clarification, for the North American species, at least in the Gray Herbarium and the Britton Herbarium, had been annotated by Leonard as *R. Tweediana*. Incidentally, had he looked up the first publication of *R. spectabilis* he would have found that its author was Nicholson, not "Nichols". Only by accepting the possible and perhaps probable interpretation that, by removing the Tweedie element from the mixed originals of Nees as *R. Tweediana*, Grisebach had, by the "doctrine of residues", left the Mexican element as true *Cryph. angustifolius*—only by this interpretation can we possibly save for the Mexican plant the inappropriate name *R. Brittoniana*, which may or may not have been intended for it. I am following this interpretation merely in order to avoid publishing still another name and thus further increasing the confusion. If the alternative reasoning were adopted the Mexican species (cultivated and naturalized eastward to Florida) would require a new and clearly applied name, since none of the authors, from Grisebach on, who have hastily proposed new names in this relatively simple pair of species, has recognized the elementary requirement of sound taxonomy, of accurately defining their species and explaining what they meant.

I have stated above what I consider the specific characters of *Ruellia Brittoniana* as here validated, and in PLATE 839 its diagnostic characters are shown. In PLATE 840 I have shown some of the differential characters of *R. Tweediana;* and in the following paragraph I indicate some of its other claims to recognition as an endemic species of temperate eastern South America, the name *R. Tweediana* thus being validated:

R. Tweediana Grisebach, caulibus glabris; foliis inferioribus lanceolatis vel lanceolato-ovatis, supernis lanceolatis subacutis vel obtusis juvenilibus ciliolatis, majoribus 5–12 cm. longis integris vel undulatis; inflorescentiis elongatis subthyrsoideis; calycibus glanduloso-hirtellis, segmentis lineari-subulatis attenuatis ad apicem acutum hirtum; corollis 3–4 cm. longis extus valde pilosis, fauce supra 5–10 mm. lato; capsulis lanceolato-fusiformibus 2–2.5 cm. longis glabris. Tab. 840.

Since *Ruellia Brittoniana* has been mistaken by Small and his followers for *R. malacosperma* Greenm. it should be noted that the latter species differs in the following characters: young internodes of stem and young leaves villous-hirsute, becoming glabrate; leaves oblong or elliptic-lanceolate, often undulate-dentate, the primary ones slender-petioled, strigillose-lineolate; calyx lineolate, with lance-attenuate sharp-pointed segments becoming 1.5–2 cm. long; corolla 3.5–5 cm. long, essentially glabrous without; capsule 2.5–3 cm. long; seeds orbicular, broadly obovate or elliptic, 2.8–3.3 mm. long. The plant called *R. malacosperma* by Small (as represented in the Britton Herbarium) is not that species; all that I have seen of it belongs to the frequently cultivated *R. Brittoniana.*

2. R. strepens L., as emended by L. in 1771. Stems 1–few from a knotty rhizome, 0.2–1.1 m. high, simple or with few ascending branches, obtusely 4-angled, minutely pilose (often in decussate lines), glabrate or glabrous (rarely, when deeply buried in silts after freshets, the stem becoming strongly ligneous and then freely branching): lowest leaves small, rounded or obovate; principal leaves membranaceous, ovate, rounded or tapering to short but definite petioles, more or less acuminate, entire or barely undulate, the larger ones 7–18 cm. long and 3–9 cm. broad, short-strigillose on one or both surfaces or glabrescent, minutely ciliolate when young: short to long ascending peduncles (0.2–10 cm. long) borne from axils of 1–3 pairs of median leaves (very rarely terminal), these bearing a pair of dilated leafy bracts and usually 1–3 showy expanded flowers: calyx-segments lanceolate to lance-linear, flat to tip, 2–4 mm. broad, 1–2.5 cm. long, villous-ciliate, more or less villous or pilose to glabrescent on the back: corolla pale blue-violet, broadly expanding, 3–6 cm. long; the slender tube about as long as the broadly funnelform throat, the broad lobes rounded: capsule (relatively infrequent as compared with the next form) 1–2 cm. long, glabrous, usually overtopped by calyx-segments.—Sp. Pl. 634 (1753) in part, as emend. by L. Mantiss. Alt. 422 (1771), he thus excluding the wholly different plants of Dillenius and others; Schkuhr, Handb. ii. t.

clxxii. (1791); Willd. Sp. iii. 363 (1800); Pursh, Fl. Am. Sept. ii. 420 (1814); LeConte in Ann. Lyc. N. Y. i. 140 (1824); and later authors generally. *Dipteracanthus strepens* (L.) Nees in Linnaea, xvi. 292 (1842) and in DC. Prodr. xi. 121 (1847), including var. *calycinus* Nees, l. c. (1847), var. *pedunculatus* Nees, l. c. 122 (1847) and var. *strictus* (Nees) Nees, l. c. (1847), in part. *D. strictus* Nees in Linnaea, xvi. 293 (1842). *R. biflora* Balbis ex Nees in DC. Prodr. xi. 122 (1847) in synonymy, nomen only. *R. foliosa* Schweinitz ex Nees l. c. in synonymy, nomen only. *R. oblongifolia* Kinn ex Nees, l. c. in synonymy, nomen only. *R. vincaeflora* DC. ex Nees, l. c. in synonymy, nomen only.—Low woods, bottomlands, wooded swamps, etc., chiefly in basic or calcareous soils, South Carolina to eastern Texas, northeast and north to north-central New Jersey, southern Pennsylvania, central Ohio, Indiana, Illinois, southern Iowa and eastern Kansas. Fl. mid-May–July (rarely –October). The following, from a very much larger series, are characteristic. New Jersey: New Brunswick, "common" June, 1894, *F. H. Blodgett* (NY). Pennsylvania: lancaster co.: rich wooded hillside along Conestoga Creek, 1 mile south of Bausman, *Louise F. A. Tanger*, no. 3270 (Pa, Phil); banks of Conestoga, near Lancaster, 1838, *W. W. Wister* (Phil), June 17, 1859, Porter; near Columbia, *S. W. Knipe* (Phil); "on an excursion to Safe Harbor", June 18, 1859, *Joseph Crawford* (Phil). cumberland co.: creek-bankside, Camp Hill Borough, *H. L. Plasterer*, as D. E. and Dorothy Wade, no. 1727 (Pa). franklin co.: Mercersburg, June, 1844, *Porter* (Phil). Delaware: without statement of locality, *Nuttall* (Phil). Maryland: cecil co.: Bald Friar, July 4, 1907, *E. B. Bartram* (Phil). montgomery co.: banks of Potomac, June 6, 1881, *J. D. Smith;* Great Falls, *C. S. Williamson;* High Island, June 6, 1881, *C. S. Sheldon* (US). District of Columbia: Potomac Flats, Chain Bridge, June 13, 1897, *Kearney* (NY); Canal District, June 9, 1897, *Steele* (US). West Virginia: jefferson co.: along Shenandoah River, near Charlestown, *R. F. Martin*, no. 200 (USNA). cabell co.: dry hillside, Huntington, *Gilbert*, no. 123 (Mo, Pa). wayne co.: Buffalo Creek, *Plymale*, no. 445. Virginia: isle of wight co.: base of rich calcareous wooded slopes by Burwell's Bay, James River, below Rushmere (Fergusson's Wharf), *Fernald & Long*, no. 13,463. prince george co.: swampy woods, bottomland of Powell's Creek, Garysville, *Fernald & Long*, nos. 8472 and 8854. clarke co.: Castleman Ferry, June 13, 1937, *O. M. Freeman* (USNA). frederick co.: low woods, Cedar Creek, Meadow Mills, *Hunnewell*, no. 13,712. shenandoah co.: along stream, north of Short Mt., *Allard*, no. 5087. page co.: shady ravine, eastern foothills of Massanutten Mountain, *W. H. Camp*, no. 1386 (NY). roanoke co.: Roanoke River, south of Roanoke, *Small & Heller*, no. 431 (Phil). mont-


*Photo. B. G. Schubert.*

RUELLIA STREPENS, forma CLEISTANTHA: FIG. 1, summit of plant, × $^{2}/_{5}$; FIG. 2, terminal glomerule, × 1; FIG. 3, node with large cleistogamous flower, × 2; FIG. 4, terminal glomerule with two small cleistogamous flowers, × 2; FIG. 5, subterminal fruiting node, × 2; FIG. 6, calyx and open capsule, × 2.


*Photo. B. G. Schubert.*

RUELLIA PEDUNCULATA: FIG. 1, small flowering plant, × 4/9; FIG. 2, base of more branching fruiting plant, × ½; FIG. 3, portion of branching inflorescence, × 1; FIG. 4, calyx and capsule, × 2; FIG. 5, calyx-segments and base of capsule, × 10; FIG. 6, strigose surface of capsule, × 10.

GOMERY CO.: limestone soil, edge of woodlands just north of Price's Station, *A. B. Massey*, no. 5065. SOUTH CAROLINA: BERKELEY CO.: Eutaw Springs, May, *H. W. Ravenel.* ATHENS CO.: Aiken, Sept. 17, 1885, *H. W. Ravenel.* GEORGIA: without stated locality: "of the Savannahs", *Le Conte* (Phil); "Mts. of Georgia", *Chapman* (US). WALKER CO.: dry ground, Chickamauga Park, May 25, 1911, *J. R. Churchill.* (Specimens from Polk County, Florida, Mrs. *J. M. Milligan* (US) were presumably of cultivated plants. Chapman includes "Florida" in his stated range, but his "*R. strepens*" was made up of several other species. There is no material from Florida in the Britton Herbarium, rich in specimens from that state.) OHIO: ATHENS CO.: Athens, *J. P. Drushel*, no. 6623 (Mo). LAWRENCE CO.: open woodlands, Coal Grove, *Biltmore Herb.*, no. 4500[b] (US). FRANKLIN CO.: Columbus, *Sullivant.* MONTGOMERY CO.: Dayton, July 7, 1879, *L. V. Morgan* (US). BUTLER CO.: moist woods, Oxford, June 30, 1910, *Overholts* (Mo). HAMILTON CO.: near Cincinnati, June 15, 1879, *C. G. Lloyd* (NY, US); open woods on hillsides, Anderson's Ferry, June 14, 1905, *E. L. Braun* (Braun). (Specimens with the label "Plants of Northern Ohio", and marked as from Lucas County, bear the memorandum "Obtained from Mr. Burger of Toledo; never found it in northern Ohio".) INDIANA: WELLS CO.: moist banks of Wabash River, June 21, 1905, *Deam* (US). MONTGOMERY CO.: Crawfordsville, June 23, 1892, *Rose* (US). MARION CO.: woods along White River, *Scott McCoy*, no. 1938 (US). PARKE CO.: Turkey Run, *W. H. Dunkan*, no. 114 (Duke). VIGO CO.: Terre Haute, June 1, 1889, *B. W. Evermann* (US). BARTHOLOMEW CO.: creek-bottom north of Elizabethtown, *Deam*, no. 34,266. JEFFERSON CO.: Hanover, 1874, *Coulter* (Phil). KENTUCKY: SCOTT CO.: along Elkhorn Creek, Stamping Ground, *J. W. Singer*, no. 219 (US). FRANKLIN CO.: open woods, Farmdale, June 16, 1879, *H. R. Bassler* (Pa). SPENCER CO.: near High Grove, *E. L. Braun*, no. 3259 (Braun). WARREN CO.: Bowling Green, June, 1892, *Sadie F. Price* (Mo.); bluff along Gasper River, southeast of Hadley, *Leslie Hubricht*, no. B2170 (Mo). UNION CO.: moist overflow-forest, near State Lake, *H. T. Shacklette*, no. 345. LYON CO.: Kuttawa, *Eggleston*, no. 4524 (NY). TENNESSEE: KNOX CO.: woods, Knoxville, *Ruth*, no. 591 (Mo) and 721 (US), *Pennell*, no. 11,301 (Phil). HAMILTON CO.: Chickamauga Park, May 27, 1911, *J. R. Churchill.* DAVIDSON CO.: bluffs below Nashville, *Biltmore Herb.*, no. 4500[c] (US); Nashville, *Eggleston*, no. 4444; limestone cliff of Cumberland River, Nashville, *Pennell*, no. 11,411 (Phil). HOUSTON CO.: limestone bank, Erin, *E. B. Harger*, no. 7866. LAKE CO.: dense shade of sandy woods, Reelfoot Lake, *J. R. Swallen*, no. 2159 (US). ALABAMA: JACKSON CO.: dry soil, Stephenson, *Biltmore Herb.*, no. 4500[a] (US); Sand Mountain, *Biltmore Herb.*, no. 4500[d]

(US). CLARKE CO.: dry copses and hillsides, Thomasville, April 27, 1888, *C. Mohr*, as *R. ciliosa*, var. *ambigua* (US). MISSISSIPPI: LEE CO.: Tupelo, 1914, *Henshaw* (USNA). OKTIBBEHA CO.: low woods north of Starkville, *C. A. & Una F. Weatherby*, no. 6309. ILLINOIS: KANKAKEE CO.: Kankakee, *C. C. Crampton*, no. 212 (US). PEORIA CO.: rich woods, Peoria, July, 1903, *F. E. McDonald*. HANCOCK CO.: Augusta, *S. B. Mead*. MACON CO.: 3 miles east of Decatur, *Clokey*, no. 2486. PIKE CO.: Mississippi levees, East Hannibal, June 3, 1913 (Mo). RICHLAND CO.: Parkersburg, June 9, 1902, *Robt. Ridgway* (US). MARION CO.: Salem, June, 1860, *M. S. Bebb* (Phil). ST. CLAIR CO.: woods, St. Clair Co., Sept. 20, 1878, *Eggert;* Cahokia, June 11, 1890, *A. S. Hitchcock* (Mo); East Carondelet, June 4, 1875, *Eggert* (Mo, US). JACKSON CO.: black rich soil, bottoms of Big Muddy and Crab Orchard Creeks, *John McCree, Jr.*, no. 775 (Mo.). IOWA: DECATUR CO.: woods, June 29, 1904, *J. P. Anderson* (Mo). MISSOURI: PIKE CO.: dry bluffs, near Eolia, *John Davis*, no. 7617 (Mo). LINCOLN CO.: rich soil, Winfield, June 7, 1916, *John Davis*, no. 1406 (Mo). MARION CO.: Scipio Bluffs, north of Hannibal, *John Davis*, no. 1491 (Mo). ST. LOUIS CO.: Creve Coeur Lake, June 12, 1914, *M. W. Lyon* (Mo); Meramec Highlands, June 13, 1909, *W. W. Ohlweiler* (Mo); Allenton, *G. W. Letterman*, many collections (Mo); rich woods, Allenton, May 29, 1918, *J. R. Churchill*. JEFFERSON CO.: DeSoto, June, 1887, *H. E. Hasse;* Ditmar, *J. H. Kellogg*, no. 2005 (Mo). FRANKLIN CO.: Pacific, *Greenman*, no. 3895 (Mo). SHELBY CO.: rich woods near Bethel, *Palmer & Steyermark*, no. 40,908 (Mo). BUTLER CO.: low woods along Mud Creek, northwest of Rombauer, *Steyermark*, no. 11,420 (Mo). BOONE CO.: Rock Bridge, June, 1926, *H. W. Rickett* (Duke). PHELPS CO.: Jerome, June 1, 1914, *J. H. Kellogg*, no. 494 (Mo). SALINE CO.: Sweet Springs, June 20, 1886, *Wm. Trelease* (Mo). GREENE CO.: Springfield, June 11, 1887, *J. W. Blankinship* (Mo). STONE CO.: rich hillside woods, Galena, *E. J. Palmer*, no. 5774 (Mo, US). DAVIESS CO.: dry banks, Pattonsburg, *Bush*, no. 13,587. JOHNSON CO.: rich woods and thickets, limestone hills, Columbus, *E. J. Palmer*, no. 36,697 (Mo). BARRY CO.: barrens, Shell Knob, *Bush*, no. 15,596 (Mo). JACKSON CO.: Independence, *Bush*, no. 39 (Pa). CASS CO.: bottoms, June 23, 1864, *G. C. Broadhead* (Mo). JASPER CO.: woods, Webb City, *Bush*, no. 528 (Mo), *E. J. Palmer*, no. 528 (Mo). ARKANSAS: CRITTENDON CO.: bottomland, Hulbert, *Demaree*, no. 11,372. PHILLIPS CO.: Crowleys Ridge, Helena, *Demaree*, no. 19,240 (NY, Mo). PULASKI CO.: Little Rock, *H. E. Hasse* (NY); swampy Arkansas bottoms, Little Rock, *Demaree*, no. 17,321 (Mo). KANSAS: LEAVENWORTH CO.: woody ravines, Fort Leavenworth, June, 1854, *F. V. Hayden* (Mo). WYANDOTTE CO.: low woods, May 30, 1897, *K. K. Mackenzie*

(NY). CHEROKEE CO.: woods along Shoal River, near Schimmerhorn Pk., no. 20,178, from *Kansas State College* (NY). RILEY CO.: low woods, *J. B. Norton*, no. 387; Manhattan, June, 1886, *Kellerman* (US). COWLEY CO.: 1895, *C. N. Gould* (NY), May, 1898, *Mark White* (Mo). OKLAHOMA: SEQUOYAH CO.: damp, shaded ground near mouth of Illinois River, *Goodman & Barkley*, no. 2131. LE FLORE Co.: low woods, Poteau, *E. J. Palmer*, no. 8275 (Mo). CREEK CO.: Sapulpa, June 2, 1924, *C. B. Williams*. KAY CO.: woods, Tonkawa, *G. W. Stevens*, no. 1869. OKLAHOMA CO.: wooded creek-bottom north of Edmond, *Waterfall*, no. 1975. POTTOWATTOMIE CO.: in small valley, St. Louis, *Mortimer Faulkner*, no. 106 (Mo). MURRAY CO.: Davis, *W. H. Ennig*, no. 683 (Mo). TEXAS: without stated locality, *Drummond*, no. 259 (cited by Nees under his *Dipteracanthus strepens*, vars. *strictus* and *pedunculatus* and under several other species and varieties!); Coombs Branch, *Reverchon* (Mo). DALLAS CO.: woods, Dallas, May 6, 1874, *Reverchon* (Mo); moist woodlands, Dallas, *Biltmore Herb.* no. 4500$^h$ (US); vicinity of Dallas, *Mary R. Stephenson*, nos. 91 and 94 (US). TARRANT CO.: rich woods near Trinity River, Lake Worth, *Ruth*, no. 318 (Pa, Phil, US). FORT BEND CO.: Richmond, *W. L. Bray*, no. 118 (US). PLATE 841; MAP 1.

2a. Forma CLEISTANTHA (Gray) S. McCoy. Flowers and abundant fruits borne in sessile or subsessile glomerules from the upper and often from most (1–8) of the axils, the stem only occasionally branching: calyx-segments often more pubescent and much shorter than to but little longer than capsule: corolla relatively small, usually reduced to a slender closed tube 0.7–2 cm. long, pale to creamy, but sometimes partially expanding or even large and terminal: capsules abundant, usually plumper and shorter than in typical form of species; retinacula mostly 6 or 8: seeds suborbicular to elliptical, 3–4 mm. long.—Am. Bot. xliii. 24 (1937). *Dipteracanthus micranthus* Engelm. & Gray in Bost. Journ. Nat. Hist. v. (Pl. Lindheimerianae), 49 (1845). *Hygrophila illinoiensis* Wood in Bull. Torr. Bot. Cl. v. 41 (1874). Var. *cleistantha* Gray, Syn. Fl. N. Am. ii$^1$. 327 (1878). *R. strepens micrantha* (Engelm. & Gray) Britton in Mem. Torr. Bot. Cl. v. 300 (1894).—Same range as the typical form of the species. Fl. June–October. The following from a very large representation before me are characteristic (omitting stations enumerated under the preceding). PENNSYLVANIA: LANCASTER CO.: wooded hillside along Conestoga Creek, south of Wabank, *L. F. A. Tanger*, no. 4603 (Pa, Phil); edge of woods along Conestoga Creek, south of Millersville, *Tanger & Groff*, no. 4872. MARYLAND: CECIL CO.: Conowingo, Aug. 19, 1906, *J. J. Carter* (NY, Phil). KENT CO.: Tolchester Beach, September 4, 1906, *C. S. Williamson* (Phil). WEST VIRGINIA: OHIO CO.: thickets near Wheeling Creek, east of Wheeling, July 22, 1909, *Mac Elwee* (Phil). VIRGINIA: CHARLES city co.: alluvial woods along James River, Harrison Point, *Fernald & Long*, no. 9150. prince george co.: wooded swamp by James River, south of Indian Point, *Fernald & Long*, no. 11,153. loudon co.: Short Hill, Aug. 9, 1936, *O. M. Freeman* (USNA). warren co.: bottomlands by Shenandoah River, *Hunnewell*, no. 17,872 (stems, deeply covered by freshet-silts, subligneous, with strong branches and shortened and firm leaves). rockbridge co.: Natural Bridge, Sept. 14, 1907, *E. B. Bartram* (Phil). Ohio: franklin co.: Gahanna, Oct. 19, 1903, *O. E. Jennings*. warren co.: moist rich soil along Little Miami River, South Lebanon, *E. B. Harger*, no. 8010. Indiana: gibson co.: low woods bordering Eggwood Pond, *Deam*, no. 9958 (NY). Kentucky: nelson co.: wooded ravine east of Chapin, *Wherry & Pennell*, no. 13,673 (Phil). edmonson co.: wooded alluvial flat of Green River, Mammoth Cave, *E. L. Braun*, no. 3611 (Braun). daviess co.: swamp in Ohio River bottom, Maceo, *Wherry & Pennell*, no. 13,585 (Phil). Tennessee: shelby co.: Memphis, Oct. 20, 1850, *Fendler*. Alabama: without stated locality: *Buckley* (paratype of *Dipteracanthus micranthus* Engelm. & Gray). lee co.: "N. W. of Lee Co.", June 24, 1897, *F. S. Earle* (NY). Illinois: champaign co.: Urbana, Oct. 4, 1880, *A. B. Seymour* (Duke). wabash co.: Mt. Carmel, 1874, *J. Schneck* (isotypes of *Hygrophila illinoiensis* Wood). hardin co.: low woods, Elizabethtown, *E. J. Palmer*, no. 17,023 (Mo). Iowa: henry co.: Mt. Pleasant, *J. H. Mills*, no. 1854 (Mo). Missouri: st. charles co.: Watson, *Wm. Trelease*, no. 453 (Mo). st. louis co.: St. Louis, Sept. 1845, *Engelmann* (paratypes of *Dipteracanthus micranthus*). iron co.: moist shady ground, Iron Mountain, Sept. 1897, *Colton Russell* (Mo). mississippi co.: rich swampy woods, Three States Timber Tract, southwest of Wolf Island, *Steyermark*, no. 8761 (Mo). ozark co.: thickets along creek, near Bakersfield, *E. J. Palmer*, no. 32,872 (Mo). taney co.: woods, Swan, *Bush*, no. 697 (Mo). sullivan co.: Pawpaw Junction, Sept. 15, 1893, *Bush* (Mo). hickory co.: low woods along Pomme de Terre River, northeast of Elkland, *Steyermark*, no. 24,514 (Mo). st. clair co.: low woods around White Sulphur Spring, *Steyermark*, no. 24,401 (Mo). dallas co.: base of slope along Mangua River, southwest of Long Lane, *Steyermark*, no. 24,231 (Mo). vernon co.: low open woods along creek, near Deerfield, *Palmer & Steyermark*, no. 42,140 (Mo, NY). mcdonald co.: low ground, Noel, *E. J. Palmer*, no. 4069 (Mo, US). Arkansas: marion co.: bottoms of White River, Flippin, *Demaree*, no. 20,640 (Mo, NY). saline co.: bottoms of Saline River, Benton, *Demaree*, no. 8491 (US). carroll co.: Eureka Springs, *E. J. Palmer*, no. 4439 (Mo). hempstead co.: woods, Fulton, *Bush*, no. 984 (Mo). lafayette co.: Spirit Lake, *A. A. & E. G. Heller*, no. 4118.

LOUISIANA: WEST FELICIANA PARISH: deciduous woodland, Catalpa, *Pennell*, no. 4308 (NY). OKLAHOMA: ROGERS CO.: Verdigris, *Bush*, no. 429 (Mo). JOHNSTON CO.: open woods near Tishomingo, *H. W. Houghton* as *Stevens*, no. 3342. PAYNE CO.: Stillwater, *Eugene Blevins*, no. 90 (Mo). TEXAS: WITHOUT STATED LOCALITY: *Drummond*, no. 202 (paratype of the following). HARRIS CO.: rich shaded bottoms around Houston (data with sheet in Herb. Mo), *Lindheimer*, Fasc. II, no. 290 (type and isotypes of *Dipteracanthus micranthus*). BRAZORIA CO.: woods, Columbia, *Bush*, no. 1342 (Mo); San Bernardo, June 28, 1923, *Tharp*. JACKSON CO.: Lavaca River, Aug. 29, 1941, *Tharp*. PLATE 842.

As originally published in Species Plantarum (1753) *Ruellia strepens* (from *strepo*, to rustle, presumably from the dehiscing of the capsules) was a mixture. The plant of the Linnean Herbarium, which Linneaus had before him, has not been available and cannot be until after "the duration". Neither can I discuss the specimens cited in other Linnean works. The name was taken over from *Ruellia strepens, capitulis comosis* of Dillenius, Elth. ii. 330 (misprinted by L. as 300), t. 249, fig. 321 (our PLATE 863), a wholly different plant from that here treated, one of the species (our no. 11) with relatively low hirsute stem, pubescent oblong leaves, dense glomerules of relatively small flowers crowded in the upper axils, and the calyx-segments narrowly linear. The confusion prevailed for some decades (before and after 1753) but in 1771, in his *Observationes in Species Plantarum cum Emendationibus et Animadversionibus*, Mantissa Altera, pp. 315 et seq., Linnaeus redefined *Ruellia strepens* (p. 422) to stand only for the present species ". . . *Pedunculi* oppositi, laterales breves, triflori. *Bracteae* 2 oppositae, etiam 2 sub singulo flore laterali. *Calyx* 5partitus, lanceolatus" etc. He thus threw out the wholly different plant of Dillenius (with abundant fruit which, when pressed, promptly rustles) and restricted the name to the showy-flowered and usually infertile or only weakly fertile typical *R. strepens* which, except in the cleistogamous state (unknown to Linnaeus), rarely gets a chance to rustle! Schkuhr, Willdenow, Pursh, LeConte, Torrey, Gray, Engelmann, Nees, Britton and all others have consistently adopted the redefinition made in Mantissa Altera, and only confusion would result if the pre-Linnean and confused application of the name were forced. Our species, preeminently of calcareous bottomland and bases of limestone bluffs, with great concentration in the Mississippi Basin (MAP 1), pushes down to the Atlantic area along the Susquehanna, Potomac, James, Santee and Savannah River systems. It is on the upper Roanoke, and, presumably, search may bring it to light farther down that valley, even in northeastern North Carolina. In the great accumulation of material before me, from some of the more representative larger herbaria, there is no evidence that it is common in either North or South Carolina; and from Georgia I have seen it only from tributaries of the Tennessee (thence the Mississippi) River, although (since it has been found at Aiken) it is probably along the Savannah in Georgia. The *Ruellia strepens, capitulis comosis* of Dillenius was raised from seed sent from Carolina and flowered in 1726: "Nata fuit haec species e seminibus Carolinensibus, & Septembri mense primum floruit anno 1726, sequentibus autem annis tota fere aestate". This plant (our no. 11), abundant in eastern North and South Carolina as well as reaching eastern Virginia, isinclined to growin slightly dry and rather acid soils.

It is a very striking fact that the accumulated material before me shows forma *cleistantha* regularly and abundantly fruiting, while the typical form, with few peduncles from a few median axils and few showy, expanded flowers, is largely sterile. Of the 270 sheets of typical *R. strepens* before me only 12 ($4\frac{2}{5}$ *per cent.*) show 1 or 2 developed capsules (PLATE 841, FIG. 4); all of the 168 sheets of forma *cleistantha* are loaded with fruit or show the possibility of it.

When he reduced Gray's var. *cleistantha* to the rank of a form Mr. Scott McCoy reported on plants brought into the garden: "Each June it bloomed as the species and each fall it bore cleistogamous flowers as does the so-called variety *cleistantha* Gray." Further checks should be made in other regions for, if all the material in the United States National Herbarium, the Torrey and Britton Herbaria of the New York Botanical Garden, the herbaria of the Missouri Botanical Garden, the Philadelphia Academy of Sciences, the University of Pennsylvania and several smaller collections, added to the representation in the Gray Herbarium, can be taken (and I believe it can) as a fair average, there are some very important characters distinguishing the two


*Photo. B. G. Schubert.*

RUELLIA PINETORUM: FIG. 1, flowering and fruiting branches from TYPE, × 1; FIG. 2, portion of fruiting branch, × 1; FIG. 3, portion of leafy base, × 1; FIG. 4, calyx and capsule, × 2; FIG. 5, surface of peduncle, × 10; FIG. 6, bases of calyx-segment and capsule, × 10.

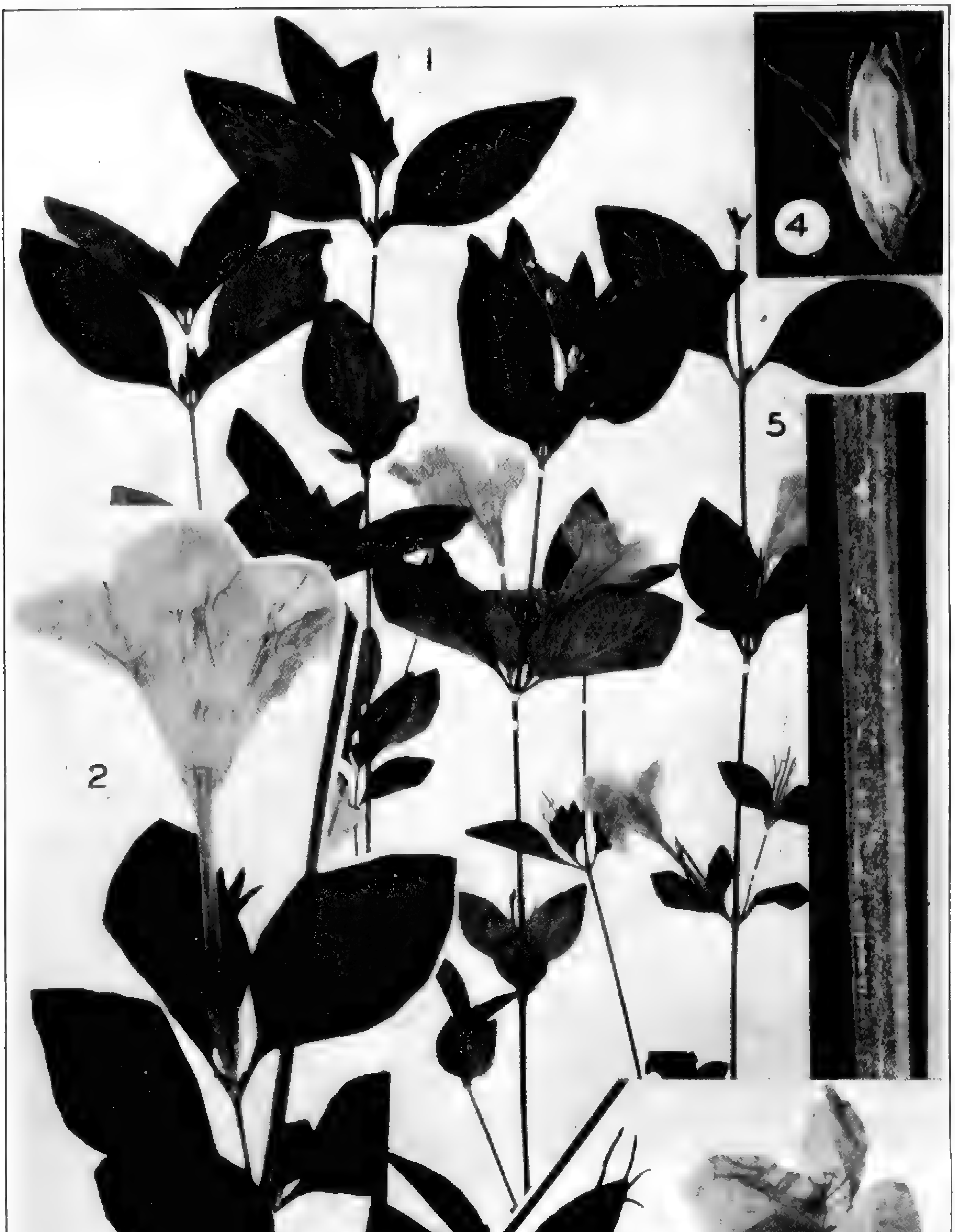



*Photo. B. G. Schubert.*

Ruellia Purshiana: fig. 1, portions of type, $\times \frac{2}{5}$; fig. 2, third node from base, $\times$ 1; fig. 3, second node from base, $\times$ 1; fig. 4, calyx and capsule, $\times$ 2; fig. 5, surface of stem, $\times$ 4.

plants which one would not expect to find if forma *cleistantha* always develops from individuals which early in the summer were typical *R. strepens.* Typical showy-flowered *R. strepens* bears 1–3 flowers on few leafy-bracted peduncles from the median axils; forma *cleistantha* has the flowers more densely crowded in nearly sessile glomerules, usually from many, including the upper, axils. Of the 270 sheets of typical *R. strepens* before me 145 (nearly 54 *per cent.*) have elongate median peduncles 2–10 cm. long; when rarely such plants fruit (July 25, Va., *Fernald & Long,* no. 13,463; July 22, Ky., *Braun,* no. 3259; June 25, Mo., *Hasse,* no. 1094; July 7, Mo., *Steyermark,* no. 11,420; July 13, Mo., *Palmer,* no. 8275; August 27, Kans., *Norton;* etc.) they show no incipient sessile glomerules in the upper axils, such as one would expect if they always change to forma *cleistantha.* The peduncles are still there, up to autumn. Of the 168 sheets of forma *cleistantha* only 20 (11.5 *per cent.*) have such peduncles (not counting branches with subsessile glomerules). Furthermore, very many specimens with only glomerulate fruits in the middle and upper axils were collected pretty early in the season, June 17–August 18 (W. Va., *McElwee;* Ky., *Price;* Ill., *Eggert;* Mo., *Palmer,* no. 1310; Ark., *Heller & Heller,* no. 4118), their fruiting period overlapping the flowering period of typical *R. strepens.* It must be evident, then, that not always do typical early and showily flowering plants of *R. strepens* change late in the season into forma *cleistantha;* if they did so a much larger percentage of the latter would retain the elongate peduncles of the former, and the former, late in the season, would regularly bear crowded fruits in the upper axils. The problem is a promising one for the experimenter. Do the abundant seeds of the cleistogamous plant reproduce only the cleistogamous form or do they equally yield the typical showy-flowered and largely infertile plant? Carefully checked and numerous cultures are necessary before we can say with finality.

3. R. PEDUNCULATA Torr. Stem 1–7.5 dm. high, slender, firm, obtusely quadrangular or subterete, puberulent or minutely cinereous-pilose, with long internodes, simple, with axillary peduncles, to branched; the branches ascending and but slightly forking to more divergent and much divided, often bushy in habit: leaves ovate to ovate-oblong or lanceolate, short-petioled, tapering from slightly above base, pale green, puberulent,

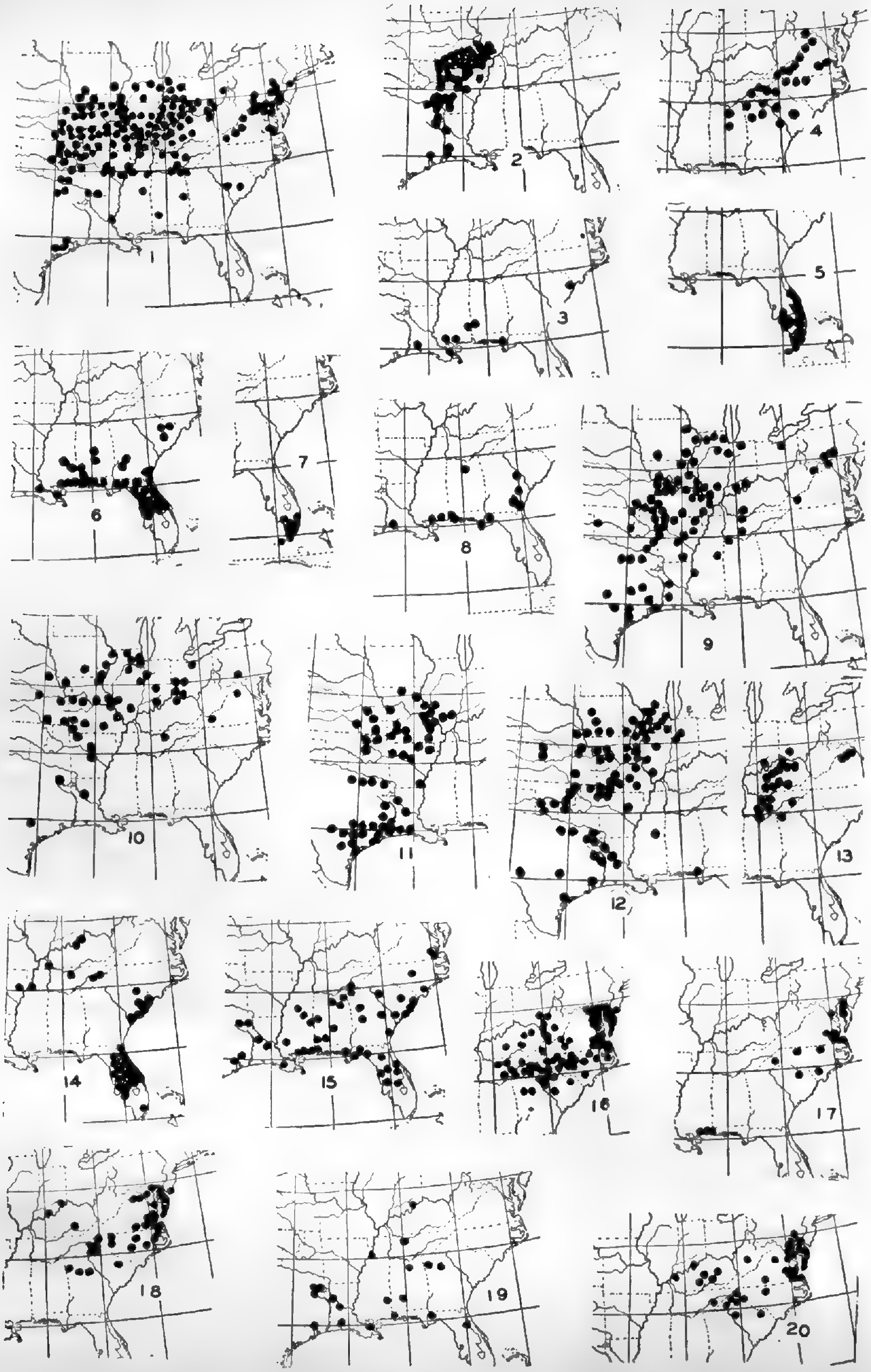
entire or very shallowly undulate; those of primary axis (above the rounded or obovate lowest ones) 3–11 cm. long and 2–4.5 cm. broad, the rameal smaller: flowers solitary at tips of simple 2-bracted peduncles or loosely cymose on the branches; the cymes, when developed, 2–several-flowered: calyx-segments linear-filiform, 0.5–1 mm. wide at base, thence tapering to very slender often flexuous tips, in maturity 1–3 cm. long, closely cinereous-hirtellous with slender-tipped spreading pubescence: corolla blue-violet, 2.5–5.5 cm. long; the slender tube about equaling the ampliate throat: ovary and capsule cinereous-puberulent; the capsule 1–2 cm. long; retinacula usually 6 or 8: seeds orbicular or suborbicular, cinereous, 2.5–3.5 mm. in diameter.—*R. pedunculata* Torr. ex Gray, Syn. Fl. N. Am. ii[1]. 325 (1878).—Woods, bluffs, rocky slopes, barrens, open fields, etc., in calcareous to circumneutral soil, western Louisiana and eastern Texas, north to southern Illinois, eastern and south-central Missouri and eastern Oklahoma. The following are representative. ILLINOIS: JACKSON CO.: Murphysboro, *Benke*, no. 4648 (US); mesophytic woods, Makanda, June 20, 1903, *Gleason;* dry upland or rocky woods, Grand Tower, *Gleason*, nos. 1793, 2654, 2655 (all as *R. strepens*); dry rocky limestone hillsides, Grand Tower, *Gleason*, no. 9007 (NY). JOHNSON CO.: rocky woods, Tunnel Hill, June 27, 1902, *J. Schneck* (NY). UNION CO.: dry sandstone bluff, Cobden, May 23, 1902, *F. S. Earle* (NY). [In Herb. Duke Univ. there is a specimen of *R. pedunculata*, bearing a label, "*Ruellia strepens*, Nees. Urbana, Ill. Oct. 4, 1884, W." with the heading "Herbarium of Merton B. Waite" and, printed above it, "Herbarium of A. B. Seymour". Since *R. strepens* is well known from the region of Urbana, where frequently collected, while there is no other evidence of *R. pedunculata* from northeast of the southwestern corner of Illinois, it is probable that in the wanderings of this material some transfer of labels has occurred]. MISSOURI: JEFFERSON CO.: rich woods in ravine, southwest of Crystal City, *Steyermark*, no. 1357 (Mo); dry copses, DeSoto, May 30, 1887, *Hasse* (Mo, US). STE. GENEVIEVE CO.: Bloomdale, *J. H. Kellogg*, no. 2004. CAPE GIRARDEAU CO.: wooded limestone slopes, Hickory Ridge, west of Delta, *Steyermark*, no. 20,811 (Mo). DUNKLIN CO.: Campbell, uncommon, *Bush*, no. 343 (Mo, NY). MADISON CO.: rocky open woods, near Fredericktown, *E. J. Palmer*, no. 31,608 (Mo). WAYNE CO.: low woods in Happy Hollow, north of Kime, *Steyermark*, no. 6318 (Mo). BUTLER CO.: rocky upland woods, Poplar Bluff, *E. J. Palmer*, no. 16,345 (Mo); cherty slopes bordering lowlands along Mud Creek, northwest of Rombauer, *Steyermark*, no. 11,422 (Mo). IRON CO.: Arcadia, *Greenman*, no. 3750 (Mo, Phil); rocky open woods near Ironton, *E. J. Palmer*, no. 18,111. REYNALDS CO.: cherty slopes, south of Oates, *Steyermark*, no.

19,724 (Mo). CARTER CO.: rocky woods, Van Buren, *J. H. Kellogg*, no. 15,300 (Mo). PHELPS CO.: Jerome, June 11, 1914, *Kellogg* (Mo). SHANNON CO.: rocky woods, Monteer, *Bush*, nos. 6401 and 6401 A. TEXAS CO.: wooded limestone slopes at base of bluffs along Big Pine River, southeast of Prewitt Spring, *Steyermark*, no. 20,077 (Mo). OREGON CO.: stony grove, Thayer, *F. W. Pennell*, no. 11,521 (Phil). OZARK CO.: cherty limestone slopes on top of bluff along White River, northeast of Dormio, *Steyermark*, no. 10,417 (Mo). DOUGLAS CO.: limestone glade and cherty open woods, between Roosevelt and Richville, *Steyermark*, no. 19,165 (Mo). WRIGHT CO.: open hillside, west of Cedar Gap, *O. E. Lansing*, no. 3020. LACLEDE CO.: cherty bottom of Pine Creek Hollow, southwest of Nebo, *Steyermark*, no. 25,159 (Mo). WEBSTER CO.: limestone outcrops, south of Fordland, *Steyermark*, no. 19,239 (Mo). TANEY CO.: common in woods, Swan, *Bush*, no. 236 (Mo, US); open rocky ground near Gretna, *E. J. Palmer*, no. 19,224. STONE CO.: dry rocky hillside by James River, *E. J. Palmer*, no. 5831 (Mo, US). BARRY CO.: dry woods around Eagle Rock, Sept. 24, 1896, *K. K. Mackenzie* (Mo, NY); Eagle Rock, *Bush*, nos. 78 and 1551 (Mo, NY, US). MCDONALD CO.: dry ground, *Bush*, no. 283. ARKANSAS: CRAIGHEAD CO.: open sandy soil, Jonesboro, *F. W. Pennell*, no. 11,510, as *R. ciliosa* (Phil); open woods, Bono, *Demaree*, no. 3519 (Mo). SHARP CO.: Hardy, *W. H. Emig*, no. 152 (Mo). FULTON CO.: dry cherty forest, Mammoth Spring, *F. W. Pennell*, no. 11,558 (Phil). IZARD CO.: sandstone, east of Guion, *Pennell*, no. 10,692 (NY, Phil). LONOKE CO.: fallow fields, Carlisle, *Demaree*, no. 17,516 (Mo, NY). DREW CO.: woods, Monticello, *Demaree*, no. 14,969 (Mo, NY). FAULKNER CO.: open fields, Conway, as *R. ciliosa*, *Flora A. Hass*, no. 1746 (US). GARLAND CO.: near Hot Springs, *Runyon*, nos. 1142 (NY) and 1439 (US). PULASKI CO.: low ridges, Fort Roots, *Demaree*, no. 17,301 (Mo, NY); Little Rock, *Demaree*, nos. 17,325 (Mo, NY) and 17,516 (Mo, NY). POPE CO.: Nogo, *Geo. M. Merrill*, no. 342 (Mo). NEVADA CO.: southeast of Prescott, June 3, 1912, *Mabel P. Hollister* (US). CARROLL CO.: dry open ground, Eureka Springs, *E. J. Palmer*, nos. 4378 (Mo, US) and 20,483 (NY). HEMPSTEAD CO.: near McNab, *Greenman*, no. 4417 (Mo). FRANKLIN CO.: rocky hillside, Ozark, *F. W. Pennell*, no. 10,622 (NY, Phil). HOWARD CO.: Baker Springs, Oct. 5, 1909, *J. H. Kellogg*. BENTON CO.: 1889, *E. N. Plank* (NY). WASHINGTON CO.: Savoy, May 18, 1922, *E. T. Wherry* (US). SEBASTIAN CO.: Fort Smith, 1853–4, *J. M. Bigelow*, paratypes (US). LOUISIANA: WITHOUT CITED STATION: *Hale*, ISOTYPE. NATCHITOCHES PARISH: dry open ground, Natchitoches, *E. J. Palmer*, no. 7511 (Mo, NY, US). ST. LANDRY PARISH: dry woods, Opelousas, *Carpenter & Hale* (US). JEFFERSON DAVIS PARISH: knolls in low prairies, Welsh, *E. J.*

*Palmer*, no. 7649 (US). Oklahoma: le flore co.: woods, near Page, *G. W. Stevens*, no. 1423. mccurtain co.: woods near Idabel, *H. W. Houghton* as *G. W. Stevens*, nos. 3625 and 3638. Texas: bowie co.: near Texarkana, *A. A. & E. G. Heller*, no. 4171 (Mo, NY, US). harrison co.: woods, Marshall, *Bush*, no. 781 (Mo). cass co.: rocky woodland, Hughes Springs, *Biltmore Herb.*, no. 10,679[a] (US). cherokee co.: dry sandy ground, Jacksonville, *E. J. Palmer*, no. 8600 (Mo, NY, US). anderson co.: Palestine, April 19, 1895, *E. N. Plank* (NY). upshur co.: sandy woods, Big Sandy, May 28, 1901, *Reverchon* (Mo); common in sand, Big Sandy, *Reverchon*, no. 2535 (Mo, NY). san augustine co.: open woods, *Geo. L. Crocket* (US). harris co.: Houston, 1917, *Ada Hayden*. Plate 843; map 2.

In view of its very definite characters it is remarkable that the earlier collectors seem not to have secured *Ruellia pedunculata* and that it was not described until 1878. It is not improbable that Nees included it in his complex and chiefly tropical *Cryphiacanthus barbadensis*. In his treatment in DC. Prodr. xi. 197 (1847) Nees gave the broad range of the latter as tropical America, thence to Virginia, Carolina and Texas ("In Americae calidioris . . . inde a prov. Virginiâ, Carolinâ et Texas") but under the citation of specimens he gave nothing from the United States. Since his *C. barbadensis* had long peduncles with cymes, subovate leaves, and subulate-acuminate calyx-segments, the Texan element was presumably *R. pedunculata*. The representatives of the latter in Virginia and Carolina are the two following, only the first of which has "pedunculis subcymosis".

4. R. **pinetorum,** sp. nov. (tab. 844), planta habitu *R. pedunculatae;* caule 1–3 dm. alto puberulo obtuse quadrangulato vel subtereto subsimplice vel divergenter ramoso vel ramosissimo internodiis elongatis; foliis oblongis vel elliptico-lanceolatis breviter petiolatis obtusis vel subacutis subcoriaceis minute lineolato-puberulis vel glabratis integris vel undulatis, majoribus 2–3.8 cm. longis 0.8–1.8 cm. latis; pedunculis axillaribus 0.2–3 cm. longis 1–3-floris, bracteolis oblongis petiolatis calyce brevioribus; calycis laciniis lineari-acicularibus deinde 1.3–2 cm. longis a basi 0.5–1 mm. latis attenuatis dorso cystolithos gerentibus; corollis caeruleo-purpureis 3–4 cm. longis, tubo cylindrico 1.5–2 cm. longo, fauce 1–1.5 cm. longo supra 6–10 mm. diametro, limbo (expanso) 2–4 cm. lato; capsulis glabris 1.2–1.6 cm. longis; seminibus orbicularibus 3 mm. diametro.—Low pine barrens of the Coastal Plain, South Carolina (possibly Virginia) to northern Florida and Louisiana, apparently local. South Carolina: horry co.: low pine barrens, July 28, 1936, *F. G.*




Ranges of RUELLIA. Map 1, R. STREPENS; 2, R. PEDUNCULATA; 3, R. PINETORUM; 4, R. PURSHIANA; 5, R. HETEROMORPHA; 6, R. CILIOSA; 7, R. SUCCULENTA; 8, R. NOCTIFLORA; 9, R. HUMILIS, var. TYPICA; 10, R. HUMILIS, var. FRONDOSA; 11, R. HUMILIS, var. LONGIFLORA; 12, R. HUMILIS, var. EXPANSA; 13, R. HUMILIS, var. CALVESCENS; 14, R. CAROLINIENSIS, var. TYPICA; 15, R. CAROLINIENSIS, var. SEMICALVA; 16, R. CAROLINIENSIS, var. MEMBRANACEA; 17, R. CAROLINIENSIS, var. NANELLA; 18, R. CAROLINIENSIS, var. CHELONIFORMIS; 19, R. CAROLINIENSIS, var. SALICINA; 20, R. CAROLINIENSIS, var. DENTATA

*Tarbox*, no. 800, TYPE in U. S. Nat. Herb. FLORIDA: CALHOUN CO.: low grounds, Iola, May, 1896, *Chapman*, three specimens, one unnamed, one marked "n. sp.", with entry of an unpublished name which appears in American herbaria on sheets of at least two other and quite different species (therefore unwise to take up), the third marked "sp. nov. affin. *R. pedunculata*" (Mo). ALABAMA: WASHINGTON CO.: Fruitdale, July, 1904, as *R. pedunculata, Southern Floral Nursery Co.* (Mo). MISSISSIPPI: WAYNE CO.: Waynesboro, Aug. 8–9, 1896, *C. L. Pollard*, as *R. strepens*, no. 1220 (Mo, NY, US). HARRISON CO.: Cuevas, Sept. 8, 1900, *Lloyd & Tracy*, no. 346 (NY). LOUISIANA: ST. TAMMANY PARISH: Covington, Sept., 1919, as *R. parviflora, G. Arsène*, no. 11,687 (US). ORLEANS PARISH: New Orleans, 1832, *T. Drummond*, nos. 257 in part (as *R. strepens*); 258 in part and 259 in part (as *R. longiflora*), the numbers inextricably confused, two of them appearing on one label. CALCASIEU PARISH: vicinity of Lake Charles, May 28, 1904, and other dates (not given) in 1904, *Andrew Allison*, nos. 57, 261 and 297, all as *R. pedunculata* (all US). MAP 3.

*Ruellia pinetorum* is the southeastern Coastal Plain representative of *R. pedunculata* and most of the few specimens seen were identified with that species which centers on the Ozark Upland. Chapman correctly understood it as a new species of this relationship but, as explained, the name he proposed but did not publish has been entered as a wholly new name on many sheets of at least two other species and should not be taken up. The finest material is that in the National Herbarium collected by Mr. Tarbox in low pine barrens of Horry County, South Carolina. I am, therefore, treating this as the type. In the chiefly Ozarkian *R. pedunculata* the leaves are more ovate, the primary ones 3–11 cm. long and 2–4.5 cm. wide; in *R. pinetorum* the leaves are oblong to elliptic-lanceolate and only 2–3.8 cm. long by 0.8–1.8 cm. wide. In *R. pedunculata* the broad bracts, especially in the simpler-stemmed plant with peduncles bearing solitary terminal flowers, nearly equal to greatly exceed the calyx; in *R. pinetorum* the narrow bracts are much shorter than the calyx. In *R. pedunculata* the calyx is copiously hirtellous with divergent sharp-tipped trichomes; in *R. pinetorum* glabrous or nearly so and closely invested with elongate and partially imbedded cystoliths. In *R. pedunculata* the corolla-tube and the ampliate throat are subequal in length; in *R. pinetorum* the tube is much longer than the less ampliate throat. In *R. pedunculata* the capsule is cinereous-puberulent; in *R. pinetorum* glabrous.


*Photo. B. G. Schubert.*

Ruellia Purshiana: fig. 3, summit of capsule, showing pilose surface, × 10.
R. Purshiana, forma claustroflora: fig. 1, summit of type, × 1; fig. 2, uppermost node, with small cleistogamous flowers (above) and capsule, × 2.


*Photo. B. G. Schubert.*

RUELLIA HETEROMORPHA, vernal stage: FIGS. 1–3, portions of flowering stems, × 1; FIG. 4, summit of internode and base of leaf, × 4; FIG. 5, base of calyx, × 10.

The very few specimens assembled indicate that *Ruellia pinetorum* is a very local plant. Now that attention is called to it, it is hoped that fuller material will become available. As noted under *R. pedunculata*, it is probable that this is the plant intended by Nees when, in DC. Prodr. xi. 197 (1847), he noted his quite different tropical *Cryphiacanthus barbadensis* as extending northward to Virginia and Carolina. No other plant known in the East satisfies his "pedunculis subcymosis petiolo longioribus vel et folium aequantibus superantibusve". We do not now know *R. pinetorum* from Virginia but so many species are now known to "jump" from eastern South Carolina or southeastern North Carolina to southeastern Virginia that *R. pinetorum* may well (before the destruction of most of the pine barrens) have been one of them. Really quite as closely related to the Ozarkian *R. pedunculata*, as is the Coastal Plain *R. pinetorum*, is the following beautiful species which centers on the Appalachian Upland.

5. R. **Purshiana,** sp. nov. (TAB. 845 et TAB. 846, FIG. 3), planta habitu plantae simplicissimae *R. pedunculatae;* caule simplice recto vel ramis erectis paucis gracile 1.5–6 dm. alto cinereo-puberulo internodiis elongatis; foliis membranaceis majoribus elliptico- vel lanceolato-ovatis basi attenuatis apice obtusis vel acutis integris vel subtile undulatis ad venas puberulis plus minusve hirtellisque vel glabratis, axis primarii 3–6-jugis remotis 2.5–10 cm. longis 1.5–4.3 cm. latis, petiolo gracili 0.5–2 cm. longo; pedunculis 1-floris 0.2–3 cm. longis axillaribus ad 1–2 (–4) nodos imos apice bracteatis; bracteis ellipticis vel ovalibus; axillis superioribus efloriferis; calycis segmentis anguste linearibus 0.7–1.2 mm. latis apice attenuatis minute cinereo-pilosis vel -hirtellis deinde 1.6–2.8 cm. longis; corollis 3–5 cm. longis caeruleo-purpureis vel pallide purpureis vel albescentibus, tubo cylindrico 1.5–3 cm. longo, fauce ampliato supra 0.8–1.4 cm. diametro, limbo (expanso) 3–4 cm. lato; capsulis minute strigoso-hirtellis vel pilosis 1.5–1.8 cm. longis; retinaculis 8.—*R. ciliosa*, var. *hybrida* Gray, Syn. Fl. N. Am. ii[1]. 326 (1878) in part only. *R. parviflora* sensu Britton in Britton & Brown, Ill. Fl. ed. 2, iii. 241, fig. 3891 (1913) at least as to fig., not *R. parviflora* (Nees) Britt. (1901) at least as to basonym, *Dipteracanthus ciliosus*, var. *parviflorus* Nees (1842).—Dry to moist woods, bluffs, granitic or calcareous slopes, etc., western Maryland, south along the mountains and locally on the Piedmont to eastern Virginia, central South Carolina, Georgia and Alabama. MARYLAND: FREDERICK CO.: *W. F. A. Aiken*, as *R. strepens*, altered

to *R. caroliniensis* (Phil). VIRGINIA: FREDERICK CO.: woods, Cedar Creek, June 2, 1929, *Hunnewell*, no. 11,135 (FWH); limestone cliffs, Cedar Creek, June 5, 1936, *Hunnewell* (VPI); both as *R. caroliniensis*, var. *parviflora;* Meadow Mills, June 9, 1935, *O. M. Freeman* (USNA), as *R. ciliosa*. ROCKINGHAM CO.: Paul's Fort, *Frederick Pursh* (Phil). ROCKBRIDGE CO.: Natural Bridge, May 28 and 29, 1909, *E. B. Bartram*, as *R. parviflora*, one sheet (Gray) changed by later student to *R. humilis* "Pursh", another (Phil) to *R. caroliniensis;* "Glasgow", June 1, 1891, *J. R. Churchill*, as *R. ciliosa*, var. *ambigua* (Mo). BOTETOURT CO.: Indian Rock, June, 1887, *H. E. Wetherill*, as *R. strepens* (Pa). WASHINGTON CO.: shaly banks, vicinity of Mendota, *L. G. Carr*, no. 572, as *R. caroliniensis*. ROANOKE CO.: Roanoke, May 29, 1890, *Brown, Hogg, Vail, Timmerman, Britton & Britton*, as *R. ciliosa*, var. *ambigua* (NY); wooded limestone slope along Roanoke River at Dixie Caverns, July 6, 1942, *C. E. Wood*, Jr., no. 3673, as *R. caroliniensis*. BEDFORD CO.: July 8, 1871, *A. H. Curtiss*, one of the several quite dissimilar sheets marked by Gray as his *R. ciliosa* var. *ambigua*, one of the Curtiss specimens tagged by a later student as *R. caroliniensis*, the other as *R. hybrida*. AMELIA CO.: June 5, 1937, *J. B. Lewis*, no. 626, as *R. ciliosa*, var. *parviflora* (VPI). HENRICO CO.: Richmond, *De Chalmot*, as *R. pedunculata* (US). NORTH CAROLINA: ORANGE CO.: open woods, Upper New Hope Creek, Duke Forest, May 27, 1932, *Blomquist*, no. 4911, as *R. caroliniensis* (Duke); New Hope Creek, Duke Forest, May 20, 1933, *Blomquist & Oosting*, no. 3364, as *R. parviflora* (Duke); dry bank near University Lake, on Neville's Creek, northwest of Chapel Hill, May 29, 1940, *Radford & Stewart*, no. 654a, as *R. ciliosa* (NC). GUILFORD CO.: near High Point, May 22, 1902, *Biltmore Herb.*, no. $14718^{d}$, as *R. parviflora* (NY, US). FORSYTH CO.: Salem, *Schweinitz*, as *R. strepens*, altered by others, first to *R. ciliosa*, later to *R. caroliniensis* (Phil); woods, Winston-Salem, Aug. 20, 1921, *P. D. Schallert*, as *R. ciliosa*, May 30, 1934, *Schallert*, no. 6509, as *R. strepens* (Schallert). RUTHERFORD CO.: Cuba, June 27, 1887, *L. W. Lynch*, no. 36, as *R. strepens* (NC). MADISON CO.: Marshall, May 28, 1904, *Biltmore Herb.*, no. $14718^{c}$, as *R. parviflora* (US); dry woods, Hot Springs, June 2, 1899, *J. R. Churchill*, as *R. ciliosa*, var. *parviflora* (Mo). SOUTH CAROLINA: SUMTER CO.: Sept., 1937, *E. E. Holdaway*, no. 73, as *R. ciliosa* (Duke). ANDERSON CO.: 1886, *Miss F. Earl*, as *R. strepens* (VPI); Andersonville, 1884, *N. H. E.* (NY). OCONEE CO.: Keowee, May 20, 1906, *H. D. House*, no. 2171, as *R. parviflora* (NY). GEORGIA: WITHOUT STATED LOCALITY: mountains of Georgia, *Chapman*, as *R. ciliosa*, var. *ambigua* (Mo). BURKE CO.: woods, Shell Bluff on Savannah River, April 23, 1936, *Leeds & Harper*, no. 2756, as *R. parviflora* (Phil). OGLETHORP CO.: granite outcrop west of Lexington, May 28, 1934, *Francis Harper*, as *R. parviflora* (Phil). DEKALB CO.: Stone Mountain, May 23, 1897, *Henry Eggert* (Mo); mixed woods, Emory University campus, April 30, 1936, *Don Eyles*, no. 695, as *R. parviflora* (Duke). FLOYD CO.: Rome, *Chapman* (Mo), as *R. ciliosa*, var. *hybrida*; dry hillsides near Silver Creek, May 11, 1899, *Biltmore Herb.*, no. 849[d], as *R. ciliosa* (TYPE in Herb. U. S. National Herb.). TENNESSEE: KNOX CO.: Knoxville, May 14, 1889, *Lamson-Scribner*, as *R. strepens*, changed by later students to *R. ciliosa* and to *R. parviflora* (US); woods and groves, Knoxville, July, 1897, *Ruth*, no. 9572, as *R. strepens* (NY); woodlands, Knox County, May, 1898, *Ruth*, no. 737, as *R. strepens* (NY). ALABAMA: BLOUNT CO.: rocky woodlands, Bangor, May 20, 1902, *Biltmore Herb.* no. 14,718, as *R. ciliosa*, var. *parviflora* (US). JEFFERSON CO.: Birmingham, May 24, 1901, *F. S. Earle*, as *R. parviflora* (NY). MAP 4.

5a. Forma **claustroflora,** f. nov. (TAB. 846, FIG. 1 et 2), floribus in glomerulis axillaribus aggregatis, glomerulis ad nodos omnes gestis; corollis tubulosis clausis 4–8 mm. longis apice dense pilosis; capsulis numerosis.—VIRGINIA: WITHOUT STATED LOCALITY: 1843, *Gray & Sullivant*, as *R. strepens*. ROCKBRIDGE CO.: "ex umbrosis Virginiae juxta *Virginia Natural Bridge*", Sept. 14, 1884, *John Ball* (US), identified by a later student as *R. strepens*, afterward changed to *R. parviflora;* Natural Bridge, Sept. 4, 1885, *N. L. & E. G. Britton*, as *R. strepens*, var. *cleistantha* (NY). TENNESSEE: COCKE CO.: within three miles of Wolf Creek Station, Aug. 31, 1897, *Kearney*, no. 863, as *R. ciliosa*, var. *hybrida* (Mo and NC), TYPE in Herb. Missouri Botanical Garden.

*Ruellia Purshiana*, named for FREDERICK PURSH, who first collected the species in the mountains of Virginia, is, when assembled from the very miscellaneous covers in which it has been confused, under 11 misidentifications, with no less than 7 species, stands out as a remarkably definite species of the Appalachian Upland. Although this is doubtless the plant chiefly intended by Gray when he conceived his *R. ciliosa*, var. *ambigua*, "as if a hybrid between *R. ciliosa* and *R. strepens*, with the aspect of the latter, but the calyx of the former", it can not be overlooked that Gray promptly lost his bearings in applying the name *R. ciliosa*, var. *ambigua*, for sheets carrying the printed annotation-slip "Syn. Fl. N. Amer." and marked by Gray as *R. ciliosa*, var. *ambigua* belong to no less than five species: the present one (in Herb. Gray); a Floridan sheet in Torrey's Herbarium containing at least three species, none of them like anything else included by Gray in his var. *ambigua;* and a mixed sheet in Herb. Gray, containing a sprig of *R. pedunculata* Torr. from Arkansas and the top of a plant of the very different Texan *R. Drummondiana* (Nees) Gray (this mixed sheet later misidentified as *R.* "*caroliniensis*"). I have not located the Kentucky plant included by Gray under *R. ciliosa*, var. *ambigua*. Even though we can infer that by his description and note Gray meant chiefly the plant I am here calling *R. Purshiana*, it is evident that, as he originally labelled specimens, the name *R. ciliosa*, var. *ambigua* was emphatically a *nomen ambiguum*. The name has subsequently been further misapplied. I am, therefore, assigning to the species with somewhat the aspect of *R. strepens* but with much more slender calyx-segments a new name, typified by a characteristic sheet of specimens.

That *Ruellia Purshiana* simulates very extreme plants of *R. strepens* with short leaves there can be no question. Some specimens of the latter, especially those from upland and dry habitats, consequently with greatly reduced stature and abbreviated leaves, are superficially similar (such specimens as the following: dry ground, Chickamauga Park, Georgia, May 25, 1911, *Churchill* (G); open woodlands, Coalgrove, Ohio, *Biltmore Herb.*, no. $4500^{f}$ (US); dry ground near Chattanooga, Tennessee, May 27, 1911, *Churchill;* and dry soil, Stevenson, Jackson County, Alabama, *Biltmore Herb.*, no. $4500^{a}$ (US)). There the resemblance stops, except for the possibly significant fact that both species have the showy flowers mostly solitary on few axillary peduncles and rarely producing fruit, and also have cleistogamous forms with glomerules of several highly fertile flowers in many of the upper axils. In *R. strepens* the stem is glabrous, pilose in lines or rarely over the whole surface; the lanceolate calyx-segments are flat to the tip, 2–4 mm. broad, and conspicuously villous-ciliate; and the capsules glabrous. *R. strepens* is usually a plant of rich calcareous woods, oftenest on wooded bottoms, with its greatest concentration in the Mississippi Basin (map 1). *R. Purshiana* (map 4) is a plant of dry rocky or upland habitats, sometimes on limestones but often (as on Stone Mountain) in granitic or somewhat acid soils. Its stem is closely cinereous-puberulent; its calyx-segments linear and only 0.7–1.2 mm. wide below the middle, thence tapering to almost thread-like tips, and its surfaces are densely cinereous-hirtellous. The capsules, too, are closely and minutely hirtellous. *R. Purshiana* was illustrated, erroneously as *R. parviflora,* in Britton & Brown, Ill. Fl. ed. 2, iii. fig. 3891. It certainly has nothing to do with the type of *R. parviflora,* which rests upon *Dipteracanthus ciliosus,* var. *parviflorus* (see p. 2).

In its minutely puberulent and slender stem, its slender calyx-segments and pubescent capsule *Ruellia Purshiana* is similar to the simpler-stemmed and least floriferous states of the chiefly Ozarkian *R. pedunculata* (MAP 2); but in these least branching plants of *R. pedunculata* (PLATE 843) the peduncles are soon widely divergent; the linear-acicular calyx-segments taper from base to apex; the showy flowers are quite fertile and regularly followed by capsules. So far as we know *R. pedunculata* does not have a cleistogamous form.

Although *Ruellia Purshiana* has often been identified as *R. ciliosa* Pursh, *R. caroliniensis* (Walt.) Steud., *R. parviflora* (Nees) Britton, *R. hybrida* Pursh, and even as *R. humilis* Nuttall, such identifications merely reflect the general lack of clarity regarding specific characters and the current and still inevitable vagueness about the early-proposed species. The earliest of these names or their basonyms is *Anonymos caroliniensis* Walt. Fl. Carol. (our no. 11). Although no specimen now exists as type of Walter's species, his remarkably detailed description, "caule tetragono hirsuto; foliis . . . hirsutis, . . . ; floribus sessilibus purpureis", surely does not apply to *R. Purshiana.* *R. ciliosa* Pursh (our no. 7) from near Savannah, was a branching plant, with subsessile ovate-oblong (really, apparently, obovate) leaves with margins and veins ciliate with long white hairs, the calyx-segments four times shorter than the corolla-tube (calycis laciniis subulatis tubo corollae quadruplo brevioribus). Such a plant could not be *R. Purshiana;* in fact, when Pursh twice collected the latter in the mountains of Virginia, he did not venture to name it. *R. hybrida* Pursh (see discussion under no. 11) also from Savannah, is quite as remote: much branched (ramosissima) and hirsute with white hairs, the oblong leaves densely hirsute, etc. *R. humilis* Nutt. (our no. 10), an essentially sessile-leaved and usually freely divergent-branched plant, originally from Arkansas, has nothing to do with *R. Purshiana;* and as to *R. parviflora* (see p. 2), that ill-defined name goes back to *Dip-*

*teracanthus ciliosus*, var. *parviflorus* Nees, from the Kentucky River, and with an impossible description for any North American member of *Ruellia:* with petioles 3–6 inches long—foliis paulo longiori petiolo (3–6-pollicari)! Only by substituting for "petiolo" the word "pedunculo" could one make much sense out of Nees' diagnosis (if his plant was a *Dipteracanthus* and related to *D. ciliosus*) but even then his var. *parviflorus* remains wholly vague. It is not a good basis for the name of a common species with petioles rarely 1 cm. long, and surely it was not *R. Purshiana.*

6. R. **heteromorpha,** sp. nov. (TAB. 847 et 848), planta dimorpha vel plus minusve heteromorpha. CAULIBUS VERNALIBUS 1–3 basi plerumque decumbentibus jam adscendentibus simplicibus vel divergenter ramosis 0.4–4 dm. altis puberulis plus minusve patenter villoso-hirsutis, nodis 3–5 (–10), internodiis 0.5–5 cm. longis; foliis membranaceis obovatis vel ellipticis vel oblanceolatis breviter petiolatis integris vel obscure undulatis plus minusve lineolato-strigillosis supra villoso-strigosis basin versus villoso-ciliatis subtus strigoso-hispidis glabratisve, laminis maturis 1.5–4.5 cm. longis 0.8–2.5 cm. latis; pedunculis perbrevibus axillaribus ad 1–3 nodos superiores bracteatis; bracteis oblongis; calycis segmentis lineari-attenuatis vix 1 mm. latis villoso-ciliatis 1.5–2 mm. longis; corollis (rarissime 2) 3–5.5 cm. longis coeruleo-purpureis vel pallide caerulescentibus late infundibuliformibus, tubo cylindrico 1.5–3 cm. longo, fauce obconico supra 1–2 cm. diametro, limbo (expanso) 3–4.5 cm. lato; capsulis glabris 1.1–1.6 cm. longis; retinaculis 6 vel 8. CAULIBUS SEROTINIS decumbentibus vel prostratis elongatis ad 6 dm. longis deinde ramosissimis, floribus in glomerulis axillaribus terminalibusque aggregatis, corollis plerumque clausis clavato-tubulosis cleistogamicis 1–3 cm. longis, vel corollis expansis reductisque; seminibus subrotundis 2.5–3.5 mm. diametro. *R. hybrida* sensu Small, Fl. Se. U. S. 1084 (1903), presumably not Pursh, Fl. Am. Sept. ii. 420 (1814).—Dry sands among pines or palmettos, Keys and Everglades, north to east-central FLORIDA: VOLUSIA CO.: moist pine barrens, near Seville, Aug. 1, 1900, *A. H. Curtiss*, no. 6701A (US), July 30, 1909, *Curtiss*, no. 6701, as *R. ciliosa*, var., vernal fl. BREVARD CO.: scrub, south of Eau Gallie, Dec. 1, 1919, *Small, Britton & De Winkeler*, no. 9200 (NY, US), later state, as *R. parviflora.* ST. LUCIE CO.: (formerly included in Brevard Co.): edge of pond, Okeechobee region, April 18, 1903, *Fredholm*, no. 5808, vernal fl., as *R. ciliosa,* annotated in one herbarium (US) as *R. parviflora,* in another (G) as *R. caroliniensis,* with an unpublished varietal name); Indian River, *Edw. Palmer*, no. 348 (Mo), as *R. strepens.* DE SOTO CO.: dry gravelly

soil, below Arcadia, March 14, 1926, *Mary H. Williams* (Phil), as *R. ciliosa*, later annotated with an unpublished specific name. LEE CO.: Owanita, March 18, 1907, *Wm. Kellogg*, vernal fl., as *R. ciliosa*, later annotated as undescribed var. of *R. caroliniensis;* among palmettos, vicinity of Fort Myers, March 21, 1916, *Jeanette P. Standley*, no. 70, vernal fl., as *R. humilis*, later annotated like the last (G) and as *R. parviflora* (US) and as an undescribed species (Phil); in pineland, vicinity of Fort Myers, May 4, 1916, *J. P. Standley*, no. 425, vernal fl. (US), as *R. humilis*, later annotated as *R. parviflora;* in pineland, Mullock Creek District, about 8 miles southeast of Fort Myers, May–June, 1917, *J. P. Standley*, no. 444, vernal fl., as *R. humilis*, annotated (G) as an unpublished var. of *R. caroliniensis*, (Phil) as an unpublished species, and (US) as *R. parviflora;* sandy pine woods along road to Coconut, April 14, 1930, *Moldenke*, no. 968, vernal fl. (Duke, Mo, NY). DADE CO.: dry sandy soil among palmettos, Buena Vista, Jan. 17, 1930, *Moldenke*, no. 426 (Duke, Mo, NY), as *R. hybrida*, vernal fl. and fr.; pinelands near Little River, Feb., 1917, *W. E. Safford* (US), as *R. hybrida*, later annotated as *R. parviflora;* Miami, April 4–7, 1898, *Pollard & Collins*, no. 233 (US), as *R. humilis*, later annotated as *R. parviflora*, April 1, 1903, vernal fl., *N. L. Britton* (US), as *R. hybrida*, later annotated as an unpublished var. of *R. caroliniensis*, March 14, 1917, *H. B. Meredith* (Phil), vernal fl., passing to later stage, as *R. ciliosa*, later annotated as an unpublished species; pinelands between Miami and Kendall Station, Nov. 5, 1906, *Small & Carter*, no. 2603 (NY), later stage, as *R. hybrida*, later annotated as unpublished var. of *R. caroliniensis;* pinelands between Cocoanut Grove and Cutler, Oct. 31–Nov. 4, 1903, *Small & Carter*, no. 1273 (NY as *R. hybrida*, Phil as *R. parviflora*, the former later annotated as an undescribed species), later stage; pinelands about Sykes Hammock, Everglade Keys, March 15, 1915, *Small, Mosier & Simpson*, no. 5772, as *R. hybrida*, later annotated as an undescribed var. of *R. caroliniensis*—TYPE of *R. heteromorpha* in Herb. N. Y. Bot. Gard., vernal fl., passing to later stage; pinelands about Goodburn Hammock, Everglade Keys, June 31, 1915. *Small & Mosier*, no. 6381 (NY); pinelands between Cutler and Longview Camp, Nov. 9–12, 1903, *Small & Carter*, no. 1097, later state, labeled and annotated like the last; pinelands between Long Prairie and Camp Longview, Oct. 31, 1906, *Small & Carter*, no. 2695 (NY), later state, labeled and annotated like the last; between Peter's and Long Prairie, Nov., 1906, *J. J. Carter*, no. 173 (Phil), as *R. parviflora*, later annotated as an undescribed species; pinelands about Humbugus Prairie, Feb. 28, 1915, *Small & Mosier*, no. 5555 (NY), later state, as *R. hybrida*, later annotated as a var. of *R. caroliniensis;* pinelands between Peter's Prairie and Homestead, Nov. 10, 1906, *Small & Carter*, no. 2701 (NY), later state, named as the last; pinelands about Ross-Costello Hammock, Everglades Keys, June 24, 1915, *Small, Mosier & Small*, no. 6552, later state, as *R. hybrida.* MONROE CO.: woods, Pine Key, *Blodgett*, later state; pinelands, Big Pine Key, May 1, 1917, *Small*, no. 8142, vernal fl., as *R. humilis.* MAP 5.

Although most often, following Small, identified as *Ruellia hybrida* Pursh, it can hardly be overlooked that *R. heteromorpha* is a species of southern Florida, most abundant in the subtropical Everglades and Keys regions, that its branches, as soon as developed, trail and greatly elongate, that the lower surfaces of its petioled leaves are glabrescent or nearly glabrous from the first (except for lineolate cystoliths and closely appressed strigae) while the upper surfaces are strigose, and that the tube of its fully expanded corolla is usually twice as long as the calyx-segments. *R. hybrida*, from Savannah, Georgia, was described as *erect and very much branched*, hirsute with white hairs; the *subsessile oblong leaves densely hirsute; the calyx-segments scarcely shorter than the corolla-tube.* That is not a good diagnosis of the present species. Furthermore, Savannah is about 180 miles (a significant distance) north of the northernmost known station for *R. heteromorpha;* and it is surely significant that Nees in DC. Prodr. xi. 123 (1847), indicating by a mark of affirmation that he had seen the Pursh material, cited as belonging with it Drummond's nos. 258 and 259, both of which belong in the essentially sessile- and oblong-leaved copiously white-villous-hirsute plant which Nuttall described from Arkansas as *R. humilis*, a species, moreover, which is unknown in eastern Georgia. Nevertheless, one can hardly pass by this identification by Nees, especially since the description of *R. hybrida* does not closely suggest *R. heteromorpha.* In view of his lack of material and his "lumping" of many different American plants as so-called varieties of his all-inclusive *Dipteracanthus ciliosus*, one can hardly accept the identification of Nees as final. Similarly, *R. ciliosa* Pursh, originally described as with subsessile, ovate-oblong leaves with margins and veins long-ciliate with white hairs, and also from Savannah, was by Nees, who evidently saw the original material, matched with the broader-leaved and longer-flowered extreme of the species which Nuttall described as *R. humilis.* Several of the numbers cited by Nees are before me. They are uniform and


*Photo. B. G. Schubert.*

RUELLIA HETEROMORPHA, later cleistogamous stage: FIG. 1, portion of long fruiting branch, × 1; FIGS. 2 and 3, branchlets, × ½; FIG. 4, tip of branchlet, with two cleistogamous flowers, × 1; FIG. 5, calyces and capsules, × 2.

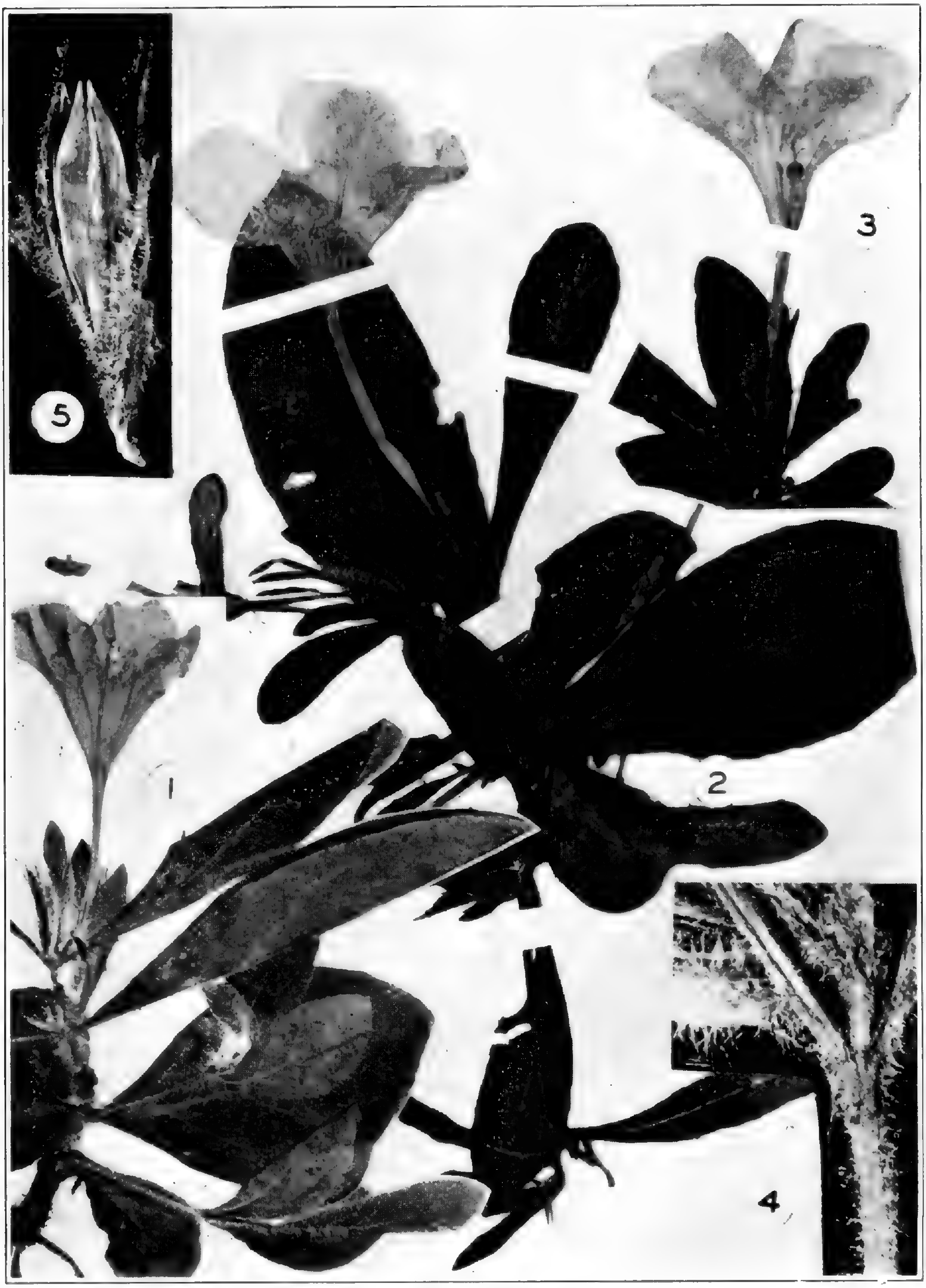



*Photo. B. G. Schubert.*

RUELLIA CILIOSA: FIGS. 1–3, plants, × 1; FIG. 4, summit of internode and base of cauline leaf, × 4; FIG. 5, calyx and capsule, × 2.

have nothing to do except generically with *R. heteromorpha* nor with any plant known from the Savannah region; *R. parviflora*, as already sufficiently emphasized (see p. 2), was a misbegotten name for some plant (surely not the present) with "petioles 3–6 inches long"; while *R. caroliniensis* goes back to Walter's remarkably clear description of a plant extending hundreds of miles north of *R. heteromorpha*, with distinctive characters which do not belong to the latter: ovate-lanceolate and hirsute leaves; throat of corolla campanulate, etc. When many of the specimens were annotated by an earlier student as an unpublished new species, they were given a name previously used by Nuttall for a quite different species (with rosettes of spatulate leaves, the plant I take to be Pursh's *R. ciliosa*, the *R. humilis* sensu Small, not Nutt.), but identical material of the same numbers was likewise annotated with 2 or more additional names. Under these circumstances it seems wiser to avoid publishing names so vaguely understood by their author and to start anew.

In its vernal showily flowering state, with simple or subsimple, erect stems (PLATE 847, FIGS. 1–3) *Ruellia heteromorpha* is so unlike the later state of the plant (PLATE 848, FIGS. 1–3), with trailing and elongate heavily fruiting and freely branching stems, and with smaller or even closed and cleistogamous flowers, that the two might be mistaken for two species. Transitions between the two states are, however, very numerous.

7. R. CILIOSA Pursh. Rosulate copiously villous plant, either with main axis abbreviated (0.5–5 cm. long) or elongated to 3 dm. high, the internodes copiously white-villous, the pairs of leaves in the abbreviated plants crowded, in the more open and elongate individuals the 2–5 pairs remote, the stem often divergently branched, especially at base: lower subrosulate leaves oblong, oblong-obovate or oblong-oblanceolate to lance-spatulate, prolonged to subsessile bases, obtuse to rounded at summit, copiously lineolate and more or less villous-hirsute, the larger ones 2–10 cm. long and 1–3 cm. broad; the median leaves often much longer; the upper reduced and often crowded, both median and upper more definitely petioled, their margins often undulate: flowers mostly solitary in the axils, short-peduncled, the heavily villous peduncle terminated by 2 small oblong to lanceolate bracts: calyx-segments linear-acicular, copiously villous, 1.5–2.5 cm. long: corolla bluish or lavender to nearly white, 2.5–5.5 cm. long; the slender tube 1.3–3 cm. long, the slenderly obconic throat 5–10 mm. in diameter at summit, the expanded limb

2.5–5 cm. broad: capsule 1.3–2 cm. long, glabrous; retinacula 6 or 8: seeds suborbicular, about 3 mm. in diameter.—Fl. Am. Sept. ii. 420 (1814), not most later auth. *Dipteracanthus ciliosus* (Pursh) Nees in Linnaea, xvi. 204 (1842), not in DC. Prodr. xi. 122 (1847), which was a hopeless mixture. *R. humilis* sensu Small, Fl. Se. U. S. 1084 (1903), not Nutt.—Dry pine barrens and sands, South Carolina to central Florida and southeastern Louisiana. South Carolina: without stated locality: "Hab. in Carolina", *H. M. Altorp* (Mo). darlington co.: sandy soil in Sheep Pasture Savannah at Hartsville, *B. E. Smith*, no. 1651 (NC), dwarf state, as *R. humilis;* sandy soil between Darlington and Hartsville, *B. E. Smith*, no. 916 (NC), tall state, as *R. hybrida* Pursh. sumter co.: pine barrens near Cane Savannah, *Witmer Stone*, no. 426 (Phil), as *R. humilis.* Georgia: without stated locality: *Nuttall*, as an unpublished new species (Phil); *Boykin* (Phil). camden co.: lowland, *Grace J. Schallert*, no. 13,127 (Schallert). charleston co.: "Extreme drought conditions", Gopher Ridge (sandy), near Sterling Branch, *Jean Sherwood Harper*, no. 419 (Phil), as *R. humilis.* worth co.: vicinity of Poulan, *Pollard & Maxon*, no. 574, as *R. humilis*, later annotated (G) correctly as *R. ciliosa.* mitchell co.: Camilla, *S. M. Tracy*, no. 3532 (Mo), as *R. strepens.* Florida: duval co.: dry pine barrens, *A. H. Curtiss*, no. 1944*, as an unpublished var. of *R. strepens*, in some herbaria altered to *R. ciliosa*, in others to *R. humilis;* Jacksonville, 1875, *A. H. Curtiss* (US), correctly as *R. ciliosa*, annotated as *R. humilis;* dry pine barrens, *Fredholm*, no. 5085, as *R. ciliosa*, var. *longiflora* Gray. st. johns co.: near St. Augustine, June, 1883, *T. F. Seal* (Phil). orange co.: sand, Winter Park, April, 1900, *A. M. Huger* (NY), as *R. humilis;* sandy pine barren, Lake Brantley, *C. S. Williamson* (NY), as *R. strepens*, altered to *R. humilis;* Clarcona, 1899, *A. J. Pieters*, no. 120 (US). lake co.: Okahumpha, March 5, 1888, *Isaac Burk* (Phil); vicinity of Eustis, *Nash*, no. 183. hernando co.: dry sandy woods, Brookeville, *Moldenke*, no. 5948 (NY). pasco co.: high pineland, Blanton, *Barnhart*, no. 2653 (US), as *R. humilis.* hillsboro co.: Tampa, June–Aug., 1898, *A. M. Ferguson* (Mo). marion co.: turkey-oak woods, east of Citra, April 14, 1940, *W. A. Murrill* (Mo), as *R. humilis.* alachua co.: Gainesville, *G. S. Miller*, no. 437 (US) as *R. humilis;* scrub west of Carroll's, near Gainesville, May 28, 1936, *W. A. Murrill* (Mo), as *R. humilis.* suwanee co.: Live Oak, *S. M. Tracy*, no. 6684 (NY), as *R. humilis.* gadsden co.: in pinetis, prope Quincy, Mai–Jul. 1843, *Rugel* (NY), as *R. strepens;* grassy, white sandy dry field under pine, River Junction, *Wiegand & Manning* no. 2927, as *R. humilis.* liberty co.: Bristol, *Chapman* (Mo, US). calhoun co.: Wewahitchka, *Chapman* (Mo). holmes co.: Ponce de Leon, June 20, 1905, *J. M. Mac-*

*farlane* (Pa). WALTON CO.: dry open woods, Crestview, *A. H. Curtiss*, no. 6489, in part, as *R. humilis.* OKALOOSA CO.: near Camp Pinchot, June 21, 1928, *O. M. Freeman* (USNA), as *R. humilis.* ALABAMA: WITHOUT STATED LOCALITY: *R. Haines*, from Gates (Phil). CHILTON CO.: Clauton, *Pollard & Maxon*, no. 273 (US), as *R. humilis.* ELMORE CO.: Deatsville, *Pollard & Maxon*, no. 305 (US), as *R. humilis.* WASHINGTON CO.: Fruitdale, July, 1904, *So. Floral Nursery Co.* (Mo), as *R. humilis.* BALDWIN CO.: dry woods, Magnolia Springs, June 25, 1909, *Schallert* (Duke); dry open woods, Point Clear, 1896, *Mohr* (US); dry pine barrens about ½ mile west of Elberta, *R. M. Harper*, no. 3795. MOBILE CO.: dry pine woods, Mobile, July, 1877, *Mohr* (US); pine barrens, Spring Hill, *E. W. Graves*, no. 498 (? or 948), in part only (Mo, US), as *R. humilis.* MISSISSIPPI: JASPER CO.: Heidelburg, *Tracy*, no. 3324 (US), as *R. humilis.* WAYNE CO.: Waynesboro, *Pollard*, no. 1221 (Mo, NY, US), as *R. humilis.* HARRISON CO.: Beauvoir, *S. M. Tracy*, no. 4942 (US), as *R. humilis;* Biloxi, *Tracy*, no. 6433 (US), as *R. parviflora*, altered to *R. humilis;* Ocean Springs, *A. B. Seymour*, no. 153, as *R. humilis*, var. *longiflora.* LOUISIANA: ORLEANS PARISH: New Orleans, *Drummond.* POINTE COUPÉE PARISH: dry sandy soil, Red River, *Hale.* PLATES 849 and 850; MAP 6.

Among the very diverse plants which have been identified with *Ruellia ciliosa* Pursh the present species seems to me most likely to be what he had from Savannah. His description, emphasizing the subsessile ovate-oblong leaves (remembering that Pursh used "ovate" for truly ovate and for *obovate* outlines) with long white ciliation, the bracts lanceolate, the subulate calyx-segments one fourth the length of the corolla-tube, was better for this plant than for most of the species (with ovate or lanceolate and petioled leaves) to which the name has been applied. Pursh's account was as follows

> *ciliosa.* 4. R. erecta, ramosa; foliis subsessilibus ovato-oblongis margine nervis venisque pilis albis longe ciliatis, bracteis lanceolatis brevibus, calycis laciniis subulatis tubo corollae quadruplo brevioribus.
> Near Savannah, Georgia. ♃. July. *v.s. in Herb. Enslen.*

Since this is the only plant which approximately satisfies the diagnosis and since it extends northward across South Carolina, I am retaining the name *Ruellia ciliosa* for it. When the actual type can be examined some revision may be necessitated. In DeCandolle, Prodr. xi. 122 (1847) Nees introduced a confusion which has lasted for nearly a century, by citing under *Dipteracanthus ciliosus* a number of *Drummond* and other specimens, from Texas to Missouri, which belong to the wholly different *R. humilis* Nutt. The latter, of which a type or isotype is before me, is a definite and wide-ranging inland species, quite unknown on the Atlantic slope of South Carolina and Georgia, with essentially sessile, oblong, ovate or lanceolate leaves with none of the subspatulate or obovate tendency of *R. ciliosa* and never, so far as I have seen, with the slightest rosulate tendency. The type of *R. humilis* was from Arkansas. Nevertheless, Small, clearly describing as *R. humilis* only the dwarfer plants of *R. ciliosa*, gave it, as *R. humilis*, the range: "Georgia and Florida to Mississippi", thus excluding the type-region. By Small's account, his "*R. humilis*" had the "Stems very short, 1–3 cm. long". The majority of collections show some individuals with stems 0.3–3 dm. high, many of them from Florida; I cannot make out how Small disposed of them, for their leaf-outline and extreme villosity keep them out of his other categories.

(*To be continued*)

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Carex cristatella in New Hampshire.—A few hundred yards from where I live in Durham is a swale through which a small brook flows, an area which for a considerable number of years, at least, has been unmowed. Having passed by this relatively unspoiled area often while on my way to work, I finally decided to investigate it. Amongst the abundant *Carices* there, one species in particular, bearing spikes of globose to subglobose and very conspicuous heads on sturdy culms, quickly attracted my attention. It proved to be *Carex cristatella* Britton.

Mackenzie[1] gives its distribution as "swampy meadows and thickets, eastern Massachusetts to North Dakota and southward to Virginia and Missouri", though immediately after he states "(Specimens examined from Quebec, Vermont, . . .)".

In New England, north of Connecticut and Rhode Island, *Carex cristatella* seems to be common only in the western parts of Massachusetts and Vermont. Outlying stations in Massachusetts noted in the Gray Herbarium are at Wilbraham Moun-

[1] North American Flora, Volume 18, p. 167, December 1931.

tain, *F. C. Seymour* No. 644, and at Framingham, July 16, 1905, *F. F. Forbes*, the latter place some sixty miles southwest of Durham. The nearest this species approaches us in Vermont seems to be Danville, which is nearly a hundred miles to the northwest.

The Durham collection, *A. R. Hodgdon* No. 4122, has been placed in the Gray Herbarium as well as the Herbaria of the New England Botanical Club and the University of New Hampshire.—A. R. Hodgdon, University of New Hampshire, Durham, New Hampshire.

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Euphrasia canadensis in Massachusetts.—While working over the lower eastern slopes of Mt. Greylock on August 11 and 12, 1944, I found *Euphrasia canadensis* at three stations in the town of Adams. The first was in wet land by the roadside between Hoxie Brook and the Theil Farm, which is now a part of the State Reservation. A second station, about a mile and a half from the first, was in dry grassy pasture-land at the top of a bank by the upper road leading southward from Peck's Brook toward Cheshire Harbor; here the plant was in considerable abundance. A few others were noticed at a third station, on a cut by the roadside on Fiske Street, nearer the village of Adams.

Prof. Fernald writes me that these are the first specimens of this plant he has seen from south of the Maine coast or the White Mountain region.

Material from the second station has been deposited in the Gray Herbarium and in the Herbarium of Massachusetts State College.—Arthur K. Harrison, Massachusetts State College, Amherst.

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Vegetative Reproduction in Carex tribuloides and C. projecta.—In an interesting little article on sympodial and monopodial growth in American *Carices*[1], Theodor Holm remarks incidentally that the vegetative shoots of *Carex tribuloides* sometimes develop small axillary buds, "which, however, die off at the same time as the entire shoot itself." The last observation is by no means always correct; both in *C. tribuloides* and its near

[1] Amer. Journ. Sci. ser. 4, i. 348–350, pl. 9 (1896).

relative, *C. projecta*, the buds may become an effective means of vegative propagation.

My attention was drawn to the matter while collecting, last summer, on the island of Grand Manan in Charlotte County, New Brunswick. In moist, well shaded ground along a brook I ran across a luxuriant clump of *C. projecta*. On the damp soil about its base lay prostrate culms of the previous season, their original blades and sheaths withered and brown, but with slender young shoots up to 5 cm. long arising from just such buds as Holm described and already beginning to take root. Obviously there were here the makings of new individuals, and since the leafy culms may reach a height of 4–5 dm. they would, if they fell outward, carry the young plants beyond the range of fatal competition with the parent rhizome.

The buds develop at the very base of the old sheaths—i. e. at the nodes—and inside them. They produce four or five short, stiff, veiny blades which apparently function as bud-scales. With their protection, the buds live independently over winter; the old culms are flaccid and seemingly dead to the very base and to all appearance could furnish no nutriment. The new shoots soon force their way out of the sheaths; but if the sheath below the point of origin of the bud is not thoroughly decomposed, the first root may grow down inside it to a distance of 2 cm. In the Grand Manan specimen, the roots also had made their way out and into the soil.

Three sheets of *C. tribuloides* and 10 of *C. projecta* in the Gray Herbarium show sprouting buds in more or less advanced stages. There would probably be more if collectors had less often been contented to snatch a culm or two and leave the rest of the plant behind. It would seem that someone must have noticed a phenomenon so far from rare, but I find no mention of it in the literature at hand.—C. A. WEATHERBY.

*Volume 46, no. 552, including pages 453–516 and title-page of volume, was issued 16 December, 1944.*


*Photo. B. G. Schubert.*

Ruellia ciliosa: fig. 1, plant, × 1; fig. 2, basal branch, × 1; fig. 3, large-flowered branch, × 1.

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# NOTES ON PLANTS OF CENTRAL PENNSYLVANIA[1]

Herbert A. Wahl

It is the purpose here to record the occurrence of some plants in Central Pennsylvania which have not previously been reported from the state, or that reach a limit of their present distribution in this region, or that are otherwise noteworthy because of their distribution. Specimens of all the plants mentioned are deposited in the herbarium of The Pennsylvania State College and duplicates of most of those collected by the author have been distributed to other herbaria, including the University of Pennsylvania, Cornell University and The Gray Herbarium.

Potamogeton Oakesianus Robbins. In 1–2 feet of water in small pool in Oak Barrens at Scotia, 4 miles W. of State College, Centre Co., June 28, 1940. *Wahl* 758.

The determination has been checked by Ogden, who had seen no Pennsylvania specimens before the publication of his monograph[2]. Well established at Scotia in shallow ponds and pools formed by iron-ore mining. Another sheet in the herbarium of The Pennsylvania State College labelled "Barrens Swamps Aug. 1857. *Lowrie*" was probably collected in Huntingdon County. It is here near the southern limit of its distribution, although it occurs also in the eastern part of the state.

P. natans L. Black Moshannon, 8 mi. E. of Philipsburg, Centre Co., July 4, 1921. *L. W. Nuttall.* Not recorded for Pennsylvania by Ogden (loc. cit.) but probably of more frequent occurrence than the reports indicate.

[1] Contribution from the Department of Botany, The Pennsylvania State College No. 145.

[2] Rhodora, 45: 57–105, 119–163, 171–216. 1943.

Bromus ciliatus var. intonsus Fernald. Wet meadow 1 mi. E. of Ridgeway, Elk Co., Sept. 6, 1940. *Wahl* 853. Dry clearing beside Black Moshannon Lake, 8 mi. E. of Philipsburg, Centre Co., Aug. 4, 1941. *Wahl* 1065. Stream-bank 5 mi. S. E. of Philipsburg, Aug. 18, 1941. *Westerfeld* 245. Roadside in woods 4½ mi. S. E. of Philipsburg, July 22, 1942. *Westerfeld* 1499. Not recorded for Pennsylvania by Hitchcock[1] but is of frequent occurrence especially in the northern counties.

B. japonicus Thunb. var. porrectus Hackel (See Rhodora, **43**: 529). In waste field at State College, Centre Co., June 11, 1942. *Wahl* 1309. Around stone-pile in hay-field 2½ mi. S. S. W. of Bellefonte, Centre Co., June 24, 1942. *Wahl* 1319. A relatively recent introduction. Pennsylvania records have been lacking.

Glyceria Fernaldii (Hitchc.) St. John (*G. pallida* var. *Fernaldii* Hitchc.). Moist soil around Black Moshannon Lake 8 mi. E. of Philipsburg, Centre Co., July 16, 1938. *Wahl* 190.

This is the only known Pennsylvania record and apparently the southernmost station for this plant of distinctly northern distribution. Since the collection in 1938, the station has been used extensively as a picnic ground. Recent search has failed to relocate the plant, so it is assumed to have been eradicated here.

G. borealis (Nash) Bachelder. Growing in edge of water, pond at log-jam, Black Moshannon, Centre Co. *Nuttall*, July 18, 1921. The only other report for this species in Pennsylvania is one listed as doubtful by Gress[2].

Eragrostis poaeoides Beauv. Waste place near C. C. C. camp S-103, Laquin, Overton Twp., Bradford Co., Aug. 1, 1942. *Westerfeld* 1187. Not listed for Pennsylvania by Hitchcock[1] but occurs also in other places in the eastern part of the state.

Calamagrostis Porteri A. Gray. Woods ¾ mi. S. of Warriors Mark, Huntingdon Co., *Lowrie*, Aug. 21, 1865. Open woods 2 mi. E. of Coburn, Centre Co., *Wahl*, July 8, 1933.

The distribution and identity of *C. Porteri* and its close relatives have been admirably discussed by Father Louis-Marie[3], who also has verified the determinations of the above collections. The Huntingdon County station is approximately 10 mi. north of Porter's original station near Alexandria, while the Centre County station is about 70 miles N. E. Gress[4] also reports it

[1] Manual of the Grasses of the United States. U. S. Dept. Agric. Misc. Pub. No. 200. 1935.

[2] The Grasses of Pennsylvania. Bur. Pl. Ind. Gen. Bul. 384. Harrisburg, Pa. 1924.

[3] Rhodora, 46: 285–305. 1944.

[4] The Grasses of Penna., Bur. Pl. Ind. Gen. Bul. 384. Harrisburg, Pa. 1924.

from Blairs Mills, Huntingdon County, about 50 miles S. E. of Alexandria and from Lackawanna and Monroe Counties in Northeastern Pennsylvania. These additional stations help to fill in the Alleghenian distribution of this rare grass.

AGROSTIS PERENNANS forma CHAETOPHORA Fernald. 2 mi. N. W. of Petersburg, Huntingdon Co., Sept. 21, 1941. *Wahl* 1164. 8 mi. N. of McAlevys Fort, Huntingdon Co., Aug. 18, 1943. *Wahl* 1389. Two other sheets from Huntingdon County and two collections by *Nuttall* from near Philipsburg in Centre Co., show this awned form of *Agrostis perennans*, described by Fernald[1] from Huntingdon Co., to be fairly common in the mountainous parts of Huntingdon and Centre Counties.

A. PERENNANS var. AESTIVALIS Vasey, forma ATHEROPHORA Fernald. "Allegheny Mt." Sept. 1873. *Lowrie.* (Probably Huntingdon or Blair Co.) Described by Fernald[3] from Quebec and not otherwise reported. Most of the above were originally labeled *A. canina.*

PANICUM LEIBERGII (Vasey) Scribn. Limestone outcrop along railroad at west edge of State College, July 10, 1941. *Wahl* 1035A.

The colony consists of only a few plants which have persisted in a healthy and vigorous condition, but without spreading, since their discovery. The only known record for Pennsylvania.

CAREX FESTUCACEA Schkuhr. Open woods at Ingleby, 2 mi. E. of Coburn, Centre Co., June 13, 1934. *Wahl.* Fairly abundant at this locality, the only station known to the author in central Pennsylvania.

C. RICHII (Fern.) Mackenzie. Ashy spot in acid marshy meadow at Avis, Clinton Co., June 3, 1938. *Wahl* 119. The only station known to the author in central Pennsylvania. Sporadic in its distribution. Listed from several counties by Bright[2].

C. STRAMINEA Willd. Edge of small temporary pool 4 mi. W. of State College. June 22, 1937. *Wahl.* Edge of dried-up waterhole 4 mi. N. W. of State College. July 1, 1941. *Wahl* 1034.

The distribution of this species given by Mackenzie[3] as being chiefly coastal adds significance to central Pennsylvania stations although it is a rare sedge here. Listed also by Bright[2] from several western counties.

[1] RHODORA, 35: 317. 1933.
[2] Trillia, 9: 1–33. 1925–1930.
[3] Cyperaceae in North American Flora 18: (part 3) p. 163. 1931.

C. aenea Fernald. Very dry gravelly bank 3 mi. N. of Lock Haven, Clinton Co., May 28, 1931. *Wahl.*

When the above specimen was collected it was placed in the herbarium under *C. foenea* Willd. (*C. argyrantha* Tuckerm.) and so remained until 1940 when its identity as *C. aenea* was suspected by the author and confirmed by Professor Fernald. The material was taken from a single large plant growing on what was then a newly formed roadside fill. A brief visit to the station in June, 1940, failed to relocate the plant, but further search is necessary to determine if the species is still present so far removed from its nearest reported stations in New York and Connecticut.

C. Geyeri Boott.

The local occurrence of this sedge, not otherwise known east of Colorado, was reported by Clausen and Wahl[1]. Its local distribution has now been determined as extending over an area approximately 4 miles long by ½ mile wide where it is chiefly confined to wooded areas on the north-west-facing slope of a valley, usually near limestone outcrops. It is especially abundant where white pine occurs intermixed with the hardwoods. It has every appearance of being indigenous to the area.

C. Sprengelii Dewey. In shallow soil at top of shaded rocky outcrop ½ mi. N. W. of State College. May 23, 1943. *Wahl* 1348. The only station known in this part of the state but present also in eastern counties.

Juncus balticus Willd. var. littoralis Engelm. Marshy meadow 1 mi. E. of State College. July 24, 1931. *Wahl.*

This characteristic plant of brackish shores here grows in a small dense colony in a distinctly calcareous marsh associated with *Carex prairea, C. Schweinitzii, C. hystricina,* etc. Of sporadic distribution in the state, but here near its southern limit. Known also from Erie Co. (Presque Isle), Lehigh and Lancaster Counties.

Stellaria calycantha var. isophylla (Fernald) Fernald[2]. Stream-bank, 5 mi. S. E. of Philipsburg, Centre Co., May 27, 1941. *Westerfeld* 358.

S. calycantha var. floribunda (Fernald) Fernald[2]. Wet place along Wallace Run 4 mi. N. of Unionville, Centre Co., June 2, 1941. *Wahl* 986.

[1] Rhodora, **41**: 28–34. 1939.
[2] Rhodora, **42**: 254–259. 1940.

These varieties are here at or near the southern limit of the distribution of the species.

Holosteum umbellatum L. In cultivated field at State College, May 17, 1943. *Wahl* 1344. The first collection of this weedy species from the local area.

Erucastrum gallicum (Willd.) Schultes. In corn-field at State College, October 6, 1941. *Wahl* 1226. Likewise the first local record of this weedy species which is becoming widely distributed.

Lespedeza stipulacea Maxim. In field not cultivated for several years, 3 mi. S. of Centre Hall, Centre Co., October 5, 1940. *Wahl* 897.

L. cuneata (Dumont) G. Don (*L. sericea* Miq.). In field not cultivated for several years 5 mi. N. W. of State College, October 8, 1941. *Wahl* 1248.

Both of the above species of *Lespedeza* are plants that are grown for forage and have become established in the fields where they occur but have not spread. Both constitute the first and only known records for the species from this area. The author is indebted to the late Dr. K. M. Wiegand for the determination of the former and to Dr. F. J. Hermann for the latter.

Hypericum gymnanthum Engelm. & Gray. Edge of dried-up pool in Oak Barrens 2 mi. N. W. of State College, August 17, 1938. *Wahl* 113.

This isolated colony, the only known local station, possibly represents the northernmost point of distribution for this species.

Lonicera villosa var. tonsa Fernald. Marsh at Black Moshannon, 8 mi. E. of Philipsburg, May 8, 1941. *Wahl* and *Sinden* 927 and 928, also 1033, July 1, 1941.

This shrub reaches the southern limit of its distribution in Pennsylvania, where it is known from Warren and Monroe Counties in addition to the above station in Centre County. The Centre County plants differ from the description of var. *tonsa* in having some of the branchlets pilose.

The locality around Black Moshannon is noteworthy because of the occurrence here of several plants of distinctly northern distribution. Those mentioned in this paper as here reaching or approaching the southern limit of their present range are *Glyceria Fernaldii, Glyceria borealis* and *Lonicera villosa* var. *tonsa.* Also present are such plants of boreal affinities as *Rhamnus alnifolia, Sanguisorba canadensis, Poa saltuensis, Dalibarda repens* and

*Cornus canadensis.* The locality is on the Allegheny Plateau, about three miles from its south-east edge, at an altitude of about 1880 feet.

Eupatorium altissimum L. Dry bank 2 mi. W. of Spring Mills, Centre Co., August 6, 1939. *Wahl* 330. Dry roadside 1 mi. W. of Spring Mills, September 3, 1939. *Wahl* 419. The only stations known in Central Pennsylvania and here at or near its northern limit. Occurs sparingly in the S. E. part of the state.

Grindelia squarrosa var. serrulata (Rydberg) Steyermark. Dry roadside 4 mi. N. E. of Bellefonte, Centre Co., July 30, 1941. *Wahl* 1047. A western species locally and sparingly introduced in the east. The only other Pennsylvania record for this variety is from Erie County.[1]

Aster lucidulus (Gray) Wiegand. Moist soil along stream at Oak Hall, September 10, 1939. *Wahl* 443. Marshy place along stream at Linden Hall, September 25, 1939. *Wahl* 526. Wet field along stream ½ mi. E. of Lemont, September 27, 1941. *Wahl* 1200B. Fairly abundant along about 4½ miles of the upper reaches of Spring Creek between Lemont and Linden Hall in Centre County. The only known Pennsylvania records for this more northern species.

Carduus acanthoides L. Dry field at Oak Hall, Centre Co., September 25, 1941. *Wahl* 1200. Quite abundant at this station and with scattered patches extending about five miles northeast. Occurs sparingly in the eastern part of the state.

The Pennsylvania State College

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Hairy Variety of Sweet Pignut in New England.—*Carya ovalis* (Wang.) Sarg. var. *hirsuta* (Ashe) Sarg. (see Sargent, C. S., Bot. Gaz. **66:** 247, 1918) has been collected in several localities near Northampton, Mass., and on Meetinghouse Hill, Winchester, New Hampshire. This variety differs from the other varieties or forms of the species in having the rachis and often the lower surface of the leaflets densely pubescent, some of the hairs fascicled, others single. Several features vary as in the species as a whole. Thus, the leaflets range from 5 to 7; the fruit is quite diverse in shape and size, in the amount of splitting of the husk, and in the roughness of its surface; the bark varies from scaly to tight. The fruit on some trees approaches that of *C. glabra.* This variety is probably found locally throughout much

[1] Ann. Mo. Bot. Gard. **21:** 483. 1934.


*Photo. B. G. Schubert.*

Ruellia succulenta: fig. 1, portion of flowering plant, × $^2/_5$; fig. 2, fruiting branch, × 1; fig. 3, summit of internode and bases of leaves, × 4; fig. 4, lower surface of leaf, showing cystoliths, × 10; figs. 5 and 6, median and terminal flowering nodes, × 1; fig. 7, calyx and fruit, × 2


*Photo. B. G. Schubert.*

RUELLIA NOCTIFLORA: FIG. 1, base of plant, × 1; FIGS. 2, 3 and 4, flowering tips, × 1 (FIG. 3, ISOTYPE); FIG. 5, summit of internode and bases of leaves, × 4; FIG. 6, calyx and capsule, × 2 of the range of the sweet pignut in eastern United States from the place of original description in North Carolina to New Hampshire. It might be confused vegetatively with *C. ovata* and *C. tomentosa* (*C. alba*) in New England, and with *C. pallida* in the southeast. The subapical tufts of hairs on the serrations of the leaflets (see Manning, Amer. Jour. Bot., supplement Dec. 1942, p. 13s) and the persistent coriaceous dark outer bud-scales of the longer terminal buds are distinctive for the shagbark. The hairy twigs, the definitely separated fascicles of quite curly hairs on the rachis, giving this a shaggy appearance, the constantly fascicled hairy lower leaflet-surface, the stout branchlets, and the large buds distinguish the mockernut. The pale hickory differs only in the clearly separated fascicles of curly hairs on the rachis together with the pale and, except for the midrib, glabrous lower surfaces of the leaflets. A paper giving distribution, notes, and a key will be published later.—WAYNE E. MANNING, Northampton, Mass.

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PEREZIA ALETES AN ARGENTINIAN SPECIES.—In RHODORA, xx. 151 (1918), *Perezia aletes* Macbride was described as a new species, casually adventive from somewhere, found in 1917 as a garden-weed in North Worcester, Massachusetts. It has not been subsequently reported; furthermore, Dr. I. M. Johnston has, correctly it would seem, identified the specimen with *P. sonchifolia* Baker, a characteristic species of Argentina. Unless it subsequently appears to have got a real foothold, the species can be considered only a temporary and casual adventive.—M. L. FERNALD.

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## RUELLIA IN THE EASTERN UNITED STATES

M. L. FERNALD

(*Continued from page 38*)

In northwestern Florida there occurs a localized variety which differs from wide-ranging *Ruellia ciliosa* in suppression of the pubescence, the internodes being merely cinereous-puberulent, and the calyx-segments, though long-ciliate, covered on the back with cinereous pulverulence. This should be called

Var. **cinerascens,** var. nov., caulis internodiis cinereo-puberulis; calycis laciniis dorso cinereo-pulverulentibus margine villoso-ciliatis.—Northwestern Florida: walton co.: dry open woods, Crestview, July 22, 1899, *A. H. Curtiss*, no. 6489 in part, distrib. as *R. humilis* (Mo, NY, US (type in U. S. Nat. Herb.)). escambia co.: Fisherville, near Pensacola, June 17, 1905, *J. M. Macfarlane* (Pa).

8. R. succulenta Small. Erect or nearly so, with simple hollow and fleshy stems or erect branches 1.5–7.5 dm. high, the internodes sparingly puberulent or generally glabrous, purplish: leaves succulent, purplish, oblanceolate, narrowly obovate or oblong, narrowed to definite petioles, glabrous or minutely hirtellous and glabrate, undulate, the surfaces more or less lineolate; larger blades 3–6 cm. long and 0.7–2 cm. wide: flowers 1–3 on very short glabrous axillary peduncles: bracts small, lanceolate or oblong, glabrous: calyx-segments linear-filiform, 1–2 cm. long, glabrous or sparsely ciliate: corolla blue-purple, 2.5–4.5 cm. long, or the latest ones smaller; the slender tube 1.5–2.5 cm. long, the slenderly campanulate throat 0.7–1 cm. in diameter at summit, the expanded limb 2.5–4 cm. broad: capsule glabrous, rarely strigose, 1–1.5 cm. long, longer or slightly shorter than calyx.—Bull. N. Y. Bot. Gard. iii. 437 (1905).—Everglades region of southern Florida: desoto co.: sandhills, Avon Park to Sebring, *Small & DeWinkeler*, no. 9047 (NY). lee co.: hammocks, Myers, *Hitchcock*, no. 261. dade co.: border of wet prairie, Bay Biscayne, *A. H. Curtiss*, no. 5500E; near Cutler, *A. A. Eaton*, no. 257; in everglades near unfinished railroad grades, between Coconut Grove and Cutler, *Small & Carter*, no. 1721 (isotypes); northwest of Perrine, *Small & Carter*, no. 2999; west of Perrine, *Small*, no. 7880; west of Peters, *Small*, nos. 7917 (NY) and 7923 (NC, NY, Pa); between Peter's Prairie and Homestead, *Small & Carter*, no. 2702 (NY); glade, Black Point Bridge, below Cutler, *J. P. Young*, no. 319 (US); hammocks, Black Point, *Small & Carter*, no. 1101 (NY); pinelands, Large Island, east of Naranja, *Small & Carter*, no. 3070 (NY); pinelands about Sykes Hammock, *Small, Mosier & Small*, no. 5659 (Duke, NY); hammocks on prairie east of Florida City, *Small*, no. 8080 (NY); near the Homestead Trail, *Small*, no. 2256 (NY); west of Camp Jackson, *Small & Wilson*, no. 1844 (NY); Camp Jackson to Camp Longview, *Small, Carter & Small*, no. 3490 (NY); Paradise Key and vicinity, *Safford & Mosier*, no. 207 (US). monroe co.: everglades, intersecting Long Key, *Small & Carter*, no. 3017 (NY). Plate 851; map 7.

In its stiffly upright habit, glabrescent and more or less fistulous stems, fleshy purplish leaves and relatively short calyx *Ruellia succulenta* is not likely to be confused with more northern species.

Small contrasted it with *R. "parviflora"*, but that name, as currently used, applies to as diverse an aggregation of plants as can be imagined, the name, as originally applied, belonging to nothing readily identifiable. In some characters, especially in habit and foliage *R. succulenta* might, superficially, be mistaken for the next.

9. R. NOCTIFLORA (Nees) Gray. Stems erect or arched-ascending (rarely divergently branching from base—presumably after injury), 1.5–6 dm. high, cinereous-puberulent or minutely cinereous-pilose, glabrescent, with elongate internodes and 3–10 pairs of leaves on main axis: leaves narrowly lanceolate to lance- or elliptic-oblong, submembranaceous, puberulent or minutely hirtellous, tapering to blunt or subacute apex and to sessile to short-petioled base, undulate; the larger ones 3–8 cm. long and 0.8–2.7 cm. broad: peduncles solitary in axils of 1–4 upper pairs of leaves, very short, cinereous-puberulent; the 2 cinereous bracts linear-lanceolate and undulate-dentate: calyx-segments slenderly linear, cinereous-puberulent or minutely hirtellous, 2.5–4.5 cm. long: corolla bluish to nearly white, expanding in the night, 6–11 cm. long; slender tube 4.5–8 cm. long; the slender throat only 1–2 cm. long and 5–10 mm. thick; the expanded limb 3.5–6 cm. broad: capsule cinereous-puberulent, 2.25–3.5 cm. long.—Syn. Fl. N. Am. ii[1]. 326 (1878). *R. tubiflora* LeConte in Ann. Lyc. N. Y. i. 142 (1824), not HBK. (1817). *Dipteracanthus noctiflorus* Nees in DC. Prodr. xi. 123 (1847) in part, *i. e.* the typonym *Dizygandra tubiflora* Shuttleworth in Pl. Rugel in herb., and the citation of *R. tubiflora* LeConte and LeConte's material, not the other citations.—Savannas and wet pine barrens, evidently local, eastern Georgia to northwestern Florida, west to southwestern Louisiana. GEORGIA: WITHOUT STATED LOCALITY: *LeConte* (Mo, NY); savannas, *LeConte?* (Phil); these perhaps portions of the original collections, at first called *R. longiflora* (not *R. longiflora* Richard, 1792) but on some sheets altered to *R. tubiflora*, LeConte in his publication saying: "Inhabits in the savannahs of the Altamaha". RICHMOND CO.: "Altamaha, Bath", *LeConte* (Phil). LIBERTY CO.: near Sunbury[1], *LeConte* (NY); wet peaty pine barrens, 14 miles southeast of Ludowici, *Wiegand & Manning*, no. 2928 (erroneously noted as from "Long Co."). MCINTOSH CO.: at sea-level, about Darien Junction, June 25–27, 1895, *J. K. Small* (NY). FLORIDA: WITHOUT STATED LOCALITY: Florida, *LeConte* (Phil); Florida, *Chapman*, several collections (Mo, NY, Phil, US); West Florida, *Chapman*, several collections. WAKULLA CO.: "*Dizygandra noctiflora* Shuttl. n. sp.", In campis graminosis,

[1] Sunbury, not found on modern maps of Georgia, was thus described in Lippincott's Gazeteer (1856): "a decayed town of Liberty co., Georgia, on the Medway River, about 30 miles S. S. W. of Savannah".

inter St. Marks et Port Leon, Florida, legit *Rugel*, Jun. 1843 (Mo, NY), ISOTYPES of *Dipteracanthus noctiflorus* Nees. FRANKLIN CO.: Apalachicola, *Chapman*, with note, "The flowers open in the night and fall off by morning"; low prairie, Apalachicola, 1867, *B. F. Saurman;* low, grassy pine barren, Apalachicola, *Chapman*, distr. by Biltmore Herb., no. 4501[a]; low pinelands, Port St. Joe to Apalachicola, *Small*, *Small & DeWinkeler*, no. 11,417 (NY, US). ALABAMA: low meadows on the coast, Portersville, Sept., 1892, *Mohr* (US)—locality not definitely located, since Portersville in DeKalb County is not on the coast. CULLMAN CO.: Cullman, June 22, 1897, *Eggert* (Mo). MOBILE CO.: grassy pine meadows near the coast, Bayou Labatre, Aug. 13, 1892, *Mohr* (NY, US). MISSISSIPPI: Deer Island, *A. B. Seymour*, no. 197 (loosely branched, presumably injured, the rameal leaves with unusually long petioles). HARRISON CO.: Biloxi, June 22, 1899, *S. M. Tracy*, some specimens as no. 6500 others as no. 4948 (Mo, NC, NY, US). HANCOCK CO.: pine barren, *Woodson & Schery*, no. 51 (Mo); Bay St. Louis, *Ingalls* (NY). LOUISIANA: CALCASIEU PARISH: vicinity of Lake Charles, 1904, *Andrew Allison* (US). PLATES 852 and 853; MAP 8.

*Ruellia noctiflora* is one of the most distinctive and, at the same time, highly localized American species. In view of the great amount of collecting in the Southeastern States, it should, if at all common, be better represented in herbaria. LeConte's statement, when he originally published it as *R. tubiflora*, that it "Inhabits in the savannahs of the Altamaha", suggest localization. When he renamed the species *Dipteracanthus noctiflorus*, Nees, as usual, had very mixed ideas, for he included with the LeConte plant and that from St. Marks, Florida, material from Texas of the wholly different *R. humilis* Nutt.; in fact he made *R. humilis* a variety of *D. noctiflorus*, and he went so far in his general misinterpretations as to note that the wonderfully different *Dipteracanthus noctiflorus* "vix a D. cilioso Purshii differret". Aside from the minutely canescent pubescence which covers most parts of *R. noctiflora*, this species has the longest corolla and calyx of any of our species, and its very long (up to 3.5 cm. long) capsule is cinereous-puberulent.

10. R. HUMILIS Nutt. Stem often at first simple, soon with arched-ascending to horizontally divergent or reclining branches; the main axis 1–7 (–8.5) dm. high; the rather short internodes villous-hirsute or canescent-pilose to glabrescent, quadrate, with 4–12 pairs of leaves longer than the internodes, and 4–10 nodes floriferous: leaves coriaceous, often hirsute to villous on


*Photo. B. G. Schubert.*

RUELLIA NOCTIFLORA: FIG. 1, summit of flowering stem of probable TYPE of *R. tubiflora*, × 1; FIG. 2, fruiting summit, × 1.8; FIG. 3, bract, calyx-segment and base of capsule, × 10; FIG. 4, surface of capsule, × 10


*Photo. B. G. Schubert.*

Ruellia humilis, var. typica: fig. 1, type or isotype, × 1; fig. 2, summit of primary axis, × 1; fig. 3, calyces and capsules, × 2 nerves and margin, oblong or oblong-lanceolate to ovate, sessile or subsessile, nearly uniform or but slightly reduced upward: flowers few in the axils: bracts lanceolate, oblong or elliptic: calyx-segments 1.5–2.5 cm. long, linear-attenuate, mostly hirsute- to villous-ciliate: corolla 2–8 cm. long, lavender to bluish (rarely white), the slender tube 0.7–5 cm. long, the throat campanulate; corolla reduced, closed and tubular in rare cleistogamous individuals: capsule glabrous, 1.2–1.5 cm. long: seed suborbicular, 3–4 mm. in diameter.—A wide-ranging polymorphous species, of which the following are the more significant varieties.

*a.* Younger internodes of stem copiously villous-hirsute to canescent-pilose or -puberulent; larger leaves 3–8 cm. long, their veins and margins usually villous-ciliate....*b*.
  *b*. Corolla 3–4.5 (–5) cm. long, its slender tube 1.2–2.5 cm. long.
    Larger leaves of main axis elliptic-oblong to oblong-lanceolate, 1–2.5 cm. broad, obtuse to subacute.
      Internodes of stem copiously villous-hirsute with long divergent hairs............................10a. Var. *typica*.
      Internodes canescent-pilose or -puberulent, with no or but few scattered long hairs......10b. Var. *typica*, forma *grisea*.
    Larger leaves of main axis ovate to oval-oblong or broadly elliptic, 2–4 cm. broad, mostly rounded at summit; stems strongly spreading-villous......10c. Var. *frondosa*.
  *b*. Corolla 5–8 cm. long, its slender tube 3–5 cm. long; internodes of stem more or less villous-hirsute.
    Larger leaves of main axis elliptic-oblong to oblong-lanceolate, 1–2.5 cm. broad, obtuse to subacute. 10d. Var. *longiflora*.
    Larger leaves of main axis ovate-oblong to broadly oval, rounded at summit, 2.5–4 cm. broad...........10e. Var. *expansa*.
*a*. Younger internodes of stem glabrous, glabrescent or with only few scattered hairs on the angles; leaves glabrous, glabrescent or only sparsely short-hirsute on nerves beneath and margin, narrowly elliptic-oblong to oblong-lanceolate, the larger ones 1–3 cm. broad and 2–6 cm. long; corolla 2–3.5 cm. long, its tube 0.7–2.3 cm. long; plant chiefly of Cumberland Plateau..................10f. Var. *calvescens*.

10a. Var. **typica.** *R. hirsuta* Ell. Sk. ii. 109 (1822), not Vell. (1790). *R. humilis* Nutt. in Trans. Am. Phil. Soc. v. 182 (1837). *Dipteracanthus noctiflorus*, β. *humilis* Nees in DC. Prodr. xi. 123 (1847), at least as to basonym. *R. ciliosa*, var. *longiflora* Gray, Syn. Fl. N. Am. ii[1]. 326 (1878) in part only. *R. ciliosa*, var. *humilis* (Nutt.) Britton in Trans. N. Y. Acad. Sci. ix. 185 (1890), at least as to basonym.—Dry prairies, rocky slopes, open woods, etc., southern and eastern Iowa to Texas, east to the Mississippi and very locally to south-central Pennsylvania, western Maryland, western Virginia, Tennessee and northwestern Alabama. The following are characteristic (all, unless specified, called *R. ciliosa* Pursh). PENNSYLVANIA: FRANKLIN CO.: "abundant and common", Chambersburg, July 24, 1896, *Thos. C. Porter*

(NY, Phil), variously as *R. ciliosa*, *R. ciliosa*, var. *parviflora* and *R. strepens*, var.; dry ground, among grasses, near Baker Cavern, south of Williamson, *Hans Wilkens*, no. 5592 (Pa); Mercersberg, 1846, *Ruel* (Phil), as *R. strepens*. Maryland: washington co.: Potomac River, Williamsport, Aug. 1849, *Porter* (Phil), as *Dipteracanthus strepens*. West Virginia: hardy co.: Lost River, Aug. 18, 1931, *Core* (NY). Virginia: giles co.: Ripplemead, Aug. 29, 1933, *Alexander, Everett & Pearson* (NY), as *R. parviflora;* roadside near Stone Quarry, above Ripplemead, July 19, 1936, *M. L. Vardell* (Pa); limestone cliffs, Ripplemead, August 11, 1937, *Lena Artz* (MtL). Ohio: cuyahoga co.: near Blue Rock Springs, Cleveland, *Greenman*, no. 1542. Indiana: st. joseph co.: South Bend, Aug. 3, 1909, *Mrs. Joseph Clemens* (NY). warren co.: dry, sunny poor soil, northwest of Covington, *R. M. Tryon, Jr.*, no. 2698 (Duke), as *R. caroliniensis*. floyd co.: rocky woods between Duncan and New Albany, *Deam*, no. 13,995 (NY). crawford co.: rocky, exposed wooded hillside southwest of Milltown, *Deam*, no. 16,422. Kentucky: logan co.: limestone ledges and barrens, near Russelville, *E. J. Palmer*, no. 17,758 (Mo), as *R. parviflora* (transition to var. *calvescens*). Tennessee: davidson co.: copses, vicinity of Nashville, *Gattinger;* West Nashville, *Eggleston*, no. 5160. franklin co.: Cumberland Mts., Cowan, *Ruth*, no. 564 (US). Alabama: franklin co.: small flat cedar glade just north of Isbell, *R. M. Harper*, no. 3887 (US, VPI), as *R. caroliniensis* (transition to var. *calvescens*). Mississippi: lowndes co.: sandy, open places, banks of Tombigbee River, Columbus, June 15, 1892, *C. Mohr* (US), as *R. ciliosa*, var. *hybrida*. warren co.: near Vicksburg, *Paul J. Schallert, Jr.*, no. 13127 (*Schallert*). Illinois: cook co.: limestone cliffs, Lemont, July 20, 1912, *E. L. Braun* (Braun). will co.: near Romeo, Aug. 6, 1895, *Umbach* (US). kankakee co.: river-bank, vicinity of Kankakee, *C. C. Crampton*, no. 568 (US). richland co.: southwest of Calhoun, *Robt. Ridgway*, no. 3183, in part (Phil). kendall co.: Yorkville, September, 1884, *T. E. Boyce*. lee co.: Dixon, July, 1861, *Wm. Boott* (Phil), as *Dipteracanthus ciliosus*, correctly annotated as *R. humilis*. washington co.: Ashley, *F. Beckwith*, no. 47 (Mo). jackson co.: gumbo soil, woods, Big Muddy River, *John McCree, Jr.*, no. 833 (Mo). union co.: southwest of Lick Creek, Oct. 7, 1939, *E. Anderson & Wm. Bauer* (Mo). Iowa: clinton co.: Lyons, *Pammel*, no. 77 (NY). henry co.: Mt. Pleasant, *C. R. Ball*, no. 1564 (Mo), *J. H. Mills*, no. 1732 (Mo). decatur co.: dry soil, Aug. 4, 1903, *J. P. Anderson* (Mo). Missouri: clark co.: Aug. 27, 1892, with cleistogamous flowers (NY). marion co.: woods, Hannibal, *John Davis*, no. 978 (Mo). ralls co.: dry hillsides, west of Hannibal, *John Davis*, no. 4646 (Mo). pike co.: Eolia, Aug. 26, 1916, *John Davis* (Mo). st. louis co.: Meramec Highlands, July 29, 1905, *A. G. Johnson* (Mo); West Webster, *Uphof*, no. 3803 (Mo). JEFFERSON CO.: Cedar Hill, *John H. Kellogg*, no. 1185 (Mo). FRANKLIN CO.: Pacific, Sept. 18, 1910, *Moses Craig* (Mo). BUTLER CO.: woods, *Bush*, no. 3739 (Mo, NY, US), as *R. parviflora.* SHANNON CO.: *Bush*, no. 70, identification correctly altered to *R. humilis.* COOPER CO.: rocky woods, *Bush*, no. 15,137 (Mo). MORGAN CO.: rocky woods, *Bush*, no. 15,147 (Mo). WEBSTER CO.: upland limestone glade, north of Forkner's Hill, *Steyermark*, no. 23,854 (Mo), as *R. caroliniensis.* OZARK CO.: rocky open ground (dolomite), slopes of "Bald Jesse", near Gainesville, *E. J. Palmer*, no. 33,073 (Mo). BENTON CO.: Cole Camp, *Trelease*, no. 439 (Mo). BARRY CO.: barrens, *Bush*, no. 15,007 (Mo), as *R. parviflora.* CLAY CO.: Chandler, June 29, 1893, *A. C. Magruder* (Mo), as *R. ciliosa*, var. *humilis.* JACKSON CO.: rocky barrens, Greenwood, *Bush*, no. 9745 (Mo, NY), as *R. parviflora;* Rocky Bluff, south of Independence, *K. K. Mackenzie*, no. 1065 (NY), as *R. ciliosa*, var. *humilis.* JASPER CO.: chert barrens, Joplin, *E. J. Palmer*, no. 1309 (Mo) and no. 18,451 (NY), the latter as *R. parviflora.* NEWTON CO.: chert barrens, Reding's Mill, *E. J. Palmer*, no. 1532 (Mo). MCDONALD CO.: July 24, 1893, *Bush* (Mo). ARKANSAS: WITHOUT STATED LOCALITY: "on rocks in the upland forests and prairies", *Nuttall*, TYPE or ISOTYPE (NY), the specimen marked by Britton *R. ciliosa* Pursh. CLAY CO.: woods, Moark, *Bush*, no. 3746 (Mo), as *R. parviflora.* LONOKE CO.: fallow fields, Carlisle, *Demaree*, no. 17,613 (Mo), as *R. caroliniensis.* PULASKI CO.: rocky ridges, Fourche Mt., *Demaree*, no. 19,797 (Mo), as *R. caroliniensis.* CARROLL CO.: rocky slopes, Eureka Springs, *E. J. Palmer*, no. 4426 (Mo). BENTON CO.: Decatur, 1899, *E. N. Plank* (NY). JOHNSON CO.: ridges, Knoxville, *Demaree*, no. 19,933 (Mo), as *R. caroliniensis.* FRANKLIN CO.: low ridges, Branch, *Demaree*, no. 17,786 (NY), as *R. caroliniensis.* YELL CO.: dry rocky ridges, Tones Mt., Dardanelle, *Demaree*, no. 20,006 (Mo, NY). SCOTT CO.: dry low hills, Mansfield, *Demaree*, no. 18,171 (NY). LOUISIANA: CALCASIEU PARISH: Lake Charles, *S. M. Tracy*, no. 3468 (NY). KANSAS: CRAWFORD CO.: 6 miles west of Pittsburg, *Rydberg & Imler*, no. 164 (NY). LABETTE CO.: bluffs north of Oswego, *Rydberg & Imler*, no. 359 (NY). MONTGOMERY CO.: northeast of Caney, *Rydberg & Imler*, no. 401 (NY). OKLAHOMA: OTTAWA CO.: woods, Miami, *G. W. Stevens*, no. 2304. MCCURTAIN CO.: woods, near Idabel, *H. W. Houghton* as *G. W. Stevens*, no. 3633. OSAGE CO.: dry knoll, near Pawhuska, *G. W. Stevens*, no. 1931. PAYNE CO.: Stillwater, *Waugh*, no. 144 (Mo); sandy clay soil, north of Stillwater, *Robert Stratton*, no. 141 (Mo). ELLIS CO.: sand, Arnett, *L. F. Locke*, no. 25 (US). TEXAS: WOOD CO.: sands, Mineola, *Reverchon* (Mo). JEFFERSON CO.: west of Beaumont, April 11, 1921, *E. T. Wherry* (US), correctly identified. HARRIS CO.: prairies, Laporte, *Reverchon*, no. 3938

(Mo), as *R. parviflora.* BRAZOS CO.: College Station, *R. G. Reeves*, nos. 167 and 168 (US). DALLAS CO.: dry places, Dallas, July, 1877, *Reverchon* (NY). BELL CO.: dry woods, near Temple, *S. E. Wolff*, no. 2288 (US). TARRANT CO.: sandy post-oak woods between Grapevine and Ft. Worth, *Lundell & Lundell*, no. 9516 (US). FAYETTE CO.: Crawford, 1892 (Mo). LAVACA CO.: Hallettsville, *G. L. Fisher*, no. 100 (US). BEXAR CO.: bank of Helotes Creek, northwest of San Antonio, *Sister Mary Clare Metz*, no. 59 (NY). KERR CO.: hillside woods, Lacey's Ranch, *E. J. Palmer*, no. 9994 (Mo). PLATES 854 and 855; MAP 9.

The minor form with white corollas is

Forma **alba** (Steyermark), comb. nov. *R. caroliniensis*, forma *alba* Steyermark in RHODORA, xli. 585 (1939).—TYPE from MISSOURI: prairie-slopes above limestone bluffs along Long Creek, 1½ miles south of Kingston, Caldwell County, *Steyermark*, no. 3058 (ISOTYPE Mo).

Although the description of forma *alba*, as a form of *Ruellia caroliniensis* (a strikingly different species not found in Missouri), gave no indication that it is an albino of the sessile-leaved species of the prairie-region and not at all of *R. caroliniensis*, the isotype is quite like typical *R. humilis* except for its white corolla.

Forma **grisea,** f. nov. (TAB. 856) caulis internodiis griseo-puberulis vel cinereo-pilosis, vix hirsutis.—Scattered through the range of var. *typica.* OHIO: PICKAWAY CO.: Aug. 9, 1912, *R. R. Dreisbach* (Phil). ILLINOIS: JACKSON CO.: gravelly hillside, Grand Tower, Aug. 28, 1900, *Gleason*, no. 1803. MISSOURI: PHELPS CO.: Jerome, Oct. 5, 1913, *John H. Kellogg*, no. 157 (Mo). JACKSON CO.: dry open bank, Kansas City, Sept. 15, 1916, *Ralph Hoffmann* (Mo). MCDONALD CO.: dry ground, uncommon, July 24, 1893, *Bush*, no. 281 (TYPE in Herb. Gray.; ISOTYPE in Herb. Britt.). LOUISIANA: JEFFERSON DAVIS PARISH: knolls in low prairie, May 17, 1915, *E. J. Palmer*, no. 7649 (Mo). CALCASIEU PARISH: Lake Charles, Aug. 7, 1897, *S. M. Tracy*, no. 3469 (US). OKLAHOMA: OTTAWA CO.: pasture near Narcissa, Aug. 31, 1937, *F. R. Fosberg*, no. 14,289 (Penn). TEXAS: VAN ZANDT CO.: Grand Saline, Oct. 18, ——, *Reverchon* (Mo).

Var. **frondosa,** var. nov. (TAB. 857), internodiis valde villoso-hirsutis; axis primarii foliis majoribus ovatis vel ovali-oblongis vel late ellipticis, 3.5–8 cm. longis 2–4 cm. latis, plerumque obtusis; corollis 3–4.5 (–5) cm. longis tubo 1.2–3 cm. longo.—Southeastern Nebraska to eastern Texas and Louisiana, eastward to south-central Pennsylvania and western Virginia; specimens, unless otherwise noted, originally called *R. ciliosa*, in a few cases corrected to *R. humilis.* PENNSYLVANIA: FRANKLIN CO.: Chambersburg, Aug. 27, 1897, *Thos. C. Porter.* VIRGINIA:


*Photo. B. G. Schubert.*

RUELLIA HUMILIS, var. TYPICA: FIG. 1, median nodes of primary axis, × 1; FIG. 2, summit of internode and bases of leaves, × 4; FIG. 3, portion of fruiting branch, showing diffuse habit, × 1


*Photo. B. G. Schubert.*

RUELLIA HUMILIS, forma GRISEA: FIG. 1, portion of TYPE, × 1; FIG. 2, internode and bases of leaves, × 4

SHENANDOAH CO.: rocky (limey) woods, near Strasburg, *Hunnewell*, no. 12,037 (FWH), as *R. caroliniensis;* limestone barrens near Strasburg, June 6, 1936, *Hunnewell* (VPI), as *R. caroliniensis;* damp thicket near Meadow Mills, *Hunnewell*, no. 17,837 (FWH). WYTHE CO.: banks, Reed Creek, June 28, 1910, *F. S. H.* (VPI). OHIO: CUYAHOGA CO.: Euclid Heights, Cleveland, *Greenman*, no. 353; near Blue Rock Springs, Cleveland, *Greenman*, nos. 1541 and 1542 (US). GREEN CO.: Xenia, July 10, 1883, *H. A. Young;* open bottoms, Yellow Springs, July 10, 1935, *Demaree*, no. 11,436 (Mo, Phil); Cedarville, July, 1906, *J. F. Clevenger* (US). MONTGOMERY CO.: Dayton, *John W. VanCleve* (Phil), as *R. oblongifolia.* CLERMONT CO.: sandy soil, gravel terrace, Mulford, June 17, 1916, *E. L. Braun* (Braun). HAMILTON CO.: gravel banks, near Fernald, July 19, 1914, *E. L. Braun* (Braun). INDIANA: WARREN CO.: prairie north of Tab, August 31, 1916, *Deam*, no. 21,613 (NY); high bank of Pine Creek, west of Kramer, July 8, 1918, *Deam*, no. 25,843. MARION CO.: abundant among tall weeds between Indianapolis and Carmel, Aug. 8, 1942, *R. C. Friesner*, no. 17,202 (TYPE in Herb. Gray.; ISOTYPE in Herb. Butler Univ.), distrib. as *R. caroliniensis;* same station, August 5, 1944, *Friesner*, no. 18,579 (topotypes). HARRISON CO.: bluff, south side of Buck Creek, southeast of Corydon, June 15, 1940, *Friesner*, no. 14,369 (Duke, NY), as *R. caroliniensis.* KENTUCKY: PENDLETON CO.: dry grassy bank, south of Peach Grove, July 8, 1941, *E. L. Braun*, no. 4037. TENNESSEE: DAVIDSON CO.: West Nashville, May 26–27, 1909, *Eggleston*, no. 4436 (Phil). ILLINOIS. COOK CO.: Chicago, *H. H. Babcock* (US); Flossmoor, Aug. 1, 1909, *Greenman*, no. 2816. DUPAGE CO.: introduced along roadside, Naperville, Aug. 1, 1897, *L. M. Umbach* (US). WILL CO.: roadside, Romeo, June 25, 1896 (Phil), July 26, 1897 (US), *Umbach.* WINNEBAGO CO.: Rockford, July 11, 1926, *Pammel & Fisk*, no. 293 (Mo). RICHLAND CO.: Larchmount, Aug. 1, 1914, *Robt. Ridgway.* CHAMPAIGN CO.: vicinity of Urbana, Aug. 10, 1910, *Steele* (US). STARK CO.: gravel slope, near Wady Petra, July 9, 1900, *V. H. Chase*, no. 673 (Phil). HANCOCK CO.: Augusta, 1845, *S. B. Mead*, as *R. strepens.* ST. CLAIR CO.: dry ground, June 28, 1875, *Henry Eggert* (Mo). IOWA: CLINTON CO.: Clinton (Lyons), Sept. 4, 1896, *Pammel*, no. 77. WARREN CO.: Indianola, July 6, 1918, *Pammel, Welbus & Jacques.* MISSOURI: CLARK CO.: Dumas, Aug. 27, 1892, *Bush* (Mo). ST. LOUIS CO.: collines arides, St. Louis, Juillet 1838, *Riehl* (Mo), as *R. strepens;* O'Fallon Park, St. Louis, June 28, 1892, *N. M. Glatfelter* (Mo). JEFFERSON CO.: Bushberg, July 4, 1883, *F. C. Prince.* ST. FRANCOIS CO.: dry ground, Bismark, Aug. 1897, *Colton Russell* (Mo). CARTER CO.: dry open ground, Van Buren, July 6, 1913, *E. J. Palmer*, no. 6205 (Mo). NODAWAY CO.: dry grassy openings, northwest of Parnell, June 20, 1938, *Steyermark*, no. 5936 (Mo). JACKSON CO.:

dry grounds, Waldo Park, June 10, 1896, *K. K. Mackenzie* (US). JOHNSON CO.: sandstone hillside, Warrenburg, Aug. 27, 1916, *G. W. Stevens*, no. 4106 (NY). GREENE CO.,: northeast of Springfield, Aug. 29, 1911, *P. C. Standley*, no. 8390 (US). JASPER CO.: chert barrens, northwest of Joplin, Aug. 16, 1908, *E. J. Palmer*, no. 1309 (Mo). MCDONALD CO.: dry open ground, Noel, Sept. 7, 1913, *E. J. Palmer*, no. 4164 (Mo); chert slopes west of Noel, May 31, 1938, *Steyermark*, no. 562 (Mo), as *R. caroliniensis*. ARKANSAS: FAULKNER CO.: rocky glade, Guy, Sept. 4, 1934, *Demaree*, no. 10,963 (US). PULASKI CO.: Little Rock, July, 1886, *H. E. Hasse* (NY). CARROLL CO.: Eureka Springs, July 17, 1898, *N. M. Glatfelter* (Mo). LOUISIANA: RAPIDES PARISH: pine woods, vicinity of Alexandria, June 6, 1899, *C. R. Ball*, no. 655, in part (Mo, US). NEBRASKA: LANCASTER CO.: roadsides, Lincoln, Aug. 1889, *H. J. Webber* (US). KANSAS: DOUGLAS CO.: Lawrence, *W. C. Stevens* (US). RILEY CO.: prairie, June 15, 1895, *J. B. Morton*, no. 386 (Mo). GEARY CO.: Republican Fork of Kansas River, June 25, 1856, *H. Engelmann* (Mo). CHEROKEE CO.: road through wooded area, southeast corner of county, July 23, 1937, *N. B. Jacobs*, no. 134 (NY). COWLEY CO.: 1895, *C. M. Gould* (NY). OKLAHOMA: ELLIS CO.: east of Harmon, June 17, 1932, *H. Wilkens* (Phil). TEXAS: VAN ZANDT CO.: sandy pasture 1 mile east of Martin's Mill, May 7, 1939, *Durward Timmons*, no. 522 (NY). TRAVIS CO.: Austin, *C. Wright*. MAP 10.

Var. **longiflora** (Gray), comb. nov. Stems villous-hirsute: leaves copiously villous-hirsute on veins and margins; the larger ones of the main axis elliptic-oblong to oblong-lanceolate, 1–2.5 cm. broad and 3–6 cm. long, obtuse to subacute: corolla 5–8 cm. long, its tube 3–5 cm. long.—*R. ciliosa*, var. *longiflora* Gray, Syn. Fl. N. Am. ii[1]. 326 (1878) as to descr., largely excl. synonyms. *Dipteracanthus Drummondii* Torr. & Gray ex Engelm. & Gray in Bost. Journ. Nat. Hist. v. 258 (1845), not *D. Drummondianus* Nees.—Southern Illinois, Missouri and eastern Kansas to Louisiana and Texas; specimens, unless noted, distributed as *R. ciliosa*, more rarely as *R. humilis*. ILLINOIS: RICHLAND CO.: Parkersburg, June 14, 1902, *Robt. Ridgway* (US). MACOUPIN CO.: Piasa, Aug. 5, 1905, *G. E. McClure* (Mo). WILLIAMSON CO.: dry soil, Bush, *John McCree, Jr.* no. 881 (Mo). MISSOURI: MARION CO.: dry soil, near Mark Twain Cave, *John Davis*, no. 4101 (Mo). LINCOLN CO.: Silex, *John Davis*, no. 3887 (Mo). ST. LOUIS CO.: Windsor Springs, July 1, 1890, *A. S. Hitchcock* (Mo). JEFFERSON CO.: stony hills north of Hematite, July 7, 1891, *Henry Eggert*, (Mo); dry limestone glade southwest of Crystal City, *Steyermark*, no. 1114 (Mo), as *R. caroliniensis;* Festus, July 11, 1925, *Woodson* (Mo); south of Festus, *Mildred Mathias*, no. 700 (Mo). WASHINGTON CO.: Potosi, July 24, 1885, *Frederick Wislizenus* (Mo). COOPER CO.: rocky barrens, *Bush*, no. 13,673 (Mo).

GREENE CO.: dry hills near Fulbright Spring, *P. C. Standley*, no. 9567 (US). TANEY CO.: Forsythe, *Trelease*, no. 440 (Mo), as *R. ciliosa*, var. *longiflora*. JACKSON CO.: rocky hillside, June 15, 1864, *G. C. Broadhead* (Mo). BENTON CO.: Mora, *Trelease*, no. 438 (Mo). ST. CLAIR CO.: rocky woods, Osceola, *Bush*, no. 12,819 (Mo). JASPER CO.: Aug. 16, 1893, *Bush* (Mo), as *R. ciliosa*, var. *longiflora*. ARKANSAS: CRAIGHEAD CO.: open woods, Lake City, *Demaree*, no. 3391 (Mo). SHARP CO.: Hardy, *Greenman*, no. 152[a] (Mo). ASHLEY CO.: prairie-thickets, Mist, *Demaree*, no. 15,096 (Mo). FAULKNER CO.: rocky hillsides, Guy, *Demaree*, no. 10,963 (NY). CONWAY CO.: Petit Jean Mt., Morrilton, June 25, 1937, *John K. Edwards* (Pa). LOGAN CO.: rocky, dry situations at 2800 ft., Magazine Mt., *Demaree*, no. 17,720 (Mo, NY), as *R. caroliniensis*. SEBASTIAN CO.: Fort Smith, 1853–4, *J. M. Bigelow* (US). LOUISIANA: WITHOUT CITED STATION: western Louisiana, *Hale*, TYPE of *R. ciliosa*, var. *longiflora* Gray, in Torrey Herb. (NY). NATCHITOCHES PARISH: dry open ground, Natchitoches, *E. J. Palmer*, no. 7940 (NY); dry sandy ground, Chopin, *E. J. Palmer*, no. 7565 (Mo); long-leaf pine sandhills, June 20, 1930, *Caroline Dorman* (NY). RAPIDES PARISH: Alexandria, *Josiah Hale* (NY). JEFFERSON DAVIS PARISH: knolls on low prairies, Welsh, *E. J. Palmer*, no. 7649 (NY). CALCASIEU PARISH: low grassy soil, 1 mile east of Lake Charles, *D. S. & H. B. Correll*, no. 9652. KANSAS: WITHOUT DEFINITE LOCALITY: between Neusha and Red Fork, Sept., 1849, *Marcy Exped.* RILEY CO: Manhattan, Sept. 29, 1884, *M. A. Carleton* (Mo). LYON CO.: Emporia, July 13, 1891, *E. C. Smith* (Mo). MONTGOMERY CO.: dry prairie, Cherryvale, September 16, 1900, *Frank W. Johnson* (NY). SEDGWICK CO.: Wichita, 1892, *H. R. Rose*. OKLAHOMA: CRAIG CO.: north of Vinita, *G. J. Goodman*, no. 3047. OSAGE CO.: dry knoll, Pawhuska, *G. W. Stevens*, no. 1931. CREEK CO.: Sapulpa, *Bush*, no. 428 (Mo). TEXAS: WITHOUT STATED LOCALITY: *Drummond*, nos. 219 and 220 (PARATYPES) and 258 (nos. 220 and 258 the types of *Dipteracanthus Drummondii* Torr. & Gray); *Lindheimer*, no. 158; *Reverchon*, no. 725 (Mo). TYLER CO.: pineland south of Woodville, *Lundell & Lundell*, no. 11,544 (US). HARDIN CO.: east of Camp Jackson, *Cory*, no. 19,793. HOUSTON CO.: sandy open ground, Latexo, *E. J. Palmer*, no. 12,820 (Mo, NY). WALKER CO.: vicinity of Huntsville, *R. A. Dixon*, no. 377. MONTGOMERY CO.: Willis, *L. R. Warner* (Mo). HARRIS CO.: open woods, June, 1842, *Lindheimer* (Mo); prairies, Houston, *Elihu Hall*, no. 425 (Mo, NY, US); low ground, Houston, *Biltmore Herb.*, no 4501[b] (US), as *R. noctiflora*; Laporte, *Reverchon*, no. 3938 (Mo, NY). FORT BEND CO.: Richmond, *W. L. Bray*, no. 96 (US). AUSTIN CO.: sandy loam of prairie, San Felipe, *F. W. Pennell*, no. 10,292 (NY). COLORADO CO.: dry sandy oak-land, Sheridan, *F. W. Pennell*, no. 5520 (Pa). DALLAS CO.: Dallas, June, 1874, *Reverchon*, no. 410, PARATYPE; vicinity of Dallas, *Mary R. Stephenson*, no. 92 (US); creek-bottoms, north of White Rock Lake, *Lundell*, no. 11,676 (US); post-oak woodland, north of Seagoville, *Lundell*, no. 11,679 (US). TARRANT CO.: Fort Worth, *Ruth*, no. 103 (different sheets as no. 103, distributed as from dry woods, June 27, 1911 (NY), dry woods, August 10, 1912 (Mo), open woods, Oct. 2, 1912 (G) and from rocky ground, Aug. 10, 1924 (NY)). TRAVIS CO.: Austin, *Tharp*, no. 1384 (US). BASTROP CO.: McDade, *Va. Collins*, no. 266. DE WITT CO.: hillside, July 30, 1941, *Marguerite Riedel*. BEXAR CO.: hills north of San Antonio, Sept. 1, 1900, *Henry Eggert* (Mo). TOM GREEN CO.: Knickerbocker Ranch, Dove Creek, May, 1880, *Frank Tweedy* (US), as *R. ciliosa*, var. *longiflora*. PLATE 858; MAP 11.

Var. **expansa**, var. nov. (TAB. 859), caulibus ad 8.5 dm. altis, internodiis valde villoso-hirsutis; axis primarii foliis majoribus ovatis vel ovali-oblongis vel late ellipticis apice obtusis, 2.5–4 cm. latis 3–7.5 cm. longis, ciliato-hirsutis; corollis 5–8 cm. longis, tubo 3–5 cm. longo.—Iowa and Nebraska to Texas, eastward to southern Michigan, western Indiana, Illinois, Missouri, and very locally to northeastern Mississippi and northwestern Florida; specimens, unless specially noted, originally distributed as *R. ciliosa*, more rarely as *R. humilis*. FLORIDA: CALHOUN CO.: Dead Lakes, *Chapman* (Mo). MICHIGAN: old specimen marked by Asa Gray "Michigan coll.". WISCONSIN: ROCK CO.: Beloit, 1860, *T. J. Hale* (Phil). INDIANA: TIPPECANOE CO.: dry sandy soil, Lafayette, July 4, 1898 (USNA), as *R. ciliosa*. MONTGOMERY CO.: roadside near Clarkshill, Aug. 12, 1934, *Scott McCoy*, no. 2010 (US). ILLINOIS: COOK CO.: Chicago, July 7, 1873, *H. H. Babcock* (US); prairie, Streator, Aug. 11, 1929, *Howard K. Henry*, no. 130 (Pa); between the Sag and Palos Park, Sept. 1, 1908, *Caldwell & Greenman*, no. 3584 (Mo); Riverside, June 29, 1871, *H. H. Babcock* (NY), July, 1888, *E. L. Sturtevant* (Mo). WILL CO.: Joliet, July 4, 1900, *H. P. Skeels* (USNA). WINNEBAGO CO.: Fountaindale, *M. S. Bebb*, as *Dipteracanthus strepens*. WOODFORD CO.: Minonk, Aug. 13, 1895, *Chas. Thom* (USNA). PEORIA CO.: Peoria, 1868, *J. T. Stewart* (Phil); dry barrens, Peoria, June, 1887, *F. E. McDonald;* dry prairies, Peoria, July, 1903, and July, 1904, *F. E. McDonald*. MASON CO.: Havana, Aug. 17, 1904, *Gleason*. HENDERSON CO.: oak barrens, near Oquawka, July 6 and August 20, 1872, *H. N. Patterson*. MCLEAN CO.: Bloomington, Aug. 1886, *E. C. Smith* (Mo). CHAMPAIGN CO.: Champaign, June 15, 1899, *Gleason*, no. 590; prairie, Urbana, July 15, 1878, *A. B. Seymour* (Duke). MACON CO.: openings in timber, Stevens Creek at Wabash, July 1, 1915, *I. W. Clokey*, no. 2429 (TYPE in Herb. Gray; ISOTYPES in Herb. Mo. Bot. Gard., N. Y. Bot. Gard. and U. S. Nat. Herb.); Decatur, July 14, 1940, *R. G. Mills* (NY). HANCOCK CO.: Augusta, 1843, *S. B. Mead* as *R. strepens?*. ADAMS CO.: Camp Point, Aug. 6,

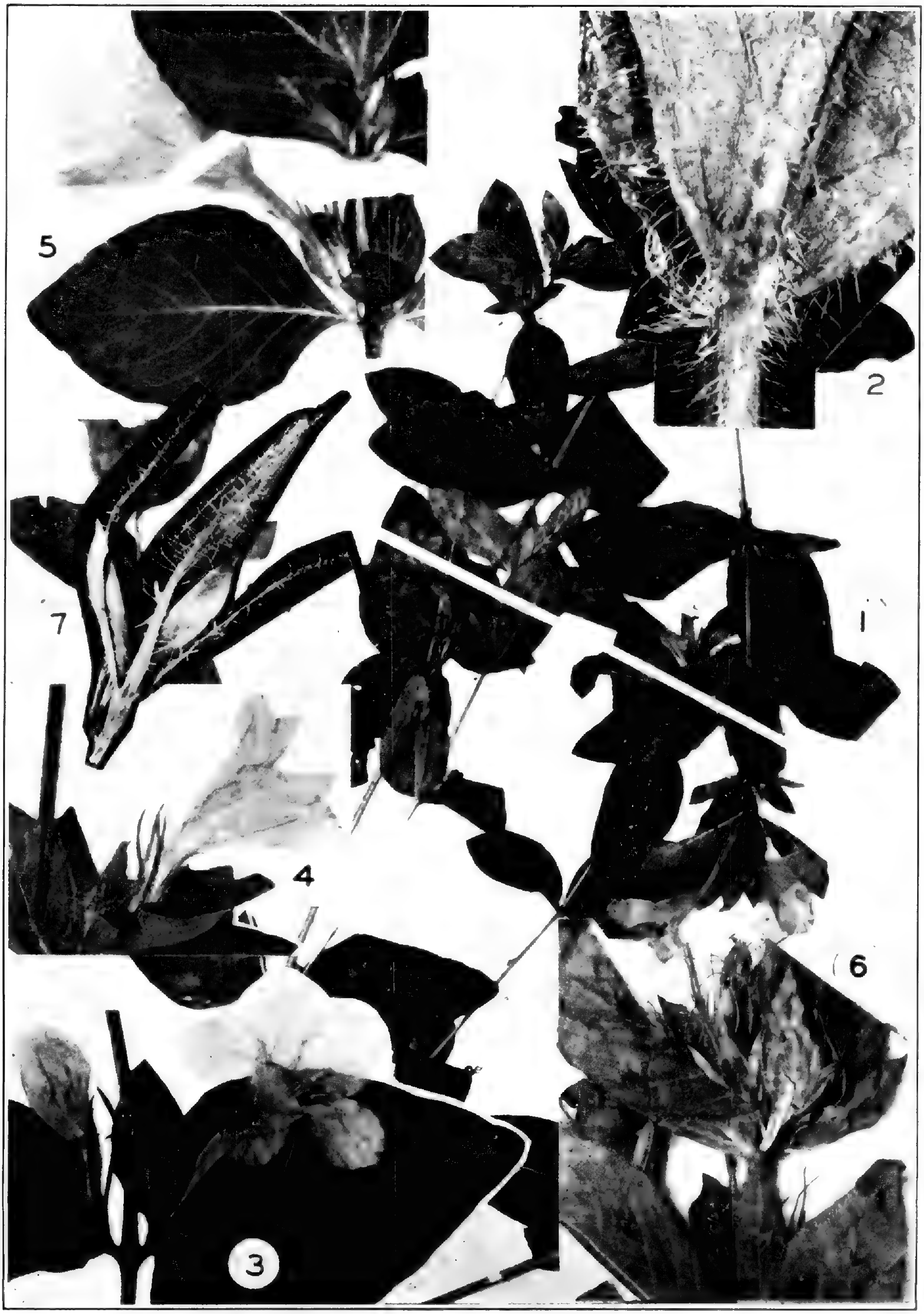


*Photo. B. G. Schubert.*

RUELLIA HUMILIS, var. FRONDOSA: FIG. 1, portion of TYPE, × ½; FIG. 2, summit of internode and bases of leaves, × 4; FIGS. 3–5, flowering nodes, × 1; FIG. 6, fruiting node, × 1; FIG. 7, calyx and capsule, × 2


*Photo. B. G. Schubert.*

Ruellia humilis, var. longiflora: figs. 1–3, summits of flowering branches, × 1; fig. 4, summit of internode and bases of leaves, × 4; fig. 5, bracts, calyces and fruits, × 2

1877, *A. B. Seymour* (Duke). ST. CLAIR CO.: woods, Belleville, July, 1846, *Th. Hilgard, Jr.* (Mo)—plant 8.25 m. high. RANDOLPH CO.: Red Bud, June 30, 1888, *L. H. Pammel* (Mo). MISSISSIPPI: OKTIBBEHA CO.: Agency, May 31, 1897, *S. M. Tracy*, no. 3203 (NY). IOWA: JOHNSON CO.: Aug. 13, 1909, *M. P. Somes*, no. 3617 (US). VAN BUREN CO.: open woods, Bentonport, July, 1920, *E. W. Graves*, nos. 1687 and 1957 (Mo). WAYNE CO.: July, 1885, *R. R. B.* (Phil). GREENE CO.: Jefferson, July 24, 1867, *J. A. Allen.* MADISON CO.: Peru, June 20, 1897, *D. E. Hollingsworth*, no. 577. RINGGOLD CO: Mount Ayr, July 24, 1926, *Ada Hayden* (Phil). FREMONT CO.: rich soil, border of woods, Manti, July 12, 1925, *L. H. Pammel*, no. 733. MISSOURI: MARION CO.: dry woods, Hannibal, Aug. 7, 1912, *John Davis* (Mo). PIKE CO.: dry meadow, near Clarkesville, June 15, 1914, *John Davis*, no. 2677 (Mo). ST. LOUIS CO.: limestone hill, Pacific, June 3, 1918, *J. R. Churchill* (Mo). WASHINGTON CO.: Irondale, June 30, 1893, *Henry Eggert.* CARTER CO.: rocky open ground, Van Buren, July 6, 1914, *E. J. Palmer*, no. 6205. PHELPS CO.: Jerome, June 16, 1914, *John H. Kellogg* (Mo). BOONE CO.: banks of Missouri River, Rocheport, July 4, 1927, *H. W. Rickett* (Duke). WRIGHT CO.: open woods, east of Mansfield, June, 1911, *O. E. Lansing*, no. 3180. MORGAN CO.: rocky woods, June 11, 1934, *Bush*, no. 13,708 (Mo, Pa). HICKORY CO.: cherty limestone slopes, east of Jordan, July 10, 1934, *Steyermark*, no. 13,216 (Mo). GREENE CO.: Springfield, July, 1904, *P. C. Standley* (US). JACKSON CO.: Independence, June 10, 1894, *Bush*, no. 349; barrens, Independence, July 6, 1900, *Bush*, no. 775 (Mo, US) and several other nos. (one of them with the penciled memorandum, "type of *R. ciliosa*", a difficult proposition to defend since Pursh's species was from Savannah, Georgia!). BARRY CO.: fields, Eagle Rock, June 29, 1897, *Bush*, no. 506 (Mo). JASPER CO.: dry prairies, Carthage, July 13, 1902, *Bush*, no. 356 (Mo). MCDONALD CO.: dry ground, *Bush*, no. 282 (NY), as *R. ciliosa*, var. *longiflora.* ARKANSAS: WITHOUT STATED LOCALITY: *Krunholdt*, no. 24. PRAIRIE CO.: Hazen, Grand Prairie, June 29, 1941, *Demaree*, no. 23,304 (Mo), as *R. caroliniensis.* CARROLL CO.: Eureka Springs, July 7, 1898, *N. M. Glatfelter* (Mo). BENTON CO.: prairie-like thickets, Willow Springs, Aug. 9, 1941, *Demaree*, no. 22,380 (Mo), as *R. caroliniensis.* LOUISIANA: RED RIVER PARISH: *J. Hale* as *R. hirsuta* Ell. NATCHITOCHES PARISH: dry open ground, Natchitoches, June 10, 1913, *E. J. Palmer*, no. 7946, in part (Mo). RAPIDES PARISH: Alexandria, 1844, *Josiah Hale* (NY, Phil, US). NEBRASKA: LANCASTER CO.: Lincoln, *H. J. Webber* (Mo). KANSAS: RILEY CO.: prairie, June 15, 1895, *J. B. Norton*, no. 386; Manhattan, 1883, *T. Bassler* (NY), June 5, 1887, *W. A. Kellerman* (Mo). BUTLER CO.: July, 1904, *S. C. Jones* (Mo). ROOKS CO.: Rockport, July 5, 1892 (US).

ELLIS CO.: *Cyril Zeller* (Mo). OKLAHOMA: OTTAWA CO.: pasture near Narcissa, Aug. 31, 1937, *F. R. Fosberg*, no. 14,289 (Pa). PITTSBURG CO.: rocky woods west of McAlester, May 27, 1920, *F. W. Pennell*, no. 10,600 (Phil). PAYNE CO.: Stillwater, June 22, 1926, *Robt. Stratton*, no. 622 (Mo); clay soil north of Stillwater, June 6, 1937, *Darrell McLean*, no. 3 (Phil). BRYAN CO.: Colbert, June 15, 1891, *C. S. Sheldon*, no. 14 (US), as *R. ciliosa*, var. *longiflora*. CLEVELAND CO.: Norman, Sept. 25, 1914, *W. H. Emig*, no. 522 (Mo), as *R. parviflora*. CADDO CO.: between Fort Cobb and Fort Arbuckle, 1868, *Edw. Palmer* (US), as *Dipteracanthus strepens*. COMANCHE CO.: Fort Sill, May 29, 1916, *Mrs. Joseph Clemens*. TEXAS: NEWTON CO.: Autreville, 1857, *C. G. Fosberg* (Phil). CAMP CO.: Pittsburg, Sept. 13, 1923, *Tharp* (Phil). GREGG CO.: July, 1939, *C. L. York*. WOOD CO.: post-oak woods, July 6, 1924, *Tharp* (US). HARRIS CO.: barren bluffs, Houston, Sept., 1843, *Engelmann* (Mo). DALLAS CO.: vicinity of Dallas, July 3, 1929, *Mary R. Stephenson*, no. 96 (US). PARKER CO.: Weatherford, July 4, 1902, *S. M. Tracy*, no. 8078. TRAVIS CO.: Austin, July 20, 1940, *Tharp* (transition to var. *longiflora*). NUECES CO.: near Corpus Christi, March, 1894, *A. A. Heller* (NY). COMANCHE CO.: DeLeon, June 16, 1941, *Tharp*. MAP 12.

Var. **calvescens,** var. nov. (TAB. 860), caulibus 1–4 dm. altis, ramosis, ramis plerumque divergentibus, internodiis glabris vel glabrescentibus vel sparse breviterque hispidis; foliis glabris vel glabrescentibus vel ad venas remote hirtellis, anguste elliptico-oblongis vel oblongo-lanceolatis, majoribus 2–6 cm. longis 0.7–2.3 cm. latis; corollis 2–3.5 cm. longis, tubo 0.7–2.3 cm. longo.—Cumberland Plateau of Kentucky and Tennessee, overlapping slightly into southern Indiana and southern Ohio, locally in Alleghenies of northwestern Virginia, Great Smoky Mountains of eastern Tennessee and mountains of northern Georgia and Alabama; specimens, unless otherwise noted, distributed as *R. ciliosa* or *R. humilis*. VIRGINIA: FREDERICK CO.: lime barrens, Middletown, Sept. 14, 1941, *Hunnewell*, no. 17,361, as *Dyschoriste oblongifolia* (misidentification mine). SHENANDOAH CO.: dry limerock barrens, 1 mile northeast of Strasburg, Aug. 30, 1927, *Wiegand & Manning*, no. 2934; rocky field near Ormanda, July 27, 1942, *Hunnewell*, no. 17,721 (FWH), as *Dyschoriste oblongifolia*. GEORGIA: WALKER CO.: Chickamauga Park, *Biltmore Herb.*, no. $849^b$ (US). OHIO: HIGHLAND CO.: Sept., 1928, *Katie M. Roads*, September, 1928 (US). INDIANA: CRAWFORD CO.: in shallow soil on washed limestone slope, just north of Leavenworth, Oct. 5, 1920, *Deam*, no. 33,429 (Pa). KENTUCKY: WITHOUT STATED LOCALITY: 1916, *Anna King*, no. 310 (Duke and, in part, US); hills of Kentucky River, Aug. 15, 1895, *H. Garman & J. N. Rose* (TYPE in Herb. Gray; ISOTYPE in U. S. Nat. Herb.), distrib. as *R. strepens*. FLEMING CO.: dry soil east of Hillsboro, Aug. 21, 1940, *E. L. Braun*, no. 3364 (Braun). ROBERTSON CO.: dry slopes, limestone soil, west of Blue Licks, July 8, 1941, *E. L. Braun*, no. 4044. NICHOLAS CO.: open woods, Blue Lick Springs, Sept. 17, 1936, *F. J. Scully*, no. 814 (US), as *R. parviflora;* dry soil, open red cedar, south of Fairview, Sept. 22, 1939, *E. L. Braun*, no. 2684 (Braun). SCOTT CO.: dry woods, Stamping Ground, July 27, 1931, *J. W. Singer*, no. 145 (US), as *R. parviflora.* PULASKI CO.: bluffs near Burnside, Aug. 22, 1903, *Biltmore Herb.* no. 849[k] (US). NELSON CO.: prairie patches, Balltown, July 22, 1940, *E. L. Braun*, no. 3248 (Braun); dry limestone slope, prairie patches, west of Bardstown, Aug. 18, 1941, *E. L. Braun*, no. 4085. HARDIN CO.: thin soil over limestone, Howe Valley, Sept. 6, 1927, *Wherry & Pennell*, no. 73,642 (Phil). HART CO:. sandy roadside, 2 miles southeast of Horse Cave, Sept. 4, 1930, *Svenson*, no. 4418. GRAYSON CO.: Leitchfield, Aug. 22, 1895, *J. N. Rose* (US), as *R. strepens;* Leitchfield, Oct. 11 and 12, 1903, *W. W. Eggleston*, no. 5442 (NY). EDMONSON CO.: prairie patches, dry limestone slopes, Mammoth Cave, Aug. 19, 1941, *E. L. Braun*, no. 4095 (branching unusually strict). WARREN CO.: near Bowling Green, Aug. 17, 1897, *Henry Eggert* (Mo); field, Bowling Green, Aug. 20, 1899, *Sadie F. Price* (Mo). TENNESSEE: SEVIER CO.: between Gatlinburg and Maryville, July 27, 1936, *W. C. Coker* (NC). WILSON CO.: dry cedar glades, Lebanon, Aug. 11, 1900, *Biltmore Herb.* no. 849[g] (US). DAVIDSON CO.: cedar barrens, common, *Gattinger* (Mo); Nashville, Aug., 1879, *Gattinger* (Mo); West Nashville, May 26–27, 1909, *Eggleston*, no. 4436 (US), Sept. 24–25, 1909, *Eggleston*, no. 5160 (NY, Phil). COFFEE CO.: near Manchester, Aug. 14, 1899, *Biltmore Herb.*, no. 849[b] (US). RUTHERFORD CO.: near Lavergne, Aug., 1897, *Henry Eggert* (Mo). FRANKLIN CO.: Cumberland Mts., Cowan, July, 1898, *Ruth*, no. 556 (NY), no. 590 (Mo). ALABAMA: MADISON CO.: ad montes, prope Huntsville, Oct., 1843, *Rugel* (NY), with unpublished but quite appropriate varietal name. MAP 13.

When sorted out from the very diverse species with which it has been confused, *Ruellia ciliosa, R. caroliniensis,* and even the wholly different *R. strepens* and the apocryphal *R. parviflora, Ruellia humilis* becomes a very consistent species of wide inland range. By the singular and not very edifying fatality which has obscured the clarification of even the simpler of our species of *Ruellia* the great bulk of material of the continental *R. humilis* (including its varieties) has very generally passed as *R. ciliosa* Pursh, its type from Savannah, Georgia, although there is no evidence in any of the larger American herbaria that the present species approaches Savannah nearer than the Shenandoah Valley of Virginia, the Great Smoky Mountains of Tennessee, the mountains of northwestern Georgia, and the northwestern corner of Florida. Conversely, although *R. humilis* was described from "rocks in the upland forests and prairies" of Arkansas, the name *R. humilis* has been consistently used by Small and his followers for true and strikingly different *R. ciliosa* Pursh and given a range, "Sandy soil, Coastal Plain, Fla. to Miss. and Ga.", through a country without the dry limestone rocks where true *R. humilis* prevails, and entirely excluding the type-region of the latter!

There is great probability that *Ruellia hirsuta* Ell. Sk. ii. 109 (1822) was typical *R. humilis* Nutt. Elliott, familiar with the more eastern plants, went beyond the stated limits of his Sketch to describe a remarkable new species from "near the Alabama River in dry soils": "Hirsute, branching, leaves oval-lanceolate, nearly acute, sessile, segments of the calyx subulate, hispid, a little longer than the tube of the corolla . . . *Stem* . . . very hirsute. *Leaves* . . . almost hispid". Elliott's type is lost; furthermore his name was antedated by *R. hirsuta* Velloso (1790).

As the TYPE OF ISOTYPE of *Ruellia humilis* (until a possibly more authentic type is found) I have taken an Arkansas specimen from Nuttall, in the Torrey Herbarium. This (PLATE 854, FIG. 1) is of the relatively short-flowered series with narrow leaves, a plant (MAP 9) prevailing west of the Mississippi, southward into Texas, but scattered eastward even to the mountains of south-central Pennsylvania, western Maryland and western Virginia. This plant passes through obvious transitions into a coarser and broader-leaved extreme of similar range (MAP 10), which might perhaps be considered an ecological variety were it not that in their morphological characters they exactly parallel the two plants with greatly prolonged corolla-tube (the longest corolla of any of our species except the southeastern Coastal Plain *R. noctiflora*). Although the very long-flowered plants have similar areas of development, the narrow-leaved var. *longiflora* (MAP 11) is more restricted, its eastern range stopping essentially at the Mississippi, with northern limits in southern Illinois and Missouri; the broader-leaved var. *expansa* (MAP 12) with outposts eastward to northwestern Florida, northeastern Alabama and in Indiana and Wisconsin and, farther west,

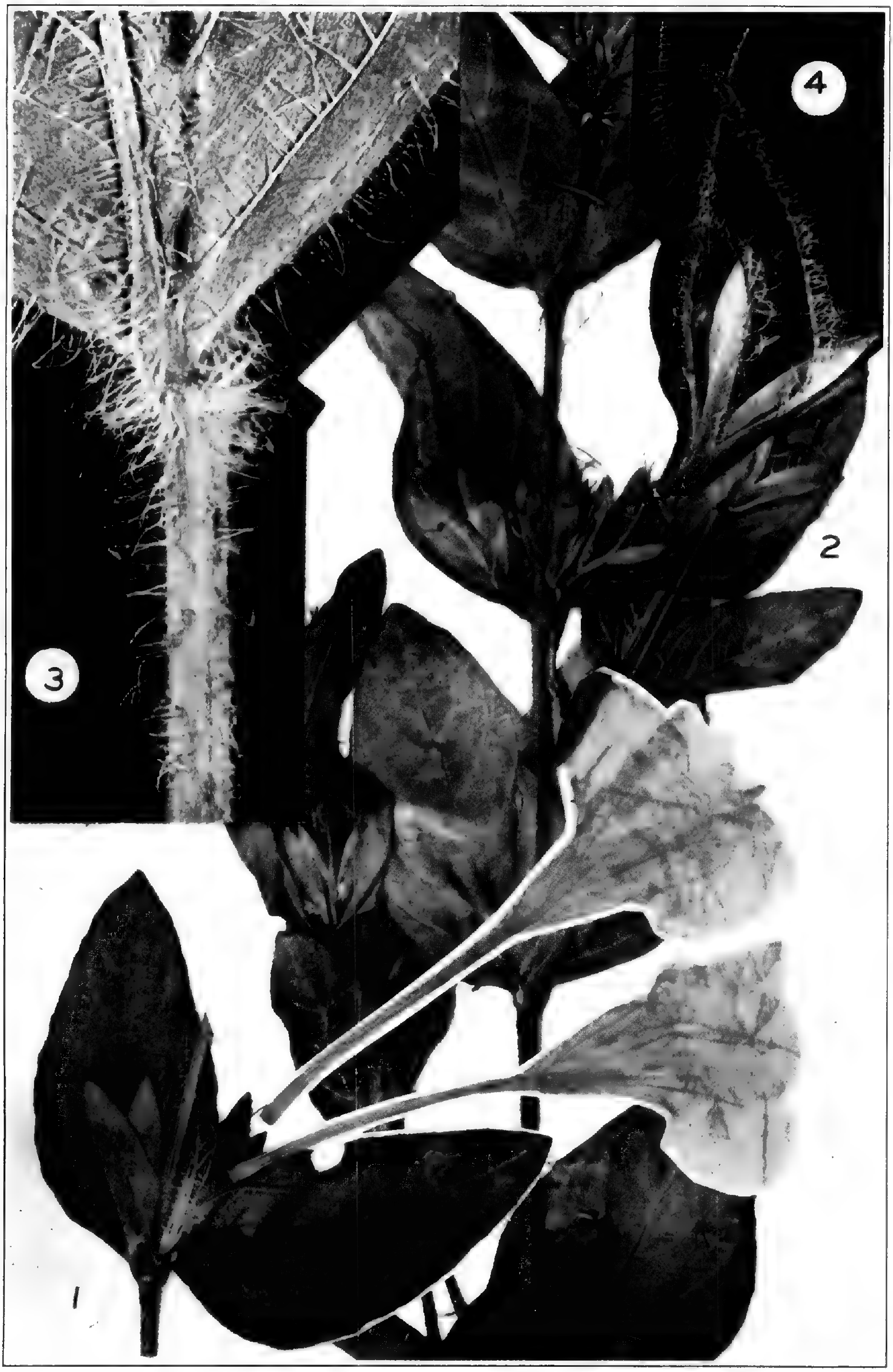


*Photo. B. G. Schubert.*

RUELLIA HUMILIS, var. EXPANSA: FIG. 1, flowering node, × 1, from TYPE; FIG. 2, median fruiting node, × 1; FIG. 3, internode and leaf-base, × 4; FIG. 4, calyx and capsule, × 2

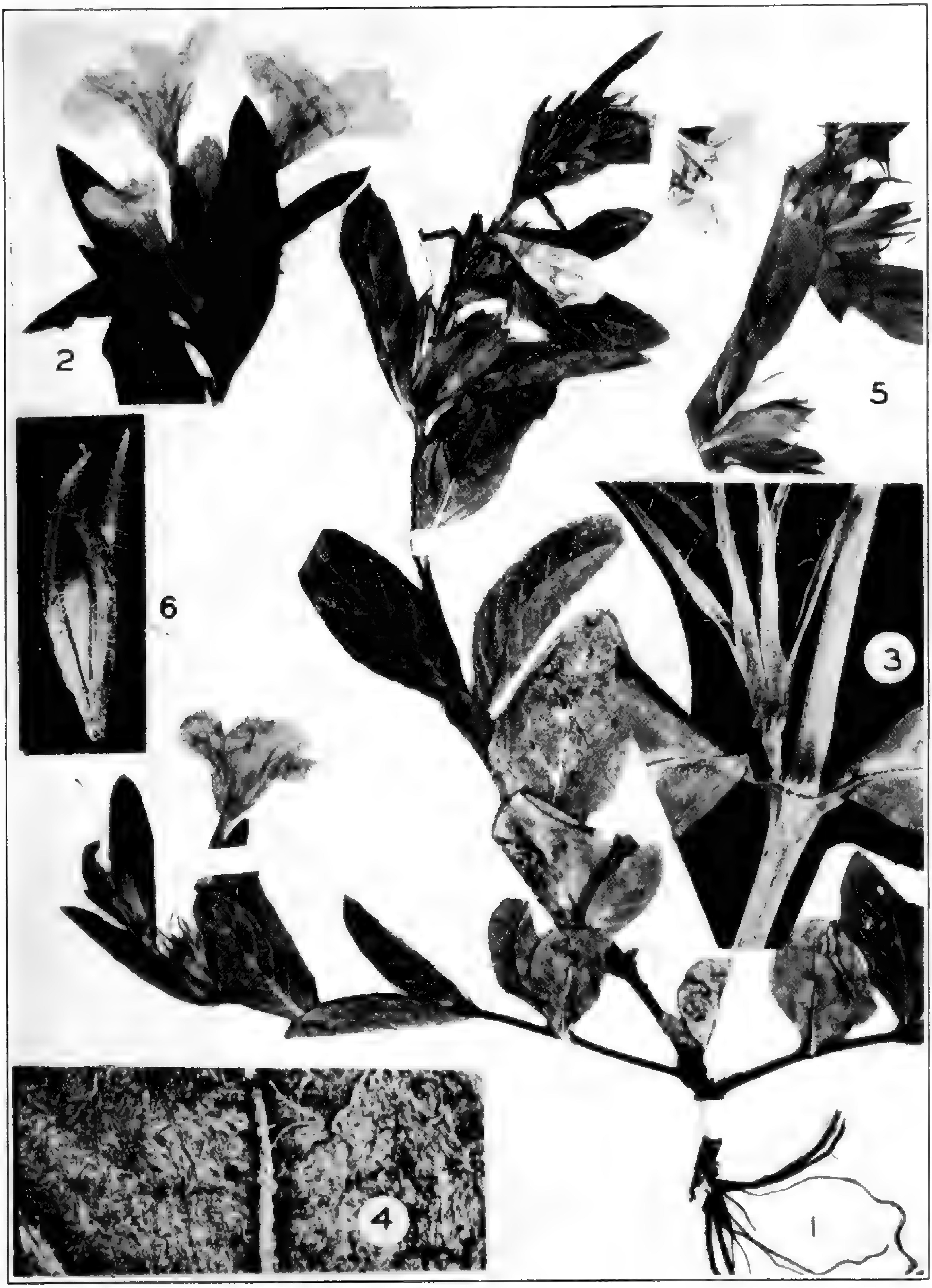


*Photo. B. G. Schubert.*

Ruellia humilis, var. calvescens: fig. 1, portion of isotype, × 1; fig. 2, flowering tip, × 1; fig. 3, internode and leaf-bases, × 4; fig. 4, lower surface of leaf, × 10; fig. 5, fruiting nodes, × 1; fig. 6, calyx and capsule, × 2 extending well into Iowa. These two plants, although merging, seem fairly well defined. In Texas and Louisiana var. *longiflora* has often been mistaken for the more eastern Coastal Plain *R. noctiflora*. It is promptly distinguished, however, by its greatly developed villous-hirsute pubescence, *R. noctiflora* being puberulent; by its short and strongly hirsute-ciliate calyx-segments, those of *R. noctiflora* prolonged (2.5–4.5 cm. long) and puberulent; and by its short and glabrous capsule, the very long (2.25–3.5·cm. long) capsule of *R. noctiflora* pubescent.

As extreme as any variation of *Ruellia humilis* is var. *calvescens* (MAP 13), concentrated on the Cumberland Plateau, with colonies along the Alleghenies and the Great Smokies. Smaller in all parts than most members of the species and nearly glabrous, it has been mistaken (by the writer among others) for *Dyschoriste oblongifolia* (Michx.) Ktze. In their more upright extremes the two plants are often superficially similar, but the technical differences of calyx-segments and anthers hold. Furthermore, when the ripe seeds of *R. humilis*, var. *calvescens*, like those of all our species of *Ruellia*, are moistened they promptly exude mucilage which soon takes the form of prolonging and streaming spiracles which finally give the seed a more or less plush-like surface. Many tests of seeds of *Dyschoriste oblongifolia* have shown no such mucilage-spiracles there. The latter species, furthermore, is a plant of southern Coastal-Plain pine barrens and fall-line sands, northward to South Carolina (the old and doubted basis for it as Virginian, in the Gray Herbarium, being a specimen with copied—not original—label, reading "Southern States. Virginia"), not of calcareous upland.

*(To be continued)*

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MARINE ALGAE OF THE MONTEREY PENINSULA[1].—Those who are interested in the seaweeds of the Pacific coast of the United States will receive with approval this book which, while dealing only with the marine algae of the Monterey region, is, nevertheless, usable for nearly all parts of that coast. The book should appeal especially to three groups of individuals, to all biologists, but particularly algologists, who will receive it with delight, to students in schools and colleges who are seeking an acquaintance with the plants of the coast, and to the more numerous group

[1] Marine Algae of the Monterey Peninsula by GILBERT M. SMITH, vii + 622 pp., with 98 plates. $6.00, Stanford University Press. 1944.

of people who have a general interest in all that they see and a desire to learn more about seaweeds and to name them. To all of these, Prof. Smith's book should be easily and pleasantly useful.

In the introduction, many of the problems receiving the attention of students of this group of plants, and particularly the factors which affect their distribution, are treated. Here are discussed various factors, among them vertical distribution and horizontal (the latter, of course, referring to range along the coast) pointing out the importance of suitable substrata on which the plants can maintain themselves. In this connection, it would seem that a map of the Monterey region would be decidedly helpful. So also a more general treatment of the effects of temperature and of seasonal distribution would be very interesting to the general user of the book. Frequent statements show that these factors are important.

Extremely thorough and excellent is the discussion of the problems of collecting the different kinds of algae under various conditions. Unfortunately, no information is given as to the means of preservation of the material which has been collected, a point of particular interest to occasional collectors.

Especially helpful to the latter group and useful to all, is the glossary which is generally adequate and if anything errs on the side of too many definitions. But would there not be some who would appreciate definitions of such terms as parthenogenesis and whorl, and others who might question the significance of a zoospore defined as a "sport with flagella," one of the very few typographical errors occurring in the book?

Keys leading to the identification of any alga of the region are numerous and eminently satisfactory, and should make fairly easy and sure the determination of all specimens found, though it is a well-known fact that there must always be a certain number of plants that will exhibit misleading or confusing characters to baffle any collector. The numerous excellent illustrations make a decidedly helpful addition, clearly and beautifully showing the nature of nearly all the marine algae of this region.—Roy M. Whelden, Harvard University.

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J. C. Nelson

# Rhodora

JOURNAL OF

## THE NEW ENGLAND BOTANICAL CLUB

**Vol. 47.** **March, 1945.** **No. 555.**


## JAMES C. NELSON


M. E. Peck


(With portrait)

The subject of this sketch was born in Grant County, Kentucky, December 11, 1867. He received his B. S. degree from Hanover College, Indiana, in 1890, and three years later his master's degree.

He had prepared himself for the teaching profession and spent the remainder of his life in this field. He taught first in Carthage College, Missouri, then in Hull Academy, Iowa, and later at Princeton, Illinois, Dubuque, Iowa, and Marshalltown, Iowa, as high school principal. From the last named place he went to Wenatchee, Washington, and two years later, 1914, to Salem, Oregon, where he spent the rest of his life, as principal of the high school until 1929, when the load of responsibility became too great and he was obliged to retire. He then took the position of registrar, which he held to the time of his death, January 29, 1944. He was married to Anna Van Horssen, of Orange City, Iowa, in 1904.

Mr. Nelson was a man of broad intellectual attainments and a tireless student to the end of his life. He mastered languages with facility, was an accomplished Latin and Greek scholar, read extensively in German, Dutch, French and Portuguese, and was a careful student of French history of the revolutionary period, gathering for his private library a large collection of French histories of the time. Later he became deeply interested in the literature of the South American republics and carried on an extensive correspondence with many of the eminent writers of those countries, and accumulated a choice collection particularly of Brazilian works.

With all his intense intellectual activity Mr. Nelson never lost personal touch with the hundreds of young people who were under his supervision. His influence over them was wholesome and profound, and he was respected and loved accordingly. His work with the Salem High School was remarkable. From a very mediocre institution he raised it, largely by his own personal influence, into one of the best schools of its kind in the state.

His botanical work, while pursued with his characteristic enthusiasm, did not constitute a major part of his activity, though he had a keen taxonomic sense. All his published papers and notes on the subject, with one or two exceptions, fall within a period of seven years, 1916–1923. This represents but a small part of his work, however. He once told me with regret of the poor start he had in taxonomy. His teacher in Botany took no interest in his aspirations in this field, and was even annoyed by his propensity for collecting and identifying plants. He persisted, however, and finally became particularly interested in grasses and sedges, accumulating a considerable collection, which he deposited in the herbarium of Willamette University. His later interests were largely concerned with the introduction of foreign plants in Oregon. The number of these exotics is very large, and the part they play in the make-up of the flora of the state is immensely important. In this field his contributions have great value, both in published records and in specimens collected, nearly all of which have been deposited in large herbaria, especially the Gray Herbarium and the National Herbarium.

It is to be deeply regretted that Mr. Nelson's botanical work could not have been continued to the end of his life. A defective heart action made it necessary to discontinue the strenuous field trips that gave zest to his work, and having no large collection or library at hand, there was little he could do to advantage. With that cheerful philosophy that characterized his whole attitude toward life, he took up those intellectual pursuits which ripened, though late in life, into a broad rich scholarship, such as we seldom find in these days.

James C. Nelson was somewhat below medium height, with clear-cut, rather rugged features, quick and energetic in his movements. He had a deep, resonant voice, with a great range of expression. He possessed a keen sense of humor and a remarkable command of language. He was capable of deep emotions and when strongly moved was a superb public speaker. I have a vivid memory of an April morning a few days after this country entered the first World War, when the call had just come for volunteers. Mr. Nelson had been asked to address the student body of Willamette University at their morning assembly. That address, which I believe was wholly extemporaneous, was the most moving, the most eloquent example of spontaneous oratory I have ever heard. Its effect on his hearers may be judged by the fact that more than a third of the young men of the student body went from the chapel straight to headquarters and enlisted.

He carried on a varied and voluminous correspondence with scientists and scholars in many parts of this country as well as in Europe and South America. His letters have a fine characteristic flavor, whether philosophical, humorous, satirical or merely circumstantial. They represent the man as we knew him best, a superior intellect, an accomplished scholar, with broad, sympathetic human interests.

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Willamette University, Salem, Oregon.

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Linum catharticum in New Brunswick.—There is always a certain interest in tracing the spread of an introduced species; from this point of view, it may be worth while to record the occurrence of *Linum catharticum* L. in New Brunswick. My wife and I found it in considerable quantity in a neglected athletic field at St. Andrew's in July, 1944. We were without collecting apparatus and could take no more specimens than could be carried in an envelope in my pocket; but enough to serve as vouchers for the locality have been deposited in the Gray Herbarium and the New Brunswick Museum.

*L. catharticum* is native in Newfoundland,[1] has been reported as adventive in eastern Nova Scotia, the central Maine coast and northern Vermont, and is said to be a bad weed at Farnham in southern Quebec—though it is hard to imagine so pretty and fragile-looking a little plant becoming really a nuisance. The St. Andrew's station is, then, not an extension of range, but it is apparently the first record for New Brunswick.—C. A. Weatherby.

[1] See Rhodora, xxxv. 15 (1933).


*Photo. B. G. Schubert.*

Ruellia caroliniensis, var. typica: fig. 1, portion of flowering plant, × 1; fig. 2, flowering tip, × 1; fig. 3, summit of internode, × 4; fig. 4, upper surface of leaf, × 10; fig. 5, lower surface of leaf, × 10


Photo. B. G. Schubert.

RUELLIA CAROLINIENSIS, var. TYPICA: FIG. 1, summit of plant, to show characteristic divergent branching, × 1; FIG. 2, calyx and capsule, × 2; FIG. 3, portion of calyx and capsule, × 10

# RUELLIA IN THE EASTERN UNITED STATES

M. L. Fernald

(*Continued from page 63*)

11. R. caroliniensis (Walt.) Steud. Erect, simple to divergently or strictly branched, 1–9 dm. high, canescent-pilose, villous, hirsute, puberulent or rarely glabrescent; the upper internodes greatly abbreviated, the lower more elongate, at least the upper with crowded leaves and glomerules: lowest leaves more or less obovate and rounded at summit; middle and upper leaves distinctly petioled, lanceolate to ovate, oval, elliptic or oblong, commonly strigose above, either strigose, hispid, pilose or glabrescent beneath: glomerules very short-peduncled to subsessile, mostly crowded, at 1–4 upper nodes (or in var. *dentata* up to 9 pairs of glomerules extending down often to base of plant): bracts oblong-lanceolate to elliptic, narrow, nearly equaling to shorter than calyx: calyx-segments linear-setaceous, 1.3–2.5 cm. long, usually shorter than corolla-tube, copiously ciliate (more rarely eciliate): corolla lilac- or lavender-blue, 2–5 cm. long; the slender tube 1.3–2.7 cm. long; the campanulate-obconic throat 1–1.5 cm. broad at summit; expanded limb 2–4 cm. broad: capsule glabrous, pilose or hirtellous, 1.2–1.7 cm. long; seeds orbicular to oval, 3 mm. long.—Our most polymorphous species, consisting of several locally constant but marginally intergrading varieties and many minor but morphologically consistent forms. The chief variations are the following.

*a*. Stem simple or with mostly strongly divergent branches from lower and median axils, these branches commonly elongate and flowering at summit; the upper internodes canescent-pilose to softly villous; leaves elliptic, subrhombic, oval or narrowly ovate, membranaceous and pliable, with more or less undulate surfaces (slightly crumpled even when carefully pressed); calyx-segments canescent-puberulent to villous on back: corolla 2.5–5 cm. long: capsule pilose-hirtellous to glabrous. . . . *b*.

*b*. Upper internodes of stem and branches copiously white-pilose and commonly white-villous; leaves white-villous to canescent-pilose beneath when young, copiously strigose above; capsule usually densely pubescent. . 11a. Var. *typica*.

*b*. Upper internodes merely short-pilose or with only few elongate hairs; leaves glabrescent or merely sparsely hirtellous beneath; capsule usually glabrous or promptly glabrate.

Calyx-segments ciliate. . . . . . . . . . . . . . . . . . . . . . . 11b. Var. *semicalva*.

Calyx-segments eciliate. . . . . . . . 11c. Var. *semicalva*, forma *detonsa*.

*a.* Stem simple or with few ascending to suberect (very rarely strongly divergent) branches, spreading-hirsute, pilose, puberulent or glabrescent, the branches when borne from the middle and upper axils rarely prolonged or floriferous; leaves flat (not crumpled when carefully pressed), lanceolate to ovate, oval, elliptic or oblong, membranaceous and flexible to thickish, hard and firm, strigose to hispid along principal veins or quite glabrous beneath, remotely strigose to glabrescent above; corolla 2–4.5 cm. long; capsule usually glabrous. . . .*c.*

*c.* Leaves of upper more or less approximate nodes chiefly longer than those below, entire or not very dentate; 1 or 2 (rarely 3 or 4) nodes of the main axis floriferous, the lowest floriferous ones from closely crowded to 10 (–15) cm. apart; stem simple, only rarely branched. . . .*d.*

*d.* Longer leaves of the uppermost nodes broadly lanceolate to oval, ovate or elliptic, if lance-subacuminate 1.5–4.5 cm. broad; calyx-segments glabrous or nearly so on back; summit of throat of corolla 0.7–1.5 cm. broad, expanded limb 2.5–4 cm. broad. . . .*e.*

*e.* Leaves membranaceous, pliable, oval, ovate or elliptic to broadly lanceolate. . . .*f.*

*f.* Stem stoutish to slender, 1–5 mm. thick at base, 1–9 dm. high; larger leaves 5–12 cm. long, if obtuse mostly more than 7 cm. long. . . .*g.*

*g.* Leaves strigose or hispid on veins beneath; calyx-segments ciliate.

Internodes of stem (or some of them) copiously spreading-hirsute. . . . . . . . . . . . . . . .11d. Var. *membranacea.*

Internodes puberulent to glabrescent, at most with remote elongate trichomes 11e. Var. *membr.*, forma *breviberbis.*

*g.* Leaves glabrous beneath.

Calyx-segments ciliate; internodes of stem usually pubescent; upper surfaces of leaves usually strigose. . . . . . . .11f. Var. *membr.*, forma *hypopsila.*

Calyx-segments eciliate; internodes glabrescent or glabrous; upper surfaces of leaves glabrous or essentially so. . . . . . . .11g. Var. *membr.*, forma *laevior.*

*f.* Stem filiform, 1–2 mm. thick at base, 1–2 (–4) dm. high; leaves membranaceous, elliptic to oblong, the larger ones 2–6 cm. long, obtuse to rounded at apex.

Calyx-segments ciliate; internodes (or some of them) of stem copiously villous-hirsute with divergent hairs. . . . . . . . . . . . . . . . . . . . . .11h. Var. *nanella.*

Calyx-segments eciliate; internodes glabrescent or merely puberulent. . . . . . . .11i. Var. *nan.*, forma *eciliata.*

*e.* Leaves subcoriaceous, firm and stiff, lanceolate to lance-ovate, subacuminate; stem rigid, 4.5–9 dm. high. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .11j. Var. *cheloniformis.*

*d.* Longer leaves of the uppermost nodes narrowly lanceolate to lance-linear, 0.5–1.5 (–2) cm. broad; stem slender, 1.5–7 dm. high; calyx-segments canescent-pilose to glabrescent; throat of corolla 5–10 mm. broad at summit, expanded limb 2–3.5 cm. broad. . . . .11k. Var. *salicina.*

*c.* Leaves of flowering summit gradually much reduced in size; 4–9 nodes of well developed main axis bearing glomerules; all but upper internodes elongate; stem frequently with


Copy, slightly reduced, of the Dillenian plate of RUELLIA STREPENS, CAPITULIS COMOSIS


*Photo. B. G. Schubert.*

RUELLIA CAROLINIENSIS, var. SEMICALVA: FIG. 1, TYPE, × 3/7; FIG. 2, portion of internode, × 10; FIG. 3, lower, and FIG. 4, upper surface of leaf, × 10; FIG. 5, calyx and capsule, × 2; FIG. 6, calyx-segment and portion of capsule, × 10

**elongate floriferous ascending basal branches; median leaves oblong, oblong-lanceolate, ovate or elliptic, subequal, subcoriaceous, often undulate-dentate......11l. Var. *dentata*.**

11a. Var. **typica.** Stem when well developed 1.5–7 dm. high, simple, or with divergently to horizontally spreading elongate branches mostly flowering at tips, obtusely angled, canescent-pilose to copiously white-villous; middle and lower internodes greatly elongated (5–18 cm. long), the uppermost greatly abbreviated: principal leaves elliptic, subrhombic, oval, ovate or ovate-lanceolate, membranaceous, slender-petioled, obtuse to acute, white-villous to villous-hirsute or canescent-pilose beneath when young, closely strigose above; the blades 3–10 cm. long and 1.5–4 cm. broad, with somewhat undulate surface, thus crumpled or puckered in drying: glomerules very short-peduncled, from 1–3 approximate or subapproximate upper nodes and at tips of longer branches, 2–many-flowered: bracts oblong-lanceolate to narrowly elliptic, nearly equaling to shorter than calyx: calyx-segments linear-setaceous, white-villous or canescent-pilose on back, villous-ciliate, 1.3–2.3 cm. long, usually considerably shorter than corolla-tube: corolla bluish-lavender, 2.5–5 cm. long; the slender tube 1.3–2.7 cm. long, the campanulate-obconic throat 1–1.5 cm. thick at summit; expanded limb 2.5–3.5 cm. broad: capsule often densely pilose-hirtellous, sometimes glabrous, 1.4–1.7 cm. long.—*R. strepens, capitulis comosis* Dillenius, Hort. Elth. ii. 330, t. 331 (1732). *R. strepens* L. Sp. Pl. 634 (1753), in part, not L. Mantiss. Alt. 422 (1771). *Anonymos caroliniensis* Walt. Fl. Carol. 168 (1788). *Pattersonia caroliniensis* (Walt.) J. F. Gmel. Syst. 925 (1791), the binomial wrongly ascribed to Walter, p. 167 (instead of 168) with a brief summary of Walter's generic diagnosis. *R. hybrida* Pursh, Fl. Am. Sept. ii, 420 (1814); LeConte in Ann. Lyc. N. Y. i. 140 (1824), in part only; Small, Fl. Se. U. S. 1084 (1903) and Man. 1229 (1933). *R. strepens* sensu Ell. Sk. ii. 109 (1822), not L. emend. *R. caroliniensis* (Walt.) Steud. (as *carolinensis*), Nom. ed. 2, ii. 481 (1841), based only on "*Patersonia carolinensis* Walt.", without further reference, this obviously copied (with change of spelling of both names) directly from J. F. Gmelin; Blake in Rhodora, xxii. 134 (1915), in part, excluding *R. ciliosa* and *R. carol.* var. *parviflora* (Nees) Blake and all synonyms cited under it. *Dipteracanthus strepens*, γ. *Dillenii* Nees in DC. Prodr. xi. 122 (1847), at least as to Dillenian plant. *D. ciliosus*, β. *hybridus* (Pursh) Nees l. c. 123 (1847), in part. *D. Mitchillianus* Nees l. c. (1847). *R. ciliosa*, var. *hybrida* (Pursh) Gray, Syn. Fl. ii[1]. 326 (1878), in part.—Sandy woods, Florida, north to eastern South Carolina; Tennessee, Kentucky and eastern Arkansas (unless otherwise noted, specimens distributed as *R. hybrida*). South Carolina: lancaster co.: rocky hillside, 40-

Acre Rock, west of Taxahaw, *Dorothy Huntley*, no. 256 (Duke). HORRY CO.: low woods near Myrtle Beach, July 13, 1932, *Coker & Totten* (NC). GEORGETOWN CO.: sandy woods, Brookgreen Gardens, *F. G. Tarbox*, no. 567 (US). WILLIAMSBURG CO.: rich woods, 10 miles southeast of Gourdin, *Godfrey & Tryon*, no. 433. BERKELEY CO.: Santee Canal, *H. W. Ravenel*, as *R. strepens*, changed by Asa Gray to *R. ciliosa*, var. *hybrida*. CHARLESTON CO.: Charleston, June, 1902, *Wm. Palmer* (US), as *R. parviflora*. BEAUFORT CO.: Bluffton, 1872, *Mellichamp* (Mo, US); St. Helena, 1878, *Laura Towne* (Pa), as *R. ciliosa*. GEORGIA: WITHOUT STATED LOCALITY: *Chapman*, CHATHAM CO.: Savannah, *Mrs. Say*. FLORIDA: WITHOUT DEFINITE LOCALITY: E. Florida, *Chapman* (NY), as *Dipteracanthus Mitchillianus*. DUVAL CO.: dry rich ground near Jacksonville, *A. H. Curtiss*, no. 4764 (Mo, NY, US), as *R. strepens*, one sheet changed to *R. hybrida*, another to *R. parviflora;* St. Nicholas, May 12, 1896, *L. H. Lighthipe* (NY), as *R. ciliosa*, April 20, 1897, *J. R. Churchill;* vicinity of Mayport and Jacksonville, *H. D. Keeler* (NY), as *R. ciliosa;* Hummock, *Fredholm*, no. 5150, as *R. ciliosa*. ST. JOHNS CO.: May 20–22, 1885, *G. C. Whitlock*. CLAY CO.: dry oak woods, Green Cove Springs, April 14, 1939, *W. A. Murrill* (Mo), as *R. ciliosa*. PUTNAM CO.: Crescent City, March, 1880, *G. Marten* (Phil). ALACHUA CO.: open pine woods I mile north of Newberry, *E. Perot Walker*, no. 1862 (Phil), as *R. humilis;* high hummock, Burnett's Lake, April 30, 1939, *W. A. Murrill* (Mo); Gainesville, 1887, *M. F. Price*, as *R. ciliosa*, var. *ambigua;* May 12, 1897, *Joseph Crawford* (Phil.), as *R. ciliosa;* hammock near Gainesville, May 31, 1937, *W. A. Murrill* (Mo), as *R. ciliosa*. VOLUSIA CO.: Port Orange, *F. C. Straub*, no. 120, as *R. ciliosa*, var. *ambigua;* sandy soil, Ormond, April 23, 1903, *H. A. Purdie*, as *R. ciliosa*, altered to *R. humilis;* lush growth by road, north of Ormond, May 16, 1943, *E. H. Butts & Oakes Ames* (Ames); in shade or half-shade, Ormond Beach, May 12, 1943, *Butts & Ames* (Ames); dry soil, Crescent City, June 28, 1943, *E. H. Butts*, as *R. parviflora*. LAKE CO.: vicinity of Eustis, *Nash*, nos. 242 (US) and 1801, July, 1894, *A. S. Hitchcock* (Mo); pinelands east of Eustis, *J. K. Small*, no. 8667 (NY), as *R. parviflora;* dry wood-border, Hiawatha Lake, *Wiegand & Manning*, no. 2932, as *R. parviflora*. SUMTER CO.: Lake Ashtachula, March 29, 1879, *J. D. Smith* (US), as *R. strepens*. HERNANDO CO.: rich open woods, Brooksville. April 9, 1927, *Hugh O'Neill* (Mo). POLK CO.: Peace Creek, March, 1880, *J. D. Smith* (US), as *R. strepens*, dry pineland, April 12, 1894, *L. B. Ohlinger* (Mo), as *R. strepens*. OSCEOLA CO.: sandy soil, Kissimmee, April 5, 1936, *Mary L. Singletary* (Duke). MANATEE CO.: Manatee, *S. M. Tracy*, no. 6758 (NY, US). DADE CO.: pine woods near Rockdale, *J. L. Fennell*, no. 270 (USNA). KENTUCKY: OWEN CO.: about 1 mile north of Scott Co. line, *E. L. Braun*, no. 3204 (Braun). JEFFERSON CO.: 3 miles south of Louisville, July 5, 1892, *L. S. Bergman*, in part (Mo), as *R. ciliosa*. CALLOWAY CO.: upland oak woods just west of the Tennessee River, *Gleason*, no. 8950 (NY). TENNESSEE: COCKE CO.: Newport, June 6, 1925, *O. M. Freeman* (USNA). KNOX CO.: Knoxville, *Ruth*, no. 101, as *R. strepens*. FRANKLIN CO.: Cowan, *Biltmore Herb.*, no. 849[e] (US), as *R. ciliosa;* woods north of Sheridan, June 6, 1897, *H. Eggert* (Mo). DAVIDSON CO.: Ridge Top, July 13, 1897, *Eggert* (Mo). SHELBY CO.: Memphis, *Fendler*, as *R. ciliosa*. ARKANSAS: ST. FRANCIS CO.: Crowley's Ridge, Forrest City, *Demaree*, no. 15,137 (Mo), possibly, when more material available, to be placed elsewhere. PLATES 861–863; MAP 14.

11b. Var. **semicalva,** var. nov. (TAB. 864), var. *typicae* simillima; caule vix villoso-hirsutis; foliis subtus glabrescentibus vel sparse strigosis; capsulis plerumque glabris.—Of much wider range, from central Florida to South Carolina, locally to southeastern Virginia, westward to eastern Texas. VIRGINIA: SOUTHAMPTON CO.: rich woods, Violet Hill, near Devil's Elbow, June 23, 1936, *Fernald, Long & Smart*, no. 5922 (TYPE in Herb. Gray; ISOTYPES in Herb. Phil. Acad., etc.), as *R. ciliosa;* about Franklin, *Heller*, no. 953 (US), as *R. ciliosa*. NORTH CAROLINA: CHATHAM CO.: dry soil, Silver City, Biltmore Herb., no. 849[j] (US), as *R. ciliosa*. COLUMBUS CO.: grassy woodland at Lake Waccamaw, *Godfrey & Shunk*, no. 4170, as *R. parviflora*. NEW HANOVER CO.: Wilmington, June, 1894, *J. M. Macfarlane* (Pa). SOUTH CAROLINA: GEORGETOWN CO.: shady, weedy waste place, Georgetown, *Godfrey & Tryon*, no. 1683. WILLIAMSBURG CO.: rich woods, 10 miles southeast of Gourdin, *Godfrey & Tryon*, no. 433. BERKELEY CO.: railroad right-of-way, south of Moncks Corner, *R. F. Martin*, no. 1130 (USNA), as *R. parviflora*. CHARLESTON CO.: near Charleston, Aug. 1886, *L. R. Gibbes* (NY), as *R. parviflora*. ANDERSON CO.: dry rich woods, Anderson, *John Davis*, no. 9193 (Mo), as *R. parviflora*. GEORGIA: WITHOUT DEFINITE LOCALITY: middle Georgia, *T. C. Porter*. JEFFERSON CO.: July 8, 1897, *M. H. Hopkins* (NY), as *R. parviflora*. LIBERTY CO.: Sunbury, *LeConte* (NY), as *R. ciliosa*. JASPER CO.: fence-corner, 1846, *T. C. Porter* (approaching var. *dentata*). COBB CO.: moist field near brook, Marietta, June 12, 1885, *R. N. Larrabee*. WALKER or DADE CO.: foot of Lookout Mt. near road out of St. Elmo, June 6, 1921, *O. M. Freeman* (USNA). FLORIDA: LAKE CO.: clay soil, vicinity of Eustis, *Nash*, no. 242. SUMTER CO.: March 29, 1879, *J. D. Smith* (US), as *R. strepens*. CITRUS CO.: moist shaded rock north of Pineola, *H. J. Oosting*, no. 135 (Duke). BREVARD CO: hammock along Indian River, Coco, *J. K. Small*, no. 8727. SEMINOLE CO.: moist grassy clearing, south of Sanford, *Moldenke*, no. 184 (Duke, Mo, NY, Pa), as *R. parviflora*. POLK CO.: sandy roadside, Winter Park, March 8, 1923, *Hunnewell*, no. 8732 (FWH). HILLSBORO CO.: Tampa, May, 1876, *A. P. Garber* (Phil, US), as *Dipt. ciliosus*. LEON CO.: near Tallahassee, *N. K. Berg* (NY), as *R. parviflora*. WAKULLA CO.: prope St. Marks, Mai, 1843, *Rugel*, with an unpublished name (NY). CALHOUN CO.: Iola, *Chapman* (Mo). TENNESSEE: HAMILTON CO.: old fields, Sequach Valley, Biltmore Herb., no. 849h (US), as *R. ciliosa*. ALABAMA: DEKALB AND ETOWAH COS.: Lookout Mt., July 6 and 8, 1898, *H. Eggert* (Mo). ETOWAH CO.: Gadsden, 1878, *G. R. Vasey* (US), as *R. ciliosa*. CULLMAN CO.: woods, June and Sept., 1897, *H. Eggert* (Mo). HALE CO.: Greensboro, 1857, *Sereno Watson*, as *R. ciliosa*, var. *ambigua*. LEE CO.: dry pine woods, *J. D. Smith*, no. 1940 (US), as *R. strepens*. MONTGOMERY CO.: low abandoned field near Montgomery, June 18, 1932, *J. K. Edwards* (Pa). DALLAS CO.: 1879, *Wm. Trelease* (Mo), as *Dipt. ciliosus*. CONECAH CO.: Evergreen, *Baker & Earle*, no. 39 (US), as *R. ciliosa*. MONROE CO.: dry hills, July 23, 1885, *Mohr* (US), as *R. ciliosa*. MOBILE CO.: Mobile, 1905, *W. C. Dukes*, as *R. parviflora;* pine barrens, Spring Hill, *E. W. Graves*, no. 498, in part (Mo). MISSISSIPPI: GRENADA CO.: moist wooded hillside, Pay West's Lake, May 27, 1932, *Vena Millsaps* (NC), as *R. ciliosa*. OKTIBBEHA CO.: Starkville, July 26, 1890, *S. M. Tracy*, as *R. strepens* (NY)—plant habitally resembling var. *dentata*. LAUDERDALE CO.: Meridian, *S. M. Tracy*, no. 3271 (NY), resembling var. *cheloniformis*. JACKSON CO.: Ocean Springs, *Josephine Skehan* as *Seymour & Earle*, no. 154, as *R. ciliosa*, var. *ambigua*, June 7, 1895, *Skehan*, as *R. ciliosa* (simulating var. *cheloniformis*). HARRISON CO.: Biloxi, *S. M. Tracy*, nos. 4944 (Mo, NY, US—very mixed no., some specimens nearly var. *salicina*), 6434 (NY, US), 6435 (G, Mo, NC, NY, US—some plants nearly var. *salicina*, others approaching var. *nanella*), as *R. strepens*. COPIAH CO.: Brushy Creek, Crystal Springs, May 18, 1925 (US), as *R. parviflora*. LOUISIANA: ST. TAMMANY PARISH: vicinity of Covington, *Bro. Anect*, no. 65 (US), as *R. parviflora; Bro. G. Arsène*, no. 12,240 (US), as *R. parviflora*. IBERIA PARISH: moist open grassy woods, Avery Island, *D. S. & H. B. Correll*, no. 9525. RAPIDES PARISH: Alexandria, *Hale* (NY), as *R. strepens*, corrected by Britton to *R. ciliosa*. NATCHITOCHES PARISH: woods near Marthaville, May 5, 1893, *Langlois* (US), as *R. ciliosa*. TEXAS: UPSHUR CO.: sandy woods, Big Sandy, *Reverchon*, no. 2536 (Mo), as *R. parviflora*. LIBERTY CO.: low woods, Dayton, *E. J. Palmer*, no. 7768 (Mo), as *R. parviflora* (plant resembling large-leaved var. *membranacea*). HARRIS CO.: Houston, *G. L. Fisher*, no. 81 (US), as *R. parviflora*. PLATE 864; MAP 15.

11c. Var. SEMICALVA, forma **detonsa,** f. nov., caule, foliis, calycis segmentibusque minute canescento-puberulis eis ecilia-

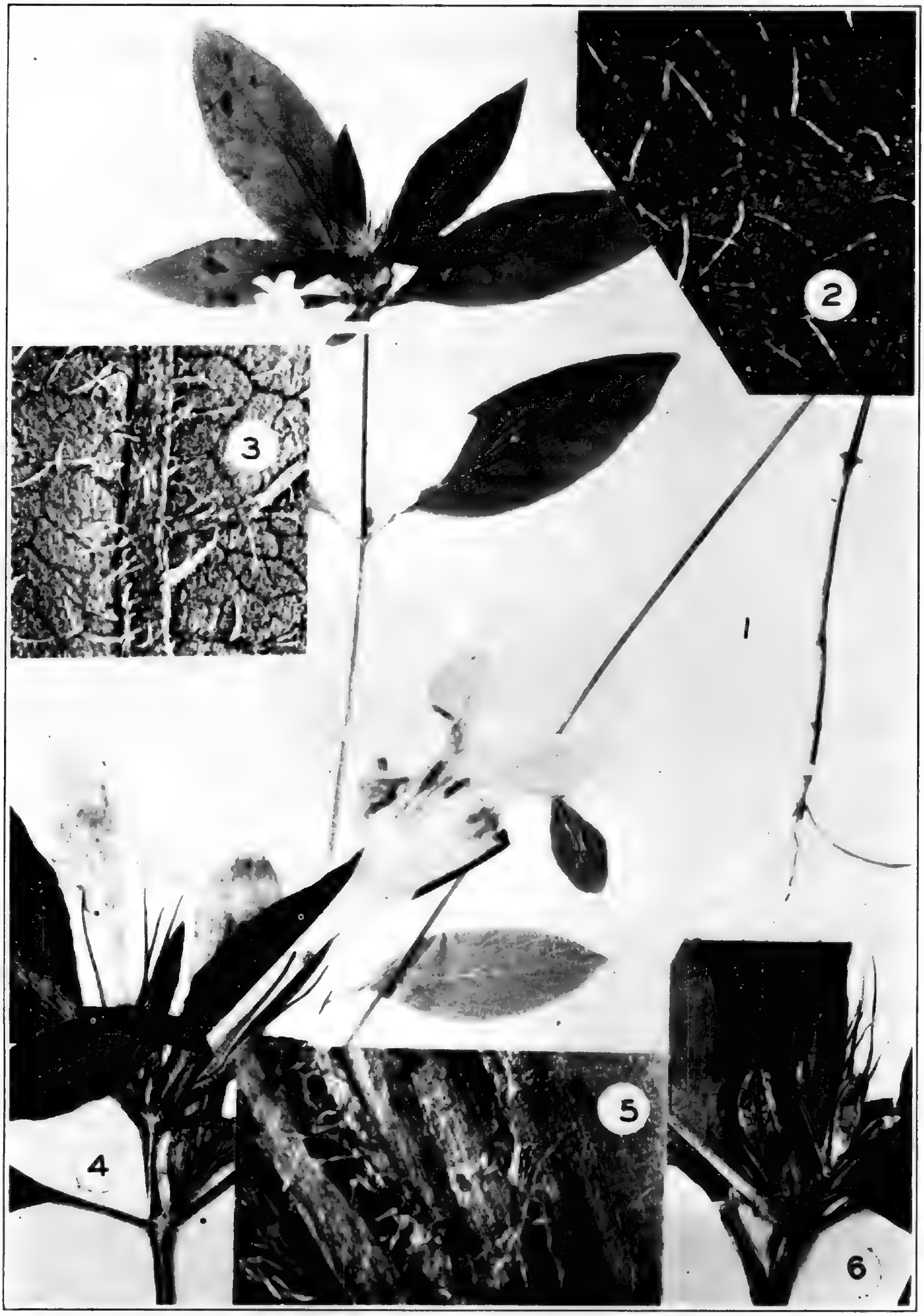


*Photo. B. G. Schubert.*

RUELLIA CAROLINIENSIS, var. MEMBRANACEA: FIG. 1, TYPE, × ½; FIG. 2, upper, and FIG. 3, lower surface of leaf, × 10; FIG. 4, flowering tip, × 1.7; FIG. 5, portion of calyx and capsule, × 10; FIG. 6, fruiting summit, × 2


*Photo. B. G. Schubert.*

RUELLIA CAROLINIENSIS, var. MEMBRANACEA: FIGS. 1–3, summits of plants, to show leaf-variation, × 1 tis.—FLORIDA: roadside, Sebring, Highland Co., March 4, 1924, *Hunnewell*, no. 9044 (TYPE in Herb. Hunnewell).

11d. Var. **membranacea,** var. nov. (TAB. 865 et 866), caule 1–9 dm. alto ad basin 1–4 mm. diametro, internodiis valde divergenterque hirsutis; foliis membranaceis 5–12 cm. longis supra strigosis subtus ad venas strigosis vel hirsutis, ovalibus, ovatis, ellipticis vel late lanceolatis obtusis vel subacutis; calycis segmentis dorso glabris vel glabrescentibus longe ciliatis—*R. parviflora* sensu Small, Fl. Se. U. S. 1085 (1903) and sensu Britton in Britton & Brown, Ill. Fl. ed. 2, iii. 242 (1913), excl. fig., which is of *R. Purshiana;* not *R. parviflora* (Nees) Britt. Man. 854 (1901), at least as to basonym, *Dipteracanthus ciliosus,* var. *parviflorus* Nees.—Woods, openings and clearings, either calcareous or subacid, north-central South Carolina to south-central Tennessee, north to southern New Jersey, southeastern Pennsylvania, northern Maryland, West Virginia, southeastern Ohio and north-central Kentucky (unless otherwise noted, distributed as *R. caroliniensis, ciliosa* or *parviflora*); usually commoner than other vars. northward. NEW JERSEY: CAPE MAY CO.: woods south of Mill Lane, north of Cape May City, Aug. 10, 1918, *W. Stone* (Phil); north of Cape May, Sept. 13, 1901, *C. S. Williamson* (Phil); Cape May Court House, Aug. 6, 1909, *Van Pelt* (Phil); Cold Spring, Sept. 13, 1908, *C. S. Williamson* (Phil), July 18, 1909, *Van Pelt*, no. 12,199 (Pa). PENNSYLVANIA: YORK CO.: below McCall's Ferry, July 11, 1895, *Joseph Crawford* (Phil). DELAWARE: NEW CASTLE CO.: Aug. 9, 1866, *A. Commons* (NY), as *R. strepens.* KENT CO.: moist woods west of Woodland Beach, *R. R. Tatnall*, no. 1462. SUSSEX CO.: Rehoboth, July 8, 1908, *C. S. Williamson* (Pa, Phil); sandy woods east of Milford, July 16, 1896, *A. Commons* (Pa, Phil). MARYLAND: CECIL CO.: Elk Neck, June 24, 1923, *W. L. Abbott* (Phil); woods, high bluff west of Georgetown, Aug. 6, 1938, *Mrs. L. R. Holmes* (Pa); Leslie, July 15, 1891, *Crawford* (Phil); flats, Conowingo, July 29, 1924, *Crawford;* Conowingo, July 25, 1907, *J. J. Carter* (Phil). KENT CO.: near Chestertown, July 11, 1907, *Shreve*, no. 1696 (US). QUEEN ANNE CO.: Aug. 20, 1900, *G. Vanatta* (Phil). TALBOT CO.: railroad ballast, northwest of St. Michaels, *R. R. Tatnall*, no. 386 (Pa); edge of woods, west of Easton, *E. C. Earle*, nos. 2251 (Pa) and 3698 (Pa). WICOMICO CO.: Salisbury, July 14, 1904, *J. J. Carter* (Phil). WORCESTER CO.: roadside through swamp, north of Dividing Creek Bridge, *G. F. Beaven*, no. 455 (Duke). HARFORD CO.: low, moist woods, Creswell, July 28, 1883, *L. W. Brosius* (Pa). BALTIMORE CO.: Baltimore, *Leroy* (NY). PRINCE GEORGE CO.: Hyattsville, Aug. 13, 1904, *Steele* (Mo). CALVERT CO.: low swampy woods, North Bay, Chesapeake Bay, *Muenscher*, no. 3867 (Mo). MONTGOMERY CO.: edge of woods, July 7, 1901, *M. W. Lyon, Jr.* (US). WASHINGTON co.: island above Harper's Ferry, *F. W. Pennell*, no. 2430 (Phil). District of Columbia: in vicinis Washington, June 29, 1884, *L. F. Ward;* thickets near Ivy City, June 14, 1891, *F. Blanchard* (Mo), as *R. strepens;* open woodland, Washington and vicinity, July 16, 1896, *Steele* (NY, Mo); Congress Heights, *Philip Dowell*, no. 7012. West Virginia: nicholas co.: dry bank, Peter Creek, *Millspaugh*, no. 596 (NY). mason co.: along Ohio River, near Pum Roy, *E. E. Berkley*, no. 913 (Mo). cabell co.: abandoned wooded pasture, Pleasant Valley, *Gilbert*, no. 483. lincoln co.: near Mills School, *E. E. Berkley*, no. 969 (Mo). wayne co.: dry hillside, Buffalo Creek, *Lewis Plymale*, no. 95. mc dowell and wyoming cos.: woods along Indian Ridge, *E. L. Morris*, no. 1172 (US). Virginia: fairfax co.: Falls Church, June 23, 1872, *J. J. Carter* (Phil). alexandria co.: Naucks, *Pennell*, no. 2456 (Phil); Fort Myer, July 14, 1895, *E. A. Mearns* (NY), as *R. strepens.* northampton co.: sandy woods back of the dunes, Savage Neck, *Fernald & Long*, no. 5453. middlesex co.: bank of Rapahannock River at Gray's Point, *A. B. Massey*, no. 2115 (VPI). mathews co.: sandy open soil along North End Branch, "Fort Nonsense", south of Soles, *Wherry & Pennell*, no. 12,616, in part (Phil). gloucester co.: Beaver Swamp Creek, north of Gloucester, July 5, 1924, *H. B. Meredith* (Phil). york co.: steep wooded bank, York River, above Mt. Folly, *Fernald & Long*, no 13,459. james city co.: rich woods and slopes by James River, Grove Landing, southeast of Grove, *Fernald & Long*, no. 13,457; moist rich soil in woods, west side of Jones Millpond, Williamsburg, *Grimes*, no. 3887. charles city co.: wooded slope by James River, at "Four Oaks", below Harrison Point, *Fernald & Long*, no. 13,149. princess anne co.: rich deciduous woods east of Little Creek, *Fernald & Long*, no. 4193; sandy woods, northern end of Knott's Island, *Fernald & Long*, no. 4194, in part. norfolk co.: Portsmouth, June, 1840, in part, *Rugel* (NY). isle of wight co.: thicket back of sandbeach of Burwell's Bay, James River, below Rushmere (Fergusson's Wharf), *Fernald & Long*, no. 13,150. surry co.: rich calcareous wooded ravines along James River, Claremont, *Fernald & Long*, nos. 13,762 and 13,837; rich calcareous wooded ravine near James River, northwest of Chippokes, July 25, 1941, *Fernald & Long*, no. 13,458. southampton co.: border of sandy woods south of Applewhite's Church, *Fernald & Long*, no. 13,153. sussex co.: border of woods near Nottoway River, Green Church Bridge, southwest of Owen's Store, *Fernald & Long*, no. 12,472 (type in Herb. Gray.; isotype in Herb. Phil. Acad.). greenville co.: bottomland woods along Meherrin River, southeast of Gaskins, *Fernald & Long*, no. 13,151. dinwiddie co.: low woods near Mt. Olivet Church, *Fernald & Long*, no. 14,021. amelia co.: *J. B. Lewis*, nos. 114 and 733 (VPI). brunswick co.: bottomland woods near Western Bridge, Meherrin River, south of Edgerton, *Fernald & Lewis*, no. 14,498. CAMPBELL CO.: vicinity of Lynchburg, July 1, 1892, *Britton, Britton & Vail* (NY). BEDFORD CO.: July 8, 1871, *A. H. Curtiss* (Mo, NY). ROCKBRIDGE CO.: "Near the natural bridge in rich soil along fences", *Pursh* (Phil), correctly called "*Anonymos caroliniensis* Walt."; Natural Bridge, *Margaret P. Russell*. NORTH CAROLINA: PASQUOTANK CO.: oak-pine-beech woods south of Elizabeth City, *Wiegand & Manning*, no. 2929. TYRRELL CO.: open woodland, Columbia, *Godfrey*, no. 4322. PITT CO.: pine woodland near Farmville, *Godfrey*, no. 4278. WARREN CO.: Warrenton, July 19, 1924, *H. B. Meredith* (Phil). GRANVILLE CO.: wet meadow, Oxford, *M. F. Buell*, no. 1404 (US). DURHAM CO.: shaded low woods, Duke Forest, *Blomquist*, no. 367 (US). WAKE CO.: sandy bank west of Raleigh, *Wiegand & Manning*, no. 2930. BLADEN CO.: moist sandy soil, *Biltmore Herb.*, no. 849[a]. ORANGE CO.: woods near Chapel Hill, Aug. 17, 1909, *Coker* (NC), June 23, 1933, *M. T. Cameron* (NC); dry open woods, Hollow Rock, *C. C. Wilson*, no. 17 (Mo). CHATHAM CO.: dry soil, Silver City, *Biltmore Herb.*, no. 849[j]. FORSYTH CO.: moist woods near Mt. Carmel, *Correll*, no. 2591 (Duke). SURRY CO.: moist shaded cove, Pilot Mt., *R. M. Williams*, no. 464 (Duke). ROWAN CO.: vicinity of Salisbury, *Heller*, no. 140 (NY, Phil). POLK CO.: near Columbus, July 22, 1897, *E. C. Townsend* (US). MADISON CO.: open woods, bluff along river, Hot Springs, *Oosting*, no. 34,230 (Duke). BUNCOMBE CO.: Biltmore, *Biltmore Herb.*, no. 849[b], in part (US); Weaversville, July 8, 1933, *H. B. Teague* (Duke). SWAIN CO.: partly shaded roadside near Cherokee Lodge, rare, *R. A. McLean*, no. 73 (Duke). SOUTH CAROLINA: DARLINGTON CO.: woods at Lauther's Lake, *Budd E. Smith*, no. 1652 (NC). LEXINGTON CO.: vicinity of Batesburg, *E. A. McGregor*, no. 309 (US), as *R. hybrida*. GREENVILLE CO.: summit of Paris Mt., July, 1896, *J. K. Small* (NY). ANDERSON CO.: damp soil, Anderson, *John Davis*, no. 8394 (US, Mo, same no. with label copied and data changed to "dry ground" by B. F. Bush whose Missouri plant grows in dry ground). OCONEE CO.: thickets, *A. P. Anderson*, no. 1222 (US); Clemson College, *H. D. House*, no. 2384 (NY). GEORGIA: CLARKE CO.: roadside, Athens, *L. M. Perry*, no. 1083, as *R. humilis*. OHIO: MEIGS CO.: Letart, Sept. 10, 1935, *C. H. Jones* (NY). KENTUCKY: LOCALITY NOT DEFINITELY PLACED: "Ky river hills, mouth of Hickman Cr.", July, 1832, *C. W. Short*, as *R. strepens* (Phil), sent to Hooker who wrote in 1833: "The other Ruellia [var. *nanella*] with small flow[s] looks diff[t]—But I am much puzzled with the Genus". ROWAN CO.: prairie patch, Clark Mt., *E. L. Braun*, no. 1930 (Braun). MENIFEE CO.: oak woods, dry limestone slope, Red River valley, *E. L. Braun*, no. 2128 (Braun). BELL CO.: rocky woodland, Pineville, *Pennell*, no. 11,804 (Phil);

sandy soil, slope of Pine Mt. at Frakes, *E. L. Braun*, no. 1530 (Braun). ROCKCASTLE CO.: wooded gully, south of Livingston, *Smith & Hodgdon*, no. 3785 (US). OWEN CO.: about 1 mile north of Scott Co. line, *E. L. Braun*, no. 3204 (Braun); wooded slope, Severn Creek, *E. L. Braun*, no. 4578 (Braun). WAYNE CO.: Beaver Creek, *E. L. Braun*, no. 3099 (Braun). JEFFERSON CO.: 3 miles south of Louisville, July 5, 1892, *L. S. Bergmann* (Mo). LARUE CO.: open cedar slope, limestone, Upton, *E. L. Braun*, no. 1970 (Braun). TENNESSEE: SEVIER CO.: Great Smoky Park, near Gatlinburg, 1932, *Mrs. C. D. Walcott* (US). KNOX CO.: Knoxville, *Ruth*, no. 101, as *R. strepens*. HAMILTON CO.: old fields, Sequachie Valley, *Biltmore Herb.*, no. 849[h] (US); Chickamauga Park, May 25, 1911, *J. R. Churchill* (Mo). FRANKLIN CO.: dry soil, Cowan, *Biltmore Herb.*, no. 849[e] (US); woods north of Shernwood, June 6, 1897, *H. Eggert* (Mo). CHEATHAM CO.: limestone bluffs, Kingston Springs, *Svenson*, no. 42. MAP 16.

11e. Var. MEMBRANACEA, forma **breviberbis,** f. nov. (TAB. 867, FIG. 4–6); var. *membranaceae* simillima, caulis internodiis puberulis vel glabrescentibus rare sparseque hirsutis.—Scattered through the general range. MARYLAND: ANNE ARUNDEL CO.: Bay Ridge, July 13, 1897, *F. H. Knowlton* (US). WEST VIRGINIA: CABELL CO.: dry field in clay soil, near Roland Park, *Gilbert & Gilbert*, no. 259 (VPI). NORTH CAROLINA: POLK CO.: wet shaded ground, Tryon, *D. C. Peattie*, no. 1351 (NC). GEORGIA: DEKALB CO.: Stone Mountain, July 1–8, 1886, *Small* (TYPE in Herb. NY. Bot. Gard.). TENNESSEE: COCKE CO.: near Wolf Creek, *Kearney*, no. 863 (US).

11f. Var. MEMBRANACEA, forma **hypopsila,** f. nov. (TAB. 867, FIG. 1–3), var. *membranaceae* simillima; caulis internodiis plerumque pubescentibus; foliis subtus glabris vel subglabris, vix strigosis, supra strigosis; calycis segmentis ciliatis.—Occasional in Virginia and North Carolina. VIRGINIA: ELIZABETH CITY CO.: Old Point Comfort, Sept. 15, 1895, *Britton* (NY). NORFOLK CO.: near Northwest, *Kearney*, no. 1565 (US). SURRY CO.: border of bottomland woods along Blackwater River, about 1 mile southwest of Dendron, June 14, 1941, *Fernald & Long*, no. 13,148 (TYPE in Herb. Gray.; ISOTYPE in Herb. Phil. Acad.), no. 13,491 (fruit of preceding). SOUTHAMPTON CO.: dry sandy pine woods by Nottoway River, near Carey Bridge, *Fernald & Long*, no. 13,147; alluvial wooded bottomland of Nottoway River, Cypress Bridge, *Fernald & Long*, no. 8470; wooded alluvial bottomland of Meherrin River, near Haley's Bridge, *Fernald & Long*, no. 8471. SUSSEX CO.: bottomland woods along Nottoway River, east of Huske, *Fernald & Long*, no. 13,761. NORTH CAROLINA: ORANGE CO.: meadow below Durham-Chapel Hill Bridge, June 26, 1915, *Coker & Totten*, transition to next form (NC).

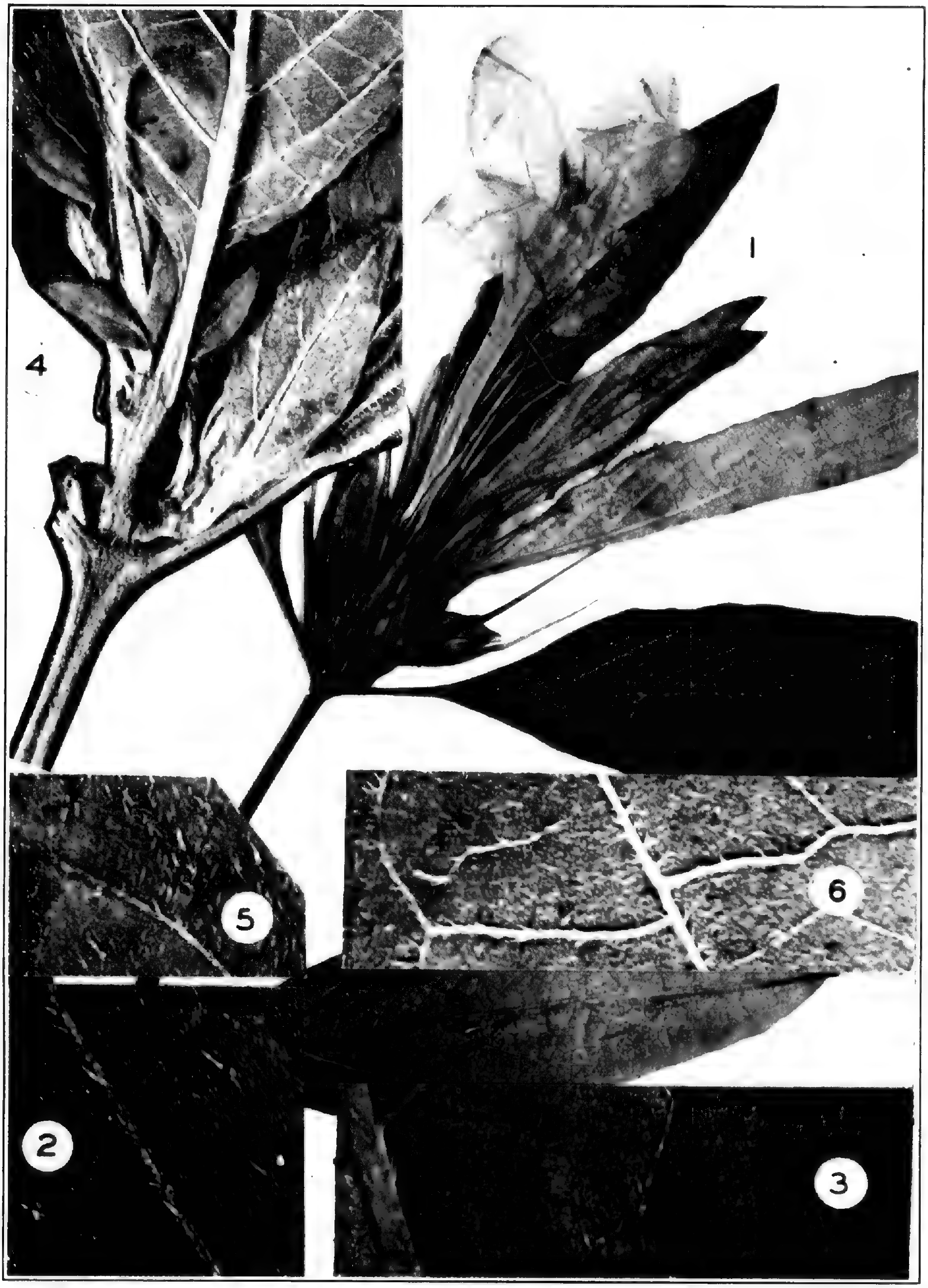


*Photo. B. G. Schubert.*

Ruellia caroliniensis, var. membranacea, forma hypopsila: fig. 1, summit, × 1, of type; fig. 2, upper, and fig. 3, lower surface of leaf, × 10
Var. membranacea, forma breviberbis: fig. 4, internode and leaves, × 1.7; fig. 5, upper, and fig. 6, lower surface of leaf, × 10


*Photo. B. G. Schubert.*

Ruellia caroliniensis, var. membranacea, forma laevior: fig. 1, fruiting summit, × 1.7, of type; fig. 2, upper, and fig. 3, lower surface of leaf, × 10; fig. 4, portion of calyx-segment and capsule, × 10

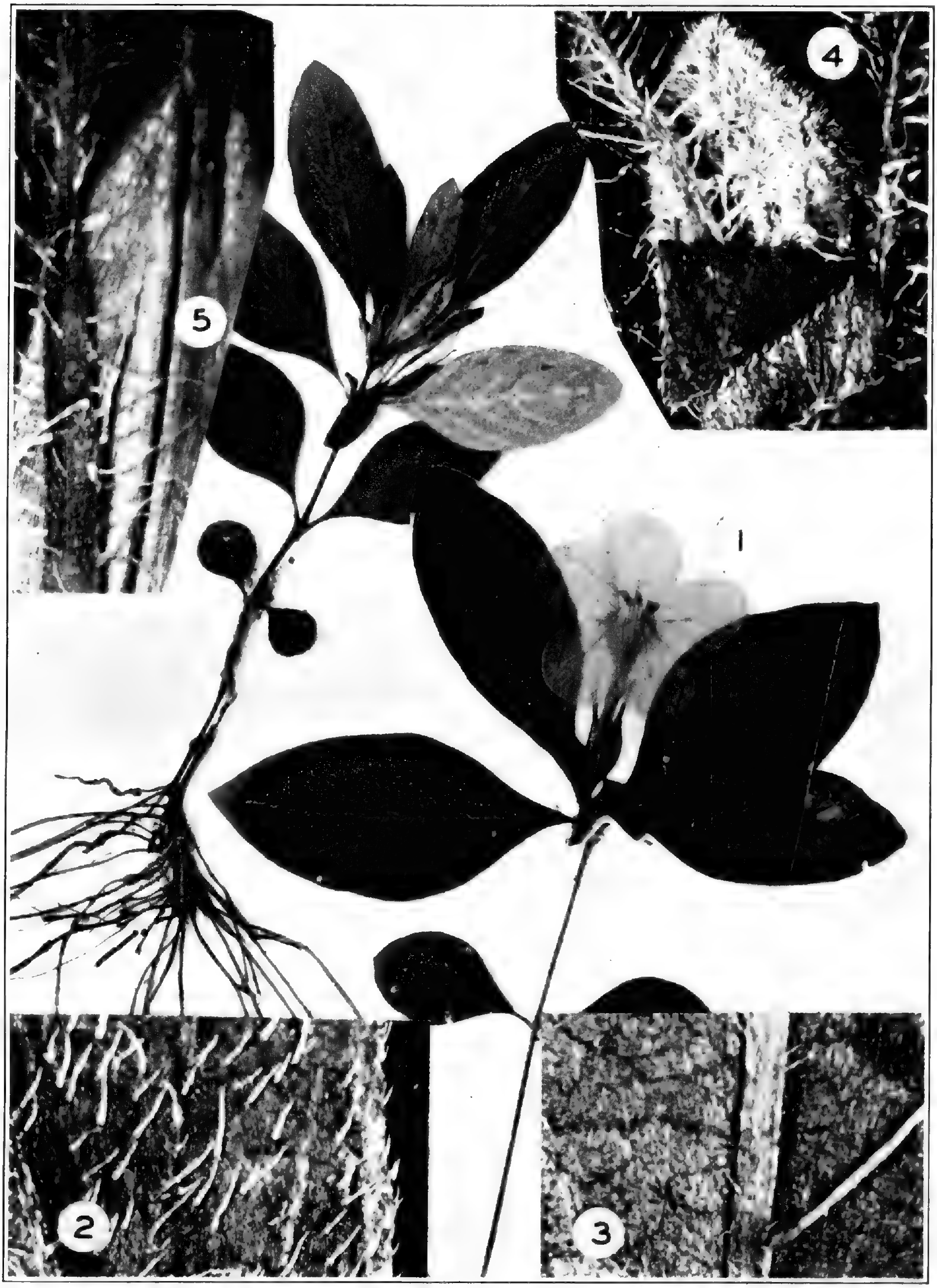


*Photo. B. G. Schubert.*

RUELLIA CAROLINIENSIS, var. NANELLA: FIG. 1, TYPE (2 plants), × 1; FIG. 2, upper, and FIG. 3, lower surface of leaf, × 10; FIG. 4, flower-bud, with folded bract and 2 calyx-segments, × 10; FIG. 5, portion of calyx-segment and capsule, × 10


*Photo. B. G. Schubert.*

Ruellia caroliniensis, var. nanella: fig. 1, internode and base of leaf, × 4
R. caroliniensis, var. nanella, forma eciliata: fig. 2, type (3 plants), × 1; fig. 3, portion of leaf, bracts and internodes, × 10; fig. 4, portion of calyx and capsule, × 10

11g. Var. MEMBRANACEA, forma **laevior,** f. nov. (TAB. 868), var. *membranaceae* simillima; caulis internodiis glabrescentibus; foliis utrinque glabris glabrescentibusve; calycis laciniis eciliatis vel vix ciliatis.—Local, Virginia and North Carolina. VIRGINIA: SOUTHAMPTON CO.: wooded alluvial bottomland of Meherrin River, near Haley's Bridge, *Fernald & Long,* no. 9151. GREENSVILLE CO.: bottomland woods along Meherrin River southeast of Gaskins, Aug. 3, 1941, *Fernald & Long,* no. 13,462 (TYPE in Herb. Gray.; ISOTYPE in Herb. Phil. Acad.). AMELIA CO.: July 1, 1936, *J. B. Lewis,* no. 114 (VPI). NORTH CAROLINA: ORANGE CO.: swamp of New Hope Creek, 5 miles east of Chapel Hill, June 30, 1931, *H. R. Totten* (NC); meadow 3 miles out from Chapel Hill, on Raleigh Road, 1931, *T. N. Webb* (NC).

11h. Var. **nanella,** var. nov. (TAB. 869 et 870, FIG. 1), caule filiformi ad basin 1–2 mm. diametro 1–3(–4) dm. alto, internodiis valde divergenter villoso-hirsutis; foliis membranaceis, ellipticis vel oblongis majoribus 2–6 cm. longis; calycis segmentis 1.3–2 cm. longis, ciliatis dorso plerumque glabrescentibus.—Dry to moist woods, local, eastern Maryland to Kentucky, south to South Carolina; southern Mississippi. MARYLAND: CECIL CO.: loamy, wooded slope, Duffy Creek, 2 miles southeast of Cecilton, *B. Long,* no. 48,422 (Phil.); North East, Sept. 2, 1894, *Joseph Crawford* (Phil), transition to var. *membranacea.* KENT CO.: Chestertown, July 29, 1901, *E. G. Vanatta* (Phil), transition to var. *membranacea.* CHARLES CO.: dense woods, Tompkinsville, *Leonard & Killip,* no. 838 (US). VIRGINIA: NANSEMOND CO.: near Suffolk, *Kearney,* no. 1718 (US); dry sandy woods above Nansemond River, east of Cahoon Pond, northwest of Suffolk July 23, 1941, *Fernald & Long,* no. 13,461 (TYPE in Herb. Gray.; ISOTYPE in Herb. Phil. Acad.). PRINCESS ANNE CO.: Oceana, July 2, 1923, *H. B. Meredith,* in part (Phil), transition to var. *membranacea;* dry, mixed woods, Little Neck, *Fernald & Long,* no. 4195, transition to var. *membranacea.* NORTH CAROLINA: HALIFAX CO.: Weldon, July, 1875, *Mac Elwee* (Phil). MCDOWELL CO.: Old Fort, June, 1872, *Walter Faxon.* ORANGE CO.: Chapel Hill, July, 1931, *Vena Millsaps* (NC). SOUTH CAROLINA: DARLINGTON CO.: damp shady woods near Auburn, June 27, 1909, *Coker* (NC). KENTUCKY: poor dry hill on the Kentucky River, 1832, *C. W. Short* (Phil), this material referred to Hooker (see note under Kentucky specimens of var. *membranacea*), with the following note: "Is this plant specifically distinct from *R. strepens* in another part of the Collection? Found on a poor dry hill on the Ky river. It flowers later than the former & is much more starved in its growth." MISSISSIPPI: JACKSON CO.: Ocean Springs, *A. B. Seymour,* no. 91 8 22, as *R. ciliosa.* HARRISON CO.: Biloxi, *Lloyd & Tracy,* no. 347, in part (NY). MAP. 17.

11i. Var. NANELLA, forma **eciliata,** f. nov. (TAB. 870, FIG. 2–4), var. *nanellae* simillima, internodiis glabrescentibus vel puberulentibus; foliis vix vel minutissime strigosis; calycis laciniis eciliatis.—Local, southeastern VIRGINIA: SOUTHAMPTON CO.: dry sand of open alluvial flat by Blackwater River, southeast of Unity, July 4, 1942, *Fernald & Long*, no. 14,412 (TYPE in Herb. Gray.; ISOTYPE in Herb. Phil. Acad.); white sand of pine and oak woods at Round Gut, southwest of Franklin, *Fernald & Long*, no. 13,154. SUSSEX CO.: bushy clearing southeast of Stony Creek, *Fernald & Long*, no. 13,145, taller plants, transitional to var. *membranacea*, forma *laevior*. MISSISSIPPI: SIMPSON CO.: Magel, *E. G. Holt*, no. 5 (US), as *R. humilis*.

11j. Var. **cheloniformis,** var. nov. (TAB. 871 et 872), caule stricto vix vel sparse ramoso 4.5–9 dm. alto basin versus 2–5 mm. diametro plus minusve hirsuto; foliis subcoriaceis firmis duris lanceolatis vel lanceolato-ovatis subacuminatis, majoribus (supernis) 6–12 cm. longis 2–4.5 cm. latis, subtus ad venas strigosis vel hispidis supra strigosis; nodis floriferis 1–4 approximatis vel imis 3–15 cm. distantibus; glomerulis congestis; calycis laciniis dorso glabris vel sparse hirsutis ciliatis; corollis 3–4.5 cm. longis.—Woods and clearings, north-central South Carolina and northern Georgia, north to southern New Jersey, northern Maryland and northern Virginia, more rarely to Kentucky and southern Indiana. NEW JERSEY: CAPE MAY CO.: margins of fresh meadows east of Cape May Court House, *Long*, no. 6685 (Phil), appr. var. *membranacea;* Cape May Court House, 1886, *Isaac Burk* (Pa, Phil); woods, Cold Spring, July 18, 1908, *Van Pelt* (Phil). DELAWARE: SUSSEX CO.: Rehoboth, July 8, 1908, *Van Pelt* (Phil). MARYLAND: CECIL CO.: North East, July 20, 1890, *J. B. Brinton* (Pa), as *R. strepens;* Elk Neck, June 24, 1923, *W. L. Abbott* (Phil); moist soil below Cromley's Mount, *Pennell*, no. 1591 (Pa). MONTGOMERY CO.: Little Falls Brook, *Pennell*, no. 2439 (Phil). ST. MARYS CO.: Point Lookout, July 13, 1930, *O. M. Freeman* (USNA). DISTRICT OF COLUMBIA: Brookland, July 17, 1897, *Carrie Harrison* (USNA). VIRGINIA: CLARKE CO.: woods, Boyce, *Hunnewell*, no. 10,742 (FWH). NORTHAMPTON CO.: dry woods, Savage Neck, July 19, 1936, *R. R. Tatnall*, no. 3013 (TYPE in Herb. Gray.). GLOUCESTER CO.: Beaver Swamp Creek, north of Gloucester, July 5, 1924, *H. B. Meredith* (Phil), as *R. parviflora*. ELIZABETH CITY CO.: Hampton, July 22, 1927, *J. R. Churchill*, (Mo), as *R. strepens*. JAMES CITY CO.: open places in moist hardwood ravine, southwest of Williamsburg, *Grimes*, no. 4609 (NY); Jamestown, June 24, 1924, *H. B. Meredith* (Duke). PRINCESS ANNE CO.: Virginia Beach, July 3, 1892, *Britton, Britton & Vail* (NY); pine woods, Virginia Beach, *Fernald & Long*, no. 4191; sandy woods, Knott's Island, *Fernald & Long*, no. 4194, in part. NORFOLK CO.: Portsmouth, June, 1840, *Rugel* (NY). DINWIDDIE CO.: low open pineland, thickets and clearings just east of McKenney, *Fernald & Long*, no. 14,413. MECKLENBURG CO.: roadside-thicket, 6 miles north of Clarksville, *F. R. Fosberg*, no. 15,463. HALIFAX CO.: old clearing, east of Dan River, *Fosberg*, no. 15,384. NORTH CAROLINA: CAMDEN CO.: low, moist bushy soil, near Shiloh, *Correll*, no. 2068 (Duke). WASHINGTON CO.: moist soil near Scuppermong, *Correll*, no. 1918 (Duke). GREENE CO.: pine woodland, Farmville, *Godfrey*, no. 4278 (Duke, US), transition to var. *membranacea*. WAKE CO.: pine woodland along Crabtree Creek, 8 miles northwest of Raleigh, *Godfrey*, no. 4991, in part. HARNETT CO.: Buie's Creek, June 29, 1938, *Frances & Sarah Fount* (NC). ROWAN CO.: Salisbury, June, 1872, *LeRoy & Ruger*, in part (NY). FORSYTH CO.: woods, June 20, 1940, *Schallert*. ALEXANDER CO.: on bank, road from Gelreath P. O. to Hidnite, *Radford & Stewart*, no. 1600 (NC). MC DOWELL CO.: Old Fort, *Biltmore Herb.*, no. 849[i] (US). BUNCOMBE CO.: Biltmore, *Biltmore Herb.* no. 849[b], in part, mixed with var. *membranacea* (US). POLK CO.: Tryon, July 22, 1897, *E. C. Townsend*, in part (US). SOUTH CAROLINA: FLORENCE CO.: sandy, shady banks of Pee Dee River, near Mars Bluff Bridge, *Wiegand & Manning*, no. 2931, as *R. parviflora*. CHARLESTON CO.: near Charleston, 1856, *L. R. Gibbes* (NY), as *R. parviflora*. OCONEE CO.: Clemson College, *H. D. House*, no. 2384 (US), as *R. parviflora*. GEORGIA: WITHOUT STATED LOCALITY: *Boykin* (NY), as *Dipteracanthus hybridus; Porter*, 1846 (Phil) "mid. Georgia, 1846," *Porter*, with the comment: "There is a good deal of confusion among the Ruellias". CLARKE CO.: Athens, June 28, 1930, *J. H. Pyron* (Duke). GWINNETT CO.: Yellow River, near McGuire's Mill, July 2, 1895, *Small* (NY), as *R. ciliosa*, changed by Small to *R. parviflora;* Thompson's Mills, *Allard*, no. 225 (NY, US). FLOYD CO.: Rome, July, 1888, *Gerald McCarthy* (US). INDIANA: JEFFERSON CO.: Hanover, July, 1875, *A. H. Young* (NY). CRAWFORD CO.: roadside near Leavenworth, *Deam*, no. 16,473 (NY), as *R. strepens*. KENTUCKY: ROCKCASTLE CO.: wooded gully south of Livingston, *Smith & Hodgdon*, no. 3758 (G), as *R. strepens*. MAP 18.

11k. Var. **salicina**, var. nov. (TAB. 873), caule simplice vel sparse breviterque ramosi tenui 1.5–7 dm. alto canescenti-puberulo vel subvilloso; nodorum superiorum foliis longioribus anguste lanceolatis vel lanceolato-linearibus 0.5–1.5(–2) cm. latis subtus glabrescentibus vel sparse strigosis; calycis segmentis dorso canescenti-pilosis vel glabrescentibus ciliatis; corollis 2–3 cm. longis, fauce supra 5–10 mm. diametro.—Northern Florida to eastern Texas, north, locally, to northern Georgia, Tennessee and southern Indiana. GEORGIA: GWINNETT CO.: Thompson's Mills, *Allard*, no. 224 (US), as *R. parviflora*. FLOYD CO.: deciduous woodland, Horseleg Mt., *Pennell*, no. 4099 (Pa). FLORIDA: GADSDEN CO.: open dry woods of pine and oak, River Junction, *Wiegand & Manning*, no. 2933. LAKE CO.: dense, moist woodland, Hawkinsville, May 7, 1910, *S. C. Hood* (Mo). INDIANA: CLARK CO.: wet grassy and rocky shore, southwest of Charleston, *F. J. Hermann*, no. 6730. TENNESSEE: DAVIDSON CO.: copses, vicinity of Nashville, Sept., 1885, *Gattinger*. SHELBY CO.: Normal, *C. E. Moore*, no. 69 (US). ALABAMA: BLOUNT CO.: Blount Springs, May 5, 1898, *C. F. Baker* (NY), as *R. pedunculata*. MONROE CO.: Perdue Hill, July 22, 1885, *C. Mohr* (US), as *R. ciliosa*, var. *hybrida*, this altered to var. *ambigua*, then the sheet, in spite of petioles 1.5 cm. long, annotated as the sessile-leaved *R. humilis!* MOBILE CO.: pine barrens and dry pastures, Spring Hill, *E. W. Ganes*, no. 948, in part (US)—the sheet also containing var. *semicalva* and *R. ciliosa*. MISSISSIPPI: CLARKE CO.: Enterprise, *S. M. Tracy*, no. 3288 (NY), as *R. ciliosa*, altered to *R. parviflora*. LOUISIANA: WITHOUT STATED LOCALITY: *Steinhaur*. ORLEANS PARISH: New Orleans, *Drummond*, no. 257, as *Dipteracanthus strepens*, another, with no., as *Calophanes humistrata*. NATCHITOCHES PARISH: open ground, Natchitoches, June 10, 1915, *E. J. Palmer*, no. 7945 (TYPE in Herb. N. Y. Bot. Gard.; ISOTYPES in Herb. Mo. Bot. Gard. and U. S. Nat. Herb.) RAPIDES PARISH: pine-barren hills, vicinity of Alexandria, *C. R. Ball*, nos. 559 (US), as *R. strepens*, and 655, in part (Mo)—the latter mixed on a sheet with *R. humilis* var. *frondosa* and quite like the other sheets of no. 559 (presumably the former mixed in handling). IBERIA PARISH: moist open grassy woods, Avery Island, *D. S. & H. B. Correll*, no. 9525. TEXAS: UPSHUR CO.: sandy woods, Big Sandy, *Reverchon*, no. 2536 (Mo); damp sandy soil, Big Sandy, *Reverchon*, no. 1402 (simulating small var. *dentata*). GREGG CO.: rich sandy woods, Gladwater, June 18, . . . ., *Reverchon* (Mo). WOOD CO.: damp woods, Mineola, *Reverchon*, no. 2113 (Mo). HARRIS CO.: White Oak Bayou, 4 miles west of Houston, *Lindheimer*, no. 40 (data and no., Mo.; two sheets without no., G), as *R. strepens*. MAP 19.

11l. Var. **dentata** (Nees), comb. nov. Stem stiff and relatively strong, simple or more often with ascending branches, the main axis 1.5–9 dm. long, hirsute to puberulent; the lower and median internodes elongate; 4–9 nodes bearing glomerules; leaves oblong, oblong-lanceolate, ovate or elliptic, subcoriaceous, often undulate-dentate, blunt or acutish, the lower and middle ones subequal, the upper reduced and definitely smaller; flowers occasionally cleistogamous; calyx-segments ciliate, 1.8–2.5 cm. long.—*Dipteracanthus ciliosus*, β. *dentatus* Nees in DC. Prodr. xi. 123 (1847).—Chiefly in dry woods and clearings, upland of South Carolina, western North Carolina and eastern Tennessee, north to Delaware, southeastern Pennsylvania, Maryland, northern Virginia, West Virginia, Kentucky and southeastern Indiana. PENNSYLVANIA: YORK CO.: below McCall's Ferry,


*Photo. B. G. Schubert.*

RUELLIA CAROLINIENSIS, var. CHELONIFORMIS: FIG. 1, TYPE, × 5/12; FIG. 2, corolla, × 1; FIG. 3, calyx and capsule, × 2; FIG. 4, bract, calyx-segment and portion of capsule, × 10


*Photo. B. G. Schubert.*

RUELLIA CAROLINIENSIS, var. CHELONIFORMIS: FIGS. 1 and 2, flowering summits, × 1; FIG. 3, upper and FIG. 4, lower surface of leaf

July 11, 1895, *Crawford* (Phil). DELAWARE: NEW CASTLE CO.: north end of cedar scrub, near Taylor's Bridge, July 28, 1891, *A. Commons.* SUSSEX CO.: oak copse, Rehoboth, Sept. 5, 1908, *J. R. Churchill.* MARYLAND: CECIL CO.: Conowingo, July 25, 1907, *J. J. Carter* (Phil). BALTIMORE CO.: near Baltimore, 1866, *P. V. LeRoy* (NY). CALVERT CO.: dry woods, Chesapeake Beach, *Hunnewell*, no. 5666 (FWH). WICOMICO CO.: Salisbury, July 14, 1904, *J. J. Carter* (Phil). DISTRICT OF COLUMBIA: June 22, 1902, *Steele* (Duke). WEST VIRGINIA: NICHOLAS CO.: dry bank, Peter Creek, *Millspaugh*, no. 596 (NY), as *R. ciliosa.* VIRGINIA: FAIRFAX CO.: woods, Great Falls, *Hunnewell*, no. 7027 (FWH). JAMES CITY CO.: dry slope about 3 miles north of Williamsburg, *R. W. Menzel*, no. 30, as *R. strepens.* HENRICO CO.: Fairway Ridge, near Richmond, July 10, 1928, *F. H. W.* PRINCESS ANNE CO.: pine woods, Virginia Beach, Sept. 25 and 28, 1900, *Wm. Palmer* (US); Oceana, July 2, 1923, *H. B. Meredith*, in part (Phil); open clay at border of woods, east of Little Creek, *Fernald & Long*, no. 4192. NORFOLK CO.: dry sandy roadside, Ocean View, July 3, 1923, *H. B. Meredith* (Phil). NANSEMOND CO.: moist clearing, site of extinct Marsh's Millpond, *Fernald & Long*, no. 14,414. ISLE OF WIGHT CO.: sandy, recently cleared woods along Blackwater River, below Broadwater Bridge, north of Zuni, *Fernald & Long*, no. 13,460. SUSSEX CO.: dry sandy woods, thickets and clearings, north of Moore's Mill, *Fernald & Long*, no. 6397; dry woods near Nottoway River, Green Church Bridge, northwest of Owen's Store, *Fernald & Long*, no. 14,020. HALIFAX CO.: old clearing, east of Dan River, 12 miles east of Danville, *F. R. Fosberg*, no. 15,384 (Pa). ORANGE CO.: field, Orange, *Killip*, no. 13,248 (US). NORTH CAROLINA: ORANGE CO.: Arboretum and Campus of Univ. N. C., July 1, 1914, *Coker* (NC). POLK CO.: banks and meadows, "Valhalla", Tryon, *D. C. Peattie*, no. 626 (NC). MADISON CO.: Warm Spring, Aug. 23, 1875, *J. H. Redfield* (Mo). BUNCOMBE CO.: Asheville, *B. L. Robinson*, no. 59, as *R. strepens;* Biltmore, *Biltmore Herb.* no. 849 (US). ROWAN CO.: vicinity of Heilig's Mill, *Small & Heller*, no. 139 (Phil, US). JACKSON CO.: near Dillsboro, Sept. 9, 1933, *Alexander, Everett & Pearson* (NY). SOUTH CAROLINA: DARLINGTON CO.: east side of Lynches River near Clyde, *B. E. Smith*, no. 1653 (NC). ANDERSON CO.: dry ground, Anderson, *John Davis*, no. 8369 (Mo). INDIANA: FLOYD CO.: wooded hillside and along railroad, west of New Albany, *Deam*, no. 14,010. KENTUCKY: ROCKCASTLE CO.: near Conway, *E. L. Braun*, no. 3132 (Braun). PULASKI CO.: thin soil over limestone, south of Burnside, *Wherry & Pennell*, no. 13,786 (Phil). EDMONSON CO.: near Sweeden, *E. L. Braun*, no. 3593 (Braun). WARREN CO.: Bowling Green, July 3, 1889, *Sadie F. Price*, painting (Mo). BALLARD CO.: woods, Wickliffe, *McFarland & Anderson*, no. 293

(Mo). Tennessee: blount co.: damp woods 2 miles east of Townsend, *W. M. Benner*, no. 5803 (Phil). Plates 874 and 875; map 20.

Of all the species of *Ruellia* in the eastern United States *R. caroliniensis* is the most baffling, for in different areas it is reasonably definable as geographic varieties, but, at least in eastern Virginia, plants with strongly spreading-hirsute stems and others with the internodes merely puberulent or short-pilose will occur side-by-side, while in other colonies may be found individuals with the leaves strongly hispid on the veins beneath almost mingled with individuals with the lower leaf-surfaces glabrous. In general the more northern series (vars. *membranacea, nanella, cheloniformis* and *dentata*) have the soft villosity or pilosity of stem or leaves less marked than in the more southern vars. *typica, semicalva* and *salicina*. In the three latter, furthermore, the leaf-blade is rather "full", so that the pressed foliage commonly puckers or has a "tuck" and the calyx-segments are commonly canescent on the back. In the more northern varieties, on the contrary, the leaf-blade is readily flattened in pressing and the calyx-segments are glabrous or only exceptionally pubescent on the back. When well developed the stems of the southern vars. *typica* and *semicalva* tend to divergent branching, with the elongate branches floriferous at tip, but simple-stemmed plants somewhat obscure this character. In the northern series the branching, except sometimes (as in var. *dentata*) from the base, is weak, most plants having simple stems or few short and rarely floriferous branches.

The commoner northern plants fall into the thin-leaved var. *membranacea* (with several minor forms based upon development or lack of development of trichomes on the leaves or of cilia on the calyx-segments), which passes insensibly, on the one hand, into the stouter, stiffer and firmer-leaved var. *cheloniformis*, on the other into the dwarf, very slender and small-leaved var. *nanella*, the latter, or something very like it, reappearing in southern Mississippi, where it passes into weak unbranched states of the southern var. *semicalva*. In the extreme South, furthermore, the narrow-leaved var. *salicina*, very definite in its extreme development, merges into var. *semicalva* and strongly suggests the narrowest-leaved extreme of the usually more northern var. *cheloniformis.* Var. *dentata,* with great reduction of leaves above, with the lower and median leaves nearly uniform, with strong tendency to develop elongate and floriferous basal branches, and its great abundance of glomerules, is as definite as any of the varieties, but some specimens show evident transition to vars. *salicina, semicalva, cheloniformis* and *membranacea.* In short, the species, like the usually more western *R. humilis,* is evidently in a state of flux and I am unable to find in it really stable characters.

The identifications of the past clearly show how perplexing have been the many variations of this most complex species, especially to those without any field-experience with it. It has been variously known or identified as *R. strepens* L. (our species 2, PLATES 841 and 842), or *R. pedunculata* Torr. (our species 3, PLATE 843), mixed in collections with *R. Purshiana* (our species 5, PLATES 845 and 846), identified as *R. ciliosa* Pursh (our species 7, PLATES 849 and 850) or as *R. humilis* Nutt. (our species 10, PLATES 854–860).

It was described and illustrated by Dillenius (our PLATE 863) and his description and plate were included in the *R. strepens* of Linnaeus (1753), but later excluded by him. In fact, Elliott, apparently not cognizant of the redefinition of *R. strepens* by Linnaeus (1771), was puzzled by the restriction of the latter name by authors who had Mantissa Altera. Describing in detail *Ruellia caroliniensis,* var. *typica,* as *R. strepens,* "the whole plant hairy . . . *Calyx* [-segments] . . . linear-lanceolate, the upper half almost setaceous, very hispid", and correctly citing for his South Carolina plant the Dillenian plate and *Anonymos caroliniensis* Walter, 168, Elliott thus expressed his perplexity: "I know not how Pursh could have called [correctly following the emended description of Linnaeus in 1771] the segments of the calyx lanceolate, they are very accurately represented by Dill. Hort. Elth. T. 249, F. 321, excepting that in number 5 and 6 the setaceous points are not sufficiently extended, but in number 1 from which he derived the epithet Comosa, the representation is very accurate."

Although the Walter type of his *Anonymos caroliniensis,* p. 168, basis of *Ruellia caroliniensis,* is lost, his generic description was good and his specific description well applies to the southern plant, which occurs abundantly in eastern South Carolina and about Savannah (see MAP 14). Since the other strongly pubescent ("hirsute") varieties (vars. *membranacea, cheloniformis* and *dentata*) barely reach the northern half of South Carolina from the north (see MAPS 16, 18 and 20) we are quite safe in identifying as Walter's plant the variety which abounds in the region he best knew. *R. caroliniensis* (var. *typica*) was next described by Pursh as *R. hybrida* (1814), evidently from the strongly branching state: "R. erecta, ramosissima, pilis albidis hirsuta; foliis . . . dense hirsutis, . . . calycis laciniis linearibus tubo corollae vix brevioribus. In sandy fields near Savannah, Georgia", where our plant abounds. If it were not for the earlier name of Walter the correct name of this species would be *R. hybrida* Pursh, the name used for the canescent-villous extreme by Small and others. Nees, who sadly mixed the identities of our American species and varieties, again beautifully described typical *R. caroliniensis* as *Dipteracanthus Mitchillianus* (1847), emphasizing the stem "pube albâ densê incano pilisque patulis hirsutis", the oval-oblong to oblong and obtusish leaves decurrent into petioles, the blades "utrinque laxe hirsutis", the linear-setaceous calyx-segments "albo-hirsutissimis" and about half as long as the corolla-tube. That was a first-rate description. Unfortunately, in the same treatment Nees published the ill-described *D. ciliosus*, "γ. *parviflorus*, corollâ vix pollicari, foliis paullo longiori petiolo (3–6-pollicari)", from Kentucky. As already sufficiently emphasized, a plant with petioles 3–6 inches long is quite impossible in *Ruellia* (at least in ours). Nevertheless, the impossible description by Nees has been made the basis for a specific combination, *R. parviflora* (Nees) Britton, and for the varietal combination, *R. caroliniensis*, var. *parviflora* (Nees) Blake; and in recent years these ill-founded names have largely appeared on the labels of most of the varieties and forms of *R. caroliniensis*.

The confusion in the use of names is here perhaps somewhat cleared. The presentation of the varieties and forms may later need revision. After some years of puzzling over the misbehavior of these inconstant trends, I have done the best I can with them. Future and wiser students may work out a better treatment.


*Photo. B. G. Schubert.*

Ruellia caroliniensis, var. salicina: fig. 1, type, × 4.7; figs. 2 and 3, summits of plants, × 1


*Photo. B. G. Schubert.*

RUELLIA CAROLINIENSIS, var. DENTATA: FIG. 1, small plant, × 2/5; FIG. 2, portion of branch, × 1; FIG. 3, portion of fruiting branch, × 1/2, to show characteristic branching

## Explanation of Plates

Plate 839. Ruellia Brittoniana Leonard: fig. 1, summit of plant, × 1, from Houma, Louisiana, *Wurzlow;* fig. 2, summit of peduncle and calyx, × 4, from *Wurzlow;* fig. 3, corolla, × 1, from *Wurzlow;* fig. 4, calyx and capsule, × 2, from *Wurzlow.*

Plate 840. R. Tweediana Griseb.: figs. 1 and 2, portions of branching plant, × 1, from Colonia Benitez, Chaco, Argentina, *A. G. Schulz,* no. 778; fig. 3, summit of peduncle and base of calyx, × 4, from no. 778; fig. 4, tip of calyx-segment, × 10, from no. 778; fig. 5, corolla, × 1, from no. 778.

Plate 841. R. strepens L.: fig. 1, flowering median node, × 1, from near Chattanooga, Tennessee, May 27, 1911, *J. R. Churchill;* fig. 2, corolla, with one basal bract removed, × 1, from near State Lake, Union Co., Kentucky, *Shacklette,* no. 345; fig. 3, flower, showing broad calyx-segment, × 1, from no. 345; fig. 4, long-peduncled fruit, × 1, from Powell's Creek, Garysville, Virginia, *Fernald & Long,* no. 8472.

Plate 842. R. strepens, forma cleistantha (Gray) S. McCoy: fig. 1, summit of characteristic plant, × 2/5, from South Lebanon, Ohio, *E. B. Harger,* no. 8010; fig. 2, a terminal glomerule, × 1, from Mammoth Cave, Kentucky, *E. L. Braun,* no. 3611; fig. 3, node with large cleistogamous flower, × 1, from Deerfield, Vernon Co., Missouri, *Palmer & Steyermark,* no. 42,140; fig. 4, terminal glomerule with 2 (upper) small cleistogamous flowers, × 2, from Joplin, Missouri, *E. J. Palmer,* no. 1310; fig. 5, subterminal fruiting node, × 2, from McDonald Co., Missouri, *E. J. Palmer,* no. 4069; fig. 6, calyx and open capsule, × 2, from St. Louis, Missouri, August 19, 1905, *A. G. Johnson.*

Plate 843. R. pedunculata Torr.: fig. 1, small flowering plant, × 4/9, from Natchitoches, Louisiana, *E. J. Palmer,* no. 7511; fig. 2, base of more branching fruiting plant, × ½, from Monteer, Missouri, *Bush,* no. 6401A; fig. 3, portion of branching inflorescence, × 1, from near Arcadia, Missouri, *Greenman,* no. 3764; fig. 4, calyx and capsule, × 2, from Baker Springs, Howard Co., Arkansas, October 5, 1909, *J. H. Kellogg;* fig. 5, calyx-segments and base of capsule, × 10, from last specimen; fig. 6, strigose surface of capsule, × 10, from same specimen.

Plate 844. R. pinetorum Fernald: fig. 1, flowering and fruiting branches, × 1, from type; fig. 2, portion of fruiting branch, × 1, from type; fig. 3, portion of leafy base, × 1, from Lake Charles, Louisiana, *Andrew Allison,* no. 261; fig. 4, calyx and capsule, × 2, from type; fig. 5, surface of peduncle, × 10, from type; fig. 6, bases of calyx-segment and capsule, × 10, from type.

Plate 845. R. Purshiana Fernald: fig. 1, portions of type, × 2/5; fig. 2, third node from base, with solitary flower, × 1, from Cedar Creek, Frederick Co., Virginia, *Hunnewell,* no. 11,135; fig. 3, second node from base, with solitary flower, × 1, from Natural Bridge, Virginia, May 28, 1909, *E. B. Bartram;* fig. 4, calyx and capsule, × 2, from Dixie Caverns, Roanoke Co., Virginia, *C. E. Wood, Jr.,* no. 3673; fig. 5, surface of stem, × 4, from *Wood,* no. 3673.

Plate 846, figs. 1 and 2. R. purshiana, forma claustroflora Fernald: fig. 1, summit of type, × 1; fig. 2, uppermost node, with a tiny cleistogamous flower (upper right) and a capsule, × 2, from Natural Bridge, Virginia, September 4, 1885, *N. L. & E. G. Britton.* Fig. 3, R. Purshiana: summit of capsule, showing pilose surface, × 10, from *Wood,* no. 3173.

Plate 847 and 848. R. heteromorpha Fernald. Plate 847, vernal stage: fig. 1, flowering stem, × 1, from near Camp Longview, Florida, *Small & Wilson,* no. 1700; figs. 2 and 3, flowering tips, × 1, from southeast of Fort Myers, Florida, *Jeanette P. Standley,* no. 444; fig. 4, summit of internode and base of leaf, × 4, from between Cutler and Longview Camp, Florida, *Small & Carter,* no. 1097; fig. 5, base of calyx, × 10, from Big Pine Key, Monroe Co., Florida, *Small,* no. 8142. Plate 848, later cleistogamous stage: fig. 1, portion of a long fruiting branch, × 1, from between Peter's Prairie and Homestead, Florida, *Small & Carter,* no. 2701; figs. 2 and 3, branchlets from more open fruiting branch, × ½, from between Coconut Grove and Cutler, Florida, *Small & Carter*, no. 1273; FIG. 4, tip of branchlet with two cleistogamous flowers, × 1, from Ross-Costello Hummock, Dade Co., Florida, *Small, Mosier & Small*, no. 6552; FIG. 5, calyces and capsules, × 2, from no. 1273.

PLATES 849 and 850. R. CILIOSA Pursh: PLATE 849, FIG. 1, plant, × 1, from Cape Savannah, Sumter Co., South Carolina, *Witmer Stone*, no. 426; FIGS. 2 and 3, plants, × 1, from Poulan, Worth County, Georgia, *Pollard & Maxon*, no. 574; FIG. 4, summit of internode and base of cauline leaf, × 4, from River Junction, Gadsden Co., Florida, *Wiegand & Manning*, no. 2927; FIG. 5, calyx and capsule, × 2, from no. 2927. PLATE 850, FIG. 1, plant, × 1, from Florida, May, *A. H. Curtiss;* FIG. 2, basal branch, × ⅗, from Clarcona, Orange Co., Florida, *A. J. Pieters*, no. 120; FIG. 3, basal branch, × 1, from Duval Co., Florida, *A. H. Curtiss*, no. 1944*.

PLATE 851. R. SUCCULENTA Small: FIG. 1, flowering plant, × ⅖, from Everglades west of Perrine, Florida, *Small*, no. 7880; FIG. 2, fruiting branch, × 1, from between Coconut Grove and Cutler, Florida, October 31–November 4, 1903, *Small & Carter;* FIG. 3, summit of internode and bases of leaves, × 4, from same collection as fig. 2; FIG. 4, lower surface of leaf, showing cystoliths, × 10, from Bay Biscayne, Florida, *A. H. Curtiss*, no. 5500E; FIGS. 5 and 6, median and terminal flowering nodes, × 1, from same specimen, as fig. 1; FIG. 7, calyx and fruit, × 2, from east of Florida City, Dade Co., Florida, *Small*, no. 8080.

PLATES 852 and 853. R. NOCTIFLORA (Nees) Gray: PLATE 852, FIG. 1, base of plant, × 1, from southeast of Ludowici, Georgia, *Wiegand & Manning*, no. 2928; FIG. 2, flowering tip, × 1, from no. 2928; FIG. 3, summit, × 1, of ISOTYPE, from inter St. Marks et Port Leon, Florida, *Rugel;* FIG. 4, flowering tip, × 1, from Apalachicola, Florida, 1867, *Chapman;* FIG. 5, summit of internode and bases of leaves, × 4, from Apalachicola, *Chapman;* FIG. 6, calyx and capsule, × 2, from Biloxi, Mississippi, *S. M. Tracy*, no. 6500. PLATE 853, FIG. 1, summit of flowering stem to show long calyx-segments, × 1, from near Sunbury, Liberty Co., Georgia, *LeConte* (probable type or isotype of *R tubiflora* LeConte); FIG. 2, fruiting summit, × 1.8, from Port St. Joe to Apalachicola, Florida, *Small, Small and De Winkeler*, no. 11,417; FIG. 3, bract, calyx-segment and base of capsule, × 10, from *Tracy*, no. 6500; FIG. 4, surface of capsule, × 10, from no. 6500.

PLATES 854 and 855. R. HUMILIS Nutt., var. TYPICA: PLATE 854, FIG. 1, TYPE OF ISOTYPE, × 1; FIG. 2, summit of primary axis, × 1, from Mercersburg, Pennsylvania, 1846, *Ruel;* FIG. 3, calyces and capsules, × 2, from Butler Co., Missouri, *Bush*, no. 3739. PLATE 855, FIG. 1, median nodes of primary axis, × 1, from west of Hannibal, Missouri, *John Davis*, no. 4646; FIG. 2, summit of internode and bases of leaves, × 4, from Cooper County, Missouri, *Bush*, no. 15,137; FIG. 3, portion of fruiting branch, showing diffuse habit, × 1, from vicinity of Nashville, Tennessee, September, 1885, *Gattinger*.

PLATE 856. R. HUMILIS, forma GRISEA Fernald: FIG. 1, portion of TYPE, showing characteristic habit of the species, × 1; FIG. 2, internode and bases of leaves, × 4, from TYPE.

PLATE 857. R. HUMILIS, var. FRONDOSA Fernald: FIG. 1, TYPE, × ½; FIG. 2, summit of internode and bases of leaves, × 4, from Cleveland, Ohio, 1895, *Starr;* FIG. 3, flowering node, × 1, from Milford, Ohio, June 17, 1916, *E. L. Braun;* FIG. 4, flowering node, × 1, from Chambersburg, Pennsylvania, August 27, 1897, *T. C. Porter;* FIG. 5, flowering node, × 1, from Corydon, Indiana, *Friesner*, no. 14,369; FIG. 6, fruiting node, × 1, from Clinton, Iowa, *Pammel*, no. 77; FIG. 7, calyx and capsule, × 2, from Champaign, Illinois, *A. S. Pease*, no. 12,420.

PLATE 858. R. HUMILIS, var. LONGIFLORA (Gray) Fernald: FIG. 1, two flowering branches, × 1, from Piasa, Illinois, 1905, *G. E. McClure;* FIG. 2, summit of flowering branch, × 1, from Wichita, Kansas, 1892, *H. R. Pease;* FIG. 3, flowering summit, × 1, from Huntsville, Texas, *R. A. Dixon*, no. 377;


*Photo. B. G. Schubert.*

RUELLIA CAROLINIENSIS, var. DENTATA: FIGS. 1 and 2, flowering summits, × 1

FIG. 4, summit of internode and bases of leaves, × 4, from Willis, Texas, *L. R. Warner;* FIG. 5, bracts, calyces and fruits, × 2, from north of Seagoville, Texas, *Lundell,* no. 11,679.

PLATE 859. R. HUMILIS, var. EXPANSA Fernald: FIG. 1, flowering node, from TYPE, × 1; FIG. 2, median fruiting node of primary axis, × 1, from Oquawka, Illinois, *Patterson;* FIG. 3, internode and leaf-base, × 4, from McDonald Co., Missouri, *Bush,* no. 282; FIG. 4, calyx and capsule, × 2, from Hendrix, Illinois, August, 1904, *B. L. Robinson.*

PLATE 860. R. HUMILIS, var. CALVESCENS Fernald: FIG. 1, portion of ISOTYPE, × 1; FIG. 2, flowering tip, × 1, from near Burnside, Kentucky, *Biltmore Herb.,* no. 489[k]; FIG. 3, internode and leaf-bases, × 4, from near Manchester, Tennessee, *Biltmore Herb.,* no. 849[f]; FIG. 4, lower surface of leaf, × 10, from Middletown, Frederick Co., Virginia, *Hunnewell,* no. 17,561; FIG. 5, fruiting nodes, × 1, from no. 17,561; FIG. 6, calyx and capsule, × 2, from north of Leavenworth, Crawford Co., Indiana, *Deam,* no. 33,429.

PLATES 861, 862 and 863. R. CAROLINIENSIS (Walt.) Steud., var. TYPICA. PLATE 861, FIG. 1, portion of flowering plant, × 1, from Ormond, Florida, *H. A. Purdie;* FIG. 2, flowering tip, × 1, from Brookgreen Gardens, Georgetown Co., South Carolina, *F. H. Tarbox,* no. 567; FIG. 3, summit of internode, × 4, from no. 567; FIG. 4, lower surface of leaf, × 10, from Green Cove Springs, Clay Co., Florida, *W. A. Murrill;* FIG. 5, upper surface of leaf, × 10, from same specimen. PLATE 862, FIG. 1, portion of summit, with flowers hardly developed, × 1, to show characteristic divergent branching, from Newberry, Alachua Co., Florida, *E. P. Walker,* no. 1862; FIG. 2, calyx and capsule, × 2, from east of Eustis, Florida, *Small,* no. 8667; FIG. 3, portion of calyx and capsule, × 10, from no. 8667. PLATE 863: copy of the plate, slightly reduced, of *R. strepens, capitulis comosis* of Dillenius.

PLATE 864. R. CAROLINIENSIS, var. SEMICALVA Fernald: FIG. 1, TYPE, × 3/7; FIG. 2, portion of internode, × 10, from TYPE; FIG. 3, lower surface of leaf, × 10, from TYPE; FIG. 4, upper surface of leaf, × 10, from TYPE; FIG. 5, calyx and capsule, × 2, from Iola, Florida, May, 1896, *Chapman;* FIG. 6, calyx-segment and portion of capsule, × 10, from last.

PLATES 865 and 866. R. CAROLINIENSIS, var. MEMBRANACEA Fernald: PLATE 865, FIG. 1, TYPE, × ½; FIG. 2, upper surface of leaf, × 10, from Savage Neck, Northampton Co., Virginia, *Fernald & Long,* no. 5453; FIG. 3, lower surface, × 10, from no. 5453; FIG. 4, flowering tip, × 1.7, from below Rushmere, Isle of Wight Co., Virginia, *Fernald & Long,* no. 13,150; FIG. 5, portion of calyx and capsule, × 10, from no. 13,150; FIG. 6, fruiting summit, × 2, from Claremont, Virginia, *Fernald & Long,* no. 13,837. PLATE 866, summits to show variations of leaves, × 1: FIG. 1, from Little Creek, Princess Anne Co., Virginia, *Fernald & Long,* no. 4193; FIG. 2, from Congress Heights, District of Columbia, *Philip Dowell,* no. 7012; FIG. 3, from Cold Spring, Cape May Co., New Jersey, *C. S. Williamson.*

PLATE 867, FIGS. 1–3. R. CAROLINIENSIS, var. MEMBRANACEA, forma HYPOPSILA Fernald: FIG. 1, summit, × 1.7, of TYPE; FIGS. 2 and 3, upper and lower surfaces of leaves, × 10, from TYPE. FIGS. 4–6, forma BREVIBERBIS Fernald: FIG. 4, internode and leaves, × 1.7, from Wolf Creek, Tennessee, *Kearney,* no. 863; FIGS. 5 and 6, upper and lower leaf-surfaces, × 10, from no. 863.

PLATE 868. R. CAROLINIENSIS, var. MEMBRANACEA, forma LAEVIOR Fernald: FIG. 1, fruiting summit, × 1.7, of TYPE; FIGS. 2 and 3, upper and lower surfaces of leaf, × 10, from TYPE; FIG. 4, portion of calyx-segment and capsule, × 10, from TYPE.

PLATE 869. R. CAROLINIENSIS, var. NANELLA Fernald: FIG. 1, TYPE, × 1; FIGS. 2 and 3, upper and lower surfaces of leaf, × 10, from TYPE; FIG. 4, flower-bud, with folded bract and 2 calyx-segments, × 10, from TYPE; FIG. 5, portion of calyx-segment and capsule, × 10, from TYPE.

PLATE 870, FIG. 1. R. CAROLINIENSIS, var. NANELLA: internode and base of leaf, × 4, from TYPE. FIGS. 2–4, var. NANELLA, forma ECILIATA Fernald:

FIG. 2, TYPE, × 1; FIG. 3, portion of leaf, bracts and internode, × 10, from TYPE; FIG. 4, portion of calyx-segment and capsule, × 10, from TYPE.

PLATES 871 and 872. R. CAROLINIENSIS, var. CHELONIFORMIS Fernald: PLATE 871, FIG. 1, TYPE, × 5/12; FIG. 2, corolla, × 1, from Cold Spring, Cape May Co., New Jersey, *Van Pelt;* FIG. 3, calyx and capsule, × 2, from Virginia Beach, Virginia, *Fernald & Long,* no. 4191; FIG. 4, bract, calyx-segment and portion of capsule, × 10, from no. 4191. PLATE 872: FIG. 1, summit, × 1, from Scuppernong, Washington Co., North Carolina, *Correll,* no. 1918; FIG. 2, portion of summit, × 1, from Cold Spring, New Jersey, *Van Pelt;* FIGS. 3 and 4, upper and lower leaf-surfaces, × 10, from *Fernald & Long,* no. 4191.

PLATE 873. R. CAROLINIENSIS, var. SALICINA Fernald: FIG. 1, TYPE, × 4/7; FIG. 2, summit of plant, × 1, from Louisiana, *Steinhaur;* FIG. 3, plant, × 1, from River Junction, Gadsden Co., Florida, *Wiegand & Manning,* no. 2933.

PLATES 874 and 875. R. CAROLINIENSIS, var. DENTATA (Nees) Fernald: PLATE 874, FIG. 1, small plant, × 2/5, from Broadwater Bridge, Isle of Wight Co., Virginia, *Fernald & Long,* no. 13,460; FIG. 2, summit of branch, × 1, from no. 13,460; FIG. 3, portion of fruiting branch, × 1/2, from Rehoboth, Delaware, *Churchill.* PLATE 875, FIG. 1, upper fifth of main axis, × 1, from Marsh's Millpond, Nansemond Co., Virginia, *Fernald & Long,* no. 14,414; FIG. 2, summit of branch, × 1, from Sweeden, Edmonson Co., Kentucky, *E. L. Braun,* no. 3593.

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REDISCOVERY OF PARONYCHIA ARGYROCOMA, var. ALBIMONTANA AT NEWBURYPORT, MASSACHUSETTS.—Gray's Manual, in noting the range of *Paronychia argyrocoma,* var. *albimontana,* states that it occurs locally on an island in the Merrimac River at Newburyport, Massachusetts. There is a specimen in the Gray Herbarium which Dr. Karl Castelhun collected at this station more than half a century ago; no record of a more recent collection being known, Dr. M. L. Fernald visited the locale to check on it in his work of rewriting the Manual for its next edition. He reported at a meeting of the New England Botanical Club that he found no trace of it. From such a careful botanist that seemed to me the final, undebatable fact and when, on June 4, 1944, I visited Carr's Island for the first time (it is a wild-life reservation of this commonwealth and posted against trespass) the *Paronychia* was the last thing I expected to find. Therefore, when I suddenly beheld a great ledge whose crevices were almost wholly clothed with a strange silver-green plant bearing a profusion of white, pinkish-tinted flowers of alpine appearance, my elation was great. Although I had never before seen the genus, many readings of its description had made me almost sure that this plant was the sought-for Paronychia. I at once dispatched a specimen to Dr. Fernald and that prompt gentleman confirmed my find by return mail. There may be some question of vandalism involved in the rediscovery of this station but I trust its value in scientific aspect will be found to compensate the commonwealth for this intrusion. Since there are eight islands in the Merrimac River at Newburyport, it seems likely that the Fernald examination covered an island other than Carr's. I counted 112 clumps on the large ledge and 86 clumps on contiguous ledges, all within 20 feet of the water at high tide. One clump is so low on the ledge that it is submerged by the occasional 12-ft. tides of early spring.—Frank J. McGregor, Newburyport, Mass.

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Thermopsis mollis in eastern Massachusetts.—In 1935, staying for a few days with a daughter living in Beverly, I got on a bus, careless of its destination. It passed close to a big sheet of water, then lost it. I jumped off. In a roadside stand I got a drink. The owner espied my "Gray" and began pumping me. Satisfied with my answers he told me he was brought up in Germany, that his mother dosed him with an herbal cure-all, that he had found a plant of it growing at the rear of his place. Would I look at it? It was *Achillea millefolium.* He told me I could go down a little-frequented road which led to the lake. I did so and found what was identified at a meeting of the New England Botanical Club as *Thermopsis mollis.* Perhaps I could have discovered other things but the mosquitoes were too powerful.

The past season, again from my daughter's, I made the same trip. The German was dead, his place closed, but I found the road which is about two hundred yards south of the murderer's stone standing at the edge of the sidewalk, opposite a cemetery, presumably the Wenham one, and running west. Getting permission to ignore a gate and after walking about three fourths of a mile, I found my plant in greater numbers and taller than previously (some in excess of five feet) disputing the ground with goldenrods, brambles, dogwoods and such like.

I should have liked to poke around but the mosquitoes again forbade.

Studying the topographic one-inch map, I imagine the location to be on the east side of the northern tip of Wenham Lake.—William Birrell, Auburndale, Mass.

Author Citation for Eriogonum hemipterum.—The recent use (Jour. Arn. Arb. **25:** 138. 1944) of the name *Eriogonum hemipterum* Torr. ex Stokes, Gen. Eriog. 21. 1936, brought to attention the matter of the author-citation.

The plant concerned was described as *E. hieracifolium* Benth. var. *hemipterum* T. & G., Proc. Am. Acad. **8:** 154. 1870. There Torrey and Gray listed as a synonym the herbarium name *Eriogonum hemipterum* Torr. In considering the plant as a species, Miss Stokes has (1) described it anew (as the Jour. Arn. Arb. indicates), (2) raised Torrey and Gray's variety to species rank, or (3) not effected a change at all.

That Miss Stokes was not intending to supply a new description for Torrey's herbarium name is quite evident both from the way the name is given (*Eriogonum hemipterum* Torr. in T. & G., Pr. 154) and from the lack of a Latin diagnosis, new species being regularly so accompanied in her 1936 work. This lack of the Latin diagnosis is probably the most tangible argument against accepting choice no. 1.

The spirit of the rules is more closely followed if Torrey and Gray's variety is raised to species rank and the subsequent author is given full responsibility, than if an herbarium name of Torrey is utilized in describing a new species when Torrey has concluded the plant to be a variety.

Inasmuch as Miss Stokes considered var. *hemipterum* T. & G. as a species, used the name *E. hemipterum*, and listed both the synonym which in more regular procedure would be unquestionably the name-bringing synonym, and the bibliographic reference, choice no. 2 is better than no. 3. The name, I think, should be Eriogonum hemipterum (T. & G.) Stokes, Gen. Eriog. 21. 1936.—George J. Goodman, Iowa State College, Ames, Iowa.

*Volume 47, no. 554, including pages 41–64 and plates 851–860, was issued 3 February, 1945.*

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CONTRIBUTIONS FROM THE GRAY HERBARIUM
OF HARVARD UNIVERSITY—NO. CLVI

# BOTANICAL SPECIALTIES OF THE SEWARD FOREST AND ADJACENT AREAS OF SOUTH-EASTERN VIRGINIA[1]

M. L. FERNALD

(Plates 876–911)

## PART I. TWO VISITS TO THE SEWARD FOREST IN 1944

Dr. Alfred Akerman, Director of the Seward Forest, and Mr. J. B. Lewis, Naturalist of the Forest, most kindly renewing invitations for me to return for study of the local flora at seasons different from those when I had visited the area in October of 1942 and in April, 1943, I gladly returned on June 19, 1944, for a week of local exploration. Lewis had been saving his gasoline-coupons against our needs but, naturally, we could not go far from Triplett, although we did get one trip, specially seeking further limits of range of *Asarum Lewisii* Fernald in RHODORA, xlv. 398, plates 774 and 775 (1943), as far as Poplar Creek, draining into the Roanoke in southwestern Brunswick County. We did not need to go far for interesting returns, for within the limits of Seward Forest and the immediate vicinity of Triplett there was plenty to occupy us. The fruit of *Rubus* was ripening and, since some of the species of this region of the outer Piedmont were quite unlike those I knew on the Coastal Plain, I made a point of securing a good series (and of testing the fruits). There

[1] The cost of plates defrayed through grants from the AMERICAN PHILOSOPHICAL SOCIETY and from the DEPARTMENT OF BIOLOGY OF HARVARD UNIVERSITY.

are several strikingly different species. Some of these will be discussed in Part II.

As we drove from the train, at Emporia, to the Seward Forest, Lewis said, "Don't forget to remind me to show you a strange *Baptisia* when we get to Philadelphia Church. It's the only colony I ever saw of it". So, when we got to the locality we stopped and I promptly said "*Baptisia tinctoria*". "But the flowers are so small. What I know as *Baptisia tinctoria* has larger flowers and leaves". It is the typical Coastal Plain extreme, the plant separated by Small as *B. Gibbesii* from "Sandy woods, Coastal Plain, S. C.", although, as I showed in Rhodora, xxxix. 414 (1937), *B. Gibbesii* is a close match for the type of *B. tinctoria* (L.) R. Br., while the common inland and northern plant, with which Lewis had been familiar, is the usually coarser *B. tinctoria,* var. *crebra* Fernald, l. c. Since I had just sent for issue in Rhodora, xlvi. 281 (1944) a note by Dr. Robert Clausen, in which he expressed the opinion that "Var. *crebra* . . . seems scarcely tangible", Lewis's unsolicited tribute to its worth was interesting. Certainly, nowhere else in the region have I seen anything so small-flowered and -fruited as the colony near Philadelphia Church.

This intrusion into the upland flora of the Piedmont in Brunswick and western Greensville Counties of plants more characteristic of the Coastal Plain was emphasized by me in my last paper on the Virginian work[1]; and now, again, we met at almost every turn a singular mixture of inland or upland species (sometimes specialties of the Appalachian Upland or of the Mississippi Basin) and those which are primarily on the Coastal Plain, although, naturally, only a few of the latter have intruded so far inland. In fact, the first plant I collected after getting into old clothes, the everywhere abundant representative of *Rubus* § *Cuneifolii,* was at once impressive on account of the 5-foliolate leaves of the primocanes, with very narrow leaflets. To me it seems a close match for *R. sejunctus,* described by Bailey from material collected by Long and me near Branchville, 30 miles to the east and well out on the Coastal Plain in southern Southampton County—there also on Meherrin drainage.

[1] *Virginian Botanizing under Restrictions*, Contrib. Gray Herb. no. clxix. Rhodora, xlv. 357–413, 445–480, 485–511 (1943)—especially pp. 374–377.


*Photo. B. G. Schubert.*

CYPERUS VIRENS: FIG. 1, TYPE, × ½, after *Cintract;* FIG. 2, spikelets, × 10, from fig. 1; FIG. 3, two inflorescences, × ½, of *C. pseudovegetus,* FIG. 4, spikelet, × 5, from fig. 3
C. ROBUSTUS: FIG. 5, spikelet, × 5


*Photo. B. G. Schubert.*

Cyperus Plukenetii: fig. 1, Plukenet's figure of a plant from Virginia; fig. 2, inflorescence of type, × 1; fig. 3, characteristic base, × 1

Two stations, one of them within the Seward Forest, the other barely not, are specially noteworthy. The most distinctive is the little spring-fed and (originally) *Sphagnum*-carpeted Magnolia swamp, which is called the "Ram-hole" or "Ram-hole Swamp", because of the ram once installed for pumping the spring-water. I have previously noted it and in September it yielded more than its share of Coastal Plain specialties. In June, however, these were scarcely evident, the most notable plant then being a long-arching and doming blackberry such as I had never met, but which proved to be characteristic across the county, even to its southwestern corner, and eastward into Greensville County. Since it is so characteristic of the Seward Forest and its vicinity I shall describe and illustrate it (PLATES 890 and 891) in Part II and there take the liberty of naming it for the Director of the Forest, although, if he could discover it, he would doubtless prefer his name to be associated with a new tree! Further discussion of "Ram-hole Swamp" will be deferred until I record the September trip.

The area which in June had the greatest mixture of upland and Coastal Plain types was the "Moseley flat pineland"[1], near Triplett. It was here that Lewis had found *Cynoctonum sessilifolium* (Walt.) J. F. Gmel., at the only known station north of the savannas of the Coastal Plain of North Carolina, and *Hypericum setosum* L., a characteristic southern species already known very locally from the Coastal Plain of Virginia, forty-five miles away. Here in June the most striking plant was a *Fimbristylis*, forming dense and tough hassocks, with many already fruiting tufts arising from bulbous bases crowded on the stout and short rhizomes. This was new to me (also to Virginia). Its identification has necessitated a prolonged study of its section of the genus, which will be detailed in Part II. Briefly, it is *F. Drummondii* Boeckl., described from New Orleans but found (though commonly misidentified) in pine or oak barrens, on sterile meadows, prairies, etc., from Florida to eastern Texas, northward, very locally, to Long Island, and, more generally, in the Interior to southern Michigan, Illinois and Missouri. With it, and giving further inland atmosphere to the spot, was *Psoralea psoralioides*

[1] The labels for this station got printed "*mostly flat pineland*". If any of them chanced to be distributed without correction, the error should be noted.

(Walt.) Cory, var. *eglandulosa* (Ell.) F. L. Freeman, widely dispersed from interior Georgia to eastern Texas, northward to the upland of North Carolina and to Ohio, Indiana, Illinois, Missouri and eastern Kansas, with its only previously known Virginian station in similar flat pineland at McKenney, 25 miles to the north, in Dinwiddie County. And with these two characteristically inland plants *Juncus Longii* Fernald in Rhodora, xxxix. 397, pl. 777, figs. 1–4 (1937), and *J. scirpoides* extended inland from the Coastal Plain, and the common Coastal Plain *Scleria pauciflora* formed loose tussocks. Near the margin of a small branch which borders this flat pineland I was puzzled by a very lax *Carex* with the flaccid culms loosely arching, so that the inflorescences lop to the ground. We had never had it in southeastern Virginia, but it proves to be the chiefly inland *C. hirsutella* Mackenzie. The "Moseley flat pineland" is an interesting tract.

The day we visited the Roanoke drainage in southwestern Brunswick County we drove directly to Ebony, where we made the first stop. Near there a bit of undisturbed swaley thicket looked promising. Here was the long-arching new *Rubus* of the "Ram-hole Swamp", 12 miles to the northeast; and when, another day, I got it in abundance near Brink in Greensville County, thus demonstrating its occurrence over a belt at least 20 miles across, it was evident that I was dealing with a true species, not merely a clone. The *Rubus* leaned out of a clump of the unusual form of Willow-Oak, *Quercus Phellos*, with the lower leaf-surfaces white with fine silk, forma *intonsa* Fernald in Rhodora, xliv. 392 (1942), typical and abundant *Q. Phellos* having the leaves green and glabrous on both sides. And here, almost in Mecklenburg County and 120 miles inland from the coast, where true *Juncus dichotomus* occurs, was the very different species, which elsewhere pushes inland and which passes as a mere flat-leaved variety of that coastal species, *J. dichotomus*, var. *platyphyllus* Wiegand. Its specific claims will be discussed in Part II.

Poplar Creek, emptying into the Roanoke, has good bottomland woods, with an abundance of *Acer floridanum* and its very definite var. *Longii* Fernald in Rhodora, xliv. 426, pl. 726 (1942), the latter previously known only from calcareous slopes to the lower James in James City County, ninety miles away. Beneath them was a fruiting *Aesculus.* Without flowering material I balk at naming it. *Geum canadense,* var. ***brevipes*** Fernald in RHODORA, xxxix. 410, pl. 479, figs. 1–3 (1937), supposed to be endemic on the bottomlands of the Nottoway, forty-five miles to the northeast, in Sussex County, abounded. It presumably will be found along the Roanoke in North Carolina. So, likewise, will be ***Boltonia caroliniana*** (Walt.) Fernald in RHODORA, xlii. 487, pl. 642 (1940), of southeastern Virginia and the lower Santee Valley of South Carolina, for here, on Poplar Creek, it is almost in North Carolina and far inland from its center on the Coastal Plain.

The "Chamblis bigwoods" of the Seward Forest, a vast tract for which I learned in September to have a vast respect (having been lost there for three hours), had yielded on my two previous visits some choice and apparently isolated inland or montane plants, enumerated in the last Virginian paper: ***Panicum flexile, Polygala Senega,*** var. ***latifolia,*** and ***Zizia trifoliata,*** for instance. In June these woods were equally productive. ***Festuca paradoxa*** Desv. (*F. Shortii*), common in rich woods of the Coastal Plain, was here abundant, although, from the range given by Hitchcock and his map (chiefly from western North and South Carolina and northwestern Georgia to Iowa, Missouri, eastern Oklahoma and northeastern Texas), one would never guess it. *Cypripedium* ***Calceolus*** L., var. ***pubescens*** (Willd.) Correll, was frequent, as was the southern *Sanicula Smallii* Bicknell. Young shrubs of *Nyssa* produced puzzling atypical leaves and I stumbled upon a few straggling shrubs of *Castanea neglecta* Dode, supposed by some to be a hybrid of *C. dentata* and *C. pumila,* but here, as in calcareous woodlands farther east, where it occurs, *C. pumila* would be out of place and *C. dentata* of acid woodland would scarcely have thrived. But the great excitement was a knoll in rich woods bordering the swamp along Quarrel's Creek, a slope covered with abundant *Sanicula Smallii, Carex oxylepis* and other species of rich southern woodland. On this knoll the leaves of a low *Circaea* were of a pale yellowish green, the margins of the rounded-cordate blades undulate, the pedicels purple-based, the sepals somewhat villous on the back, the tiny fruits as in the northern *C. canadensis* Hill (*C. intermedia* Ehrh.).

Outside of Europe *C. canadensis* is known from the Gaspé Peninsula of eastern Quebec to Lake St. John, and south to Nova Scotia, southern Maine, southern New Hampshire, western Massachusetts and Connecticut, New York and upland West Virginia. Its associates are northern, not southern species. We as yet know the little plant of Seward Forest from only this one spot. Its characters, however, justify its separation from the northern plant which, superficially, it suggests. In Part II it will be described and illustrated (PLATE 896).

Two old clearings within the area of the "Chamblis bigwoods" are, like most such habitats, largly given over to brambles (*Rubus*). Two species here specially interested me, both of them doming and forming intricate mounds, with the long and coarse overarching canes eventually trailing at tip, as in the wide-ranging plant already noted, members of my § *Tholiformes*. These were both very different from each other and quite unlike anything I can find described. One of them was in the clearings about the old Chamblis place and also in the clearing near the old Taylor place, the other was noted only in the latter locality. The former of these two abounds near an old outhouse where, in June, a brood of young turkey-buzzards very unsociably ran to a corner and tried to hide from our gaze and where, in September, they still clung to the old home. Since most descriptive specific names in *Rubus* are preempted I shall, in Part II, name this very characteristic blackberry (plates 892 and 893) for the buzzards upon whose domain we rudely forced ourselves in collecting it. The other (plates 894 and 895) I am naming for the very antithesis of a buzzard, the generous and scholarly founder of the Seward Forest, Dr. WALTER SEWARD.

I kept hearing of Quarrel's Creek and Pair's Store. These geographic names, coupled with Triplett (which our non-meddlesome government rules should be spelled "Triplet", in spite of the name of the original settler—on a tributary to Fontaine, not "Fountain", Creek), struck my whimsical sense of humor, for the combination of pairs, triplets and quarrels would intrigue even a dull imagination. So we went from Triplett to Pair's Store and thence followed down Quarrel's Creek to its junction with Fontaine Creek. Swaley open woods not far from Pair's Store looked interesting but, alas, most of the area had been under the plow; elsewhere it had been burned. The only plant of note there was the white-flowered *Polygala sanguinea,* a form I had rarely seen. The bottomland woods had passed the interesting period of early spring and had not reached the autumnal phase which is always interesting, but at the margin of the bottomland I was delighted to come upon the first thicket of *Amorpha fruticosa,* but not the last, I had ever seen, for in a few days we found it along Fontaine Creek near Round Hill Church, also in Greensville County, but nearer the Fall Line.

On my first trip to Seward Forest we had gone to the Meherrin River at Westward Bridge (or Mill), south of Edgerton. The greatest excitement there was the discovery on the bottomland of *Muhlenbergia glabriflora* Scribn., previously known only from southwestern Indiana and Illinois to Texas. With this rather startling isolation in mind we returned to Westward Bridge. I had many times tried to cap one good discovery with another, but usually it hadn't worked. So I was prepared for the worst. Wallowing through the deep and retarding tangle on the bottom, I suddenly halted. The *Tripsacum* there didn't look right. Its slender staminate inflorescence had narrow and sharply acuminate glumes, whereas I remembered the glumes as broad and blunt. Three or four plants were taken "just in case", and this time luck was with me. I cannot separate the Meherrin River plant from an isotype and other Texan material of the recently described *Tripsacum dactyloides,* var. *occidentale* Cutler & Anderson, the variety known to them only from the Davis and the Chisos Mountains in western Texas. When in doubt take a specimen!

Lewis and Dr. Akerman again saved up gasoline, and in September it seemed possible to get about a little. So, on September 11, I reached Seward Forest. This time we conserved all possible motive power for a final day, and our longest trip away from the Forest, until I had to return to Emporia to take the night-train home, was to the Meherrin at Westward Bridge. My arrival had broken the all-summer drouth[1]; consequently the muddy shore of the river, where I hoped for good things,

[1] For several summers, whenever Long and I reached our old center at Petersburg, it would begin to rain. So regularly did this occur that we were always greeted: "I knew you had come; the drouth has broken".

was drowned under more than opaque red-brown water. But the woods contained the very heavily pubescent *Elephantopus carolinianus*, forma *vestitus* Fernald, which we had known only from the bottomland of Adams Swamp, seventy miles to the east in Nansemond County; the mass of ordinary pink-flowered *Polygonum pensylvanicum* contained scattered plants with bright white flowers. The *Pycnanthemum incanum* certainly was not the northern plant with more or less divergent pubescence. Neither did it look like the southern var. *Loomisii* (Nutt.) Fernald, with the internodes and calyces densely canescent. It looked too glabrescent. At the risk of possibly overloading with material of the latter, already much collected farther east, I took a specimen. It is the extreme of *P. incanum* recently described as *Pycnanthemum puberulum* Grant & Epling, its type from southwestern Georgia. At any rate, I got one specimen! But I took twenty sheets of the next plant of note. This is *Dicliptera brachiata* (Pursh) Spreng., a very definite member of the *Acanthaceae*. Some years ago Long and I made frequent visits to the intermittently drowned bottomland of the Meherrin just before it leaves Virginia, below Haley's Bridge (between southeastern Greensville and southwestern Southampton Counties), for in early summer we had there found young foliage of a strange member of the *Acanthaceae*. Repeated or long-continued drownings delayed the identification until finally, in October, the water receded and we got the *Dicliptera* in flower and fruit. That has been the only station known in Virginia. Now, directly under the northern end of Westward Bridge, we have another.

Hoping that the once flooded but now fully overgrown bottom where the dam had gone out at old Clipper's Mill on Rattlesnake Creek, southwest of Triplett, would have some worth-while shore-vegetation, we tried there. For the most part the old bottom is a dense and very deep swale of *Pilea*, *Boehmeria* and their ilk, but here was an inland station, pretty well back from the Coastal Plain, of *Rhynchospora corniculata*, and in one area there is an *Erianthus* with peculiarly silvery and pale panicles. It didn't quite register; I had never met it growing, for it is *E. alopecuroides*, an inland species which we have not had on the Virginian Coastal Plain. Not far away, in a mossy bottom, *Dryopteris cristata,* very local in southeastern Virginia, abounds, but, so far as I saw, that is the only specialty of note there.

Visiting the lower mile of Quarrel's Creek and again following down to its confluence with Fontaine Creek, we were amazed that the bottomland woods had none of the big *Compositae* we should have expected. However, as we entered the woods near the station of *Amorpha fruticosa,* we got into a tangle of *Vitis cinerea,* frequent farther down the Meherrin system on the Coastal Plain, although generally treated as western or very southern: "Centr. Ill. to Kan. and Tex."—*Gray;* "Indiana, southwestern Wisconsin, Illinois, Missouri, Kansas, Arkansas, Oklahoma, eastern Texas, Louisiana, Alabama, western Georgia"—Bailey, Gent. Herb. iii. 316. Farther down, where the often flooded bottoms by Quarrel's Creek merge with those of Fontaine Creek, we established some new inland extensions of Coastal Plain types, such as *Scirpus divaricatus, Juncus repens* and *Ludwigia glandulosa.* And farther up Quarrel's Creek, in the swamp where it flows through the "Chamblis bigwoods", I was delighted to find an inland colony of *Cornus foemina* Willd. (*C. stricta* Lam.). Searching near-by for mature fruit of the new *Circaea* (now completely dessicated and ruined by prolonged drouth), I was impressed by a nearly smooth creeping *Desmodium,* much smoother than *D. rotundifolium* with which it grows. It proves, according to Dr. Schubert, to be only the Coastal Plain *D. lineatum,* which, in former years, I had learned to pass without emotion. This station, very rich and damp woodland, is so unlike the relatively sterile and dry woods where I had known it that I was fooled. Beside it was another plant which registered with some doubt; so I took a couple of specimens. It is fortunate that I did so, for it is *Polymnia Uvedalia,* var. *densipila* Blake, described from Louisiana, Oklahoma and Texas; also Bermuda. That was the last important collection in the "Chamblis bigwoods".

Lewis had announced, while I was in the swamp, that it was time to start home; but very soon he commented on the shouts, like those of a woman calling, from deep in the woods. He said it was a Barred Owl, and I suppose he was right. Nevertheless, when I came out of the swamp and whistled for my companion and guide, he was gone. My masculine shouts did not interest him; and, reasoning that he had gone on ahead and had ascribed to me a greater degree of wood-craft than I possess, especially on a rainy and sunless day in a strange and extensive "bigwood", I followed broken plants and some remembered landmarks to what I thought the proper place to break out toward the waiting car, soon got tangled and twisted around in impenetrable briars and towering dog-fennel (*Eupatorium capillifolium*) ten feet high, and, taking again to the woods, made broad circles for three hours, until, finally, by sighting on tall trees and following a straight course, I came out, rather surprised at myself, at the car. After that I carried raisins as well as a compass in my hip-pocket! As we approached headquarters a truck, with the Director and a crew, had started out as a searching-party. The whole community soon had the story, but I insisted on pretending to wonder whether the womanish calls which had lured Lewis away were really those of an owl!

Dr. Akerman wanted us to see one of the eastern extensions of the Seward Forest, in the extreme eastern edge of Brunswick County, south of Ante. As we entered the dry pines the first herbaceous plant we noticed was the essentially glabrous Coastal Plain *Tephrosia virginiana*, var. *glabra* Nutt. Then we walked through acres and acres of *Asarum Lewisii*, forming broad and open carpets to the exclusion of anything else. This, the most extensive colony yet known, is in ordinary dry or dryish woods, largely of Loblolly Pine. Here, in the spring, we may be able to secure the unknown fruit, for so extensive a colony must spread largely by seed.

I could not leave Seward Forest without spending some hours in the little "Ram-hole Swamp", so near-by that we were apt to overlook it. We already knew it as the only station yet discovered in the Manual range for the southern square-stemmed *Solidago salicina* Ell., here isolated by 100 miles from the northernmost known station in North Carolina; also as an isolated inland station for the beautiful *Lobelia glandulifera* (Gray) Small (See Rhodora, xlv. 377 (1943)), the *Lobelia* delighting in just such spots on the Virginian Coastal Plain. Unfortunately, fire has ruined much of the sphagnous carpet and inevitable brambles are rapidly monopolizing the area, but enough of the original bog remains to maintain the *Solidago* and the *Lobelia*.


*Photo. B. G. Schubert.*

CYPERUS RETROFRACTUS: FIG. 1, TYPE, × 1/3, of *Scirpus retrofractus* L.; FIG. 2, inflorescence of TYPE, × 1/2; FIG. 3, inflorescence, × 1, of type of *C. hystricinus;* FIG. 4, rhizome, × 1


*Photo. B. G. Schubert.*

JUNCUS TENUIS: FIG. 1, inflorescence, × 1, of TYPE, after *Rostkovius;* FIG. 2, two inflorescences, × 2, of *J. macer;* FIG. 3, sheath and auricle, × 5; FIG. 4, mature fruits, × 6
J. DICHOTOMUS: FIG. 5, summit of sheath and base of leaf, × 10; FIG. 6, inflorescence, × 1; FIG. 7, fruits, × 6

In September the Coastal Plain *Helianthus angustifolius* and *Cirsium virginianum*, including the cut-leaved forma *revolutum* (Small) Fernald, abound and here we got our most inland stations in southeastern Virginia for *Rhynchospora globularis* (Chapm.) Small, var. *recognita* Gale, *Lycopus americanus*, var. *Longii* Benner, typical *Eupatorium hyssopifolium* (See RHODORA, xliv. 459), *Solidago rugosa*, var. *celtidifolia* (Small) Fernald and *Fuirena squarrosa* (*F. hispida* Ell.). The latter was tangled in and rather overwhelmed by the dominating Coastal Plain *Panicum lucidum* and a very slender but long-since overripe *Rhynchospora* which must be collected earlier another season. These are not all. A problematic low shrub of some species of *Pyrus*, subg. *Aronia*, is quite like low and simple-stemmed shrubs from pine barrens and savanna of the southeastern Coastal Plain, its identity yet to be worked out; and some other puzzles, still awaiting study, were secured. One of them, the tiniest alder I know, fruiting shrubs only 2 to 3 feet high, with scattered simple and erect stems, mature leaves only 1 to 2 inches long and very small staminate aments, cones and fruits, is like similarly dwarf shrubs once collected by Long and me in a bushy sphagnous swamp, with *Sarracenia flava* and *Lachnocaulon anceps*, in Prince George County. This is so strikingly unlike other eastern Virginian alders, that I have dug out from hiding a study of the Swamp Alders of eastern America, a study begun nearly 40 years ago but several times shelved or pigeon-holed. This I am aiming to bring to a conclusion for publication in the near future. This little remnant of a springy and sphagnous bog is one of the unique and most interesting habitats in the Seward Forest. What a place it must have been before fire (Dr. Akerman's scrupulously avoided and most dreaded foe throughout the forest) got into the place!

At last it was time to leave. It had rained intermittently through five days out of seven and, of course, we got some of the downpour at the western border of the hurricane of the period. In early July of 1943 Long and I had discovered on the sandy beach of Whitefield's Millpond, southwest of Corinth in Southampton County, very young plants of an annual which closely simulated the southern and southwestern *Eryngium prostratum*, originally described from Arkansas. The material was too young, but its fruit did not seem quite typical of *E. prostratum*, unknown within some hundreds of miles of southeastern Virginia. In October, 1943, after a week of downpour, following months of drouth, Akerman, Lewis and I visited Whitefield's Pond in search of ripe material. But the elements were not on our side. As I wrote in my last Virginian paper: "When we got to Sedley we were told that we could not get at Whitefield's Pond from the south, for the road was completely under water and the dam itself flooded. That sounded pretty bad, and when we reached Whitefield via Corinth, there was the overflowing pond extending back into the woods. The farmer living near-by told us that in the forty years he had lived there the water had never been so low as it was until the five-day rain came on. We could have wept. Locating a spot where the little *Eryngium* should be, I walked in to shoulder-depth (I was already drenched by rain), ducked and grabbed. Nothing but floating *Utricularia* and debris came up. The *Eryngium* still evades us"—Rhodora, xlv. 390 (1943).

That defeat had been rankling for two years; and when I reached Seward Forest I had urged that we use the accumulated gasoline with rigid economy, in order to try again on the last day, before I should take the night-train north from Emporia. So on Monday, the 18th, disappointed that Dr. Akerman must give up the trip with us, Lewis and I started for Whitefield's Pond. It still rained, so hard as seriously to obscure our vision, but we figured on getting to Whitefield by 9 in the morning and then having a full day for exploration. But Fate was still not wholly reconciled to our programme. On the way to Sedley, reached by a road full of unexpected angles and forkings, we were undecided which of two surfaced forks to take. Driving up to what in the rain looked like a filling station, we suddenly went bang! bang! A rear and a front wheel were down to their hubs in rotted tar pavement! The filling station had been deserted and we were alone on a deserted road. Luckily a friendly board-pile was soon discovered and eventually we pried ourselves out. It was afternoon when we got to Whitefield. Twenty feet of beach were still undrowned. The *Eryngium*, with sky-blue flowering and paler fruiting heads, made repent mats and by rapid work we secured a splendid type-series

(PLATES 897 and 898) before the early twilight. We had finally won! There was no time for exploration of the four miles of beach and marshy shore, but while uprooting the trailing branches of the undescribed *Eryngium*, I snatched a single plant of a *Ludwigia* which looked unfamiliar. It is; I can find nothing quite like it in the herbarium, but without fuller material I withhold further comment. The carpet of *Polygonum* bordering the outlet of Whitefield's Pond looked strange: with the very narrow (almost linear) leaves and thick finger-like panicles suggesting *P. opelousanum* Riddell, but the flowers deep pink, not greenish. A hastily snatched bunch had to suffice, but the plant proves to be a very definite new variety (PLATE 884) of *P. hydropiperoides*, represented in the Gray Herbarium by an old collection of Rugel's from Norfolk County; otherwise only from the region of Wilmington in southeastern North Carolina—a geographic segregation repeated by very many plants of the Coastal Plain of southeastern Virginia. Whitefield's Pond needs close study! The next morning, September 19, in a few short hours a regular cloud-burst precipitated 6 inches of rain over southeastern Virginia and caused disastrous floods. We had got the *Eryngium;* one day later we should have missed it.

Thus the two short visits to Seward Forest, with a total of 14 half-days or one week of field-work, brought their botanical returns in unexpected number, and it is possible to close off the very brief season of 1944 with a record of discovery not at all discreditable in view of the limitations. These results would have been impossible without the cordial and genuine hospitality and helpfulness of the Director, Staff and families of the Seward Forest. My gratitude to them all is very great.

## PART II. TECHNICAL NOTES AND REVISIONS

As usual in this series of papers, the more important range-extensions are briefly assembled, even though already noted in the journal. Plants thought to be previously unrecorded from Virginia are indicated by an asterisk (*) and in all except the several technical studies, the names of collectors, *Fernald & Long, Fernald & Lewis*, etc., are omitted, the numbers sufficing. Since, for the most part, Lewis has a separate series of numbers, plants collected by us both and of which only my own series of numbers are available are cited as *Fernald* (with *Lewis*), etc. Some studies which have resulted from earlier collections in the state by Mr. Bayard Long and me are included; a few plants, recently recorded by me elsewhere and new to Virginia, are briefly noted, that their records may be easily available; and the last discussion, although not growing immediately out of our field-work, is here included, since most of the plants discussed are Virginians. As for several years past, I am greatly indebted to Dr. Bernice G. Schubert for her skill in preparing the plates. The cost of engraving has been met through grants from the American Philosophical Society and from the Department of Biology of Harvard University.

Dryopteris cristata (L.) Gray. Brunswick Co.: bottomland woods near old Clipper's Mill, southwest of Triplett, no. 14,680. Not recorded by Massey from Brunswick Co. See p. 101.

Festuca paradoxa Desv. Local range extended inland to Brunswick Co.: low woods along Meherrin River near Westward Bridge (or Mill), no. 14,554. Seen in other rich woodlands. See p. 97.

Vulpia **Elliotea** (Raf.), comb. nov.? *Festuca quadriflora* Walt. Fl. Carol. 81 (1788), not Honkeny, Verz. Aller Gew. Teutschl. 268 (1782). *F. monandra* Ell. Sk. i. 170 (1816), in obs. on misapplied name *F. myuros* L., the full description being of the indigenous plant of S. C. *Dasiola elliotea* Raf. Neogen. 4 (1825). *Festuca sciurea* Nutt. in Trans. Am. Phil. Soc. n. s. v. 147 (1835). *V. sciurea* (Nutt.) Henrard in Blumea, ii. 323 (1937).

The earliest available name for this characteristic American (including Virginian) species is *Dasiola Elliotea* Raf. (1825), Rafinesque defining the new genus *Dasiola* with the single species *D. Elliotea* based on the very fully described *Festuca monandra* Elliott. Elliott's description is unequivocal; he called the plant the Old World *F. myuros* L., but said "I once considered this plant as distinct from the Linnaean F. myurus, and named it F. monandra; the description however of Lamarck . . . renders it probable that it is the same: the only circumstances which still occasion any doubt, the hairy corolla and solitary filaments, are omitted in his description". The hairy "corolla" is distinctive of the native southern plant; and this comment, as well as Elliott's full account, leaves no question as to the identity of his plant, therefore of Rafinesque's *Dasiola Elliotea*. Elliott's *Festuca monandra* can not be taken up. He published it only as a *provisional* name which he had himself abandoned.

V. OCTOFLORA (Walt.) Rydb., var. **tenella** (Willd.), comb. nov. *Festuca tenella* Willd. Sp. Pl. i. 419 (1797). *F. octoflora*, var. *tenella* (Willd.) Fernald in RHODORA, xxxiv. 209 (1932).

V. OCTOFLORA, var. **glauca** (Nutt.), comb. nov. *Festuca tenella*, β. *glauca* Nutt. in Trans. Am. Phil. Soc., ser. 2, v. 147 (1835). *F. octoflora*, var. *glauca* (Nutt.) Fernald, l. c. (1932).

It is difficult to understand why the genus *Vulpia* has not been generally taken up in America, except that Piper, in his *North American Species of Festuca*, Contrib. U. S. Nat. Herb. x. pt. 1 (1905), followed Hackel in treating it as *Festuca*, subg. *Vulpia* and Hitchcock and others have followed Piper. The two groups, true *Festuca* L. and *Vulpia* K. C. Gmelin, are very different in morphology and in geographic occurrence. *Festuca* is a genus of perennials, occurring in temperate regions of both northern and southern hemispheres and extending to the Arctic and to high-alpine habitats. The florets open regularly and the plumose stigmas emerge from the sides of the lemmas; the 3 free anthers are exserted and, as we know, are so distinctive as to offer clear and diagnostic specific characters. The grain is ellipsoid or ovoid. In most species of true *Festuca* the 2nd glume is merely pointed, though sometimes awned, and the acute to blunt lemmas may be awnless or awned.

*Vulpia*, on the other hand, is a group chiefly of annuals, with the lower glume often greatly reduced, the upper one frequently awned, and the slender lemmas long-attenuate to long-awned. The florets do not open, but remain closed (cleistogamous) and are enlarged upward when the anther is mature, the 1 (rarely 3) included anther being appressed to the lemma or to the included stigmas and with nearly suppressed filament; and the linear-cylindric grains are attenuate to each end. This characteristic group occurs in temperate Europe and the Mediterranean region (North Africa and southwestern Asia), in temperate (not frigid) North America and in western South America.

The fact that Hackel in his earlier work and in Engler & Prantl merged *Vulpia* with *Festuca* is hardly sufficient ground for maintaining an artificial union. Hackel, likewise, merged other groups which, in Washington, have been officially segregated.

Thus, by Hackel, in his monumental Andropogoneae in DC. Mon. vi. (1889), *Sorghum*, *Sorghastrum* (*Chrysopogon*), including *Rhaphis*, *Vetiveria*, *Cymbopogon*, *Hyparrhenia* and *Heteropogon*, all maintained with us as genera, were merged into *Andropogon;* and just imagine how the ultraconservative and very accurate Hackel would have groaned at the segregation of *Panicum* as he conceived it; to him *Digitaria*, *Trichachne*, *Brachiaria*, *Echinochloa*, etc., were mere sections of *Panicum*. Since all or nearly all of his sections in *Panicum* and his subgenera in *Andropogon* (as well as in many other groups) are taken up in America as full genera, why discriminate against his *Festuca*, subg. *Vulpia?* In Europe and Africa nearly all, if not quite all, recent close students of the *Gramineae* regularly maintain *Vulpia* as a genus: Beck von Managetta, Rouy, Hegi, Lindman, Henrard and such sound and conservative British authorities on grasses as Bews, C. E. Hubbard and Vaughan. It seems reactionary to persist in merging *Vulpia* with *Festuca*[1].

Eragrostis multicaulis Steud. Synop. Pl. Glum. i. 426 (1855). *Glyceria airoides* Steud. l. c. 287 (1854), not Reichenb. (1827). *E. pilosa*, var. *Damiensiana* Bonnet in Naturaliste, iii. 412 (1881). *E. pilosa*, var. *condensata* Hackel in Allg. Bot. Zeitschr. vii. 13 (1901). *E. peregrina* Wiegand in Rhodora, xix. 95 (1917). *E. Damiensiana* (Bonnet) Thell. in Fedde, Repert. xxiv. 323 (1928).

I am indebted to Capt. Stanley J. Smith for calling my attention to the correct name for the ruderal annual which has rapidly spread in eastern North America and which is currently known as *Eragrostis peregrina* Wiegand. In their Grasses of Mauritius and Rodriguez, 43 (1940) the two distinguished English specialists on grasses, C. E. Hubbard and R. E. Vaughan, give the above bibliography of *E. multicaulis*, "Native of eastern Asia; introduced into Europe, America and Australia". Steudel originally described the species as *Glyceria airoides* from Japan but a year later, describing it under *Eragrostis*, he rightly gave a new specific name, since his earlier name, *Glyceria airoides*, was a later homonym. Now that we know *E. multicaulis* (*E. peregrina*) to be introduced from eastern Asia, not indigenous, its behavior, suddenly appearing and then rapidly spreading, is easily understood. It well matches eastern Asiatic specimens.

[1] For a scholarly discussion see Henrard, Th., *A Study in the Genus Vulpia*, Blumea, ii. 299–326 (1937).

PHLEUM PRATENSE L., var. NODOSUM (L.) Schreb. Local range extended inland to GREENSVILLE Co.: roadside bordering sandy woods and thickets along Fontaine Creek, near Round Hill Church, no. 14,556.

PANICUM AGROSTOIDES Spreng., var. RAMOSIUS (Mohr) Fernald. Local range extended inland to western GREENSVILLE Co.: bottomland woods along Fontaine Creek, at mouth of Quarrel's Creek, no. 14,688.

P. ROANOKENSE Ashe. Range extended inland from Coastal Plain to western GREENSVILLE Co.: low woods, Mitchell's Millpond, west of Brink, no. 14,563.

* SETARIA FABERII Herrm. See RHODORA, xlvi. 57, 58 (1944). Abundantly naturalized in ROANOKE and BOTETOURT COS., *C. E. Wood, Jr.*

ERIANTHUS ALOPECUROIDES (L.) Ell. BRUNSWICK COUNTY: abundant in bottomland woods along Rattlesnake Creek, at old Clipper's Mill, southwest of Triplett, no. 14,690. Chiefly an inland species, here at our first station in the southeastern counties. See p. 100.

* TRIPSACUM DACTYLOIDES L., var. OCCIDENTALE Cutler & Anders. in Ann. Mo. Bot. Gard. xxviii. 258 (1941). BRUNSWICK COUNTY: border of low woods, Meherrin River at Westward Bridge (or Mill), no. 14,565. HALIFAX COUNTY: Lawson Creek, southwest of South Boston, June 21, 1938, *Fosberg*, no. 15,412. See p. 99.

Recently distinguished as a supposed endemic of the Davis and the Chisos Mts. of western Texas, on account of the long and narrow acuminate glumes of the staminate spikelets. The plant at Westward Bridge is closely associated with *Muhlenbergia glabriflora* Scribn., there at its first known station east of the Mississippi Basin (southwestern Indiana and Illinois to Texas)—see Fernald in RHODORA, xlv. 379 and 385 (1943). It is a very close match for the TYPE-collection of var. *occidentale* (*Moore & Steyermark*, no. 3092). Material from near Nashville, Tennessee, *Gattinger*, has even longer and narrower glumes and is comparable with coarse extremes of var. *occidentale* from Texas (Chisos Mts., *Mueller*, no. 7891 and *Warnock*, July 12, 1937, and Presidio Co., *L. C. Hinckley*, no. 1691).

THE IDENTITY OF CYPERUS VIRENS Michx. (PLATE 876, FIGS. 1–4).—In sorting the large accumulation of photographs of types assembled before the present war I have, rather naturally, been amazed to note that the type (FIG. 1, × ½) of *Cyperus virens* Michx. Fl. Bor.-Am. i. 28 (1803), "*Hab.* in Carolina", is very characteristic material of *C. pseudovegetus* Steud., Syn. Cyp. 24 (1855) and not at all the plant which Steudel and all his followers have erroneously called *C. virens*. *C. virens* (figs. 1 and 3) is a relatively slender plant, with culms 3–7.5 dm. high; leaves nearly equaling the culm and 2–5 mm. wide, not strongly spongy below; the ovate spikelets (fig. 4, × 5) very flat and soon, by spreading of the narrow scales, with slightly excurved mucronate tips (fig. 5), displaying the rachilla. The much coarser plant, erroneously passing as *C. virens*, has stout culms 0.5–1.2 (in the tropics –1.8) m. high; its spongy-based leaves much shorter than the culms ("Folia culmo parum breviora"—*Kükenthal*) and 5–13 mm. wide; the slightly narrower spikelets relatively plump, with the broader and straight scales (fig. 5, × 5) rather closely imbricated at base, so that the rachilla remains partly hidden. Differences in the achenes and other characters not evident in the photograph of Michaux's type need not now concern us. The Michaux type (fig. 1, × ½, and fig. 2, × 10) is very evidently the same as *C. pseudovegetus* (figs. 3 and 4) and not at all the coarser and largely tropical plant. If Kükenthal's synonymy is safer to follow than his identifications of species (for Kunth's types should certainly have been available to him, even if inhibition and Germanic self-satisfaction kept him from seeing Michaux's in Paris), the coarser plant may perhaps be *C. robustus* Kunth, Enum. ii. 4 (1837). I have not yet checked that point, as it concerns a species as yet known only outside the area upon which I must chiefly concentrate. Michaux's *C. virens* was from Carolina. Of the slender species which perfectly matches his type there are before me 12 sheets from North Carolina, 9 from South Carolina, 16 from Virginia and others from Delaware, Maryland, the District of Columbia and New Jersey. Of the coarse tropical and subtropical species the northernmost specimen (the only one I have seen from the state) is from Washington County, on Albemarle Sound, in North Carolina (so near the Virginia line that I may yet have to settle the name!), with 5 sheets from river-swamps and tidal reaches of South Carolina. Michaux got the ubiquitous species of the Carolinas.

Cyperus (§ Umbellati) **Plukenetii,** sp. nov. (tab. 877), rhizomate subligneo crasso abbreviato; culmo subrigido scabropuberulo 0.3–1 m. alto; foliis firmis scabris planis 4–8 mm. latis

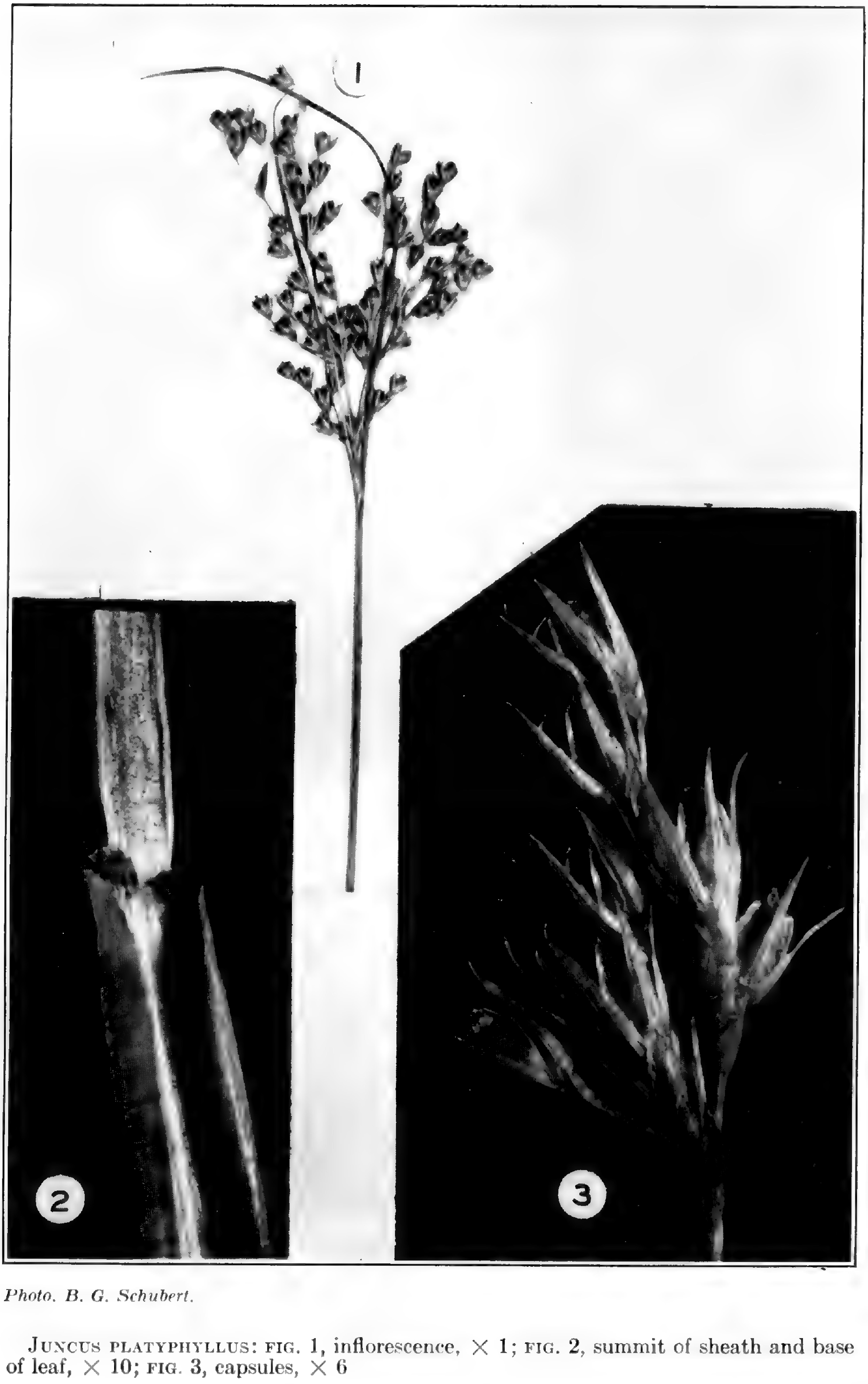


*Photo. B. G. Schubert.*

Juncus platyphyllus: fig. 1, inflorescence, × 1; fig. 2, summit of sheath and base of leaf, × 10; fig. 3, capsules, × 6


*Photo. B. G. Schubert.*

JUNCUS CANADENSIS, var. EUROAUSTER: FIG. 1, portion of TYPE, × ½; FIG. 2, portion of glomerule, × 10, from TYPE; FIG. 3, seeds, × 10, from TYPE Var. SPARSIFLORUS: FIG. 4, inflorescence, × 1; FIG. 5, glomerule, × 10 attenuatis; involucro 3–7-phyllo, foliis quam radiis brevioribus scabris; radiis 4–12, subrigidis scabris adscendentibus ad 2.5 dm. longis; spicis turbinato-obovoideis 1–2.3 cm. longis; spiculis 75–125 lineari-subulatis valde appresso-reflexis 6–7 mm. longis; squamis 4 vel 5 striatis terminale involuta firma subacerosa; acheniis linearibus 2.5–3 mm. longis.—Dry or moist sands and rocks, Florida to Texas, north to New Jersey (possibly Long Island), southern Ohio and southeastern Missouri. TYPE: sandy pinelands, The Desert, Cape Henry, Virginia, July 28 and 29, 1934, *Fernald & Long*, no. 3734 (in Herb. Gray.; ISOTYPE in Herb. Phil. Acad.), distrib. as *C. retrofractus* (L.) Torr.

*Cyperus Plukenetii*, named for LEONARD PLUKENET (1641–1706), who originally described and illustrated it (our FIG. 1) from Virginia, has been erroneously passing as *C. retrofractus* (L.) Torr., Fl. N. Y. ii. 344 (1843), Torrey's combination resting on the *Scirpus retrofractus* L. Sp. Pl. 70 (1753), our PLATE 878. Linnaeus, like Torrey and some others after him, confused two quite distinct species. His original account was very brief:

> *retrofractus.* 17. SCIRPUS culmo triquetro, umbella simplici: spicarum flosculis retrofractis.
> Cyperi genus indianam, panicula speciosa, spiculis propendentibus atris. *Pluk. phyt.* 415. *f.* 4.
> *Habitat in* Virginia.

As is so often the case, everyone since 1753 has taken the easier course. It was perfectly simple to turn to Plukenet and see his very characteristic figure (our FIG. 1); it would have required more effort and considerable trouble to find out what Linnaeus actually had before him. If they had taken this trouble, it would have been evident that the Linnean TYPE (PLATE 878, FIGS. 1 and 2) is not like the Plukenet plant, for Linnaeus had from Virginia a very characteristic specimen of *Cyperus hystricinus* Fernald in RHODORA, viii. 127 (1906), our PLATE 878, FIG. 3. In PLATE 878 I show the type (FIGS. 1 and 2) of *Scirpus retrofractus*, × ⅓ and ½, from a photograph received from Mr. Savage. With it, × 1, is an umbel from the type of *Cyperus hystricinus*[1]. That they are quite the same no one, who really understands *Cyperus*, can doubt.

True *C. retrofractus* (*C. hystricinus*) differs in many characters from *C. Plukenetii* (*C. retrofractus* sensu Torrey, for the most

[1] This type, from Haddonfield, New Jersey, was collected by *C. F. Parker*, not C. F. Austin, as erroneously stated with the original description.

part, and most later authors, incl. Kükenthal in Engler, Pflanzenr. iv[20]. fig. 56 (1935), the latter an excellent illustration of *C. Plukenetii*). The chief differences are as follows:

C. RETROFRACTUS: rhizome relatively slender and elongate, the corms (when more than 1) remote; culm smooth and glabrous; leaves smooth and glabrous, the basal 2–5 mm. wide; rays of umbel smooth, when fully mature mostly shorter than the smooth and narrow involucral leaves; spikes cylindric or cylindric-obovoid; spikelets golden brown, not pungent, soon loosely reflexed and promptly falling; achenes 2–2.5 mm. long.

C. PLUKENETII: rhizome stoutish, the corms (when more than 1) approximate; culm scabrous-puberulent; leaves harsh and pubescent, the basal 4–8 mm. wide; rays of umbel scabrous, when mature mostly much longer than the involucral leaves; spikes strongly turbinate-obovoid, tapering to acute obconic base; spikelets greenish, becoming drab or dull brown, pungent, soon tightly appressed-reflexed, long-persistent; achenes 2.5–3 mm. long.

If one takes Kükenthal's bibliography at its face value it will be found as unreliable for North American plants as his treatment of many of our species. Besides *Scirpus retrofractus* L. and the resultant combinations under *Cyperus* and *Mariscus* he gives, without the slightest indication of doubt, the synonym *Mariscus pubescens* Presl, Reliq. Haenk. i. 181 (1830). Now, *Cyperus retrofractus* sensu Kükenthal (*C. Plukenetii*), with, to quote Kükenthal, involucral leaves (like the basal) "4–8 mm. lata plana", the "spicae obovato-turbinatae", "Spiculae omnes retroflexae", occurs from Florida to eastern Texas, north to New Jersey, southern Ohio and southeastern Missouri. *Mariscus pubescens* Presl was originally said to be from Monterey, California, its "Involucella setacea", the "Spicae cylindraceae", "Spiculae horizontales". Kükenthal has another guess coming, if he survives the war. He evidently accepted, without looking up the Presl plant or description, the entry in Index Kewensis, fasc. iii. 169 (1894) under *Mariscus: "pubescens*, J. & C. Presl, Rel. Haenk. i. 181 = retrofractus". In the first fascicle, 697 (1893) the editor, Jackson, had entered the same plant as a maintained species of *Cyperus:* "pubescens, J. & C. Presl, Rel. Haenk. i. 181—Calif.", thus making a new and superfluous name, for there was already a *C. pubescens* Steud. (1855)[1].

PLATE 876, FIGS. 1–4, CYPERUS VIRENS Michx.: FIG. 1, TYPE, × ½, photograph after *Cintract;* FIG. 2, spikelets, × 10, from TYPE; FIG. 3, inflorescences,

[1] *Mariscus pubescens* was named for the very pubescent culm and leaves. So far as I can find, nothing like it is known in California. It might have come from western Mexico, the Philippine Islands, Peru or some other Pacific area. Steudel, Syn. Pl. Cyp. 50 (1855) had a *Cyperus pubescens* from the Island of Bourbon.

× ½, of characteristic *C. pseudovegetus* Steud. from Accomac, Virginia, *Fernald, Long & Fogg*, no. 5225; FIG. 4, spikelet, × 5, from no. 5225. FIG. 5, *C. robustus* Kunth (*C. virens* sensu Steudel and later auth., not Michx.): spikelet, × 5, from Walterboro, Colleton Co., South Carolina, *Wiegand & Manning*, no. 523.

PLATE 877, CYPERUS PLUKENETII Fernald: FIG. 1, Plukenet's figure of *Cyperi genus indianam*, etc. from Virginia, included by Linnaeus under his mixed *Scirpus retrofractus;* FIG. 2, inflorescence, × 1, of TYPE; FIG. 3, characteristic base, × 1, from Cypress Bridge, Southampton Co., Virginia, *Fernald & Long*, no. 6040.

PLATE 878, C. RETROFRACTUS (L.) Torr. as to type: FIG. 1, TYPE, × ⅓, of *Scirpus retrofractus* L., courtesy of Mr. *S. Savage;* FIG. 2, inflorescence, × ½, of TYPE; FIG. 3, inflorescence, × 1, of type of *C. hystricinus* Fernald; FIG. 4, characteristic rhizome, × 1, from Joyner's Bridge, Isle of Wight Co., Virginia, *Fernald, Griscom & Long*, no. 6528.

C. ODORATUS L. Sp. Pl. i. 46 (1753). *C. ferax* Richard in Act. Soc. Hist. Nat. Par. i. 106 (1792).—Frequent in saline and brackish marshes or on shores along the coast.

Since some have questioned the identity of these two species, a memorandum by Dandy in Exell, Cat. Vasc. Pl. So. Tomé, 360 (1944), is important to quote. Under *C. odoratus* L. he says:

> This species is the true *C. odoratus* of Linnaeus, which was based on the Jamaican plant named *Cyperus odoratus, panicula sparsa, spicis strigosioribus viridibus* by Sloane, Cat. Pl. Ins. Jam. 35 (1696); Voy. Jam. Nat. Hist. I. 116, t. 74, fig. I (1707). . . . The original specimen from which Sloane's figure was drawn is preserved in Herb. Sloane (vol. II. fol. 46) at the British Museum, and is identical with *C. ferax* Rich. There was no specimen of *C. odoratus* in the Linnean Herbarium in 1753, and the type of the species is Sloane's figure (since Linnaeus did not see the actual specimen). The name *C. odoratus* has been misapplied to *C. polystachyos* and other species.

C. TENUIFOLIUS (Steud.) Dandy in Exell, Cat. Vasc. Pl. So. Tomé, 363 (1944).—Seen along wet woodroads in the Seward Forest, but not collected; common farther east.

*C. tenuifolius* (Steud.) Dandy is the plant generally known as *Kyllinga pumila* Michx. (1803), the genus *Kyllinga* now very generally reduced to *Cyperus*. Its essential synonymy, as given by Dandy, is as follows:

> C. TENUIFOLIUS (Steud.) Dandy, l. c. (1944). *Kyllinga pumila* Michx. (1803), not *C. pumilus* L. (1756). *K. elongata* Kunth (1816), not *C. elongatus* Steud. (1855). *K. caespitosa* Nees (1842), not *C. caespitosus* Poir (1806). *K. tenuifolia* Steud. (1855). *K. rigidula* Steud. in part (1855), not *C. rigidulus* Vahl (1806). *C. densicaespitosus* Mattf. & Kükenth. (1936).

* FIMBRISTYLIS DRUMMONDII Boeckl. BRUNSWICK COUNTY: damp openings in woods, "Moseley flat pineland", near Triplett, *Fernald* (with *J. B. Lewis*), no. 14,568. See p. 95.

*Fimbristylis Drummondii* has been variously confused with a number of other species, particularly with the tropical South American and very distinct *F. spadicea* (L.) Vahl and the halophilous North American *F. castanea* (Michx.) Vahl and *F. caroliniana* (Lam.) Fernald (= *F. puberula* (Michx.) Vahl). *F. castanea* is the coarse and densely cespitose, rigid plant of salt marshes and saline shores, from the West Indies and Florida to Texas, extending northward on saline marshes to Long Island. Its coriaceous dark sheaths, rigid culms up to 1 m. tall, its lustrous and coriaceous broadly rounded scales and the castaneous broad-ovoid achenes clearly mark it. *F. caroliniana* (Lam.) Fernald in Rhodora, xlii. 246 (1940) is the same as *F. puberula* (Michx.) Vahl and its habit was clearly shown in Rhodora xxxvii. t. 388 (1935). It is contrasted with *F. castanea* by its small soft-based tufts, with paler sheaths, its prolonged and slender cord-like scaly stolons, its thinner and membranaceous scales, at least the outer ones puberulent, and the narrower and paler achene. It occurs on brackish or saline sands, flats or marshes and in dune-hollows along the coast from Florida to Texas, northward to New Jersey.

*Fimbristylis Drummondii,* on the other hand, is nonstoloniferous; its culm-bases are enlarged and bulbous and when fully developed it makes dense tussocks with the stout rhizome forking into thick crowns covered with the bulbous-based tufts. Too many specimens in herbaria, however, merely pulled off from the rhizome, fail to display this distinctive character and very young and first-fruiting plants often have only poorly developed rhizomes. They have, however, the bulbous bases which are characteristic, the puberulent scales and the pale achenes. This plant, which has recently been confused with the others, is a species of peats, sterile meadows, pine and oak barrens, and other acid habitats. It occurs from Florida to eastern Texas, northward to Virginia, southeastern Pennsylvania, the New Jersey pine barrens and the Hempstead Plains of Long Island; in the interior across Tennessee and Arkansas to southern Michigan, Illinois and Missouri. Whereas the halophilous *F. castanea* and *F. caroliniana* fruit from late July to October, the inland *F. Drummondii* is mature from May into July, the Virginia material, collected in June, being over-ripe. One other species of this series should be noted, *F. interior* Britton in Britt. & Br. Ill. Fl. ed. 2, i. 320, fig. 785 (1913), a species of the Great Plains, from east-central Nebraska to eastern Colorado, south to Texas. Somewhat resembling both *F. caroliniana* and *F. Drummondii*, the material has bulbous-based tufts of the latter but shows no tendency to produce subligneous rhizomes and occasionally it develops stolons suggesting those of the former species. Its scales, however, are firmer and glabrous or glabrescent and its achenes with many more longitudinal ribs than in the others. It seems to be a well defined campestrian species.

The correct application of the name *Fimbristylis Drummondii* needs clarification, for its author, Boeckeler, created a confusion regarding it, the effects of which still linger. Boeckeler published his first *F. Drummondii* in Flora, xli. 603 (1858), a plant with "basi valde bulboso-incrassato, bulbo (crassitie nucis Coryli minoris) vaginis . . . coreaceis. . . . obtecto . . . squamis . . . omnibus puberulis", etc. This species consisted of two varieties: "*α. minor;* culmo subpedali, umbella subsimplici, spicis magis ovatis foliis superne scabris. Prope N. Orleans legit D r u m m o n d. (In hrb. ej. sub Nro. 416.)" and "*β. major;* culmis elatis (sesquipedalibus); spicis paulo majoribus subglobosis, involucellis squamisque glabrescentibus. Ad rio Brazas terrae Texanae legit D r u m m o n d". Since var. *α. minor* was the first defined and since two sheets of Drummond's no. 416 from New Orleans before me have the puberulent scales as described in Boeckeler's full description I am taking these to be isotypes of *F. Drummondii*. His var. *β. major* seems to contradict his fuller description in having "squamis glabrescentibus". Boeckeler cited no number and, presumably, his type is now destroyed. If it came from the upper Brazos it might have been *F. interior* Britton; if from the tidal reaches of the lower Brazos it might have been the glabrous-scaled *F. castanea* (Michx.) Vahl, which abounds in coastwise Texas. The latter species does not have bulbous bases, however; but Boeckeler's "squamis glabrescentibus" is not easily reconciled with his "squamis . . . omnibus puberulis" of his primary description of *F. Drummondii*. Although the identity of var. *β. major* can not now be settled, the identity of var. *α. minor* is clear. It is the plant I am taking up as *F. Drummondii*.

In 1836 Torrey, treating the all-inclusive *Isolepis*, placed together in one series two species, *I. capillaris*, the tiny capillary-leaved annual now known as *Bulbostylis capillaris*, and the new *I. Drummondii* Torr. & Hook. in Ann. Lyc. Nat. Hist. N. Y. iii. 350 (1836), this being a very tall plant, with firm "*Culm* 3 feet high . . . *Spikes* half an inch long . . . *Scales* closely appressed [coriaceous], smooth . . . Hab. Texas, *T. Drummond!*", the authors stating that it has the habit of *Fimbristylis spadicea*. I have not seen the type but the description suggests *F. castanea*. Still another Drummond plant from Texas was described by Boeckeler, this his *F. anomala* in Flora, xliii. 242 (1860), "Caespitosa; radice valide fibrosa stolonifera; stolonibus tenuibus (crass. pennae corvinae) . . . culmo 1–2 pedali rigido . . . spicis 3–4 lin. longis 1⅓ lin. latis . . . ; squamis arcte imbricatis . . . , inferioribus puberulis . . . Texas. Herb. D r u m m o n d. Nr. 445." This number, likewise, I have not seen. The point in bringing into the discussion *Isolepis Drummondii*, with culms "3 feet high" and smooth scales, and *F. anomala*, 1–2 feet high, stoloniferous, with lower scales puberulent, is that they both soon figured under another name, *F. Drummondii* (Torr. & Hook.) Boeckeler in Linnaea, xxxvii. 21 (1871), based nomenclaturally upon *Isolepis Drummondii* Torr. & Hook., with *F. anomala* cited as a synonym, this plant stoloniferous, the subsolitary culms 1½–2½ feet high, the scales of the spikelet *membranaceous-margined*, "nitidulis".

Naturally, there can be no second valid *Fimbristylis Drummondii* (Torr. & Hook.) Boeckl. (1871), in view of the earlier and different *F. Drummondii* Boeckl. (1858), which is the eastern species with bulbous-based tufts arising from stout caudices or hard rhizomes, with the outer scales of the spikelets puberulent. Whether *F. anomala* is an earlier name for *F. interior* I do not know; only examination of Boeckeler's type or of an unquestioned isotype can settle that. But for our plant the name *F. Drummondii* Boeckl. (1858) seems to be the correct one.

Scirpus polyphyllus Vahl. To the very few stations in the southeastern counties add one in Brunswick Co.: margin of Mill Creek, southwest of Ebony, no. 14,566.

S. divaricatus Ell. Local range extended inland to western Greensville Co.: bottomland woods along Quarrel's Creek below Pair's Store, no. 14,567. See p. 101.

FUIRENA SQUARROSA Michx. (*F. hispida* Ell.). Local range extended into the Piedmont in BRUNSWICK Co.: springy sphagnous and argillaceous bog, Ram-hole Swamp, Seward Forest, near Triplett, no. 14,692; culms weak and reclining. See p. 103.

RHYNCHOSPORA CORNICULATA (Lam.) Gray. Range extended back into the Piedmont. GREENSVILLE Co.: bottomland woods along Fontaine Creek, at mouth of Quarrel's Creek, no. 14,694. BRUNSWICK Co.: bottomland woods along Rattlesnake Creek, at old Clipper's Mill, southeast of Triplett, no. 14,693. See p. 100.

R. GLOBULARIS (Chapm.) Small, var. RECOGNITA Gale (*R. cymosa* sensu Torr. and later auth., not Ell.). Local range extended from Coastal Plain inland to BRUNSWICK Co.: springy sphagnous and argillaceous bog, Ram-hole Swamp, Seward Forest, near Triplett, no. 14,569; damp openings in woods, Moseley flat pineland, near Triplett, nos. 14,570 and 14,571. See p. 103.

SCLERIA PAUCIFLORA Muhl. To the counties from which this species is known (see RHODORA, xxxix. 392) add GREENSVILLE Co.: swaley clearing along Quarrel's Creek, below Pair's Store, no. 14,573. Also BRUNSWICK Co.: damp woods along branch, east of Moseley flat pineland, near Triplett, no. 14,574. See p. 96.

CAREX HIRSUTELLA Mackenzie. BRUNSWICK COUNTY: woods, Moseley flat pineland, near Triplett, no. 14,581, our first station in the southeastern counties. Plant very lax, with flaccid, loosely divergent culms, the inflorescences lopping to the ground. See. p. 96.

COMMELINA VIRGINICA L. (*C. hirtella* Vahl). Ordinarily with erect flowering stems, the plants in bottomland woods along Meherrin River at Westward Bridge (or Mill) have them depressed or trailing (no. 14,695).

Since the summer had been one of unusual drouth and the *Commelina* was well above the level of the river in mid-September the trailing habit was, obviously, not induced, at least during this season, by drowning.

THE IDENTITY OF JUNCUS TENUIS (PLATE 879).—*Juncus tenuis* was described by Willdenow, Sp. Pl. ii[1]. 214 (1800)[1], as follows:

> *23. JUNCUS **tenuis** W.
> J. culmo teretiusculo indiviso, foliis linearibus canaliculatis, corymbo terminali, calycinis foliolis acuminatis capsula triquetra obtusa longioribus. W.
> Schlanke Simse. W.

[1] Although the title-page gives the date 1799, vol. ii. pt. 1, was apparently not issued until early in 1800.—See Schubert in RHODORA, xliv. 147–150 (1942).

*Habitat in* America boreali.[1] ♃ (v. s.)
Culmus *dodrantalis teretiusculus subcompressus basi foliosus*. Folia *ut in praecedente*. Flores *ut in praecedente* [i. e. *J. bulbosus* sensu Willd. incl. *J. compressus* Jacq. and *J. Gerardi* Loisel.] *sed duplo majores et rami laterales corymbi majis elongati*.
Foliola *calycina lanceolata acuminata capsula paulo longiora*. Capsula *triquetra truncato-obtusa*. W.

Practically without exception the name *Juncus tenuis* was thereafter correctly applied to a widespread and very common species with drab or pale brown young sheaths, flattish (though on drying often inrolled) leaves with whitish scarious and friable margins to the sheaths, the elongate-oblong or lanceolate auricles thin and scarious or thin-hyaline, the inflorescence greatly overtopped by 2 or more flattish bracts, the flowers, in more open inflorescences, inclined to be grouped in 3's, the perianth overtopping the oblong-ovoid capsule which is retuse at summit and partially 3-locular. So firmly established was the name *J. tenuis* Willd. for this clear-cut and wide-ranging species (much of North America, Europe, Australia, New Zealand, etc.) that it came as a shock when, in 1929, the late Kenneth K. Mackenzie announced:

"*Juncus tenuis* Willd. (Sp. Pl. **2**: 214. 1799), 'Habitat in America boreali,' is *Juncus dichotomus* Elliott (Bot. S. Carolina & Georgia **1**: 406. 1817), and is not the plant appearing as *Juncus tenuis* in our current manuals. Dr. Diels, Director of the Botanical Garden and Museum at Berlin, has very kindly sent me from Willdenow's material portions showing the leaf-blade, the mouth of the sheath, the inflorescence, and the seeds. The leaf-blade is not flattened, and the auricles are rounded cartilaginous and not conspicuously prolonged.

"I was brought to look into this matter by noting that Steudel (Syn. Pl. Glum. **2**: 305. 1855) described *Juncus tenuis* Willd. as with 'vaginis adpressis ore nudis'. On the same page he described a new species *Juncus germanorum* ('J. tenuis Auctor. Germ.') as with 'vaginis laxiusculis ore in marginem membranaceum utrinque productis (ligulam mentientem)'. This last, of course, is a very accurate description of the plant appearing in our manuals as *Juncus tenuis*"—Mackenzie in Bull. Torr. Bot. Cl. lvi. 25 (1929).

That seemed to settle the matter and I promptly fell into the unintentional trap. In my search for the earliest name for *Juncus tenuis* of most authors I found, while in England, that the earliest available name (if *J. tenuis* Willd. is indeed only *J.*

[1] The "*Habitat in* America boreali" of Willdenow is rendered by Index Kewensis as "Europ.; Ind. occ.; Austral."

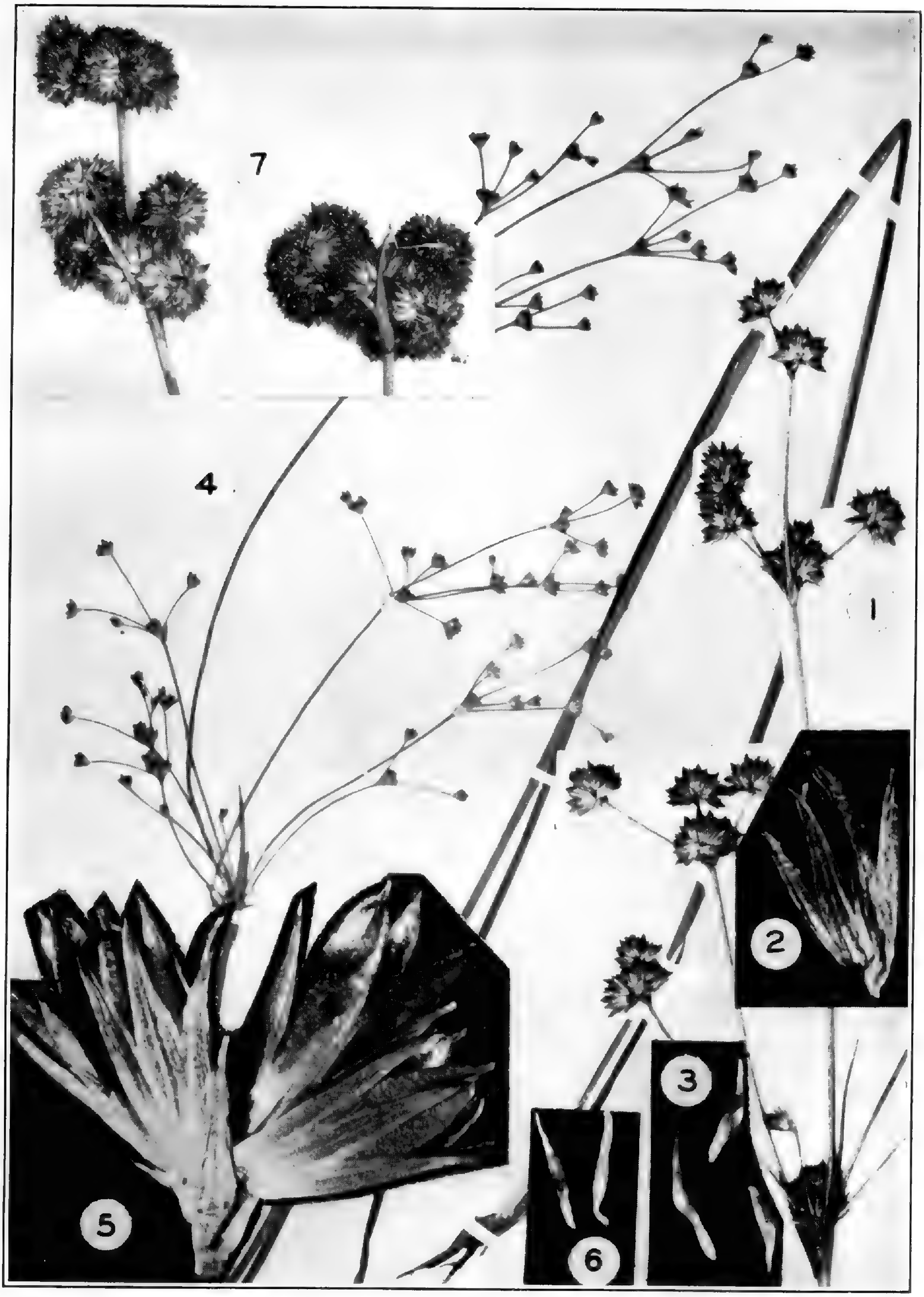


*Photo. B. G. Schubert.*

JUNCUS CANADENSIS, var. TYPICUS: FIG. 1, inflorescence, × 1; FIG. 2, flower, × 10; FIG. 3, seeds, × 10
Forma APERTUS, all figs. from TYPE: FIG. 4, inflorescence, × ½; FIG. 5, glomerule, × 10; FIG. 6, seeds, × 10
Forma CONGLOBATUS: FIG. 7, two inflorescences, × 1, from TYPE

RUMEX BRITANNICA: the Clayton (Gronovian) specimen from Virginia, photo. from Dr. *John Ramsbottom* = R. OBTUSIFOLIUS L.

*dichotomus* Ell.) seemed to be *J. macer* S. F. Gray, Nat. Arr. Brit. Pl. ii. 104 (1821). This decision I announced in Journ. Bot. lxviii. 366 (1930) and, most unfortunately, my interpretation has been generally accepted in America, Europe and Australia.

The difficulty seems to be, that Willdenow had mixed material. From Mackenzie's account the fragments sent to him were apparently from *J. dichotomus* Ell. That species (FIGS. 5–7), however, is strongly distinguished from *J. macer* (*J. tenuis* of Rostkovius, Engelmann, Buchenau, Gray, Britton, etc.), FIGS. 1–4, by many characters:

J. MACER: (1) Tufts or tussocks relatively soft; young membranaceous sheaths drab or pale brown to greenish; (2) with whitish friable broad scarious margins; (3) the uninjured auricles lance-triangular to -oblong, scarious or thin-hyaline and much longer than broad; (4) leaf-blades flat or broadly canaliculate; (5) lower involucral bract and ordinarily 1 or 2 others much prolonged beyond the cyme; (6) cyme either compact or open and with elongate outer branches, each branch or branchlet (in the typical form) with 2–6 (commonly 3) approximate flowers; (7) prophylla thin or membranaceous, greenish or drab; (8) sepals much longer than capsule; (9) capsule retuse, 3-locular; (10) anthers much shorter than filaments; etc.

J. DICHOTOMUS Ell.: (1) Dense and hard tussocks with inner firm sheaths purple-tinged, the outer brown, (2) without friable margins; (3) short rounded auricles firm and cartilaginous; (4) leaf-blades filiform, merely slenderly channeled on upper side; (5) lower involucral bract shorter than or but slightly exceeding cyme, the others shorter; (6) cyme with flowers mostly secund and alternate along the branchlets; (7) prophylla coriaceous, pale to deeper-brown; (8) sepals and capsule subequal; (9) capsule rounded at summit, 1-locular; (10) anthers nearly equaling filaments.

Willdenow's original description, of course, has final significance. This was beautifully supplemented by the dissertation on *Juncus* by Rostkovius—De Iunco (1801)—for Rostkovius definitely states that his dissertation for the degree of Doctor of Medicine[1] was based upon the material of *Juncus* in Willdenow's Herbarium: "Cum absoluto cursu academico de specimine inaugurali meditarer, inter varia argumenta suasu optimi Praeceptoris Clarissimi WILLDENOWII, Professoris Historiae naturalis Berolini, e ditissimo Suo Herbario Iunci genus selegi, quod benevolentia Celeberrimorum Virorum LINKII, MÜHL-

[1] How our M. D's. have slumped! One of them in Cambridge came to see me and asked: "Are there any plants around here which might poison a child? I was called up to see a sick child and I can't make out what is the trouble". "There's one right there", I replied, pointing to *Datura Stramonium*. "All right", he said, "I'll treat him for Stramonium-poisoning". Another, also a professor in a distinguished medical school, argued at me throughout the length of a dinner, that there must be some simple formula (like the silver spoon with toadstools) by which any one can tell whether any wild plant is poisonous or edible!

enbergii, Stephanii, et Hoppii valde auctum evasit, spe fretus hocce tentamen Botanophilis haud ingratum fore".—Rostk. Iunc. Praefatio (1801). Not only did Rostkovius (his p. 24) evidently study the plant which Willdenow had described as *J. tenuis;* he gave a very detailed description of it and an illustration of the characteristic and wholly distinctive inflorescence (our plate 879, fig. 1). Here is the account by Rostkovius:

18. *Iuncus tenuis.* Tab. Nost. I. fig. 3.

I. culmo folioso simplici teretiusculo, foliis canaliculatis, corymbo terminali dichotomo foliis floralibus breviore, capsula oblongo obtusa petalis breviore.
I. culmo teretiusculo indiviso, foliis linearibus canaliculatis, corymbo terminali, calycinis foliolis acuminatis capsula triquetra obtusa longioribus. *Sp. pl. ed. W. 2. p.* 214.
I. foliolus minimus campestris et nemorensis *Gron. virg.* 152.
Gramen iunceum virginianum calyculis paleaceis bicorne *Moris. hist.* 3. *p.* 228. *f.* 8. *t.* 9. *f.* 15.
Gramen iunceum elatius pericarpiis ovatis americanum *Pluk. alm.* 179. *t.* 92. *f.* 9.

*Habitat in* America *boreali.* ♃.

*Culmus* semipedalis vel pedalis erectus simplex teretiusculus basi foliosus.

*Folia* linearia canaliculata.

*Corymbus* terminalis dichotomus, ramis multifloris.

*Folia floralia* bina, sub corymbo, linearia canaliculata, quorum alterum corymbo quadruplo longius, alterum longitudine corymbi vel paulo longius.

*Calyx* bivalvis membranaceus, valvulis lanceolatis acutis.

*Corolla* hexapetala, petalis lanceolatis acuminatis margine membranaceis, interioribus parum brevioribus.

*Capsula* oblonga triquetra obtusa basi styli persistentis coronata, trilocularis trivalvis polysperma, petalis brevior.

Similis praecedenti [*J. bulbosus* sensu Willd., i. e. *J. compressus* and *J. Gerardi*], sed corymbo dichotomo paucifloro, petalis acuminatis capsula longioribus diversus. Flores fere ut in Iunco bufonio. Synonyma Iunci nodosi a Linnaeo adducta huc per.

Now if we make an analysis of the differential characters of *Juncus tenuis,* as originally described by Willdenow, almost immediately thereafter and in great detail by Rostkovius from Willdenow's material, and by Engelmann, Buchenau, Wiegand and others who have maintained it in the sense of *J. macer,* (our figs. 1–4) and those of *J. tenuis* sensu Steudel and Mackenzie and those of us who have supposed that they were right (i. e. *J. dichotomus* Ell.), our FIGS. 5–7, we get the following results. The index-numbers are those used in the contrasts given on p. 119.

| | J. TENUIS as defined by Willdenow and by Rostkovius from Willdenow's material | J. DICHOTOMUS Elliott (*J. tenuis* sensu Steudel and Mackenzie) |
|---|---|---|
| (1) Habit | No statement (Willd.) | "very small tufts" (Ell.) |
| (2) basal sheaths | No statement (Willd.) | No statement (Ell.) |
| (3) auricles | No statement (Willd.) | No statement (Ell.) |
| (4) basal leaves | linear, channeled (Willd., Rostk.); "readily distinguished . . . by its flat leaves, . . . only . . . on the margin slightly involute" (Engelm.); "lax, flat and soft, rarely slightly involute" (Wieg.); "folia . . . plana" (Buch.) | nearly terete, channeled on the upper side (Ell.); "terete . . ., marked by a shallow groove on their upper side" (Engelm.); "nearly terete, rarely much channeled" (Wieg.); "subteres, anguste canaliculata" (Buch.) |
| culms | nine inches high (Willd.); ½–1 ft. (Rostk.); a few inches to 2 ft. (Engelm.); 2–6 dm., commonly spreading (Wieg.); 10–40 (rarely –90) cm. (Buch.) | 1–2 ft. (Ell.); 3–10 dm., stiff, erect (Wieg.); 20–80 cm., strict (Buch.) |
| (5) lower involucral bracts | 2, linear-canaliculate, 4 times as long as corymb (Rostk.); 2, rarely 3, foliaceous, much exceeding inflorescence (Wieg.); 2 (rarely 1 or 3), frondose, "inflorescentia . . . longe superata" (Buch.) | "One . . . sometimes longer than the panicle, the others much shorter" (Ell.); "either longer or shorter" (Wieg.); "bractea infima frondosa inflorescentia nunc longior, nunc brevior" (Buch.) |
| (6) cyme | lateral branches much elongate (Willd.); "ramis multifloris" (Rostk.); fig. of Rostk. with flowers in 3's at tips of branches; flowers somewhat aggregated at ends of very unequal branches (Wieg.); open, mostly many-flowered, anthelate (Buch.) | dichotomus, flowers alternate and terminal (Ell.); anthelate, dense, rarely open (Buch.) |
| (7) prophylla | membranaceous (Rostk.) | coriaceous |
| (8) comparative length of sepals and capsule | longer than capsule (Willd.); "*Capsula*, . . . petalis brevior" (Rostk.); exceeding capsule (Engelm.); "capsule . . . shorter than the perianth" (Wieg.); "Fructus tepalis brevior" (Buch.) | "Capsule . . . , when mature, as long as the calyx" (Ell.); "capsule ¾–⅞ the length of the perianth" (Wieg.); "Fructus perigonium fere aequantia" (Buch.) |

| | J. tenuis as defined by Willdenow and by Rostkovius from Willdenow's material | J. dichotomus Elliott (*J. tenuis* sensu Steudel and Mackenzie) |
|---|---|---|
| (9) capsule | "Capsula *triquetra* truncato-obtusa" (Willd.); "*Capsula* oblonga triquetra obtusa . . . , trilocularis" (Rostk.); retuse (Engelm.); "thin-walled, obtuse", "3-celled" (Wieg.) | "oval, nearly globose" (Ell.); "subglobose, . . . but never retuse . . . the ripe pods assume a mahogany color" (Engelm.); "ovate-oblong, rounded", "1-celled" (Wieg.); trigonous-spherical or -ovate, obtuse (Buch.) |

From this summary of the characters recognized by the original authors and by the closest students of the group in the past (with length of stamens and some other characters not mentioned by Willdenow or Rostkovius omitted) it should be apparent that the plant which Willdenow and, after him, Rostkovius, redescribing the Willdenovian material, had before them was of the species which Kunth, E. Meyer, Engelmann, Gray, Wiegand, Britton, Buchenau and most others have regularly and correctly recognized as *J. tenuis*, the plant which, most unfortunately, I took up in 1930 as *J. macer* S. F. Gray. The plant called *J. tenuis* by Steudel in 1855 and by Mackenzie in 1929 was obviously not what Willdenow diagnosed and Rostkovius more fully described and illustrated. Whether it was contemporaneous in the Willdenow Herbarium with the material actually described by him we may never know. At any rate, we cannot accept it as the type of his very different species; it is obviously material of *J. dichotomus* Ell.

Confusions in the old and much handled herbaria are common and no specimen in them should be accepted as the type of the briefly described old species unless it agrees with the description. That seems axiomatic, but too many students overlook the necessity to eliminate the demonstrably extraneous or subsequently acquired specimens. In case of the Willdenow Herbarium, now tragically lost, to the incalculable detriment of our science, such confusions have been demonstrated. Thus, as pointed out by Weatherby in Contrib. Gray Herb. no. cxxiv. 19 (1939), various students were misled by a confusion regarding the type of *Acrostichum lanuginosum* Willd. Quite similarly in Rhodora, xxxv. 193–195 (1933), I showed that students had been taking the wrong plant as the type of *Elymus striatus*

Willd. *Juncus tenuis* seems to be another case in which early confusion of material crept in. At any rate, we may now, happily, come out of the misinterpretation which has recently prevailed and again use the name *Juncus tenuis* as Willdenow described it and as most botanists up to Mackenzie have correctly interpreted it. With this reinstatement of long-established and erroneously abandoned temporary usage the following combination becomes necessary:

*JUNCUS TENUIS Willd., forma **discretiflorus** (F. J. Hermann), comb. nov. *J. macer*, forma *discretiflorus* F. J. Hermann in RHODORA, xl. 82 (1938).

Although Hermann had seen forma *discretiflorus* only from the southern third of Indiana, it is of wider range, south at least into Tennessee and eastward to New York, Pennsylvania and Virginia. The following Virginian material is much larger than Hermann's largest specimen ("ultimate branches of inflorescence . . . frequently 7 cm. long"), for its longer branches have a length of 15 cm.:

SUSSEX COUNTY: wooded bottomland, Jones Hole Swamp, west of Coddyshore, *Fernald & Long*, no. 10,187.

Although, as noted by me in Journ. Bot. lxviii. 365 (1930), the Michaux material of his *Juncus bicornis*, Fl. Bor.-Am. i. 191 (1803) "is without question . . . *J. dichotomus*", the earlier and often misinterpreted name of Michaux cannot be taken up to replace Elliott's later one. After his not too convincing diagnosis of *J. bicornis* Michaux confused matters by giving as an exact synonym "*J. tenuis*. Rostk. 24. t. l. f. 3", the *J. tenuis* of Rostkovius being identical with and based upon *J. tenuis* Willd. (1800). By the present International Rules the name *J. bicornis* is, therefore, illegitimate, for Michaux was giving a new name and not taking up the valid earlier one as he should have done.[1] *J. dichotomus* Ell., therefore stands but

[1] Unfortunately the application of this rule to Michaux's Flora Boreali-Americana (1803) results in the following mishaps. For the first combinations I offer the superfluous apology that, my name as author of plant-names being abbreviated "Fern.", I occasionally feel justified in touching up the nomenclature of that group!

PTERETIS **pensylvanica** (Willd.), comb. nov. *Onoclea nodulosa* Michx. Fl. Bor.-Am. ii. 272 (1803), as to description and type-specimen preserved in Michx. Herb., not as to synonyms and habitat stated; Sw. Synop. Fil. 111 (1806); Schkuhr. Krypt. Gew. i. 96, t. 104 (1809). *Struthopteris pensylvanica* Willd. Sp. Pl. v. 289 (1810). *S. nodulosa* (Michx.) Desv. Mém. Soc. Linn. Paris, vi². 287 (1827). *S. germanica*, var. *pensylvanica* (Willd.) Lowe, Ferns, Brit. and Exot. ii. 138 (1862). *Matteuccia nodu-*

another plant which has been associated with it seems to be specifically distinct from it. It is discussed in the following notes.

Juncus **platyphyllus** (Wiegand), stat. nov. Plate 880. *J. dichotomus* Ell., var. *platyphyllus* Wiegand in Bull. Torr. Bot. Cl. xxx. 448 (1903). *J. tenuis* Willd., var. *platyphyllus* (Wiegand) Cory in Rhodora, xxxviii. 405 (1936). See p. 96.

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*losa* (Michx.) Fernald in Rhodora, xvii. 164 (1915). *Pteretis nodulosa* (Michx.) Nieuwl. in Am. Mid. Nat. iv. 334 (1916). *P. Struthiopteris*, var. *pensylvanica* [as *pennsylvanica*] (Willd.) Farwell in Rep. Mich. Acad. Sci. xxi. 346 (1920). *S. Struthiopteris*, var. *pensylvanica* (Willd.) Farw. in Am. Mid. Nat. xii. 252 (1931).

P. pensylvanica, forma **pubescens** (Terry), comb. nov. *Struthiopteris germanica*, f. *pubescens* Terry in Clute in Fern Bull. xvi. 5 and 47 (1908), originally published by Clute as "Ostrich Fern var. pubescens". *Onoclea Struthiopteris*, var. *pubescens* (Terry) Clute, l. c. (1908). *S. pubescens* (Terry) Clute in Fern Bull. xvi. 48 (1908). *S. pensylvanica*, f. *pubescens* (Terry) Clute, l. c. (1908). *Matteuccia pubescens* (Terry) Clute, l. c. (1908). *M. Struthiopteris*, f. *pubescens* and var. *pubescens* (Terry) Clute, l. c. (1908). *Pteretis nodulosa*, f. *pubescens* (Terry) Fernald in Rhodora, xxxvii. 219 (1935). *P. Struthiopteris*, var. *pensylvanica*, subvar. *pubescens* (Terry) Clute in Am. Fern. Journ. xxxvii. 15 (1937).

P. pensylvanica, forma **obtusilobata** (Clute), comb. nov. *Onoclea Struthiopteris*, f. *obtusilobata* Clute in Fern. Bull. xviii. 111 (1910). *Struthiopteris germanica*, f. *obtusilobata* Clute, l. c. (1910). *P. nodulosa*, f. *obtusilobata* (Clute) Fernald in Rhodora, xxxvii. 219 (1935). *P. Struthiopteris*, var. *pensylvanica*, subvar. *obtusilobata* (Clute) Farwell in Am. Fern Journ. xxvii. 15 (1937).

P. pensylvanica, forma **foliacea** (Farw.), comb. nov. *P. Struthiopteris*, var. *pensylvanica*, subvar. *foliacea* Farwell in Am. Fern Journ. xxvii. 15 (1937). *P. nodulosa*, f. *foliacea* (Farw.) Broun, Index N. Am. Ferns, 150 (1938).

Unfortunately the combination *Pteretis nodulosa* is based upon an illegitimate name. When he published his *Onoclea nodulosa* Michaux gave what he thought two earlier synonyms for it. Although these do not apply to the plant he described, he nevertheless thought that they did. He should, therefore, have taken up the earlier specific name of the two. Both Swartz (1806) and Schkuhr (1809) repeated the supposed synonyms. Willdenow (1810) described his *Struthiopteris pensylvanica* from Muhlenberg material and gave no earlier name for it. His name is the first legitimate one for our plant.

Scirpus **rubricosus,** nom. nov. *S. Eriophorum* Michx. Fl. Bor.-Am. i. 33 (1803), as to plant described "spiculis copiosissimis, rufidulis, ovatis, omnibus distincte pedicellatis" and the "*Hab.* a Virginia ad Georgiam," not as to synonym, *Eriophorum cyperinum* L., cited.

Michaux well described the tall southeastern species (Florida to Tex., north to southeastern Massachusetts, Long Island, New Jersey, southeastern Pennsylvania, Maryland, West Virginia, Indiana and Illinois) with spikelets drooping on long pedicels and with bractlets, scales, etc., red-ochre in color (whence the new name); and his southern material, preserved at Paris, is unequivocal. He complicated matters, however, by giving the synonym *Eriophorum cyperinum* L. If, as he thought, his species was the Linnean one he should have used the latter's specific name. *S. cyperinus* (L.) Kunth, however, is a relatively northern species with the spikelets sessile in glomerules (Newfoundland to Minnesota, south to upland North Carolina and to Oklahoma). When Willdenow described the inclusive *S. thyrsiflorus* Willd. Enum. Hort. Berol. 78 (1809) he cited as mere synonyms *S. Eriophorum* Michx. and *Eriophorum cyperinum* L. Here again he neglected to take up the earliest specific name and by the International Rules of 1935 his *S. thyrsiflorus* is illegitimate.

S. rubricosus, forma **praelongus** (Fernald), comb. nov. *S. Eriophorum*, f. *praelongus* Fernald in Rhodora, xliv. 383 (1942).

Although Wiegand distinguished his var. *platyphyllus* from *J. dichotomus* merely by its "Leaves expanded and flat, otherwise as in the type", he and those who have seen only that character (less evident in dry foliage), overlooked several important points. *J. dichotomus* is a stiffly erect or ascending plant of the outer coastal strip, forming hard tussocks, with the inner firm sheaths purple-tinged, the outer ones brown. Its leaf-blades are stiff, filiform, or merely very slenderly channeled on the upper side, with short rounded firm and cartilaginous basal auricles (PLATE 879, FIG.4). The lustrous hard perianth equals or but slightly exceeds the strongly lustrous brown obscurely 1-locular capsule (PLATE 879, FIG. 6).

In *J. platyphyllus* (a hardly descriptive name), on the other hand, the small tufts are relatively soft, although the fresh inner sheaths are purple-tinged; the blades are flat (FIG. 2) or, on drying, merely inrolled; the auricles (FIG. 2) are truncate or merely round-tipped, of firm-membranaceous texture and drab or fuscous, about as broad as long (these differing from the whitish scarious and friable lance-triangular or -oblong auricle of the green- to drab-sheathed *J. tenuis* Willd.); and the relatively soft perianth (FIG. 3) exceeds the paler-brown partially 3-locular capsule, in which the partitions extend half-way to the axis. Other characters in the bracteoles, seeds, etc. are good, but less obvious. Whereas *J. dichotomus* is strictly a coastwise species, *J. platyphyllus* extends far inland (to central Maine, western New York, the Piedmont of Pennsylvania, etc.). In Virginia it is common on the inner Coastal Plain and at least the outer Piedmont: to westernmost Brunswick Co., near the Mecklenberg line, 120 miles due west of False Cape, on the coast, where *J. dichotomus* prevails.

The collections (many more could have been made) of *Juncus platyphyllus* are the following from BRUNSWICK Co.: springy sphagnous and argillaceous bog, Ram-hole Swamp, Seward Forest, near Triplett, no. 14,585; damp thicket northeast of Ebony, no. 14,583.

PLATE 879, FIGS. 1–4, JUNCUS TENUIS Willd. (*J. macer* S. F. Gray): FIG. 1, inflorescence, × 1, of TYPE, after *Rostkovius;* FIG. 2, characteristic inflorescence, × 1, from Middletown, Rhode Island, July 4, 1909, *E. F. Williams;* FIG. 3, summit of sheath, showing friable hyaline margin and thin, prolonged and easily shriveled auricle, × 5, from Southington, Connecticut, *L. Andrews*, no. 189; FIG. 4, mature fruits, × 6, from Knight's Island, North Hero, Vermont, July 14, 1901, *Ezra Brainerd*. Figs. 5–7, J. dichotomus Ell. (*J. tenuis* sensu Steudel, Mackenzie and their followers, not Willd.): fig. 5, summit of sheath and base of leaf, × 10, from Angier, Hartnett Co., South Carolina, *Godfrey*, no. 4266; fig. 6, inflorescence, × 1, from no. 4266; fig. 7, fruit, × 6, from no. 4266.

Plate 880, J. platyphyllus (Wiegand) Fernald: fig. 1, inflorescence, × 1, from near Burgess Station, Dinwiddie Co., Virginia, *Fernald & Long*, no. 10,185; fig. 2, summit of sheath and base of leaf, × 10, from no. 10,185; fig. 3, capsules, × 6, from no. 10,185.

A second Station for Juncus Griscomi.—Two species of *Juncus* § *Genuini* are among the rarest plants of the eastern United States. The famous *J. gymnocarpus* Coville has a few remote stations, the northernmost in a sphagnous swamp on top of Broad Mountain in Schuylkill Co., Pennsylvania, where it was discovered by the late *Charles E. Smith*, the species appropriately called *J. Smithii* Engelm., but, on account of the earlier use of that name, changed to *J. gymnocarpus*. The other is *J. Griscomi* Fernald in Rhodora, xxxviii. 401, pl. 445, figs. 1–4 (1936), suggesting a lax-flowered extreme of *J. effusus* L., but with the flowers mostly on filiform pedicels up to 1 cm. long, the capsules rounded to the summit and definitely beaked (instead of emarginate and beakless). This remarkable plant was discovered by Griscom and me by lucky chance. Botanizing on a terrifically hot June day in 1935, on Little Neck in Princess Anne County, Virginia, we were panting with thirst when we saw children emerge from the rich woods with pails of water. Quick to take the hint, we followed the foot-path and came to a spring-rill and mossy swale in the deciduous woods, the swale solidly occupied by the strange new *Juncus*. Search by my companions and me during eight seasons has failed to reveal another station for it.

At the meeting of the New England Botanical Club on the evening of June 2nd last, I showed these two famously rare species and urged the members to watch for them in New England or elsewhere. I little expected immediate results; but promptly on the morning of June 3, looking through the miscellaneous unidentified *Junci* at the Gray Herbarium, I was surprised and delighted to find a beautifully characteristic specimen of *J. Griscomi*, sent in unidentified and collected on June 20, 1922, by *L. F. & Fannie R. Randolph* (no. 403) in "moist rich soil, Powhatan Swamp ½ mile southwest of Five Forks, James City County", Virginia. As usual the Randolphs saw and prepared beautiful material of a great rarity.


*Photo. B. G. Schubert*

Polygonum hydropiperoides, var. euronotorum, all figs. from type: fig. 1, portion of plant, × 3/5; fig. 2, summit of ochrea, × 4; fig. 3, panicle, × 1; fig. 4, portion of panicle, showing ochreolae, × 10


*Photo. B. G. Schubert.*

POLYGONUM HYDROPIPEROIDES (typical): FIG. 4, ochrea, × 4; FIG. 5, panicle, × 1; FIG. 6, portion of panicle, to show ochreolae, × 10
Var. BUSHIANUM, all figs. from TYPE: FIGS. 1 and 2, summit of plant, × 1; FIG. 3, portion of panicle, to show ochreolae, × 10

J. REPENS Michx. Local range extended inland to western GREENSVILLE Co.: open muddy border of Fontaine Creek, near mouth of Quarrel's Creek, no. 14,696. See p. 101.

J. LONGII Fernald. Local range extended inland from Coastal Plain to BRUNSWICK Co.: damp openings in woods, scarce, Moseley flat pineland, near Triplett, no. 14,586, there associated with other Coastal Plain types, such as *Hypericum setosum* L. and *Cynoctonum sessilifolium* (see RHODORA, xlv. 374, 376, 453 and 457), as well as such essentially inland plants as *Fimbristylis Drummondii* (p. 95), *Carex hirsutella* (p. 96) and *Psoralea psoralioides*, var. *eglandulosa* (p. 95).

J. SCIRPOIDES Lam. Local range extended back into the Piedmont in BRUNSWICK Co.: with the last, no. 14,587. See p. 96.

SOME VARIETIES AND FORMS OF JUNCUS CANADENSIS (PLATES 881 and 882).—Even after the removal from the complex *Juncus canadensis* J. Gay, as conceived by Engelmann, of *J. brachycephalus* (Engelm.) Buchenau, *J. brevicaudatus* (Engelm.) Fernald and *J. subcaudatus* (Engelm.) Coville & Blake, the remaining stiffly ascending *J. canadensis* is still a complex and highly variable plant. Generally, throughout its range, its capsule barely to but slightly exceeds the perianth and is gradually rounded at summit to a short and rather abrupt beak, but from southeastern Virginia to Georgia there occurs a very similar plant (PLATE 881, FIGS. 1–3), always with a large cyme (1–3.3 dm. long and 5–16 cm. broad), closely resembling large plants of typical *J. canadensis*[1], but with prolonged capsule tapering gradually to summit, much as in the northern *J. brevicaudatus* and the extremely southern *J. trigonocarpus*. This constitutes a well defined geographic variety which I am calling

*JUNCUS CANADENSIS J. Gay, var. **euroauster,** var. nov. (TAB. 881, FIG. 1–3), planta robusta 0.9–1.2 m. alta, culmo ad basin 4–7 mm. diametro; cyma 1–3.3 dm. longa 5–16 cm. alta; capitulis hemisphericis vel subglobosis multifloris distinctis vel paullo aggregatis; perianthiis 3–4 mm. longis; capsula acuta sensim attenuata valde exserta.—Southeastern Virginia to Georgia. VIRGINIA: pool in sandy barrens, Cape Henry, Sept. 23, 1933, *Fernald & Griscom*, no. 2811; sphagnous springy swales bordering Whiteoak Swamp, west of Elko Station, Henrico Co., Sept. 21, 1938, *Fernald & Long*, no. 9294; moist argillaceous pineland about 2 miles east of Stony Creek, Oct. 11 and 12, 1933, *Fernald & Long*, no. 9553; wet sandy and peaty shore, near entrance to Portsmouth Ditch, Lake Drummond, Great Dismal Swamp,

[1] See Fernald in RHODORA, xxxii. 83–88 (1930).

west of Wallaceton, Norfolk Co., Sept. 6, 1941, *Fernald & Long*, no. 13,588 (TYPE in Herb. Gray., ISOTYPE in Herb. Phil. Acad.); fresh reed-marsh and swale along Northwest River, near Northwest, Norfolk Co., Oct. 11, 1941, *Fernald & Long*, no. 13,913; sphagnous bog about 1 mile northwest of Dahlia, Greensville Co., Sept. 18, 1938, *Fernald & Long*, no. 9293. NORTH CAROLINA: drainage-ditch near Sea Level, Cartaret Co., Sept. 1, 1938, *Godfrey*, no. 6505. SOUTH CAROLINA: without stated locality, *M. A. Curtis;* drainage-ditch, 15 miles northwest of Georgetown, Georgetown Co., Aug. 25, 1939, *Godfrey & Tryon*, no. 1693. GEORGIA: swamp (at sea-level) Satella River, near Woodbine, Camden Co., Aug. 23, 1902, *Harper*, no. 1564.

In its slender, long-exserted and tapering capsule *Juncus canadensis*, var. *euroauster* suggests *J. trigonocarpus* Steud., but in all other characters, including the very large cyme, it belongs with *J. canadensis*.

Typically and through most of its range *Juncus canadensis* has a relatively short and apically rounded and abruptly short-beaked capsule, and the perianth is only 2.5–rarely 3.5 mm. long, but in the plant of Newfoundland, the northern regions of Quebec and locally southward into Nova Scotia and eastern Maine, rarely on Cape Cod, var. *sparsiflorus* Fernald (PLATE 881, FIGS. 4 and 5) in RHODORA, xxiii. 241 (1921), the perianth is 3.5–4 mm. long, much as in the extreme southern var. *euroauster*. The remaining large series which passes as *J. canadensis* presents three rather striking forms—forms because, although sometimes more abundant in definite ecological conditions, they occur wholly within the broad range of typical *J. canadensis*. In order to show their distinctive characteristics I am indicating the varieties and forms in a key.

*a*. Capsule plump, gradually rounded at summit to the rather abrupt short beak....*b*.
- *b*. Perianth 2.5–3.3 (rarely –3.5) mm. long; cyme (except in forma *conglobatus*), with spreading-ascending branches (rays) and branchlets, 0.4–3 dm. high....*c*.
  - *c*. Heads chiefly or wholly scattered in anthelate fashion along the branches of the open cyme; cyme 0.4–3 dm. high, with some elongate branches.
    - Heads densely 8–20-flowered, hemispherical to subglobose.......................... *J. canadensis*, var. *typicus*.
    - Heads turbinate to subhemispherical, 2–7-flowered Var. *typicus*, forma *apertus*.
  - *c*. Heads all or many densely crowded into irregular glomerules or masses, globose, many-flowered, the glomerules sessile or on short rays up to 1–3 cm. long. Var. *typicus*, forma *conglobatus*.

*b.* Perianth 3.5–4 mm. long; cyme with stiffly erect branches and branchlets, 0.3–1.5 (–2) dm. high . . . . . . . . . . . . . Var. *sparsiflorus.*

*a.* Capsule slender, gradually attenuate to acute tip, long-exserted; cyme open, 1–3.3 dm. high; glomerules hemispherical to subglobose, many-flowered; perianth 3–4 mm. long . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Var. *euroauster.*

J. CANADENSIS J. Gay, var. **typicus.** PLATE 882, FIGS. 1–3. *J. canadensis* J. Gay in Laharpe, Mon. Junc. 134 (1827), in large part (α); Engelm. Trans. St. Louis Acad. ii. 436 (1866—var. *longicaudatus*) and 474 (1868—var. *longecaudatus*); Coville in Britton & Brown, Ill. Fl. i. 394, fig. 955 (1896); Fernald in RHODORA vi. 35 (1904) and xxxii. 83 et seq. (1930).—Widely distributed from southern Quebec and Ontario to Georgia, Tennessee and Louisiana.

*Forma **apertus,** f. nov. (TAB. 882, FIG. 4–6), cyma 1–3 dm. longa laxe aperta, capitulis remotis turbinatis vel subhemisphaericis 2–7-floris.—Scattered in the range of var. *typicus.* NOVA SCOTIA: gravelly margin of brook, Sydney, Aug. 18, 1902, *Fernald;* roadside-pool, Yarmouth, June 22–29, 1901, *Howe & Lang,* no. 131. MAINE: Labrador Pond, Sumner, Aug. 9, 1890, *J. C. Parlin.* MASSACHUSETTS: sandy and cobbly beach of Seth's Pond, West Tisbury, Aug. 16, 1928, *Fernald & Fogg,* no. 865. RHODE ISLAND: edge of pond-hole, northwest shore of Block Island, Aug. 11, 1919, *C. B. Graves.* CONNECTICUT: ponds, Wethersfield, *Chas. Wright.* NEW YORK: woody swale east of north end of Duck Lake, Conquest, Aug. 12, 1916, *F. P. Metcalf,* no. 6164. NEW JERSEY: border of white-cedar swamp along Scotland Run, Malaga, Gloucester Co., Nov. 1, 1936, *Bayard Long,* no. 49,279 (TYPE in Herb. Gray.). VIRGINIA: quaking margin of pond-hole about 2 miles east of Bowling Green, Oct. 15, 1941, *Fernald & Long,* no. 13,914; sandy swampy ground, Chisel's Run, west of Williamsburg, July 16, 1921, *Grimes,* no. 4040; sphagnous border of shallow pond-hole ½ mile east of Centerville, James City Co., July 26, 1941, *Fernald & Long,* no. 13,296. SOUTH CAROLINA: creek, 8 miles southeast of Columbia, Lexington Co., Aug. 8, 1939, *Godfrey & Tryon,* no. 1346. GEORGIA: bushy place, south of Kennesaw Mt., Cobb Co., July 12, 1900, *Harper,* no. 995.

*Forma **conglobatus,** f. nov. (TAB. 882, FIG. 7), culmo stricto 2–10 dm. alto; cyma 1–12 cm. longa; capitulis globosis multifloris in glomerulis subglobosis vel lobatis plerumque aggregatis, ramibus nullis vel ad 1–4 cm. longis.—Through much of the area of var. *typicus,* especially concentrated near the Atlantic coast from southern Maine to Maryland. The following are selected from a large representation. MAINE: brackish marsh, Winnegance Creek, Phippsburg, Aug. 23, 1909, *Fernald,* no. 1559. NEW HAMPSHIRE: marsh, Rye Beach, Aug. 18, 1886, *W. Deane.* MASSACHUSETTS: Plum Island, Essex Co., 1896, *A. A. Eaton;*

Kent's Island, Byfield, Aug. 18, 1904, *J. H. Sears;* Dorchester, Aug. 28, 1853, *Wm. Boott;* Sept. 3, 1882, *C. W. Swan;* damp open sandy soil near Kelly's Pond, West Dennis, Dennis, Aug. 10, 1918, *Fernald & Long,* no. 16,544; cranberry bog near beach, Hyannis, Oct. 5, 1911, *C. A. Weatherby,* no. 2833 (TYPE in Herb. Gray, ISOTYPE in Herb. New Engl. Bot. Cl.). RHODE ISLAND: Cat Swamp, Providence, Sept. 4, 1892, *J. F. Collins;* Middletown, Sept. 13, 1908, *E. F. Williams;* dryish fresh to slightly brackish borders of marshes east of Trim's Pond and Great Salt Pond, Block Island, Aug. 20, 1913, *Fernald & Long,* no. 9206; borders of brackish pools and salt marshes, vicinity of Watch Hill Pond, Westerly, Aug. 31, 1919, *Weatherby & Collins.* CONNECTICUT: wet meadow, East Windsor, Aug. 14, 1906, *Bissell;* moist field, Waterbury, Aug. 21, 1911, *Blewitt,* no. 510; fresh-water swamp near Saybrook Point, Saybrook, Sept. 7, 1908, *Blewitt;* edge of salt meadows, Fairfield, Aug. 20, 1909, *Eames.* NEW YORK: edge of salt marsh, Oceanside, Nassau Co., Sept. 20, 1917, *House,* no. 18; Westbury Prairie, Butler, Wayne Co., Oct. 5, 1916, *Metcalf & Wright.* NEW JERSEY: Hackensack Marshes, Sept., 1848, *J. Carey* (the specimen given by Engelmann an appropriate but unpublished formal name but one preoccupied in the specific category). DELAWARE: moist soil, Rehoboth, Sept. 6, 1908, *Churchill:* wet hollows in sand dunes, south of Bethany Beach and on Fenwick Island, Sussex Co., Aug. 28, 1936, *Fogg,* nos. 11,225 and 11,301. MARYLAND: wet sand, border of brackish marsh, north of Ocean City, Worcester Co., Sept. 12, 1936, *Fogg,* no. 11,429. VIRGINIA: "Ram-hole Swamp," Seward Forest, Brunswick Co., Dec. 1, 1944, *Lewis.* NORTH CAROLINA: marsh near Leechville, Hyde Co., Oct. 13, 1938, *Godfrey & White,* no. 6852. SOUTH CAROLINA: wet ground near a spring, Aiken, Oct. 8, 1866, *H. W. Ravenel* in Engelm. Herb. Junc. Bor.-Am., no. 86. GEORGIA: shallow grassy pond, alt. 250 ft., near Adams Park, Twiggs Co., Sept. 7, 1903, *Harper,* no. 1972. MICHIGAN: wet ground, Hersen Island, mouth of St. Clair R., Sept. 17, 1908, *C. K. Dodge,* no. 39; drying mucky shore of Lake Sixteen, Black Lake State Forest, Presque Isle Co., Aug. 27, 1935, *F. J. Hermann,* no. 7010 (transitional). WISCONSIN: St. Croix Co., 1861, *T. J. Hale.* ILLINOIS: Englewood, South Chicago, Sept. 2, 1893, *Churchill.* MINNESOTA: Minneapolis 1861, *T. J. Hale;* moist sandy soil, shores of Moore Lake, Anaka Co., Oct. 3, 1927, *Rosendahl,* no. 5472, Sept. 6, 1936, *Rosendahl & Rydberg,* no. 5124.

From its strong tendency along the Atlantic coast to abound at the upper borders of salt marshes forma *conglobatus* might be thought a good variety (and perhaps it is), but it also occurs in acid peats and sands and extends as far west as typical *J. canadensis.* Many specimens, difficult to place, occur, these making every conceivable transition to the latter plant, with more open cyme, elongate rays and mostly scattered or anthelate heads. As noted in one case, Engelmann gave an appropriate but preoccupied formal name to this plant.

Var. SPARSIFLORUS Fernald in RHODORA, xxxiii. 241 (1921). PLATE 881, FIGS. 4 and 5.—Newfoundland to the Laurentide Mts. of Quebec, south to Nova Scotia and eastern Maine, rarely on Cape Cod, Mass.

Var. EUROAUSTER Fernald, supra. PLATE 881, FIGS. 1–3.—Southeastern Virginia to Georgia.

PLATE 881, FIGS. 1–3, JUNCUS CANADENSIS J. Gay, var. EUROAUSTER Fernald: FIG. 1, portion of TYPE, × ½; FIG. 2, portion of glomerule, × 10, from TYPE; FIG. 3, seeds, × 10, from TYPE. FIGS. 4 and 5, var. SPARSIFLORUS Fernald: FIG. 4, inflorescence, × 1, from Quarry, Newfoundland, *Fernald & Wiegand*, no. 5129; FIG. 5, glomerule, × 10, from no. 5129.

PLATE 882, FIGS. 1–3, J. CANADENSIS, var. TYPICUS: FIG. 1, inflorescence, × 1, from Iona Island, Hudson River, Rockland Co., New York, *Muenscher & Curtis*, no. 5833; FIG. 2, flower, × 10, from no. 5833; FIG. 3, seeds, × 10, from no. 5833. FIGS. 4–6, forma APERTUS Fernald, all figs. from TYPE: FIG. 4, inflorescence, ×½; FIG. 5, glomerule, × 10; FIG. 6, seeds, × 10. FIG. 7, forma CONGLOBATUS Fernald: two inflorescences, × 1, from TYPE.

*SMILAX BONA-NOX L., var. EXAURICULATA Fernald in RHODORA, xlvi. 36 and 37, t. 811. fig. 3 (1944). Type from Norfolk, *Reed?*

DIOSCOREA BATATAS Dcne. To the relatively few stations recorded add one in BRUNSWICK Co.: climbing over bushes, dry thicket near old Taylor Place, Seward Forest, near Triplett, no. 14,593.

CYPRIPEDIUM CALCEOLUS L., var. PUBESCENS (Willd.) Correll. To the few recorded stations in the southeastern counties add one in BRUNSWICK Co.: rich woods, "Chamblis bigwoods", Seward Forest, near Triplett, no. 14,594. See p. 97.

QUERCUS PHELLOS L., forma INTONSA Fernald in RHODORA, xliv. 392 (1942). To the two recorded Virginia stations add one in BRUNSWICK Co.: damp thicket northeast of Ebony, no. 14,598. See p. 96.

CASTANEA NEGLECTA Dode. To the few recorded stations add two in BRUNSWICK Co.: rich woods "Chamblis bigwoods", Seward Forest, near Triplett, no. 14,597; mixed woods, Seward Forest, southeast of Ante, no. 14,698.

Here, as in the more eastern counties, *Castanea neglecta* is a straggling or loosely branched shrub of rich woodland. We have never found it fruiting, nor have we found it with *C. pumila* nor in habitats where *C. dentata* might formerly have grown. See p. 97.

The Indigenous Variations of Ulmus americana.—*Ulmus americana,* the most wide-spread of the American species and the tree probably more generally recognized than any other by the layman in the East, is far from being a definite unit. As one collects material in foliage he promptly becomes aware of four different forms. These first came to my attention when, in late May, 1904, I visited my parents in central Maine, just as the fruit of the elms was dropping and the foliage well expanding. I then made collections to display the forms and have subsequently waited in vain for some of the specialists on trees to clarify the situation. In brief, *Ulmus americana* may have the leaves smooth or essentially smooth to touch on the upper surface, or the latter may be almost as harshly scabrous as in the Slippery Elm, *U. rubra* Muhl. (*U. fulva* Michx.)—see last notes in this paper. In each series the young branchlets may be pubescent or quite glabrous. In the flowering condition, obviously, these strongly marked extremes can hardly be recognized; in the foliage-material they are striking.

As early as 1789 Aiton, Hort. Kew. i. 319, 320 (1789) recognized varieties of *Ulmus americana* with scabrous or with smoothish leaves and Spach (1841) and Walpers (1852–53) took these up or augmented them; but so far as I can find, the actual type of Linnaeus has not been closely examined, to determine to which of the four variations it belongs. The photograph of it before me is wholly inconclusive. Nor can I get what I consider true geographic varieties in the species. Each of the variations appears throughout most or all of the broad range of the species, trees with scabrous or smooth leaves and with pubescent or glabrous new branchlets occurring, for example, in New England, while two or three of these trends are represented in the Gray Herbarium from Virginia, Ontario and Oklahoma. I am, therefore, treating them as forms, with the clear understanding that when the actual types of Linnaeus, Aiton and others can be studied some shifting in the application of the names may be required. It is better to have names by which the forms can be designated than to call them all one, without differentiation. As I see these forms they are as follows:

Leaves smooth or smoothish above.
Young branchlets pubescent . . . . . . . . . . . . . . . . . . . . . . . . . Forma *pendula*.
Young branchlets glabrous . . . . . . . . . . . . . . . . . . . . . . . . . . Forma *laevior*.
Leaves harshly scabrous above.
Young branchlets pubescent . . . . . . . . . . . . . . . . . . . . . . . . . Forma *alba*.
Young branchlets glabrous . . . . . . . . . . . . . . . . . . . . . . . Forma *intercedens*.

U. AMERICANA L., forma **pendula** (Ait.), stat. nov. *U. americana* γ. *pendula* Ait. Hort. Kew. i. 320 (1789); Willd. Sp. Pl. $1^2$. 1326 (1798); Spach in Am. Sci. Nat. Bot. sér. 2, xv. 364 (1841). *U. americana*, α. *glabra* Walp. Annal. iii. 424 (1852–53), illegitimate substitute for var. *pendula* Spach.

The following Virginian specimen is clearly referable here. HENRICO Co.: south shore of James R., Richmond, April 20, 1915, *J. R. Churchill*.

*Forma **laevior,** f. nov. foliis supra laevibus vel sublaevibus; ramulis novellis glabris.—TYPE: river-bank, Orono, Maine, May 30, 1904, *Fernald* (in Herb. Gray.; ISOTYPE in Herb. New Engl. Bot. Club).

The following Virginian specimens are before me. PRINCESS ANNE Co.: Oceana, *Fernald & Long*, nos. 3911 and 3912. ISLE OF WIGHT Co.: below Rushmere, *F. & L.* no. 13,325.

*Forma **alba** (Ait.), stat. nov. *U. americana*, β. *alba* Ait. l. c. (1789); Willd. l. c. (1798). *U. americana*, β. *scabra* Spach, l. c. (1841), illegitimate substitute for var. *alba* Ait.

The following Virginian specimen belongs here. NEW KENT Co.: Pamunkey R., southeast of White Horse, *F. & L.*, no. 11,560.

*Forma **intercedens,** f. nov., foliis supra scaberrimis; ramulis novellis glabris. TYPE: Franconia, New Hampshire, Sept. 15, 1910, *G. G. Kennedy* (Herb. Gray.).

The following Virginian specimen is characteristic. FAUQUIER Co.: Bull Run Mts., *Allard*, no. 1037.

ASARUM LEWISII Fernald in RHODORA, xlv. 398, plates 774 and 775 (1943). Range extended slightly to the northeast in BRUNSWICK Co.: very abundant, forming extensive carpets in pine (*Pinus Taeda*) or mixed woods, even far removed from streams, Seward Forest, southeast of Ante, no. 14,699. Leaves varying from short-reniform (nearly twice as broad as long) through cordate-rotund or cordate-ovate outlines to subhastate or narrowly ovate. See p. 102.

SO-CALLED RUMEX BRITANNICA NOT A VIRGINIAN. (PLATE 883).—In his Materia Medica, 59 (1749) Linnaeus, describing the Water Dock of northern Europe, *Rumex Hydrolapathum* Huds., stated that its root was known in pharmacy as "HERBAE BRITANNICAE Radix" and that it occurred in Europe:

177. RUMEX floribus hermaphroditis, valvulis integerrimis nudis, foliis cordato-lanceolatis. *Fl. Suec.* 292. *β.*

LAPATHUM aquaticum, folio cubitali. *Boerh. pin.* 116.

LOC: Europae nostrae paludes. *Perennis, vulgaris.*

PHARM: HERBAE BRITANNICAE Radix.—L. Mat. Med. 59 (1749).

Three years later, in Sp. Pl. 334 (1753) there appeared, immediately following *Rumex verticillatus* from Virginia, another reputed Virginian:

*Britannica.* 5. RUMEX floribus hermaphroditis: valvulis integerrimis: omnibus graniferis, foliis lanceolatis: vaginis obsoletis. *Mat. med.* 17.

Rumex aquatica, calycis foliolis omnibus aequalibus, radice exterius nigra vel flava. *Cold. noveb.* 83.

Lapathum foliis longis latis vix acuminatis costis caulibusque rubentibus, radice intus crocea. *Gron. virg.* 39.

*Habitat in* Virginia. ♃.

*In praecedenti stipula cylindrica membranacea fere ad dimidium vaginans internodium, in hac vero non item, sed ut in Europaeis. Pedicelli in priori crassiores in hac capillares; prior magis spicata; hac magis paniculata. Plantam Gron. in Fl. virginica habui a Cl. Authore, quae non rubra erat caule aut costis.*

The first reference, to "*Mat. med.* 17", was apparently meant for his no. 177, with the description somewhat altered but belonging to the European plant. The Colden plant, *Rumex aquatica*, etc. from New York was probably the American species which now passes as *R. Britannica* but the Clayton (Gronovian) material from Virginia was "something else again". Asa Gray, studying the Gronovian material reported as follows:

*RUMEX BRITANNICA L. I think I have been able to determine the *Rumex* to which Linnaeus gave this unfortunate name. The source of the name is to be found by following up his reference to "*Mat. Med.* 17," i. e. Materia Medica, paragraph 177 (not 17), where, under reference to Fl. Suec. 292, "Europae nostrae paludes," is added "*Pharm. Herbae Britannicae radix.*" The North American plant to which he applied this name was one in his herbarium sent to him by Gronovius from Clayton's herbarium of the Flora Virginica. The fruit of it is not well developed, but the slender pedicels and the foliage show that it is the *R. orbiculatus* of the later edition of my Manual. But the specimen retained in Clayton's herbarium to represent the species, and the only Rumex in that herbarium, is quite different, has some long-awned teeth to the valves, and is, I believe, *R. obtusifolius*. The difference in the plants accounts for the remark of Linnaeus: "Plantam Gron. in Fl. Virginica habui a Cl. Authore, quae non rubra erat caule aut costis." For Clayton's character, as printed by Gronovius in the first edition of


*Photo. B. G. Schubert.*

Polygonum hydropiperoides, var. breviciliatum, all figs. from type: fig. 1, flowering tip, × 1; fig. 2, ochrea, × 4; fig. 3, portion of panicle, to show ochreolae and distant flowers, × 10


*Photo. B. G. Schubert.*

AMARANTHUS GRAECIZANS: FIG. 1, TYPE, × 2/5, from photograph from Dr. *John Ramsbottom;* FIG. 2, text from bottom of sheet; FIG. 3, portion of type, × 1, of *A. blitoides*

Flora Virginica, was:—"Lapathum foliis longis latis vix acuminatis, *costis caulibusque rubentibus*, radice intus crocea." That probably relates to the plant retained by Gronovius. And the specimen sent was perhaps Clayton's other species, viz.,—"Lapathum aquaticum foliis longis," &c., which Linnaeus referred to *R. verticillatus*. As to the *R. Britannica* of Michaux, Pursh, and even Meisner, it is uncertain whether they had in view the plant called by me in the Manual by that name, but named by Professor Wood *R. altissimus*, or that which Wood and probably Pursh took for *R. Britannica*, and I named *R. orbiculatus*. The latter proves to be the Linnaean species, and must claim the name, unless that be regarded as a *nomen falsum*, in which case we must take up that of *R. Claytoni*[*i*] Campdera, who may be presumed to have meant the Linnaean plant, although there is nothing in his character to certify it. A considerable difficulty in identifying the Linnaean species by the description grew out of the comparison in the species Plantarum with *R. verticillatus*, with which when in fruit it has little in common, except the slender pedicels. It should also be noticed that there is a transposition in the naming of the specimens in the Linnaean Herbarium, which, however, has been corrected by Smith.—Gray, Proc. Am. Acad. viii. 399 (1872).

Gray referred to the fragment sent by Gronovius to Linnaeus as having "the fruit . . . not well developed, but the slender pedicels and the foliage show that it is the *R. orbiculatus* of the later edition of my Manual", while the specimen in the Clayton (Gronovian) collection seemed to him *R. obtusifolius*. Of the latter a photograph (our PLATE 883) before me is convincing; it is very characteristic *R. obtusifolius*, adventive from Europe. As to the bit preserved in the Linnean Herbarium Reckinger wrote:

The name *R. Britannica* is used here in the sense of Trelease and subsequent authors. The identity of this plant with Linné's *R. Britannica* is not clear to me. Earlier authors seem to have confused it with *R. altissimus* Wood. Perhaps it would be more cautious to use the name *R. orbicularis* [*orbiculatus*] Gray.

Mr. H. W. Pugsley of London kindly undertook to examine for me the specimen of *R. Britannica* in the Linné Herbarium. He wrote that the specimen deposited there under the name *R. Britannica* is not absolutely a type, because there is no evidence of the date at which it was inserted in the herbarium. It consists of a small branch with narrow leaves, without axillary branches. The fruiting pedicels are 7–15 mm. long and the valves triangular, about 5 mm. long and broad. These characters for the most part seem not to agree with *R. Britannica* of authors.—Reckinger, North American Species of Rumex, Field Mus. Nat. Hist. Bot. Ser. xvii. no. 1. 126 (1937).

It is not without significance that we do not know the subaquatic plant which regularly passes as *Rumex Britannica* so far south as Virginia. The southernmost material in the Gray Herbarium from the Atlantic States is from northern New Jersey and northeastern Pennsylvania, although Mr. Long informs me that it reaches south, rarely, to southern New Jersey and southeastern Pennsylvania; Trelease said "south to New Jersey" and Reckinger cites nothing from south of northern New Jersey.

Since *Rumex Britannica* started out as a European species but, in spite of references to the latter in 1753, when the binomial was published, had its "*Habitat in* Virginia", and since the only fragment in the Linnean Herbarium is something else, while the Virginian specimen in Clayton's herbarium is the adventive *R. obtusifolius* L., it is difficult to see why *R. Britannica* is not an absolute *nomen confusum*. I must view it so and am taking up for our indigenous representative of the European *R. Hydrolapathum* the unequivocal R. ORBICULATUS Gray, Man. ed. 5: 420 (1867).

When he published the name *Rumex orbiculatus* for the northern subaquatic American species with orbicular or round-ovate to subcordate fruiting valves all grain-bearing, Gray took up for the mixed Virginian material the ill-begotten name *R. Britannica* and placed in its synonymy *R. Claytonii* Campdera, "which name is to be adopted if we reject that inconsiderately assigned by Linnaeus, who transferred the obscure *Herba Britannica* of the old writers to a Virginian species". Campdera, however, in publishing *R. Claytonii* Mon. Rumex, 99 (1819) with "Hab. ad rivulos Virginiae et Carolinae", stated off with the Gronovian description of the red-veined *R. obtusifolius* L., which Gronovius had from Clayton, then the Colden reference to the aquatic plant of New York, then the description of the European plant in Materia Medica, etc., and described the valves as scarcely grain-bearing (sepalis interioribus vix granulatis). Since our northern subaquatic species is very definite, in having the three valves all grain-bearing, Campdera's *R. Claytonii* was almost as confused a concept as was the original *R. Britannica;* and any one who is familiar with the "rivulos Virginiae et Carolinae" knows that the abundant plant at their margins is *R. verticillatus* L. Specimens of *R. altissimus* Wood, with which Gray in 1867 identified *R. Claytonii*, could be found by Trelease southward in the East only to the District of Columbia; while Reckinger saw Virginian material only from the Potomac near Washington and none from farther south in Virginia or from the Carolinas. Within the area known to Clayton the only material of *R. altissimus* we know is a small patch recently and casually introduced into the yard of the Norfolk and Western Railroad at Petersburg. The Norfolk and Western did not exist in Clayton's time. *R. Claytonii*, then, is a hopelessly confused concept, the plant "ad rivulos Virginiae et Carolinae" being the earlier published *R. verticillatus* L.!

Four sheets in the Gray Herbarium were marked by Gray *Rumex orbiculatus* "Man. ed. 3", although actually in ed. 5. In ed. 3 he merely suggested that our plant, which he then called *R. Hydrolapathum*, var. *americanus*, was probably a distinct species. As TYPE of *R. orbiculatus* I am designating a sheet from New Haven, Connecticut, coll. *D. C. Eaton*.

*POLYGONUM PENSYLVANICUM L., forma **albinum,** f. nov., calycis albidis.—Wooded bottomland of Meherrin River at Westward Bridge, Brunswick Co., VIRGINIA, Sept. 16, 1944, *Fernald* (with *J. B. Lewis*), no. 14,702 (TYPE in Herb. Gray.). An albino of typical *P. pensylvanicum* (with glandular peduncles). See p. 100.

*P. MINUS Huds., var. SUBCONTINUUM (Meisn.) Fernald in RHODORA, xix. 134 (1917). GREENSVILLE Co.: roadside, Emporia, no. 14,600. Not previously recorded, apparently, from south of Pennsylvania.

*P. HYDROPIPEROIDES Michx., var. **euronotorum,** var. nov. (TAB. 884), foliis anguste linearibus vel lanceolato-linearibus plerumque 6–12 cm. longis 4–14 mm. latis longe attenuatis supra glabrescentibus vel sparsissime minuteque strigillosis subtus minute puberulis marginibus revolutis; ochreis strigosis ciliis vaginas subaequantibus; paniculis densis 5–8 mm. crassis; ochreolis arctis supra turbinatis inferioribus ciliis 3–5 mm. longis, mediis ciliis 1.5–2 mm. longis; pedicellis vix exsertis; calyce fructifero anguste rhomboideo 3–3.5 mm. longo achenio trigono arcte adpresso.—Southeastern Virginia and southeastern North Carolina. VIRGINIA: Western Branch, Norfolk Co., August, 1840, *Rugel*, no. 113; moist sandy and peaty shore of Whitefield's Millpond, southwest of Corinth, Southampton Co., Sept. 18, 1944, *Fernald*, no. 14,701 (TYPE in Herb. Gray.; ISOTYPE in Herb. Phil. Acad.). NORTH CAROLINA: along shore of lake at Lakeview, Moore Co., July 18, 1938, *Godfrey*, no. 5112; Greenfield Lake, Wilmington, New Hanover Co., June 29, 1938, *Godfrey & Wells*, no. 4808 (in bud); drainage-ditch at Carolina Beach, New Hanover Co., July 18, 1938, *Godfrey*, no. 4656. See p. 105.

Var. *euronotorum* (of southeast winds) is one of the very narrow-leaved extremes of *Polygonum hydropiperoides.* In foliage and in its dense panicle it simulates *P. opelousanum* Riddell, but its deep pink flowers with relatively slender calyces 3–3.5 mm. long and completely investing the achene, place it clearly in the former species, the usually greener and plumper calyx of *P. opelousanum* being only 1.5–2 mm. long and shorter than the achene.

*P. hydropiperoides,* var. *euronotorum* has the long cilia of the ochreolae (fig. 4) as in var. *Bushianum* Stanford in Rhodora, xxviii. 27 (1926) but that plant (plate 885, figs. 1–3) of Oklahoma, Kansas and possibly Missouri has broadly lanceolate leaves and the panicles (figs. 2 and 3) loose and open with very long-exserted pedicels. Occasionally typical *P. hydropiperoides* (plate 885, figs. 4–6) has as narrow leaves, but its panicles are more slender and the cilia of the ochreae 2–4 mm. long (fig. 4), those of the ochreolae 0.5–1 mm. long (fig. 6), the uninjured ochreae of var. *euronotorum* having cilia 5–7 mm. long, those of the ochreolae 1.5–2 mm. long. The local var. *breviciliatum* Fernald in Rhodora, xlii. 448 (1940), our plate 886, as yet known only from Dinwiddie Co., Virginia, has lanceolate leaves 1.5–3.2 mm. broad, the cilia of the ochreae only 0.8–1.2 mm. long (fig. 2), those of the ochreolae (fig. 3) wanting or at most 0.4 mm. long, the panicle (figs. 1 and 3) slender and open, with long-exserted pedicels.

In its apparent concentration on the coastal plain of southeastern Virginia and in the region of Wilmington and adjacent southeastern North Carolina var. *euronotorum* joins a considerable group of plants of similarly bicentric ranges.

Plate 884, Polygonum hydropiperoides Michx., var. euronotorum Fernald, all figs. from type: fig. 1, portion of plant, × 3/5; fig. 2, summit of ochrea, × 4; fig. 3, panicle, × 1; fig. 4, portion of panicle, to show ochreolae, × 10.

Plate 885, figs. 1–3, P. hydropiperoides, var. Bushianum Stanford, all figs. from the type, *Bush,* no. 509 from Sapulpa, Oklahoma: figs. 1 and 2, summit of plant, × 1; fig. 3, portion of panicle, to show ochreolae, × 10. Figs. 4–6, typical P. hydropiperoides: fig. 4, ochrea, × 4, from northwest of Raynor, Isle of Wight Co., Virginia, *Fernald & Long,* no. 13,330; fig. 5, panicle × 1, from no. 13,330; fig. 6, portion of panicle, to show ochreolae, × 10, from no. 13,330.

Plate 886, P. hydropiperoides, var. breviciliatum Fernald, all figs. from type, south of Burgess Station, Dinwiddie Co., Virginia, *Fernald & Long,* no. 8698: fig. 1, flowering tip, × 1; fig. 2, ochrea, × 4; fig. 3, portion of panicle, showing ochreolae and distant flowers, × 10.

Amaranthus graecizans L. Sp. Pl. 990 (1753). *A. blitoides* S. Wats. in Proc. Am. Acad. vii. 273 (1877). Plate 887.

This is a disconcerting but apparently necessary change, for the name *Amaranthus graecizans* for the erect or bushy-branched *A. albus* L. Syst. ed. 10: 1268 (1759), the plant with elongate pungent bracts, has been erroneously used for the latter ever since Uline and Bray took it up in Bot. Gaz. xix. 316 (1894). Unfortunately they did not see even a photograph of the Linnean *A. graecizans* and, consequently, did not appreciate the significance of Linnaeus's contrast between the two when, in 1759, he published the second species of the pair as *A. albus*, a species with stiffish ascending whitish stems and prolonged subulate bracts, as contrasted with the prostrate purplish and slightly succulent stems and blunter and shorter bracts of *A. graecizans* L. (*A. blitoides*).

*Amaranthus graecizans* was known to Linnaeus only from the Clayton material from Virginia:

> *graecizans.* 5. AMARANTHUS floribus triandris conglomeratis axillaribus, foliis lanceolatis obtusis.
> Amaranthus floribus lateralibus congestis, foliis lanceolatis obtusis. *Gron. virg.* 116.
> *Habitat in* Virginia. ⊙

A photograph, × ⅖, of the Clayton plant, received from the British Museum of Natural History through Dr. John Ramsbottom, is shown as Plate 887, fig. 1; fig. 2 is the text at bottom of the sheet, slightly enlarged from that on the original photograph, for ease of reading. The last two words of the first line are, therefore, since the line is a long one, moved up above their original position. Beside these, fig. 3 shows a portion, × 1, of one of the specimens (the type) marked by Watson *A. blitoides.* Since no type of Watson's species was indicated, I am now designating as its type a sheet from Ames, Iowa, sent by the late *C. E. Bessey* with the critical notes which evidently drew Watson's attention to it. Watson had originally identified the plant as *A. Blitum* L., but Bessey wrote: "Plant prostrate, spreading from a central root, resembling the habit of *Portulaca oleracea,* often with a reddish or purplish cast". Then, for full measure, "☞ This plant with us *never* is ascending in growth, but is always prostrate". It was upon these characters and the "bracts nearly equal, ovate-oblong, shortly acuminate,

. . . little exceeding the . . . sepals" that Watson distinguished his *A. blitoides* from *A. albus*, of "usually erect diffusely branched habit . . . bracts subulate, rigid, pungently awned". Unfortunately, he seems to have overlooked *A. graecizans* L. (1753).

There is, however, no reason why we should not take up the latter name for *A. blitoides*, thus restoring *A. albus* L. for the stiffer species with slender spinescent bracts, which for more than half a century has wrongly passed as *A. graecizans*.

The name *graecizans* is not at once of obvious meaning. In his Flora Virginica, after giving the diagnosis, which was copied as well as altered by Linnaeus, Gronovius made a guess that the plant was "Amaranthus Graecus sylvestris angustifolius" of Tournefort. The specific name, then, is comparable to that of *Galium circaezans* L., meaning, approximately, simulating *A. graecus*.

The following transfer is necessitated:

Amaranthus albus L., var. **pubescens** (Uline & Bray), comb. nov. *A. graecizans*, var. *pubescens* Uline & Bray in Bot. Gaz. xix. 317 (1894). *A. pubescens* (Uline & Bray) Rydb. in Bull. Torr. Bot. Cl. xxxix. 313 (1912).

Xanthorhiza simplicissima Marsh. To the relatively few recorded stations in the eastern counties add one in Greensville Co.: sandy woods and thickets along Fontaine Creek, near Round Hill Church, no. 14,605.

Menispermum canadense L. To the few recorded stations on the Coastal Plain add one in Greensville Co.: rich woods along Meherrin River, below Emporia, no. 14,606; very rank, the very shallowly to hardly lobed leaves 1.4 dm. broad and on petioles 2 dm. long.

Litsea **aestivalis** (L.), comb. nov. *Laurus aestivalis* L. Sp. Pl. 370 (1753). *Laurus geniculata* Walt. Fl. Carol. 133 (1788). *Tetranthera geniculata* (Walt.) Nees, Syst. Laurin. 567 (1836). *Litsea geniculata* (Walt.) Benth. & Hook. f. Gen. Pl. iii. 162 (1883) and Nichols. Dict. Gard. ii. 287 (1885). *Malapoenna geniculata* (Walt.) Coult. in Mem. Torr. Bot. Cl. v. 164 (1894). *Glabraria geniculata* (Walt.) Britton in Britt. & Brown, Ill. Fl. ed. 2, ii. 135, fig. 1970 (1913). Plate 888.

It is most astounding to note how generally *Laurus aestivalis* and *L. Benzoin* L. l. c. (1753) have been merged by authors as one species under the competitive generic names *Lindera* and *Benzoin*. As usual, Linnaeus was too keen a student to publish two species, one next the other and both received from Virginia, if they were identical. His account in Species Plantarum was simple and clear:

*aestivalis.* 8. LAURUS foliis venosis oblongis acuminatis annuis, ramis supra-axillaribus.
Laurus foliis lanceolatis enervibus annuis. *Gron. virg.* 159.
Laurus foliis enervibus ovatis utrinque acutus. *Gron. virg.* 46.
*Habitat in* Virginia ad ripas rivulorum. ♄.
*Pedunculi hujus fructiferi colorati sunt.*

*Benzoin.* 9. LAURUS foliis enerviis ovatis utrinque acutis integris annuis. *Hort. Cliff.* 154. *Mat. med.* 195. *Gron. virg.* 46. *Roy. lugdb.* 226.
Arbor virginiana, citreae vel limoni folio, Benzoinum fundens. *Comm. hort.* I. *p.* 189, *t.* 97.
Arbor virginiana, pishaminis folio, baccata Benzoinum redolens. *Pluk. alm.* 42, *t.* 139. *f.* 3. 4.
*Habitat in* Virginia.

One must note, in the first place, the error of citing the same reference to Gronovius, p. 46 for both species and the further Linnean error of misquoting under the second species his own original and correct diagnosis in Hortus Cliffortianus, in which the leaves are described "foliis . . . obverse ovatis", i. e. *obovate,* not, as Linnaeus carelessly wrote in 1753, "ovatis", and the same error made in transcribing from Gronovius.

In the original and fuller account in Hortus Cliffortianus, Linnaeus gave a clear definition of our Spicebush, *Lindera Benzoin* (L.) Blume: "Involucrum *sessile, tetraphyllum, corni simillimum, includens flosculis quinque petiolatas, longtiudine involucro*", etc. The identity of the shrub of Virginia, with entire obovate leaves, called *Laurus Benzoin,* and having the involucrate inflorescences sessile and suggesting those of *Cornus mas,* can hardly be questioned and the photograph, sent me by Dr. Ramsbottom (our PLATE 889) of the Hortus Cliffortianus specimen, which must stand as the TYPE, is unequivocal.

Excluding from the account of *Laurus aestivalis* the reference to the obovate-leaved shrub of Virginia, erroneously cited under it as well as under *L. Benzoin,* for Gronovius had merely copied and cited the diagnosis given in Hortus Cliffortianus, we have left the real *Laurus aestivalis.* This was a shrub which had been collected by Clayton and Clayton's own note, not reprinted by Linnaeus, was of real significance: "Lauro affinis aquatilis". This, added to the lanceolate or oblong leaves and the supra-axillary branching, clearly indicate the rare shrub of ponds and inundated swamps, Pond-spice, which Walter later described as *Laurus geniculata*. In this shrub the umbels, instead of being sessile along the main branches, are on short and scattered branchlets (our FIG. 3, from Georgia). It is, then, exactly as it should be: the TYPE of *Laurus aestivalis* in the Linnean Herbarium (our PLATE 888, FIGS. 1 and 2) is the same as *Laurus geniculata* Walt. The TYPE has Linnaeus's annotation: species no. "8. *aestivalis*" and a further annotation (FIG. 2) giving Clayton's account, "Laurus affinis aquatilis", etc. *Laurus aestivalis* of Linnaeus obviously is not at all his *L. Benzoin*!

So far as we know *Litsea aestivalis* has not been found in Virginia since Pursh collected it in Southampton County. It should be sought at pond-margins.

PLATE 888, LITSEA AESTIVALIS (L.) Fernald: FIG. 1, TYPE of *Laurus aestivalis* L., × ½, courtesy of Mr. *S. Savage;* FIG. 2, Clayton's description from bottom of sheet, × ⅔; FIG. 3, flowering branch, × 1, of characteristic *Litsea geniculata* (Walt.) Benth. & Hook. f., from Schreven Co., Georgia, *Eyles*, no. 6748, as *Glabraria geniculata* (Walt.) Britton.

PLATE 889, LINDERA BENZOIN (L.) Blume: TYPE, × ⅖, of *Laurus Benzoin* L., courtesy of Dr. *John Ramsbottom*.

*(To be continued)*

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SOME HERETOFORE UNNOTICED PLANTS OF THE SOUTH CAROLINA COASTAL PLAIN.—UVULARIA FLORIDANA Chapm. Collected in slightly sloping rich woods bordering swamps at three stations near Charleston, S. C. (Caw Caw Swamp, Turkey Creek, and at the north end of Goose Creek Reservoir). This is the first record of this species north of Georgia.

SILENE VIRGINICA L. Found in well-drained woods along the roadside near Middleton Gardens. In Small's *Manual* this species is said to grow "north of the Coastal Plain". However, Dr. John Bachman included a "*Silene virginiana*" of Linnaeus in the list of Charleston plants which he published in the *Southern Agriculturist* for June, 1835, and recently Dr. R. T. Clausen collected this species on the inner edge of the Coastal Plain, just southeast of Augusta, Ga., on the Savannah River.

CASSIA FASCICULATA Michx., var. ROBUSTA (Pollard) Macbride. The typical form of the species has been credited to the Carolina Coastal Plain, but not this variety. Actually, it is the variety

*Photo. B. G. Schubert.*

LITSEA AESTIVALIS: FIG. 1, TYPE of LAURUS AESTIVALIS L., × ½, courtesy of Mr. *S. Savage;* FIG. 2, Clayton's description from bottom of sheet; FIG. 3, flowering branch, × 1, of *Litsea geniculata* (Walt.) Benth. & Hook. f.


LINDERA BENZOIN: TYPE, × 2/5, of LAURUS BENZOIN L., after photograph from Dr. *John Ramsbottom* which is more common around Charleston, frequently seen by roadsides and in fields.

VICIA TETRASPERMA (L.) Moench. Locally abundant in fields and vacant lots in the Charleston suburbs.

CAMELLIA SINENSIS (L.) Kuntze (*Thea sinensis* L.). Collected at Holly Grove on the south edge of Caw Caw Swamp, on the site of a former tea-plantation. The area is now a woodland with the tea-shrubs forming the chief understory species. Cultivation was discontinued some thirty years ago.

HELIOTROPIUM AMPLEXICAULE Vahl. An escape, growing abundantly in a sandy field at Mt. Pleasant.

Specimens of these are in the herbarium of the College of Charleston, and duplicates have been deposited at Cornell University, the Gray Herbarium, and the University of Georgia. I am grateful to Dr. Robert T. Clausen for searching the South Carolina collections at Cornell for these species, and to Dr. Lyman B. Smith for doing the same at the Gray Herbarium. Dr. Smith has also kindly checked and corrected my determinations of these and numerous other species.—KENNETH W. HUNT, College of Charleston, Charleston, S. C.

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GENTIANA QUINQUEFOLIA IN MAINE.—In October, 1944, among some plants which I received from Maine, collected October 15, 1944, by Miss E. A. Lowell and Mr. Stanley B. Attwood, was a gentian which seemed unusual. This was kindly identified by Prof. Fernald as *Gentiana quinquefolia* L. It was collected in Paris, Oxford County, south of Hall Pond. There is a single sheet of this species from Maine in the Gray Herbarium, collected at Pike's Hill, Norway, by a Mr. Olmsted in 1864, which is in the same general region. It has not been seen from this part of Maine for many years. There is a single specimen from Maine in the Herbarium of the New England Botanical Club, collected at Prout's Neck, Scarboro, in southern Cumberland County on October 3, 1895.—R. C. BEAN, Wakefield, Mass.

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WOODY PLANTS OF MAINE.—Under this title a very attractive and authoritative book has appeared[1], which every New England botanist and student of trees and shrubs will wish to have. The plates at the front of

[1] FAY HYLAND AND FERDINAND H. STEINMETZ. The Woody Plants of Maine, Their Occurrence and Distribution. 72 + xix pp., map, 7 half-tone plates. University Press, Orono. 1944. Order from Library, University of Maine, Orono, Maine. 50c.

the volume are attractive, the treatment of species and varieties up-to-date. The authors have studied all the extant collections available and have been at great pains to check recent studies and revisions. For those who have not been situated to do so, it is as invaluable as a reference work as are Wiegand & Eames's Flora of the Cayuga Lake Basin or Deam's Flora of Indiana, in which, likewise, the studies since the 7th edition of Gray's Manual are duly cited. Thus *Picea rubens* correctly takes the place of *P. rubra, Salix Bebbiana* of *S. rostrata, S. pyrifolia* of *S. balsamifera, Sambucus pubens* of *S. racemosa,* etc.; *Amelanchier* appears with 8 species, *Rubus* with 29. The generic treatment is sound, not trifling and radical. *Pinus, Juniperus, Ribes, Pyrus, Potentilla, Prunus, Rhus, Acer, Cornus,* etc. are kept intact. The local viewpoints of the Rafinesques, Rydbergs and Smalls have not been accepted as superior to the outlooks of the DeCandolles, Endlicher, Bentham & Hooker, Baillon, Gray, Engler, Bailey and others who have had a world-wide view of genera. The book is as conservative as the State of Maine. "As Maine goes so [should go] the nation" was once a proverb. It is now too often forgotten!—M. L. F.

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Minor Forms and Transfers—

Alnus crispa (Ait.) Pursh, forma **stragula,** f. nov., truncois ramibusque prostratis; foliis maturis 2–4.5 cm. longis; amentis foemineis maturis 0.8–1 cm. longis.—Alpine areas, eastern Quebec to northern New York. Type from dry schistose crests and talus of Razorback Ridge, alt. 850–1000 m., Mt. Logan, Matane Co., Quebec, July 13, 1923, *Pease & Smith,* no. 25,707, in Herb. Gray.

This is evidently the prostrate and otherwise dwarfed shrub intended by House in N. Y. State Mus. Bull. no. 254: 271 (1924), when he recorded from the summits of the Adirondacks the European *A. viridis* (Chaix) DC., var. *repens* (Wormskj.) Aschers. & Graebn. It is only subgenerically allied to *A. viridis.*

Nemopanthus mucronata (L.) Trel., forma **chrysocarpa** (Farwell), stat. nov. Var. *chrysocarpa* Farwell in Rhodora, xlii. 307 (1940).

Scutellaria ovata Hill, var. **rugosa** (Wood), stat. nov. *S. rugosa* Wood, Class-Bk. ed. 2: 424 (1847). *S. ovata,* subsp. *rugosa* (Wood) Epling in Univ. Calif. Pub. Bot. xx. no. 1: 57 (1942).

M. L. Fernald.

*Volume 47, no. 555, including pages 65–92 and plates 861–895, was issued 19 March, 1945.*

# Rhodora

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JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 47. May, 1945. No. 557.

# THE SO-CALLED WOODSIA ALPINA IN NORTH AMERICA

A. E. Porsild

It has, for some time, been clear to the writer that the plant which in temperate eastern North America has long passed as *Woodsia alpina* is really abundantly distinct from the circumpolar, arctic-alpine plant which alone should bear that name.

The latter is a somewhat variable species which, by some European authors[1], has been considered a variety or subspecies of the circumpolar *W. ilvensis* (L.) R. Br. Thus Robert Brown (Linn. Soc. Trans. XI, 172 (1815)), in discussing the relation of *W. ilvensis* to *W. hyperborea* [a *nomen confusum* for *W. alpina*] states:

> "These two plants are indeed so nearly related, that I find myself unable to construct for them clear specific characters; and therefore, in proposing them here as distinct species, I am, for want of sufficient materials to determine the question, rather following the prevailing opinion than my own."

Brown's description, which follows, clearly shows his difficulty:

> "*ilvensis*. 1. W. frondibus bipinnatifidis, pinnis oblongis, pinnulis confluentibus multifloris: inferioribus subrepandis: infimis subaequalibus. . . .
> *Habitat* in rupibus Europae et Americae borealis . . .
> *hyperborea*. 2. W. frondibus pinnatis, pinnis triangularibus oblongisve inciso-pinnatifidis: lobis integerrimis paucifloris: antico baseos productiore. Tab. XI. . . .
> *Habitat* in Europae alpibus . . ."

The nomenclature of the latter species is as follows:

Woodsia alpina (Bolton) S. F. Gray, Nat. Arr. Brit. Pl. **2:**

[1] Hartman, Skandinaviens Flora p. 536 (1879); Gelert in Ostenfeld, Flora Arctica p. 7 (1902); Simmons, Fl. Ellesmereland 183 (1906); Hegi, Fl. v. Mittel-Europa 1: 13 (1906).

17 (1821); *Acrostichum alpinum* Bolton, Fil. Brit. 76 (1790); *W. hyperborea* R. Br. as to plant, not as to basonym, *Acrostichum hyperboreum* Liljebl. Sv. Fl. 307 (1792); Fl. Dan. Tab. 2921 fig. 2.

Holmberg (Skandinaviens Flora 1: 4 (1922)) gives the following description (here translated from the Swedish text):

> "**W. alpina** (Bolton) S. F. Gray . . . *Stipe usually 1/3 to 1/2 as long as the lamina; lamina hairy on the underside but without chaff; length of the primary segments not, or but slightly, greater than their breadth.*—Usually lower (3.0 to 15.0 cm.) and fresher green than preceding [*W. ilvensis*]. Lamina narrowly linear-lanceolate, 1.0–2.0 cm. broad, broadest at or above the middle, sparingly hirsute, sometimes without chaff. Primary segments short, broadly ovate, often deeply lobed, with 1–3 (–4) entire secondary segments on each side . . .
> On rocks (preferably calcareous) chiefly in the mountains and in alpine places."

To Holmberg's description should be added that the stipe is straw-colored to pale brown, *dull, not at all shiny*, always more or less chaffy. The fronds are rather stiffly erect, usually forming small, dense and firm tufts; the sori as a rule are confluent. In 21 typical specimens selected at random in the Gray Herbarium and in the National Herbarium of Canada, the fronds average 8.1 cm. in length and 1.45 cm. in breadth, near or slightly above the middle, while the average diameter of the stipe just above the joint is 1.0 mm. Habitat: dry, sunny places such as rock talus etc. Distribution: Circumpolar, arctic-alpine. Northern East and West Greenland across arctic Canada to Yukon and Alaska, arctic and alpine Asia and Europe, Iceland. The following specimens in the Gray Herbarium (G) and the National Herbarium of Canada (Can) are representative:

Sweden: Uppl. Djurö S$^{n}$, Ranmarö, July 10, 1922, *A. Hülphers* (Can). Iceland: Thingvellir, *Edith Scamman*, No. 1202 (G). W. Greenland: Umiviarfik Fj., 71° 56′ N., *M. P. Porsild*, Sept. 7, 1934 (G); Kangerdluarsuk, 74° 18′ *N. Ryder* (Can). Hudson Strait: Nottingham Island, *R. Bell* (Can 28,354); Coats Isl., *A. E. Porsild*, 5862 (Can). Keewatin District: Baker Lake, *A. E. Porsild*, 6075 (Can). Mackenzie District: East slope of Richardson Mts. west of the Mackenzie Delta, *A. E. Porsild*, 6744 (Can). Yukon Territory: Canol Road, Rose-Lapie Pass, *A. E. Porsild & A. J. Breitung*, 10,103 (Can). Alaska: Healy, *J. P. Anderson* 5772 (Can); Norton Sound, Pastolik, *A. E. & R. T. Porsild*, 889 (Can).

The plant of temperate eastern North America differs consistently from the arctic-alpine, circumpolar plant by its non-confluent sori, *reddish-brown, shiny stipes and rhachis which are almost completely devoid of chaffy scales.* Also it is taller and more delicate and the fronds are somewhat flexuous. Unlike the arctic-alpine plant it prefers moist, shady places and is invariably found on calcareous soil. In 29 typical specimens selected at random in the Gray Herbarium and in the National Herbarium of Canada the fronds average 12.4 cm. in length and 1.58 cm. in breadth well above the middle while the average diameter of the stipe just above the joint is 0.75 mm.

In 1940, Mr. C. A. Weatherby (Am. Fern. Journ. **31**, no. 2: 62 (1941)), in the herbarium of Mount Allison University of Sackville, New Brunswick, discovered a number of Lawson's fern types, among them the type of *Woodsia glabella* β *Belli* Lawson. Of it Mr. Weatherby, l. c., writes as follows:

> "Lawson was evidently in much doubt as to this specimen. A slip accompanying it reads: "Woodsia laetevirens var. of glabella ??, ilvensis ? or hyperborea ??," and finally, in pencil, "hyperborea according to Eaton". Lawson eventually accepted Eaton's determination and reduced his variety (Trans. Bot. Soc. Edinburgh **8**: 108 (1866)). The specimen is a rather stout individual of *W. alpina.*"

A photograph kindly presented by Mr. Weatherby shows that Lawson's plant is indeed our plant, the name of which becomes:

WOODSIA **Belli** (Lawson), n. comb. *W. glabella* β *Belli* Lawson, Edinburgh New Phil. Journ. n. s. **19**: 281 (1864); *W. alpina* of Gray's Manual, not *W. alpina* (Bolton) S. F. Gray (at least in part). TYPE: Dartmouth River, 20 miles from mouth, Gaspé, C. E. [Canada East], July 3, 1862, *John Bell.* Habitat: Shaded, moist places on calcareous rocks. Distribution: Lab., Nfld., Que., south to northern New Brunswick and northern Vermont; the Adirondacks, N. Y. and west to Lake Superior. The following specimens in the Gray Herbarium (G) and the National Herbarium of Canada (Can) are typical: LABRADOR: Nain, 56° 30′ N., *V. C. Wynne-Edwards*, No. 7531 (Can). NEW BRUNSWICK: Aroostook Falls, *John Macoun*, No. 22,700 (Can). QUEBEC: BONAVENTURE CO., Grand Cascapedia R., *J. F. Collins & M. L. Fernald*, No. 7 (G and Can); RIMOUSKI CO., crevices of limestone-conglomerate, north side of the "Haystack" west of Bic, *M. L. Fernald & J. F. Collins*, No. 831 (G and Can); GASPÉ CO., River Ste. Anne des Monts, *M. L. Fernald & J. F. Collins*, No. 292 (G and Can). ONTARIO: Kakabeka Falls, Kaministiquia R., Red Rock near C. P. R. station, *John Macoun*, No. 28,351 (as *W. glabella*) (Can); Thunder Bay, Lake Superior, July 31–Aug. 6, 1926, *F. Morris*, No. 117,370 (Can). MICHIGAN:

Keweenaw Co., Eagle Harbor, *M. L. Fernald & A. S. Pease*, No. 3051 (G). Minnesota: Cook Co., south side of Clearwater Lake, *F. K. Butters & M. N. Buell*, No. 397 (G).

The characters distinguishing *W. alpina* from *W. Belli* may be summarized as follows:

| | *W. alpina* | *W. Belli* |
|---|---|---|
| Stipe: | straw-coloured to pale brown, *dull*, ± chaffy | reddish-brown, *shiny*, almost devoid of chaff |
| Average diam. just above joint: | 1.0 mm. | 0.75 mm. |
| Frond: | broadest above the middle, stiffly erect, | broadest at the middle, delicate, flexuous |
| Average dimensions of frond: | 8.1 cm. long; 1.45 cm. wide | 12.4 cm. long, 1.58 cm. wide. |
| Sori: | usually confluent | rarely confluent. |

National Museum of Canada

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Distichlis spicata in Australia.—When publishing in 1943 (Bull. Torr. Bot. Club **70:** 633–650) on "The North American Variations of *Distichlis spicata*", the writer confined the range for the composite species to North and South America. It was also stated that *Distichlis* "is represented by *D. distichophylla* (Labill.) Fassett in the South Australian area." This last conclusion was drawn entirely from the literature on the genus, since at that time no Australian material had been examined. Subsequent study of sheets of *D. distichophylla* in the Herbarium of the New York Botanical Garden show it to fall well within the specific limits of *D. spicata*. Although the relationship within *D. spicata* must remain obscure until the South American varieties are clarified, in order to redefine the range of the species and also to bring the Australian material into its proper alignment in the genus, the following combination is important:

Distichlis spicata (L.) Greene var. **distichophylla** (R. & S.) comb. nov. *Uniola distichophylla* R. & S. Syst. Veg. **2:** 596. 1817. *Distichlis distichophylla* Fassett, Rhodora **27:** 71. 1925.

Apparently *Distichlis* is native in Australia for a specific distribution involving North and South America and Australia is not unusual. The geographical varieties that compose both *Scirpus americanus* Pers. and *S. cernuus* Vahl encompass the same area.—A. A. Beetle, Division of Agronomy, University of California, Davis.


*Photo. B. G. Schubert.*

Rubus Akermani (floricane), all figs. from type: fig. 1, portion of cane, × 1; fig. 2, portion with 3-fruited spurs, × ⅓; fig. 3, lower surface of leaf, × 10; fig. 4, summit of pedicel and base of calyx, × 5


*Photo. B. G. Schubert.*

RUBUS AKERMANI (primocane), all figs. from TYPE: FIG. 1, portion of cane and typical leaf, × 1; FIGS. 2 and 3, upper and lower leaf-surfaces, × 10

# BOTANICAL SPECIALTIES OF THE SEWARD FOREST AND ADJACENT AREAS OF SOUTHEASTERN VIRGINIA

M. L. Fernald

*(Continued from page 142)*

Persea Borbonia (L.) Spreng., forma **pubescens** (Pursh), stat. nov. *Laurus caroliniensis β. pubescens* Pursh Fl. Am. Sept. i. 275 (1814). *P. caroliniensis α.* Nees, Syst. Laur. 150 (1836). *Tamala palustris* Raf. Sylv. Tellur. 137 (1838). *P. caroliniensis β. pubescens* (Pursh) Meisn. in DC. Prodr. xv[1]. 51 (1864). *P. caroliniensis*, var. *palustris* (Raf.) Chapm. Fl. So. U. S. 393 (1860). *P. pubescens* (Pursh) Sarg. Silva N. A. vii. 7, t. 302 (1895). *Tamala pubescens* (Pursh) Small, Fl. Se. U. S. ed. 2: 822 and 1375 (1913). *P. palustris* (Raf.) Sarg. in Bot. Gaz. lxvii. 229 (1919).

After closely watching, collecting, and intensively studying the Red Bay, as it occurs in eastern Virginia, I have abandoned the futile attempt to see two species or two varieties in the glabrous-leaved material and that with leaves densely pubescent beneath, and I cannot look upon them as anything but glabrous and pubescent forms of one species, *P. Borbonia* (L.) Spreng. The bibliography of the latter is

P. Borbonia (L.) Spreng. Syst. ii. 268 (1825). *Laurus Borbonia* L. Sp. Pl. 370 (1753). *L. axillaris* Lam. Encycl. iii. 453 (1789). *L. caroliniensis* Michx. Fl. Bor.-Am. i. 245 (1803). *L. caroliniana* Poir. in Lam. Encycl. Suppl. iii. 323 (1813). *L. caroliniensis, α. glabra* Pursh, Fl. Am. Sept. i. 276 (1814). *P. caroliniensis* (Michx.) Nees, Syst. Laur. 150 (1836). *Tamala Borbonia* (L.) Raf. Sylv. Tellur. 136 (1838). *P. caroliniensis, α. glabriuscula* Meisn. in DC. Prodr. xv[1]. 51 (1864). *P. palustris*, forma *laevifolia* Fernald in Rhodora, xliv. 399 (1942).

Hoping against hope that, with most of our American herbarium material interned (or destroyed?) in Holland, there might be some erudite difference which I could not discover, I went so far in 1942 as to distinguish a glabrous-leaved form of the pubescent-leaved *Persea palustris*, although it already had a plethora of names. Now, having to dispose of *Laurus axillaris* Lam., a photograph of the type of which is before me, I have again sought characters aside from the superficial and very obvious and variable one of pubescence. In the first place, *Laurus axillaris* Lam. is not, as indicated by *Index Kewensis*, *Litsea geniculata* (i. e. *L. aestivalis* supra); the type is a very immature branch of *Persea Borbonia* with very young (therefore short-peduncled) inflorescences. It was sent by Fraser from South Carolina and Lamarck merely suggested its relationship to the *Litsea*: "*An Laurus geniculata* Walt." In the second place, I can get nothing stable out of the supposed specific differences: *P. Borbonia*, according to Sargent's Silva, with "Peduncles short; leaves oblong or oblong-lanceolate, obscurely veined, glabrous; branchlets puberulous"; *P. palustris* (or *pubescens*) with "Peduncles elongated; leaves oval or lanceolate, conspicuously veined, tomentose on the lower surface; branchlets coated with tomentum".

*Persea Borbonia*, according to Sargent, with "Peduncles short; leaves oblong or oblong-lanceolate, obscurely veined", started in L., Hort. Cliff. 154 (1737), and by Linnaeus was described as having the *peduncles long* (pediculis longis), instead of "short", the *leaves lanceolate*, instead of "oblong or oblong-lanceolate" and the *veins transverse* (*evident to Linnaeus*)! The full account was:

3. Laurus foliis lanceolatis, nervis transversalibus, fructus calicibus baccatis.
Borbonia fructu oblongo nigro, calyce coccineo. *Plum. gen.* 4?
Laurus caroliniensis, foliis acuminatis, baccis coeruleis, pediculis longis rubris insidentibus. *Catesb. ornith.* 63, *t.* 63.
*Crescit in* Carolina.

In Species Plantarum (1753), under *Laurus Borbonia*, the only changes were the dropping of the reference to Plumier, the adding of references to Gronovius, Virg. 46, and to Royen, and the change to "*Habitat in* Carolina, Virginia". According to Daydon Jackson there was no specimen in the Linnean Herbarium in 1753. We can, of course, not get at the Hortus Cliffortianus material now, but Catesby's plate is a definite, though much distorted representation, with petioles often much longer than in nature and obviously not differentiated by the artist from the "foot-stalks [peduncles] of two or three inches long". "These Trees . . . not common in *Virginia*, except in some places near the Sea. In *Carolina* . . . every where seen, particularly in low swampy lands." In the collections represented in the Gray Herbarium nearly glabrous-twigged and


*Photo. B. G. Schubert.*

RUBUS CATHARTIUM (floricane), all figs. from TYPE: FIG. 1, portion of cane in fruit, × 1; FIG. 2, lower surface of leaf, × 10; FIG. 3, summit of pedicel and base of calyx, × 5

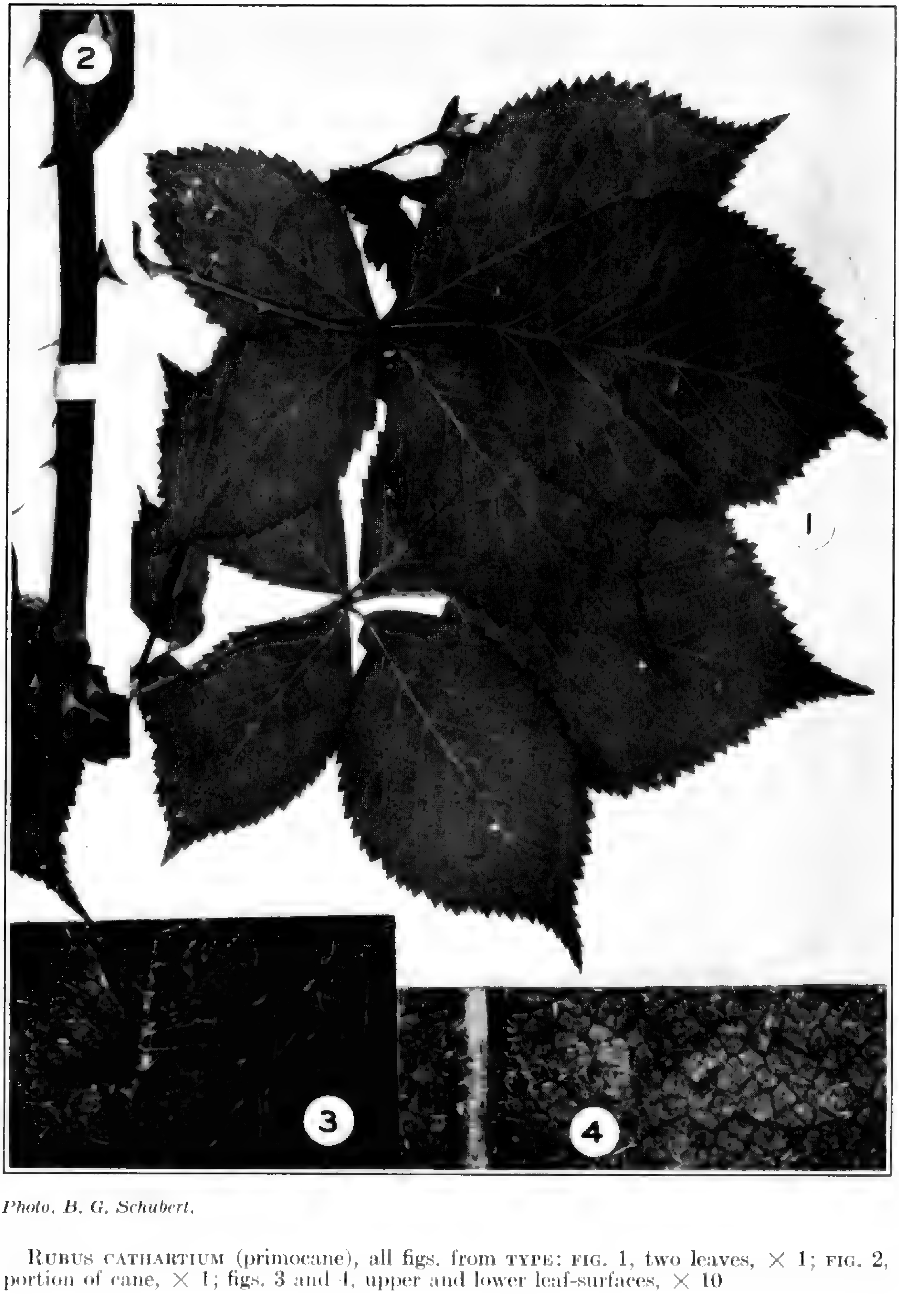


*Photo. B. G. Schubert.*

RUBUS CATHARTIUM (primocane), all figs. from TYPE: FIG. 1, two leaves, × 1; FIG. 2, portion of cane, × 1; figs. 3 and 4, upper and lower leaf-surfaces, × 10

-leaved branches may have peduncles only 1 cm. long or up to the length shown in Catesby's plate. Similarly, branches with densely velvety cortex and lower leaf-surfaces (merely taking the Virginian series) may have fruiting peduncles anywhere from 1.5–7 cm. long. As forms the essentially glabrous and the heavily pubescent extremes are striking, but there are altogether too many transitional trees for them to be called geographic varieties and surely not different species. It is inconvenient that the very pubescent form is much commoner than the glabrescent type of the species. At least, in the material which has accumulated in the Gray Herbarium since the bulk of specimens was sent on loan to Utrecht, the heavily pubescent form outnumbers the other two to one.

*MAGNOLIA VIRGINIANA L., var. AUSTRALIS Sargent in Bot. Gaz. lxvii. 231 (1919). Range extended from southeastern North Carolina northward into southeastern Virginia. DINWIDDIE Co.: along stream near Petersburg, May 13, 1935, *E. Puette & M. Ellyson.* PRINCESS ANNE Co.: rich pine woods, Munden, *Fernald & Griscom*, no. 4408, with note: "Trunk 1 ft. in diameter; trees 30 ft. high."

This southern large extreme with silky white pubescence on new branchlets, petioles and often the lower side of the leaf, was pronounced by Sargent a larger tree than glabrous true *M. virginiana* and "Swamps in the neighborhood of Wilmington, North Carolina, is the most northern station from which I have seen specimens of this tree". The Munden material is thoroughly typical; that from Petersburg even more heavily pubescent than any from Florida to Louisiana.

In the Gray Herbarium there is extreme material of var. *australis* from Tyrrell Co., North Carolina: south of Columbia, *Godfrey*, no. 3928. This station is on Albemarle Sound, only 40 miles south of Munden, whereas Wilmington is nearer 190 miles from Munden.

*CRATAEGUS AESTIVALIS (Walt.) T. & G. PRINCESS ANNE Co.: low woods along Back Bay, Long Island, no. 10,671. The first from north of South Carolina.

C. FLAVA Ait. NANSEMOND Co.: dry pine and oak woods about 2 miles southeast of Cleopus, no. 9578 (vegetative sprouts with characteristic glandular-margined stipules). ISLE OF WIGHT Co.: dry sandy woods northwest of Raynor, no. 14,339; border of dry sandy woods south of Zuni, no. 6818. SOUTHAMPTON Co.:

about Franklin, June, 1893, *Heller*, no. 978 as *C. glandulosa* Moench, the identification changed by Eggleston to *C. flava;* frequent on higher ridges, Franklin, Aug., 1908. *Eggleston*, no. 4011, with the note: "Only known Manual station". GREENSVILLE Co.: rich deciduous woods by Metcalf Branch, east of Emporia, no. 8293. BRUNSWICK Co.: wooded swamp along Quarrel's Creek, "Chamblis bigwoods", Seward Forest, near Triplett, no. 14,710.

Although included by Eggleston in Britton & Brown, Ill. Fl. ed. 2, from southeastern Virginia, *C. flava* is given by Tidestrom in Small's Manual as coming north only to Georgia.

GEUM CANADENSE Jacq., var. BREVIPES Fernald in RHODORA, xxxix. 410, pl. 479, figs. 1–3 (1937). This characteristic plant, heretofore known only from the bottoms of the Nottoway, is now found along Roanoke drainage in southwestern BRUNSWICK Co.: bottomland woods along Poplar Creek, southwest of Ebony, no. 14,619. See p. 97.

RUBUS (§ FLAGELLARES) CONNIXUS Bailey, Gent. Herb. v. 273, fig. 113 (1943). Range extended 45 miles southeastward from the type-locality (Keysville, Charlotte Co.) to eastern BRUNSWICK Co.: trailing in argillaceous flatland along Sawmill Branch, Seward Forest, near Triplett, no. 14,617.

The specimens closely match Bailey's figure and his description, including (for most leaves) his "leaves of primocanes . . . leaflets . . . not subcordate at base", although one leaf retained at the Gray Herbarium fits Bailey's contradictory key-character: "Odd or terminal leaflet of primocane leaves . . . more or less cordate".

R. (§ CUNEIFOLII) SEJUNCTUS Bailey, Gent. Herb. v. 201, fig. 205 (1943). To the original stations in Southampton Co. add one in BRUNSWICK Co.: dry thicket, Seward Forest, near Triplett, no. 14,611. Very abundant; seen over much of the region. See p. 94.

*RUBUS (§ THOLIFORMES) **Akermani,** sp. nov. (TAB. 890 et 891), valde arcuans deinde depressis cannis tholos formantibus, cannis vel ramibus ad 2–3 m. longis apicibus prostratis rare radicantibus; primocannis simplicibus 4–8 mm. diametro glabris remote armatis; aculeis rectis horizontalis vel vix recurvatis subulatis 3–6 mm. longis basi 2–5 mm. latis; primocannae foliis ternatis firmis supra strigoso-pilosis subtus dense tomentulosis; foliolis ovatis acuminatis duplicato serratis basi subrotundatis, foliolo terminali 5–8 cm. longo 2.5–5.5 cm. lato, petiolulo armato 1.5–2.5 cm. longo; floricannis intricate ramosis ramibus porrectis vel divergentibus rigidis; floricannae foliis ternatis, foliolis ellipticis vel anguste cuneato-obovatis acutis vel obtusis subtus pilosis, foliolo terminali 1.5–6 cm. longo; inflorescentiis perbrevibus corymbiformibus foliosis 1–4-floris, bracteis trifoliolatis vel superne simplicibus quam pedicellis superantibus; pedicellis villosis plerumque inarmatis adscendentibus 0.7–1.8 cm. longis; calycis pilosis inarmatis segmentis deinde reflexis; fructibus ad 1.8 cm. diametro.—Brunswick and Greensville Counties, VIRGINIA: springy sphagnous and argillaceous bog, Ram-hole Swamp, Seward Forest, near Triplett, Brunswick Co., June 22, 1944, *Fernald* (and *Lewis*)[1], no. 14,614 (TYPE in Herb. Gray., ISOTYPE in Herb. Phil. Acad.); damp thicket northeast of Ebony, Brunswick Co., June 21, 1944, *Fernald* (and *Lewis*), no. 14,613; dry woods near Mitchell's Millpond, west of Brink, Greensville Co., June 29, 1944, *Fernald* (and *Lewis*), no. 14,618.

*Rubus Akermani*, with which it is a great pleasure to associate the name of ALFRED AKERMAN, Director of the Seward Forest, to whom I am under great obligation, is a relatively unique species. Its doming and long-arching habit is striking, as are the very leafy few-flowered and -fruited corymbs with the fruits mostly hidden among the leaves. It is much coarser than the species with slender and closely trailing floricanes (the Dewberries), and I am not able to place it definitely near any described species. See p. 95.

*R. (§ THOLIFORMES) **cathartium,** sp. nov. (TAB. 892 et 893), valde arcuans cannis tholos altos formantibus, cannis vel ramibus ad 2.5 m. longis apicibus prostratis plus minusve radicantibus; primocannis simplicibus vel ramosis longe arcuatis flexuosis subteretibus glabris ad 7 mm. diametro armatis; aculeis oblique deltoideo-subulatis recurvatis vel unguiculatis 3–5 mm. longis basi 3–6 mm. latis; primocannae foliis imis ternatis mediis superioribusque quinatis submembranaceis supra strigoso-pilosis subtus piloso-tomentulosis pilis fulvescentibus; petiolo valde unguiculato-armato; foliolis ovatis vel elliptico-ovalibus grosse duplicato-serratis acuminatis basi rotundatis, foliolo terminali 8–14 cm. longo 5–10 cm. lato, petiolulo armato 1.5–3 cm. longo; floricannis subsimplicibus subrigidibus; foliis membranaceis ternatis, petiolo piloso sparse stipitato-glanduloso setosisque, foliolis rhomboideo-oblongis acutis vel subacutis duplicato serratis 4–7 cm. longis; racemis corymbiformibus 1–7-floris, bracteis imis ternatis supernis simplicibus quam pedicellis valde brevioribus; pedicellis erectis filiformibus pilosis plus minusve stipitato-glandulosis setosisque plerumque 2–4 cm. longis; calycis pilosis plus minusve glanduliferis deinde reflexis.—

[1] Lewis did not take specimens.

Brunswick County, Virginia: dry thickets near old Taylor Place, Seward Forest, near Triplett, June 23, 1944, *Fernald* (and *Lewis*), no. 14,615 (TYPE in Herb. Gray.; ISOTYPE in Herb. Phil. Acad.); dry thicket, Old Chamblis Place, Seward Forest, June 20, 1944, *Fernald* (and *Lewis*), no. 14,612.

*Rubus cathartium* (*cathartium*, of buzzards, from *Cathartes*, the Turkey-buzzard[1] because, in collecting the type (see p. 98), we seriously disturbed a brood of young buzzards whose home was in the shed near-by) is, like *R. exsularis* Bailey, Gent. Herb. v. 386, fig. 175 (1943), "a rampageous very prickly woody grower making deep tangled mounds or heaps" (*Bailey*, p. 243), "a fearsome briar to handle"[2] (his p. 388), and the pubescence, glandularity and prickles are similarly distributed. The pedicels in the New York *R. exsularis* are illustrated as much shorter than and overtopped by the leafy bracts. In *R. cathartium* they greatly overtop their subtending bracts, thus suggesting the inflorescences of *R. flagellaris*. From the latter *R. cathartium* is quickly distinguished by its coarse and doming habit, the densely velvety lower surfaces of the primocane-foliage, the broad-based prickles and the glandular inflorescence.

*R. (§ Tholiformes) **Sewardianus,** sp. nov. (TAB. 894 et 895), valde arcuans cannis tholos formantibus, cannis vel ramibus ad 2 m. longis apicibus longe arcuatis; primocannis deinde divergente ramosis 5–7 mm. diametro glabris vel apice pilosis remote armatis; aculeis rectis horizontalis subulatis 3–5 mm. longis basi 2–3 mm. latis; primocannae foliis ternatis vel quinatis membranaceis supra remote strigosis subtus tomentulosis, petiolo unguiculato-armato superne piloso; foliolis ovatis acuminatis duplicato serrato-dentatis basi rotundatis, foliolo terminali 8–12 cm. longo 5–7.5 cm. lato basi cordato, petiolulo piloso armato 2.5–3 cm. longo; floricannis inextricabiliter divergenterque ramosis valde arcuato-depressis ramis unguiculato-aculeatis; floricannae foliis ternatis, foliolis anguste elliptico-ovalibus acuminatis duplicato serratis 4–7 cm. longis subtus minute pilosis; inflorescentiis breviter racemoso-corymbosis 2–8-floris;

[1] I have been told that the specific name *cathartium* (of turkey-buzzards) will inevitably be misspelled and interpreted as coming from *catharticum*, a cathartic. As a matter of fact, the very rich and juicy fruit of *Rubus cathartium* would make the finest of blackberry-cordial, the famous old domestic cure for diarrhoea. Turkey-buzzards, unless scrupulously cleaned and thoroughly cooked before eating, might give uncomfortable results.

[2] In his rather unconventional descriptions of "rampageous" and "fearsome" briars Bailey consistently uses in his Latin diagnoses the Latin ablative "*canis*," spelled like the classical nominative for a *dog*, instead of the more conventional *cannis*, from *canna*, a *cane*. Sometimes the scratchy and "fearsome" canes certainly suggest a dog.


*Photo. B. G. Schubert.*

Rubus Sewardianus (floricane), all figs. (× 1) from type: fig. 1, primary axis, showing straight prickles; fig. 2, upper fruiting branchlets; fig. 3, portion of lateral branch, showing unguiculate prickles, and of leafy branch

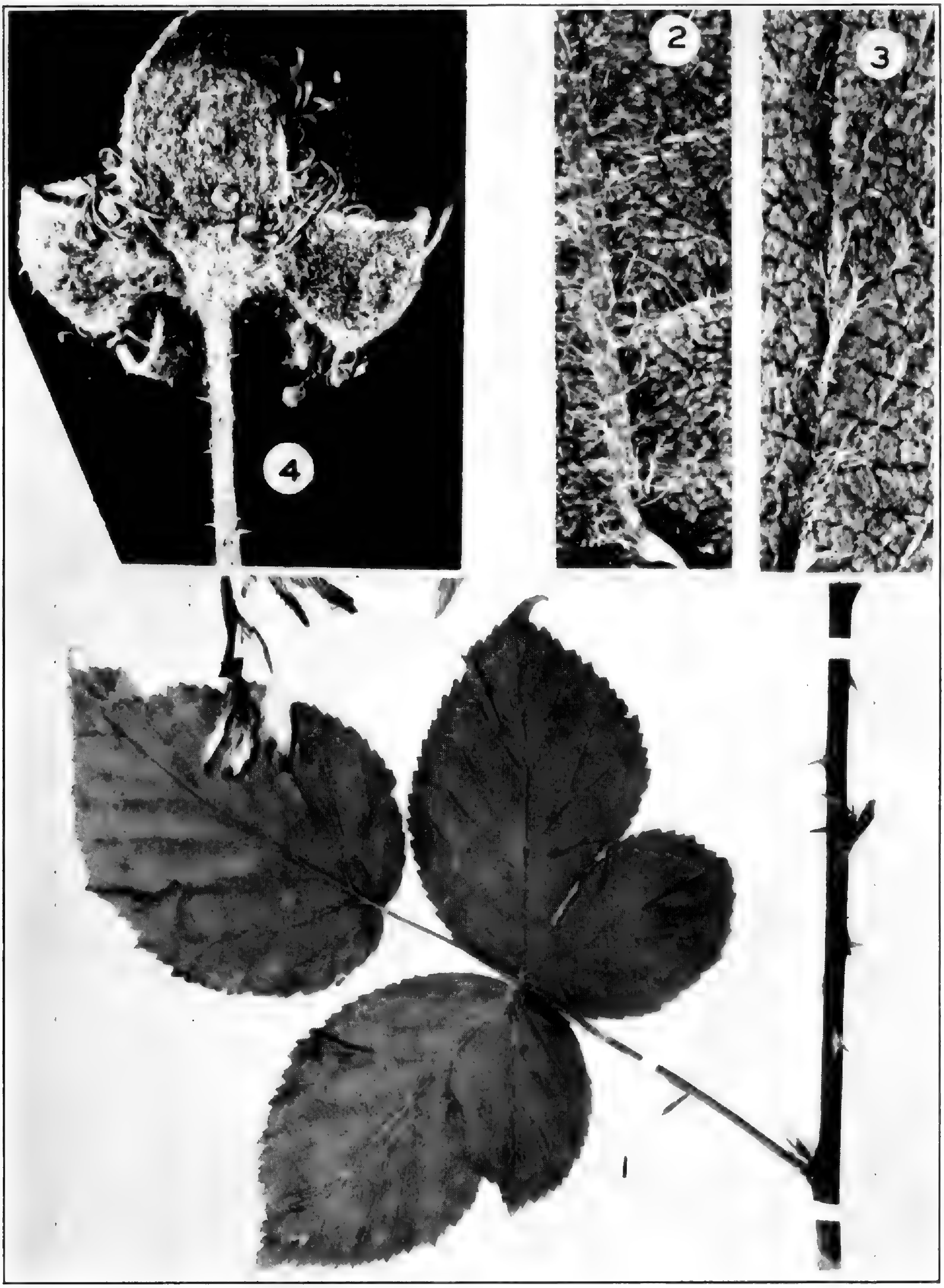


*Photo. B. G. Schubert.*

Rubus Sewardianus, all figs. from type: fig. 1, portion of primocane with leaf, × 5/6; figs. 2 and 3, lower and upper surfaces of primocane-leaf; fig. 4, summit of pedicel and calyx, × 5 bracteis imis ternatis, superne simplicibus parvis quam pedicellis; pedicellis divergenter adscendentibus 1–2.5 cm. longis retrorse villosis plus minusve armatis; calycibus pilosis segmentis acuminatis deinde reflexis; fructibus 1.5–1.8 cm. diametro.—Brunswick County, VIRGINIA: dry thicket near old Taylor Place, Seward Forest, near Triplett, June 23, 1944, *Fernald* (and *Lewis*), no. 14,616 (TYPE in Herb. Gray.; ISOTYPE in Herb. Phil. Acad.). See p. 98.

*Rubus Sewardianus* is named for the late Dr. WALTER SEWARD of Triplett, Virginia, through whose munificence the University of Virginia received the original Seward Forest and its initial endowment. Not referable to any of the doming species accounted for by Bailey, Gent. Herb. v. part v (1943). Very striking on account of the divergently branched overarching canes, which, because of the long and intricate branching and the strong prickles, become almost inextricable. Notable also because the prickles of the primary axes of the primocanes and the floricanes are straight and horizontally divergent, those of the branches strongly unguiculate. The very broad leaflets of the primocane-foliage, with the terminal leaflet cordate, and the acuminate leaflets of the floricanes at once distinguish it from firmer-leaved *R. Akermani*. From *R. cathartium* it is quickly told by its chiefly 3-foliolate leaves, those of the primocanes with low and relatively small dentation (rather than coarse and sharp serration), by the glandless petioles of the floricane-leaves and glandless pedicels and calyx, by the more compact inflorescence, and by the unusual disparity in the toothing of the leaves, those of the primocanes dentate, of the floricanes sharply serrate. The differences between prickles of primary and secondary axes and between toothing of primocane- and floricane-foliage are unusual features. *R. Sewardianus, R. Akermani* and *R. cathartium* are neighbors. No one would confuse them and, except for growth-habit, they are very different plants.

PLATES 890 and 891, RUBUS AKERMANI Fernald, all figs. from TYPE. PLATE 890, floricane: FIG. 1, portion of cane, bearing solitary fruits, × 1; FIG. 2, another cane with 3-fruited spurs, × ⅓; FIG. 3, lower surface of leaf, × 10; FIG. 4, summit of pedicel and base of calyx, × 5. PLATE 891, primocane: FIG. 1, portion of cane and typical leaf, × 1; FIGS. 2 and 3, upper and lower leaf-surfaces, × 10.

PLATES 892 and 893, RUBUS CATHARTIUM Fernald, all figs. from TYPE. PLATE 892, floricane: FIG. 1, portion of cane in fruit, × 1; FIG. 2, lower surface of leaf, × 10; FIG. 3, summit of pedicel and base of calyx, × 5. PLATE 893, primocane: FIG. 1, two leaves, × ½; FIG. 2, portion of cane, × 1; FIGS. 3 and 4, upper and lower leaf-surfaces, × 10.

Plates 894 and 895, Rubus Sewardianus Fernald, all from type. Plate 894, all figs, × 1: fig. 1, primary axis of floricane, to show straight prickles; fig. 2, upper fruiting branchlets; fig. 3, portion of lateral branch (showing unguiculate prickles) and of leafy branch. Plate 895, fig. 1, primocane and primocane-leaf, × 5/6; fig. 2, lower, and fig. 3, upper leaf-surface, × 10; fig. 4, summit of pedicel and calyx, × 5.

Rosa multiflora Thunb. Well naturalized around Triplett, Brunswick Co.: no. 14,713.

Baptisia tinctoria (L.) R. Br., typical. Brunswick Co.: very local, seen only in thicket near Philadelphia Church, no. 14,621. See p. 94.

Tephrosia virginiana (L.) Pers., var. glabra Nutt.; see Rhodora, xlv. 452 (1943). Local range extended inland from the Coastal Plain to Brunswick Co.: dry pine woods, Seward Forest, southeast of Ante, no. 14,715. See p. 102.

Amorpha fruticosa L. Greensville Co.: thicket along Quarrel's Creek, below Pair's Store, no. 14,623; sandy woods and thickets along Fontaine Creek, near Round Hill Church, no. 14,624. Closely approaching the Coastal Plain. See p. 99.

Psoralea psoralioides (Walt.) Cory, var. eglandulosa (Ell.) F. L. Freeman. To the single recorded Virginian station, in Dinwiddie Co. (see Rhodora, xlv. 366 and 452) add one in Brunswick Co.: damp openings in woods, Moseley flat pineland, near Triplett, no. 14,630. See p. 95.

Desmodium lineatum (Michx.) DC. Local range extended inland to Brunswick Co.: rich low woods, "Chamblis bigwoods", Seward Forest, near Triplett, no. 14,716. See p. 101.

*Polygala sanguinea L., forma albiflora (Wheelock) Millsp. Greensville Co.: swaley clearing along Quarrel's Creek, below Pair's Store, no. 14,632. See p. 99.

*Cyrilla racemiflora L., var. subglobosa Fernald in Rhodora, xlvi. 46, t. 813, figs. 1 and 2 (1944). Known only from a wooded swamp along Mill Creek, north of Skipper's, Greensville Co.

The Identity of Michaux's Acer barbatum.—For many years the northern and montane Sugar-Maple, *Acer saccharum* Marsh., at least in part, was called *A. barbatum* Mich. Fl. Bor.-Am. ii. 252 (1803). This name was used by Sargent, Silva, ii. 97 (1891), Sargent then including under it the northern Sugar-Maple, *A. saccharum* Marsh., the Black Sugar-Maple, *A. nigrum* Michx. f., the Southern Sugar-Maple or Sugartree, *A. floridanum* (Chapm.) Pax, the southwestern *A. grandidentatum* Nutt. and some others—an all-inclusive species later better understood and broken up by him (Man. Trees N. A.) into five species: *A. saccharum* with bark "becoming on large trunks ½′–¾′ thick and broken into deep longitudinal furrows, . . . gray-brown", leaves pale beneath and "glabrous" (or in the var. *Schneckii* Rehd. of the Interior pubescent beneath), "calyx . . . greenish yellow, hairy on the outer surface", fruit "glabrous", etc.; *A. nigrum* Michx. f. with bark "becoming on old trunks thick, deeply furrowed, and sometimes almost black", leaves "with a broad sinus usually more or less closed . . . , dull green on the upper surface, yellow-green and soft-pubescent . . . on the lower surface, . . . with drooping sides", "flowers yellow, . . . calyx . . . pilose on the outer surface near the base", "fruit glabrous"; *A. floridanum* (Chapm.) Pax, with bark "thin, smooth, pale", leaves "at maturity . . . pale and pubescent below", "rounded, truncate or slightly cordate at the broad base", calyx "ciliate on the margin with long pale hairs", fruit "villose until fully grown"; the shrubby green-leaved and light-barked *A. leucoderme* Small, with "calyx glabrous or slightly villose", "fruit villose . . . until nearly grown"; and the western *A. grandidentatum* Nutt.

When, in Rhodora, xliv. 359 and 360 and 426–428, plates 725–727 (1942), I discussed the variations of *Acer floridanum*, I mistakenly assumed that the almost universal[1] reduction by students of trees of *A. barbatum* Michx. to the glabrous-leaved northern and montane *A. saccharum* (or *A. saccharophorum* K. Koch) meant that they had settled that point, in my general ignorance of trees supposing it unnecessary to look up my notes made in 1903, when I studied the Michaux material. Michaux in his Flora Boreali-Americana showed clear understanding of our maples, and the specimens in his herbarium closely match his descriptions. Passing *A. pensylvanicum, montanum, rubrum* and *Negundo*, we have three species of his Flora to consider: *A. saccharinum* "L.", *A. barbatum* Michx. and *A. eriocarpum* Michx. As said, the material in the Michaux Herbarium at Paris definitely fits his descriptions.

*A. eriocarpum* was described: "foliis palmato-5-lobis, inaequaliter dentatis, subtus glabriusculis glaucisque; sinubus obtusis: floribus fertilibus subsessiliter conglomeratis. *A. tomentosum. Hort. paris.* Obs. Fructus junior lanosus; maturus

[1] In Rhodora, xxiv. 79 (1922) Ashe spoke of *A.* "*barbatum* Mx. (*A. floridanum*) (Chap.) Pax" but he did not here discuss his identification.

pubens, alis amplissimis, decussato-convergentibus". This is, as it should be from the description, the River-Maple, *A. saccharinum* L., not Wangenheim and others.

*Acer saccharinum* of Michaux (following Wangenheim) included the two northern Sugar-Maples, *A. saccharum* Marsh. in part (*A. saccharophorum*) and *A. nigrum* Michx. f. There are two sheets in the Michaux Herbarium, with the small labels probably interchanged by the post-Michauxian mounter. The labels read: "Rivière Sagney et tout le Canada" and "Kentucky, Ohio et Tenassee". One is, as my notes say, "the common Sugar Maple of New England and Quebec", i. e. *A. saccharum.* The other, the tree collected by Michaux on his trip down the Ohio, is, my notes say, "the best kind of *A. nigrum*". When we compare these, "*Hab.* a sinu *Hudson* ad Carolinam et Tennassée", with Michaux's "*Obs.* Habitus *A. platanoidis.* Folia modo, uti supra dicti, subtus glabella, modo pubentia", it is evident that the *A. saccharinum* of Michaux was both the glabrous-leaved *A. saccharum* and the pubescent-leaved *A. nigrum.* That being the case and Michaux a remarkable observer, why should he describe the Sugar-Maple of the North all over again, in the very next paragraph, and why give the name *A. barbatum* (bearded) to the glabrous or essentially glabrous northern and montane tree which he so well knew?

The answer is, that *Acer barbatum* Michaux, as shown by his material, is *A. floridanum* (Chapm.) Pax (1886). *A. barbatum* "*Hab.* in Carolina" "foliis breviter trilobis" had the "flores pallido-viriduli", the "Calyces masc. intus densissima barba obsiti", whence the specific name. The calyces of *A. floridanum* are striking in anthesis on account of the long setiform beard projecting from the summit, the beard particularly conspicuous in the hermaphrodite flowers because it also covers the prolonging ovary. Now, more than 40 years late, I read in my notes on the Michaux material, examined when I had never heard of the pubescent-leaved southern *A. floridanum* (Chapm.) Pax with bearded calyx, these items: "*A. barbatum,* flowering branches of *very pubescent A. saccharum* (Sugar-Maple), nos. 1, 2, 3, 4, & 5. 6 = leaves and 7 fruit of *A. rubrum!*", the latter doubtless due to confusion during handling.[1]

[1] Torrey and Gray, neither of them knowing *Acer floridanum,* wrote: "We suspect,

In view of the general abundance in the Piedmont and Coastal-plain areas of the Carolinas, thence to Florida and west to Texas (inland to southeastern Missouri), of this characteristic tree with thin and pale bark, leaves pale and pubescent beneath, and flowers bearded at summit, it would seem very strange if the tree were not separated until Chapman noted it in 1860 as a variety, and that its specific separation should have waited for Pax in 1886. Michaux knew it and gave it a descriptive name in 1803!

This interpretation gains support from the known ranges of *A. saccharum* and *A. floridanum* in North Carolina. I quote from Coker and Totten, Trees of North Carolina, 79 (1916). Under *A. saccharum*, Sugar-Maple, they say: "plentiful in our mountain valleys and slopes . . . Ayers and Ashe remark that it is 'Common . . . above an elevation of 2000 feet on cold moist soil'", while *A. floridanum*, Southern Sugar-Maple, "takes its place in the Piedmont and coastal plain regions of this state and from thence southward". Michaux, with vast experience in the North, where *A. saccharum* (his *A. saccharinum*) grew on "Rivière Sagney et tout de Canada", but also, more broadly, "a sinu *Hudson* ad Carolinam et Tennassée", would not redescribe it in the very next paragraph, if he considered it identical with the more northern and upland trees just described, as a second species from Carolina, with copiously bearded calyx-throat and there collect specimens with flowering branches very pubescent. Such a tree from eastern Carolina, with its characteristically paler and smoother bark could hardly have been missed by him. While I regret the necessity to change, I feel that *Acer barbatum* should finally be recognized for what it is. I am, therefore, forced to the following transfers.

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indeed, that the description of A. barbatum, *Michx.* was drawn up, at least as to the flowers and fruit, from specimens of A. saccharinum [meaning Sugar-Maple]; the only species, so far as we are aware, which has the sepals bearded inside"—T. & G. Fl. i. 249 (1835). In the Supplement, after Gray had seen the Michaux material, he reaffirmed this judgment, saying: "*A. barbatum* (Michx.!) should be discarded as a species, it having been founded (as we had indeed long suspected) upon the flowers of A. saccharinum, the fruit of A. rubrum, and a leaf of something else, apparently of A. spicatum, (v. sp. in *herb. Michx. propr. & herb. Richard.*)—T. & G. l. c. 684 (1840). Gray, apparently, was not disturbed by the very pubescent branchlets; neither was he troubled when he found that "*A. saccharinum* was wholly established by Linnaeus upon a specimen (leaves only) received from Kalm; which specimen, we find on inspection, belongs to A. dasycarpum! Still as the A. saccharinum of Wangenheim, Michaux, and all succeeding authors, is the true *Sugar-Maple*, a change in the application of the name would be unwarrantable."—T. & G. l. c. That happy period is gone.

Acer barbatum Michx. Fl. Bor.-Am. ii. 252 (1803), not Sargent and later auth. *A. floridanum* (Chapm.) Pax, var. *villipes* Rehder in Sargent, Trees and Shrubs, ii. 255 (1913). *A. floridanum*, forma *villipes* (Rehder) Fernald in Rhodora, xliv. 426, t. 725, fig. 3, and 727, fig. 4 (1942).

A. barbatum, forma **floridanum** (Chapm.), stat. nov. *A. saccharinum*, var. *floridanum* Chapm. Fl. So. U. S. 81 (1860). *A. floridanum* (Chapm.) Pax in Engler, Bot. Jahrb. vii. 243 (1886). *A. barbatum*, var. *floridanum* (Chapm.) Sargent, Garden & Forest, iv. 148 (1891) and Silva, ii. 100, t. xci. fig. 4 (1891); Fernald in Rhodora, l. c. t. 725, figs. 1 and 2, and 727, fig. 3 (1942).

A. barbatum, var. **Longii** (Fernald), comb. nov. *A. floridanum*, var. *Longii* Fernald in Rhodora, l. c. t. 726 (1942).

A. barbatum, var. Longii, forma **platylobum** (Fernald), comb. nov. *A. floridanum*, var. *Longii*, forma *platylobum* Fernald, l. c. t. 727, figs. 1 and 2 (1942).

To the Virginian records add the following from the Roanoke drainage.

A. barbatum Michx., forma floridanum (Chapm.) Fernald, supra. Brunswick Co.: bottomland woods along Poplar Creek, southwest of Ebony, no. 14,636. See p. 96.

A. barbatum, var. Longii (Fernald) Fernald, supra. With the last, no. 14,637. See p. 96.

Vitis cinerea Engelm. Local range extended inland to western Greensville Co.: bottomland woods along Quarrel's Creek, below Pair's Store, no. 14,723. See p. 101.

Viola Stoneana House. To the single record from southeastern Virginia (Princess Anne Co.) in Rhodora, xxxviii. 436 (1936) add the following. Norfolk Co.: rich deciduous wooded ridge above swamp, near Gertie, no. 14,201. Dinwiddie Co.: border of swampy woods southwest of Carson, no. 7542. Greensville Co.: rich deciduous woods by Metcalf Branch, east of Emporia, no. 9102; rich deciduous wooded slope by Three Creek, slightly above the "fall-line", northwest of Emporia, no. 11,872. Brunswick Co.: mixed woods, Seward Forest, south of Hobbs Store, no. 14,725. Mecklenburg Co.: dry wooded ridge north of Roanoke River, near Goode's Ferry, no. 7115.

Other specimens, one from Stony Man Mountain, identified by Brainerd in 1914, coll. *Steele & Steele*, no. 106, others from Alexandria Co., *Steele*, are in the Gray Herbarium. It is, therefore, a bit surprising to note the restricted range recorded by Brainerd in his Violets of North America, 21 (1921): "It is of limited range—moist woodlands New Jersey, eastern Pennsylvania to the vicinity of the District of Columbia". The Check-


*Photo. B. G. Schubert.*

CIRCAEA CANADENSIS: FIG. 5, half of leaf, × 1
Var. VIRGINIANA, all figs. from TYPE: FIG. 1, plant, × ½; FIG. 2, leaf, × 1; FIG. 3, portion of inflorescence, × 10; FIG. 4, fruit, × 10


*Photo. B. G. Schubert.*

ERYNGIUM PROSTRATUM: FIG. 4, fruits, × 10
Var. DISJUNCTUM, all figs. from TYPE: FIG. 1, portion of plant, × 1; FIG. 2, head, × 5; FIG. 3, fruits, × 10

list of Plants in the Washington-Baltimore Area (1941) does not mention it. Very slight effort would probably extend its range from southeastern Virginia into eastern North Carolina.

*Rhexia virginica L., var. septemnervia (Walt.) Pursh. Frequent on the Coastal Plain, all collections but the first by *Fernald & Long*. James City Co.: Sphagnum-Magnolia swamp, 4 miles west of Williamsburg, *Grimes*, no. 4315. Norfolk Co.: wet peaty clearings in woods of *Pinus serotina*, south of Grassfield, no. 4063. Nansemond Co.: low sandy woods along Nansemond River, east of Cahoon Pond, northwest of Suffolk, no. 13,701; border of low woods northeast of Baines Hill School, no. 13,979. Sussex Co.: border of wet woods, Coppahaunk Swamp, southeast of Waverly, no. 10,746; swampy woods north of Jarratt, no. 12,749. Prince George Co.: exsiccated argillaceous swale about 3 miles southeast of New Bohemia, nos. 6299 and 6842.

*Rhexia virginica,* var. *septemnervia* is the extremely coarse variation of the species, originally described by Walter, Fl. Carol. 130 (1788) with "caule 4 s. 5-pedali". It is not only much taller than typical *R. virginica;* its aggregate of characters mark it as a good variety of the southern Coastal Plain, occurring from Florida to Louisiana, northward to southeastern Virginia, whereas the smaller typical *R. virginica* occurs from Nova Scotia to southern Ontario and Minnesota, thence south to Georgia, Alabama, Tennessee and Missouri, often ascending to high altitudes (up to 2300 ft. in North Carolina and Tennessee). I distinguish the two as follows

R. virginica (typical): stem 1–5 (exceptionally to 10) dm. high, 1–4.5 mm. thick toward base (excluding spongy tissue when present), its angles with wings 0.1–rarely 1 mm. wide; larger leaves 0.5–3 cm. broad, those at base of inflorescence 0.5–2 cm. broad, their longer teeth 0.5–1.2 mm. long; flowers 1–50 (rarely –100).

Var. septemnervia: stem (0.6–) 0.8–1.6 m. high, 5–8 mm. thick, its conspicuous thin wings 1–2 mm. wide; larger leaves 2–4 cm. broad, those at base of inflorescence 1.5–3 cm. broad, their longer teeth 1–1.5 mm. long; flowers 20–200 or more.

Ludwigia glandulosa Walt. Local range extended inland from Coastal Plain to western Greensville Co.: border of Mitchell's Millpond, west of Brink, no. 14,641; muddy margin of Fontaine Creek, at mouth of Quarrel's Creek, no. 14,727. See p. 101.

*Circaea canadensis Hill, var. **virginiana,** var. nov. (tab. 896, fig. 1–4) rhizoma firma 2.5–3 mm. crassa; foliis firmis cordatis undulato-dentatis; racemi rhachi pedicellisque valde villosis, pedicellis ad basin purpurascentibus; sepalis dorso villosis.—Brunswick County, VIRGINIA: rich woods, associated with *Sanicula Smallii* Bickn., "Chamblis bigwoods", Seward Forest, near Triplett, June 23, 1944, *Fernald* (and *J. B. Lewis*), no. 14,643 (TYPE in Herb. Gray; ISOTYPE in Herb. Phil. Acad.). See p. 97.

*Circaea canadensis* Hill (1756), as revived by me in RHODORA, xix. 86, 87 (1917), is a plant of rich or alluvial woods; in America occurring from the Gaspé Peninsula to Lake St. John, Quebec, south to Nova Scotia, southern Maine, southern New Hampshire, western Massachusetts and Connecticut, New York and upland West Virginia. Although having the essential characters of the more northern plant, var. *virginiana* differs in some notable points: its rhizome is stiffer and thicker than in most of the northern material, though in occasional northern plants quite as stout; its leaves are of firmer texture than in most (but not all) of the northern series, the petiole relatively short, the definitely cordate blade (FIGS. 1 and 2) merely undulate-dentate (in typical *C. canadensis* (FIG. 5) the membranaceous long-petioled blade merely rounded or subcordate, rarely definitely cordate, at base, and coarsely sharp-dentate); in var. *virginiana* the bases of the pedicels (and sometimes the adjoining rachis) are conspicuously deep purple (in typical *C. canadensis* only faintly so); in var. *virginiana* the backs of the calyx-lobes are somewhat spreading-villous, in typical *C. canadensis* mostly glabrous. It may prove that the petals are shorter in var. *virginiana*, the material being too inadequate to warrant a definite assertion. The 2-locular fruits seem inseparable from those of *C. canadensis*.

Var. *virginiana* is geographically far removed from the typical northern (and Eurasian) plant. Its type-station is in rich woods at the base of a slope (alt. about 200 feet) in the Seward Forest, where, as stated, it is associated with unusually abundant and southern *Sanicula Smallii* (Florida to eastern Texas, north to southern Virginia, Tennessee and southeastern Missouri), other occupants (some of them scarce) of these rich woods including such southern species as *Zizia trifoliata* (Michx.) Fern. (*Z. Bebbii* (Coult. & Rose) Britton), *Ligusticum canadense* (L.) Britt., *Carex oxylepis* Torr. & Hook. and *C. flaccosperma* Dew., *Polymnia Uvedalia*, var. *densipila* Blake (Bermuda, and Missouri to Louisiana and eastern Texas), etc. These are not the northern species with which typical *Circaea canadensis* is usually associated. Further collections, which will doubtless be made elsewhere in the South, may reveal other and stronger differences.

PLATE 896, FIGS. 1–4, CIRCAEA CANADENSIS Hill, var. VIRGINIANA Fernald, all from TYPE: FIG. 1, a plant, × ½; FIG. 2, leaf, × 1; FIG. 3, portion of inflorescence, × 10; FIG. 4, fruit, × 10. FIG. 5, typical C. CANADENSIS: half of characteristic leaf, × 1, from Frankfort, Maine, *Fernald & Long*, no. 14,208.

SANICULA SMALLII Bickn. To the few recorded Virginian stations add a prosperous one in BRUNSWICK Co.: rich woods, "Chamblis bigwoods", Seward Forest, near Triplett, no. 14,644. See p. 97.

*ERYNGIUM PROSTRATUM Nutt., var. **disjunctum,** var. nov. (TAB. 897, FIG. 1–3, TAB. 898, FIG. 1), fructu plus minusve obconico 0.6–0.9 mm. longo 0.5–0.6 mm. lato.—Southampton Co., VIRGINIA: moist sandy and peaty shore of Whitefield's Millpond, southwest of Corinth, July 7, 1943, *Fernald & Long*, no. 14,375; Sept. 18, 1944, *Fernald* (with *J. B. Lewis*), nos. 14,728 (TYPE in Herb. Gray.; ISOTYPES in Herb. Phil. Acad. and elsewhere), 14,729 and (in wet litter and humus under shrubs at upper border of beach) 14,730. See p. 103.

*Eryngium prostratum* Nutt. has the usually depressed-cupuliform or subglobose fruits (PLATE 897, FIG. 4) 0.8–1 mm. broad and mostly shorter (0.4–0.6 mm. high or long), with the scattered papillae capitate or barely stalked. It occurs from northern Florida to eastern Texas, northward to southeastern South Carolina, southwestern Georgia, southwestern Kentucky and western Tennessee, southeastern Missouri and eastern Oklahoma. It thus has a wide Coastal Plain range, largely on the Gulf Coastal Plain and along the Mississippi Embayment. Var. *disjunctum*, removed by 360 miles from the northeastern known limit of typical *E. prostratum* (Cambahee River, southwest of Hendersonville, Colleton Co., South Carolina, *Wiegand & Manning*, no. 2263), by about 500 miles from the nearest station (muddy shore of small pond near Flint River, Sumter Co., (*Harper*, no. 1047) in Georgia, and by 600 miles, with the Cumberland Plateau and the Appalachian Upland intervening, from the easternmost station in Kentucky (gravelly edge of small creek, 3 miles south of Murray, Calloway Co., *Smith & Hodgdon*, no. 4149), shows a type of geographic affinity which we find in many plants of southeastern Virginia.

Superficially and in the great range of ecological variation in response to lack of or abundance of moisture and shade, the plant of Whitefield's Pond closely matches typical *E. prostratum*, but its fruits (PLATE 897, FIG. 3) are usually more elongate, tending to obconic, usually narrower than in the typical form and with stipitate papillae. At the type-locality the plant is excessively variable. When discovered in early July, 1943, the loosely ascending stems were only 5–15 cm. long. In mid-September, 1944, they were prostrate, rooting at all but the lower nodes and up to 4.5 (rarely –6) dm. long. On open sand the basal leaf-blades ranged from 1.5–3 cm. long and 0.8–2 cm. broad, the cauline leaves 2–10 mm. wide (PLATE 897, FIG. 1). Nearer the water the leaves were thinner and larger, while in the loose litter and humus in the shade of the thicket the plants (PLATE 898, FIG. 1) scarcely yet fruiting, had basal blades 4–7 cm. long and 2–4.3 cm. broad, the cauline leaves often nearly as broad.

The latest treatment of the genus with us seems to be the *Synopsis of the North American Species of Eryngium* by Mathias and Constance in Am. Midl. Nat. xxv. 361–387 (1941). There they assign our two prostrate species, *E. prostratum* Nutt. and *E. Baldwini* Spreng., the following ranges: *E. prostratum*, "Tennessee to Florida west to Missouri and Texas"; *E. Baldwini* "Southeastern Georgia to Florida". Much earlier, in 1888, Coulter & Rose, Revis. N. Am. Umbelliferae, 102 (1888), cited *E. prostratum* from Georgia and Kentucky, and later, in their *Monograph of the North American Umbelliferae*, Contrib. U. S. Nat. Herb. vii. no. 1: 46 (1900), they also cited material of *E. prostratum* from Indian Territory (now Oklahoma). In the small representation in the Gray Herbarium *E. prostratum* is represented from South Carolina, Georgia, Florida, Kentucky, Tennessee, Mississippi, Missouri, Arkansas, Louisiana, Oklahoma and Texas, as well as Virginia (var. *disjunctum*). It is too bad that the authors of the recent *Synopsis*, who (their p. 361) cite the Gray Herbarium as having lent material of the genus, did not check the representation there (and evidently in other herbaria).

Although in their Monograph of 1900 Coulter & Rose, l. c. 45, assign the quite distinct *Eryngium Baldwini* (altered by them to


*Photo. B. G. Schubert.*

ERYNGIUM PROSTRATUM: FIGS. 2–5, heads, × 5, from different colonies

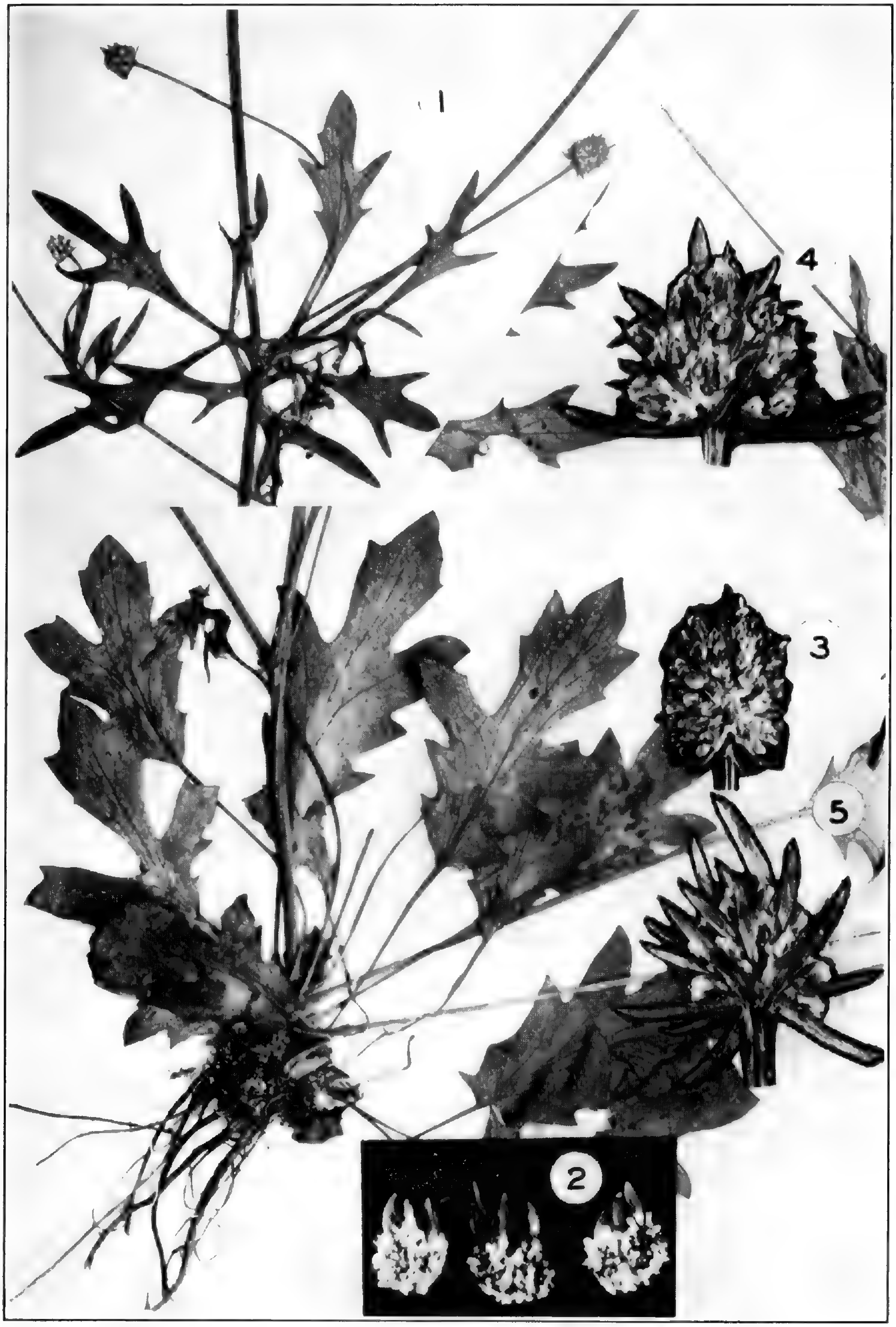


*Photo. B. G. Schubert.*

Eryngium Baldwini: fig. 1, base and median node, × 1; fig. 2, fruits, × 10; figs. 3–5, heads, × 5, from different stations "*baldwinii*") the range "from Georgia and Florida to Louisiana and Missouri", they added the significant "although all the material we have seen is from Florida". The small series in the Gray Herbarium shows 3 numbers from Georgia, many from Florida, but none from farther west; but, in view of the many characters distinguishing *E. Baldwini* and *E. prostratum*, the only distinctions given in the recent *Synopsis* are bound to perplex the beginner:

"Involucral bracts shorter than the heads; bractlets exceeding the fruit; fruit 1 mm. in diameter..................39. *E. Baldwini.*
Involucral bracts equalling the heads; bractlets shorter than the fruit; fruit 2 mm. in diameter................40. *E. prostratum.*"

In attempting to identify plants by these characters one quickly finds the length of bracts very unstable but the length of bractlets very constant, while it is most difficult in *E. prostratum* to find any ripe fruits more than half the diameter here assigned them (see PLATE 897, FIG. 4), unless, perchance, they referred to the persistent calyx-segments which cap the fruit. In *E. prostratum*, typical, the cauline leaves have dilated, flat and entire to coarsely toothed or cleft blades, in *E. Baldwini* (PLATE 899), to quote Coulter & Rose, they are "3-parted (rarely entire or lobed), the divisions from lanceolate to filiform". In *E. prostratum* all but sometimes the uppermost bractlets are shorter than the flowers, so that the summits of the loosely spreading-ascending perianth are evident, the bractlets, often appressed to the young flower, being coarsely trident-shaped, with the 2 lateral lobes broad, thus suggesting the bracts of *Betula populifolia;* the mature head is 3–10 mm. long and subtended by an involucre of variable length, sometimes (but rarely) as prescribed, equaling the heads (PLATE 898, FIG. 2), often (FIG. 3) two thirds as long, again (FIG. 4) barely half as long, and sometimes (FIG. 5) so short as scarcely to equal half the diameter of the head! In *E. Baldwini* (PLATE 899), on the other hand, the bractlets are as stated by Mathias & Constance, "exceeding the fruit", so that the erect and connivent calyx-segments are prevented from spreading. Incidentally the long bractlets are lance-attenuate and entire (not broadly 3-lobed). The mature head (FIGS. 3–5) is 2–6 mm. high, usually with very short involucres (FIG. 3) but sometimes with them half as long as the head (fig. 4) or rarely quite as long (fig. 5). The best character, in addition to the foliage and bractlets, is in the mature fruit. In *E. prostratum* the large calyx-segments, capping the fruits (plate 897, figs. 3 and 4), are divergent to only loosely ascending and the papillae on the body of the fruit are scattered. In *E. Baldwini* the persistent calyx-segments are erect and strongly connivent above (plate 899, fig. 2) and the papillae are closely crowded.

Since the strongest specific characters of these two species have been previously so little clarified, it seems desirable to show them in the accompanying plates. It is also important to discuss the characteristic and strictly erect plant of the South which passes as *Eryngium integrifolium* Walt. Fl. Carol. 112 (1788). Taking the characters chiefly from Coulter & Rose, Contrib. U. S. Nat. Herb. vii. 48, we get

> Erect, 3 to 9 dm. high, branching above; leaves oblong or oblong-obovate, the basal ones entire or crenately toothed [very rarely entire; Small says simply "serrate-crenate"], upper ones becoming sharply serrate or even laciniately toothed; bracts linear and entire or with 2 to 4 prickly teeth longer than the heads; bractlets equally 3-cuspidate, longer than the flowers.

Now, taking the characters of *E. prostratum* chiefly from Coulter & Rose, l. c. 45, we get

> Prostrate, diffusely branched; lower leaves oblong, entire, few-toothed, or lobed at base, the upper ovate, few-toothed or entire, with some additional trifid ones; bractlets very small [broadly trifid above].

The reason for intruding *Eryngium integrifolium* into the discussion is, that Walter, in describing it, may have had *E. prostratum* Nutt. before him. Torrey & Gray, uniting *E. prostratum* and *E. Baldwini* as a single species, referred *E. integrifolium* with doubt to the aggregate; and in other works, like Watson's *Bibliographic Index* and *Index Kewensis*, it has been similarly referred to *E. prostratum* as a doubtful earlier name, but not formally taken up, since no *E. prostratum* was actually known from South Carolina. Now, however, with good material of it known from near Hendersonville in Colleton Co., only about 45 miles from Charleston, Walter's species comes into the picture. Here is Walter's account *integrifolium* 3. caule procumbente ramoso; foliis radicalibus rotundatis, integris, planis; foliis caulinis nervosis, ovato lanceolatis, apice serratis basi integris, serraturis subspinosis; foliis floralibus trifidis; paleis trifurcis; capitulis parvis caeruleis.

Obviously *caule procumbente* is far from good for the tall (up to 9 dm.) and erect so-called *Eryngium integrifolium* of recent treatments (*E. virgatum* Lam.), but it is the striking habital character of *E. prostratum*. *Caule ramoso* would do for either (if the larger and somewhat forking plants of *E. virgatum* are considered). *Foliis radicalibus rotundatis* is as poor for one as for the other. *Foliis integris* is perfect for most material of the procumbent *E. prostratum*, not at all good for characteristic *E. virgatum*. *Foliis caulinis nervosis, ovato-lanceolatis* would do for either, while *apice serratis basi integris* is good for *E. prostratum*, not for *E. virgatum;* and *serraturis subspinosis* is perfect for *E. virgatum*. *Foliis floralibus trifidis* is good for *E. virgatum*, in which occasional involucral bracts are 3-cleft; and *paleis trifurcis* is unquestionably good for the long 3-cleft bractlets of the latter, the 3-forked pales (bractlets) of *E. prostratum* being hidden in the head. *Capitulis parvis caeruleis* is all right for either. It is difficult to reconcile the procumbent stem, entire basal leaves and cauline leaves with entire bases and teeth only at apex, with *E. virgatum*. The other characters, when not shared by both species, are better for that than for *E. prostratum*. It is also difficult to imagine Walter confusing such very different species. When Coulter & Rose, considered whether Walter's *E. integrifolium* might be either *E. Baldwini* or *E. prostratum*, they concluded: "But Walter's description is so meagre [mixed or confused would have been better], and the two species in question so variable, that there seems to be no way of positively determining which one of them is *E. integrifolium* Walter"—C. & R., Revis. N. Am. Umbelliferae, 102 (1888). Soon thereafter, two distinguished botanists at the British Museum of Natural History, James Britten and Edmund G. Baker, took up the point:

E. INTEGRIFOLIUM Walt. Fl. Carol. 112 (1788). Messrs. Coulter & Rose . . . . say that it "seems impossible to determine" this plant. The specimen in Walter's Herbarium, however, although fragmentary, is clearly identical with *E. virgatum* Lam. as was indeed correctly indicated by Sprengel (Syst. i. 870) in 1825. Walter's name must therefore be substituted for Lamarck's.—Britten & E. G. Baker, Journ. Bot. xxxviii. 244 (1900).

In view of the facts, that Walter's own herbarium is lost, that the series which John Fraser carried to England was many times handled[1] and its specimens given to those who were specially interested,[2] and that it had at least one change of lodging before it reached the British Museum, one can hardly escape the conviction that the specimen discussed by Britten & Baker does not tell the whole story.

Plate 897, figs. 1–3, Eryngium prostratum Nutt., var. disjunctum Fernald: fig. 1, portion of type, × 1; fig. 2, head, × 5, from type; fig. 3, fruits, × 10, from type. Fig. 4, typical E. prostratum: fruits, × 10, from Saratoga, Mississippi, *Tracy*, no. 8631.

Plate 898, figs. 2–5, Eryngium prostratum Nutt., heads, × 5: fig. 2, from Chattahoochee River, Seminole Co., Georgia, *Eyles*, no. 7081; fig. 3, from Lake Charles, Louisiana, *Allison*, no. 210; fig. 4, from Sapulpa, Oklahoma, *Bush*, no. 193; fig. 5, from southwest of Hendersonville, South Carolina, *Wiegand & Manning*, no. 2263. Fig. 1, var. disjunctum Fernald; base of very large plant, × 1, from type-station, *Fernald*, no. 14,730.

Plate 899, Eryngium Baldwini Spreng.: fig. 1, base and median node, × 1, from Indian River, Florida, *Curtis*, no. 1002; fig. 2, fruits, × 10, from north of Waverly, Camden Co., Georgia, *Wiegand & Manning*, no. 2259; fig. 3, head, × 5, from no. 2259; fig. 4, head, × 5, from Shell Island, Florida, *Tracy*, no. 7446; fig. 5, head, × 5, from Fort Myers, Florida, *J. P. Standley*, no. 108.

Cornus foemina Willd. (*C. stricta* Lam.). Range extended inland to Brunswick Co.: wooded swamp along Quarrel's Creek, "Chamblis bigwoods", Seward Forest, near Triplett, no. 14,732. See p. 101.

Nyssa sylvatica Marsh., var. biflora (Walt.) Sarg. Local range extended inland to Brunswick Co.: along Sawmill Branch, Seward Forest, near Triplett, no. 14,647.

N. sylvatica, var. caroliniana (Poir.) Fernald in Rhodora, xxxvii. 436, pl. 400 (1935). Local range extended to Brunswick Co.: "Chamblis bigwoods", Seward Forest, near Triplett, no. 14,648.

Rhododendron canescens (Michx.) Sweet. Local range extended inland to Brunswick Co.: by small branch in woods, Seward Forest, east of Hobbs Store, no. 14,733.

*Leucothoe axillaris (Lam.) D. Don., var. **ambigens,** var. nov. (tab. 901), a var. typica differt foliis lanceolatis vel lanceolato-oblongis superna sensim angustatis acuminatis; racemorum

[1] "Walter in his Flora Caroliniana has another species . . . Of this plant I was not able to find any information in his Herbarium."—Pursh, Fl. Am. Sept. 415 (1814). If we accept the reputation given Pursh by Thomas Nuttall and other contemporaries, it is a wonder that any of Walter's plants were preserved for inspection by later students!

[2] See Fernald & Griscom, Rhodora, xxxix. 497 (1937).

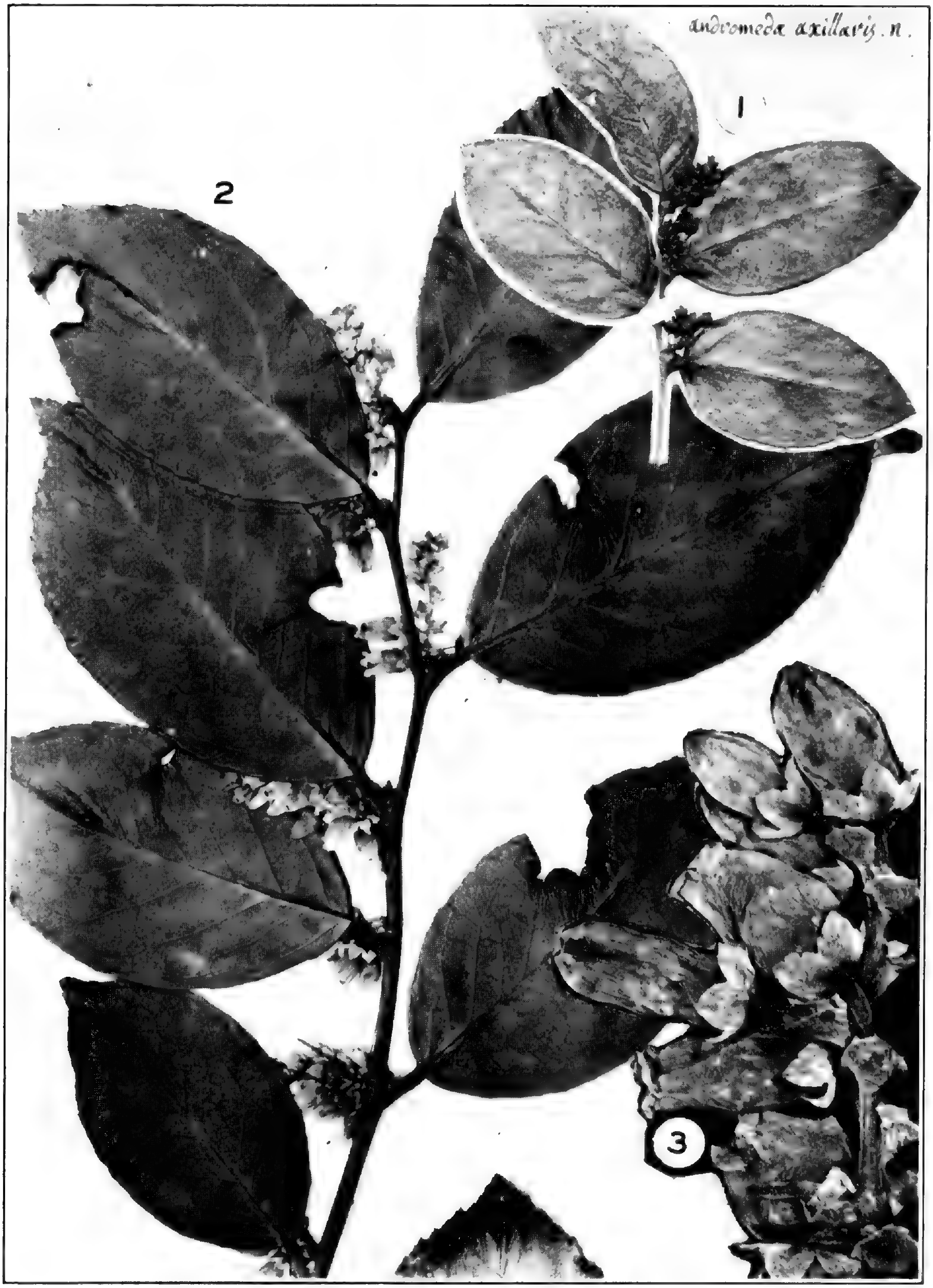


*Photo. B. G. Schubert.*

LEUCOTHOE AXILLARIS: FIG. 1, TYPE, × ½, of *Andromeda axillaris* Lam., after *Cintract;* FIG. 2, flowering branch, × 1, of *L. platyphylla* Small; FIG. 3, portion of inflorescence, to show blunt bracts and calyx-segments, × 4


*Photo. B. G. Schubert.*

LEUCOTHOE AXILLARIS, var. AMBIGENS: FIG. 1, portion of TYPE, × 1; FIG. 2, portion of inflorescence of TYPE, × 4 bracteis subrotundis obtusis; sepalis oblongo-ovatis obtusis.—Swampy woods and clearings, southeastern Virginia to Florida. VIRGINIA: by Lake Drummond, Great Dismal Swamp, Norfolk Co., April 8, 1939, *J. T. Baldwin, Jr.*, no. 120; swampy woods, west end of Lake Drummond, Nansemond Co., Dec. 30, 1938, *Fernald & Long*, no. 9683; border of pine woods near Benefit, Norfolk Co., May 7, 1935, *Fernald & Griscom*, no. 4480; low woods, Adams Swamp, Nansemond Co., April 9, 1937, *Fernald & Long*, no. 7124; Goodman Swamp, near St. Mary's Church, southwest of Whaleyville, Nansemond Co., Sept. 17, 1937, *Fernald & Long*, no. 7565; wet woods and clearings, Great Dismal Swamp, southeast of Whitemarsh School, Nansemond Co., Oct. 12, 1929, *Fernald & Long*, no. 11,600 (autumnal flowering); swampy thickets in sandy and peaty pine barrens, east of Cox Landing, south of South Quay, Nansemond Co., May 10, 1940, *Fernald & Long*, no. 11,887 (TYPE in Herb. Gray.); swampy pine woods south of Yadkin, Norfolk County, April 21, 1942, *Fernald Long & Abbe*, no. 14,213. NORTH CAROLINA: low oak-pine woods, 8 miles south of Williamston, Martin Co., June 21, 1927, *Wiegand & Manning*, no. 2373. SOUTH CAROLINA: locality not stated, type of *Andromeda axillaris*, *β*. Lam.; rich pine woods, Pine Island, Horry Co., April 9, 1932, *Weatherby & Griscom*, no. 16,608. FLORIDA: several sheets without further data, *Chapman*.

*Leucothoe axillaris*, var. *ambigens* is so named because of the extreme doubt, which, until after the war, cannot be removed, as to its exact identity. That it is an extreme variety of *L. axillaris* (Lam.) D. Don there can be no doubt, but whether it has one or more earlier names is the problem. The type of *Andromeda axillaris* Lam. Encycl. i. 157 (1783) is shown in PLATE 890, FIG. 1. It is the extreme of the species with ovate, oval or ovate-oblong leaves abruptly short-tipped, the shrub which abounds on the Coastal Plain, from Florida to Louisiana, northward to North Carolina and, less characteristically and locally, into southeastern Virginia (swamp of Nottoway River, Smith's Ferry, Southampton Co., *Fernald & Long*, no. 7935; swampy woods north of Whitemarsh School, Nansemond Co., *F. & L.*, no. 10,764), both of the Virginia collections being transitional to var. *ambigens*.

There are two very similar species, *Leucothoe axillaris* of the Coastal Plain, and the shrub of the mountain-region which passes, perhaps incorrectly, as *L. Catesbaei* (Walt.) Gray (PLATE 902). *L. axillaris*, when it lives up to the type (PLATE 900, FIG. 1) and to Gray's description in the Synoptical Flora, "leaves from oval to oblong-lanceolate . . . , mostly with an abrupt acumination, serrulate mainly toward the apex," is easily distinguished because the bracts of the young raceme are broadly rounded and the broad ovate-oblong sepals blunt, whereas the mountain species which we call *L. Catesbaei* (PLATE 902) has "leaves ovate-lanceolate to lanceolate and tapering into a long and slender acumination, serrulate throughout" and the bracts are acute, the acutish sepals narrow. *L. axillaris*, var. *ambigens* has leaves which can easily be matched by those of the upland species and in some collections, such as *Fernald & Long*, no. 7565, sharp serrulations extend three-fourths to the base, more strongly than in much of *L. "Catesbaei"*.

Now the difficulty is, that Walter could hardly have escaped seeing either typical *Leucothoe axillaris* or transitional forms or var. *ambigens* somewhere in the eastern Carolinas or Georgia, for either typical *L. axillaris*, the extreme described as *L. platyphylla* Small in Bull. Torr. Bot. Cl. xxviii. 290 (1901) (PLATE 900, FIGS. 2 and 3), or intermediates or extreme var. *ambigens* are in his territory, as shown by abundant specimens. Nevertheless, the only evergreen *Andromeda* of this affinity described by Walter was his

> *A. Catesbaei* 3. racemis ovatis axillaribus, corollis ventricoso tubulosis bracteatis; foliis alternis petiolatis, ovato-lanceolatis, serrulatis, crassis, perennantibus.—Walt. Fl. Carol. 137 (1788).

When, not realizing that the Coastal Plain species may also have ovate-lanceolate or narrower leaves "serrulatis", Gray examined Walter's type he merely made the memorandum that it "= *A. spinulosa* Pursh." But Pursh had some points scrambled, for he described *A. axillaris*, with a var. *longifolia* (foliis lineari-lanceolatis *longissimis*) from "the mountains of Virginia to Georgia", whereas the type of *A. axillaris* is of the shortest- and broadest-leaved extreme of the Coastal Plain species! As to *A. spinulosa* Pursh, with *A. Catesbaei* cited as a synonym, his description seems to be that of the montane species, although he specifically assigned it to "Lower Carolina", the Coastal Plain region.

Since none of the original descriptions note any of the really distinctive characters, while those botanists who early applied or misapplied the names did not seem to understand them, we are left with the problems as to the true identities of *Andromeda Catesbaei* Walt. and of *A. spinulosa* Pursh. It is not unreasonable to suppose that, when the types can be studied with the real specific differences in mind, we may have to reduce *A. Catesbaei* Walt. to the Coastal Plain species and to decide on the proper name for the montane one.

It is not without interest that Lamarck recognized two varieties of his *Andromeda axillaris:* the typical plant, "foliis ovatis", and $\beta$. "foliis lanceolatis", but he gave no name to the latter; the specimen, as shown by a photograph of it, being *Leucothoe axillaris* var. *ambigens* from South Carolina.

PLATE 900, LEUCOTHOE AXILLARIS (Lam.) D. Don: FIG. 1, TYPE of *Andromeda axillaris* Lam., × ½, after *Cintract;* FIG. 2, flowering branch of *L. platyphylla* Small, × 1, from Emanuel Co., Georgia, *Harper*, no. 2093; FIG. 3, portion of inflorescence, to show blunt bracts and calyx-segments, × 4, from near Augusta, Georgia, *Olney & Metcalf.*

PLATE 901, L. AXILLARIS, var. AMBIGENS Fernald: FIG. 1, portion of TYPE, × 1; FIG. 2, portion of inflorescence of TYPE, to show blunt bracts and calyx-segments, × 4.

PLATE 902, L. CATESBAEI (Walt.) Gray, as usually interpreted: FIG. 1, portion of flowering branch, × 1, from Biltmore, North Carolina, *Bilt. Herb.*, no. $1280^b$; FIG. 2, portion of inflorescence, to show acute bracts and calyx-segments, × 4, from no. $1280^b$.

VACCINIUM TENELLUM Ait. Range extended inland to GREENSVILLE Co.: sandy woods and thickets along Fontaine Creek, near Round Hill Church, no. 14,651.

LYSIMACHIA LANCEOLATA Walt. Very local in BRUNSWICK Co.: border of rich woods, Seward Forest, near Triplett, no. 14,652.

FRAXINUS CAROLINIANA Mill., var. PUBESCENS (M. A. Curtis) Fernald. Local range extended inland to western BRUNSWICK Co.: bottomland woods along Poplar Creek, southwest of Ebony, no. 14,653.

LIGUSTRUM SINENSE Lour. To the records from more easterly counties add one from GREENSVILLE Co.: thicket by Meherrin River, below Emporia, no. 14,604.

*PHACELIA FALLAX Fernald in RHODORA, xlvi. 51, t. 814 (1944). Known in Virginia only from GILES Co.: May, 1869, *Canby*.

*P. DUBIA (L.) Trel., var. INTERIOR Fernald in RHODORA, xlvi. 54, t. 816, fig. 4 (1944). ALLEGHANY Co.: dry roadside, Covington, *Hunnewell,* no. 4080.

*HELIOTROPIUM AMPLEXICAULE Vahl. HENRICO COUNTY: waste ground, Richmond, May 11, 1884, *J. R. Churchill* as *H. anchusaefolium* Poir.; waste places and roadsides, Richmond, *Fernald, Long & Smart,* no. 5904, as *H. europaeum* L. DINWIDDIE COUNTY: waste ground and cinders of freight-yard of

Atlantic Coast Line Railroad, Petersburg, *Fernald & Long*, no. 12,172, as *H. europaeum*.

*H. amplexicaule* Vahl, a decumbent perennial, with many soon forking branches, sessile or but short-petioled narrowly oblong-lanceolate leaves and lilac flowers in at first dense cymes, has fruit very similar to that of *H. indicum*. It was formerly erroneously reported as *H. europaeum*, an annual with 4-lobed (instead of 2-lobed) fruits and long-petioled elliptic leaves. The latter is before me from streets of Alexandria, Virginia, September 28, 1897, *Steele*. *H. amplexicaule* (with an often misleading name) is naturalized from South America.

Scutellaria parvula Michx., var. **Leonardi** (Epling), comb. nov. *S. Leonardi* Epling in Am. Journ. Bot. xxvi. 20 (1939). *S. parvula*, var. *ambigua* sensu Fernald in Rhodora, iii. 201 (1901), not *S. ambigua* Nutt. Gen. ii. 37 (1818). *S. ambigua* sensu Leonard in Contrib. U. S. Nat. Herb. xxii. 729 (1927), not Nutt. (1818).

When I identified this smoothish extreme of *Scutellaria parvula* as *S. ambigua* Nutt. I was apparently in error. Epling has stated that the Nuttall material at Kew, as well as the representation of it at the Philadelphia Academy, suggests a mixture of *S. nervosa* Pursh with *S. parvula*, var. *Leonardi*, only Epling, naturally, did not use the latter combination. He speaks of Leonard "who, in his careful and useful revision, recognized the specific distinctions clearly but, lacking access to the type, was misled as to the name." The "specific" distinctions are those of superficial pubescence and size and slight difference of shape of leaf-outline, points which, if treated as "specific", would break such a complex transcontinental series as *S. epilobiifolia* A. Hamilt. into many such "species". Yet Epling, in spite of a very real difference in the nutlets, throws the latter, not even as one of his "subspecies", back into the Old World *S. galericulata* L. As to the "specific distinctions clearly" "recognized" in Leonard's revision one finds himself in some perplexity. On p. 729 of his study, Leonard said under *S. parvula*: "*Scutellaria parvula* is closely related to *S. ambigua*, since both species have similar flowers and roots and resemble each other in habit. There are, however, certain striking differences. The stem of *S. ambigua* is glabrous, or, at most, roughened or finely puberulent on the angles, while its leaves are rather narrowly ovate or more nearly lanceolate, strongly involute, and not exceeding 7 mm. in width. . . . Plants are not uncommon, however, in the ample material of the U. S. National Herbarium, which seem to be intermediate between the two species."

Remembering, then, that *S. ambigua* sensu Leonard is "strikingly" different from *S. parvula* because its "stem is glabrous, or, at most roughened or finely puberulent on the angles" and the leaves are "strongly involute", we turn to the discussion of the former at the bottom of the page and read: "*Scutellaria ambigua* is a well-marked species, *readily distinguished from S. parvula by its minutely puberulent stem and* more pointed *leaves with revolute margins*" (italics mine). Furthermore, although Nuttall, in describing *S. ambigua*, definitely said, "Hab. In dry and open forests, Ohio", Leonard says: "Type locality: Council Bluff on the Missouri." It is too bad that the name *S. ambigua* does not really belong here. Some such name is needed for the "specific distinctions clearly" "recognized" in these quotations.

As I understand the Nuttall type of *Scutellaria ambigua*, Dr. Pennell having kindly sent me the specimen at the Philadelphia Academy for study, it is a stiff and thick-leaved extreme of *S. nervosa* Pursh, with the larger cauline leaves unusually small and subentire or barely dentate, narrowly ovate and 1.5–2.5 cm. long by 8–15 mm. broad. It is highly localized: on Linnaean Hill in the District of Columbia (*Steele* in U. S. Nat. Herb.), somewhere in Ohio, presumably near the Ohio River (Nuttall's type), near Blue Licks in northern Kentucky (*Short*) and on limestone outcrops at Mascot, Tennessee (*Billings, Cain & Drew*).

Typical *Scutellaria nervosa* is much more flexuous, with the leaves membranaceous, the larger median cauline ones broadly to narrowly ovate and dentate with several teeth on each margin, 2–5 cm. long by 1–3.25 cm. broad, the young foliage abundantly strigose on the upper face. This plant is of broad range in the Piedmont region and Appalachian Upland (Pursh's type, which Dr. Pennell has kindly sent me for study, coming from Winchester, Virginia) and only slightly and exceptionally intruding into the lower or flatter marginal areas. In its narrower- and firmer-leaved extremes it merges into *S. ambigua*. Superficially resembling typical *S. nervosa* is the plant of the outer Piedmont and Atlantic Coastal Plain region, crossing westward mostly north of the Appalachian Upland, as far as Iowa and found at relatively low levels along the Mississippi Valley. This extreme, which has the upper surfaces of the leaves glabrous, was called to my attention by Mr. Bayard Long. It and typical *S. nervosa* are neighbors near Philadelphia and Washington and at some points along the Ohio River but the general avoidance of the Appalachian Upland of the plant with upper leaf-surface glabrous is so evident from the 118 sheets of specimens before me that I am looking upon *S. nervosa* as consisting of three geographic varieties as follows. For the use of the material in their care I am greatly indebted to Dr. Fred J. Seaver of the New York Botanical Garden, Dr. Francis W. Pennell and Mr. Bayard Long of the Academy of Natural Sciences, Philadelphia, and Dr. William R. Maxon of the United States National Herbarium.

Scutellaria nervosa Pursh, var. **typica.** *S. nervosa* Pursh, Fl. Am. Sept. 412 (1814) from "the banks of rivulets: Virginia", Winchester, in the mountains. *S. gracilis* Nutt. Gen. ii. 37 (1818). *S. parviflora* Raf. ex A. Hamilt. Mon. Scut. 37 (1832) as a syn. of *S. gracilis* Nutt., without diagnosis. [Epling, Univ. Calif. Pub. Bot. xx. no. 1. 20 (1942) gives as the first synonym of *S. nervosa* "*S. teucrifolia* J. E. Smith, *in* Rees Cycl. 32, No. 15, 1816; a synonym, based upon the preceding [*S. nervosa*]". But, if he had looked up Smith's publication of 1819, not 1816, he could hardly have made that statement, for as no. 6 Smith maintained *S. nervosa*, taking his account from Pursh; while his no. 15, the new *S. teucrifolia*, was a segregation from the mixed *S. integrifolia* L. (1753), and he did not mention *S. nervosa* in his account of it. In fact, at the end of his discussion of *S. teucrifolia*, Smith explicitly said: "Mr. Pursh seems not to have recognized this plant. At least we can refer it to none of his species." See discussion under *S. elliptica* at end of this Contribution].—Eastern Pennsylvania to central Ohio, southern Indiana and southeastern Illinois, south in the Piedmont and among the mountains to western North Carolina and eastern Tennessee; also northwestern Louisiana.

*Var. **calvifolia,** var. nov., a var. *typica* recedit foliis supra glabris.—Northern New Jersey to southern Ontario, west to southeastern Iowa, s. on or near the Coastal Plain to Virginia, and in the interior to southern Ohio, southern Indiana and western Tennessee. The following are referred here. New Jersey: Little Falls, Aug. 22, 1889, *Geo. D. Hulst;* rare at foot


*Photo. B. G. Schubert.*

LEUCOTHOE CATESBAEI, as usually interpreted: FIG. 1, flowering branch, × 1; FIG. 2, portion of inflorescence, to show acute bracts and calyx-segments, × 4


*Photo. B. G. Schubert.*

PYCNANTHEMUM MONOTRICHUM, all figs. from TYPE: FIG. 1, plant, × ½; FIG. 2, leaf, × 1; FIG. 3, venation of back of leaf, × 4; FIG. 4, flower, × 5; FIG. 5, portion of glomerule, × 10; FIG. 6, calyx, × 10 of bluff in woods north of Weston's Mills below New Brunswick, *Mackenzie*, no. 7041; Lambertville, June 2, 1886, *R. E. Schuh*, May 28, 1921, *Mackenzie;* Princeton, 1883, *J. E. Peters;* along Crosswick's Creek, Bordentown, *Long*, no. 10,139. PENNSYLVANIA: along East Swamp Creek, Milford Square, *Long*, no. 34,645; Telford, *Benner*, no. 430½; Rockhill, July, 1882, *Fretz;* West Rockhill, June 6, 1926, *F. H. Strohm;* near Quakertown, June 3, 1894, *S. Brown;* near Tinicum Creek, Ottsville, *Long*, no. 33,392; Palm, June 18, 1925, *Mary H. Williams;* Sumneytown, May 30, 1903, *Albrecht Jahn;* near Ridge Valley Creek, Finland, *Long*, no. 24,787; Ivy Rock, May, 1894, *S. Brown*, May, 1906, *Long;* Byberry, *Martindale;* Manayunk, *C. E. Smith* and others; Fairmount Park, Philadelphia, *C. E. Smith;* banks of Schuylkill near Philadelphia, July, 1844, *Thurber;* ne. of Friedensburg, *Wilkens*, no. 5526; slope of Wagenhorst Hill, nw. of Kutztown, *Wilkens*, no. 5137; Conewago, May 28, 1889, *Heller, Small*, May 29, 1889, *Small;* limestone bluffs on Conestoga, above Lancaster, June 22, 1913, *Long;* Aspinwall, June 8, 1901, *J. A. Shafer*. DELAWARE: near Perry's Tavern, June 12, 1897, *Canby*. MARYLAND: Conowingo, May 30, 1907, *Bartram*, June 24, 1907, *J. J. Carter*. DISTRICT OF COLUMBIA: Insane Asylum woods, in vicinis Washington, May 21, 1879, *L. F. Ward*, May 26, 1889, *Coville*. VIRGINIA: rich sandy and loamy wooded slopes and clearings along Appomattox River, just above the "fall-line", about 2 miles west of Petersburg, May 12, 1940, *Fernald & Long*, no. 11,905 (TYPE in Herb. Gray., ISOTYPE in Herb. Phil. Acad.). ONTARIO: near Kingsville, *J. Macoun*, no. 54,679. OHIO: Florence, Erie Co., 8/7, 1897, *Moseley;* Muskingum, Herb. *Schweinitz;* Columbus, 1837, and 1840, *Sullivant;* "Fernbank"—ad ripas fluminis Ohio, prope "North Bend", *Short*. INDIANA: Seymour, *Pennell*, no. 11,751, *Friesner*, no. 16,774. TENNESSEE: woods along river, Clarksville, *E. J. Palmer*, no. 17,601; bank of Tennessee R., Rockport, *Harger*, no. 7893. ILLINOIS: Tazewell Co., July, 1889, *F. E. McDonald;* Athens, Menard Co., 1861, *E. Hall;* Olney, Richland Co., *E. J. Palmer*, no. 15,585; Madison Co., June, 1877, *Eggert;* St. Clair Co., June, 1877, *Eggert;* near No. 13, Saline Co., *Pepoon & Barrett*, no. 5154. IOWA: Cedar Creek, Stockport, *E. W. Graves*, no. 2052; (In the U. S. Nat. Herb. there is a sheet without locality on the original label, but with an annotation which seems to be "Knobs. Ia. Mohr lg. 1854." The specimens are of the strigose-leaved var. *typica*, such as one expects from the Knobs of Kentucky and Tennessee, but not from Iowa. The disparity in the two handwritings on the label suggests some error).

Var. **ambigua** (Nutt.), comb. nov. *S. ambigua* Nutt. Gen. ii. 37 (1818) not sensu Leonard in Contrib. U. S. Nat. Herb. xxii. 729 (1927). *S. parvula*, var. *ambigua* (Nutt.) Fernald in RHODORA,

iii. 201 (1901) as to basonym only.—See discussion on pp. 172 and 173.

Agastache nepetoides (L.) Ktze. Charles City Co.: old clearing in dry woods above Chickahominy River, Eagle Bottom, *F. & L.*, no. 11,724. Surry Co.: rich wooded ravine, northwest of Ingersoll, no. 11,723; rich alluvial thickets back of sand-beach of James River, below Sunken Meadow Beach, no. 8443.

These stations are here cited because, from the most recent map of ranges of *Agastache*, Lint & Epling in Am. Mid. Nat. xxxiii. map 1, p. 213 (1945) one is likely to assume that the species is not in southeastern Virginia—the map showing an eastern boundary from near Washington southwestward across western Virginia, more than 200 miles west of Surry County.

*Glechoma hederacea L., forma acutiloba Neuman. The form with sharp-toothed leaves. Surry Co.: roadside bank about 3 miles southwest of Surry Courthouse, no. 13,127.

*Pycnanthemum **monotrichum,** sp. nov. (tab. 903), planta habitu *P. aristato* simillima; caule puberulo 0.8–1.2 m. alto ramulis elongatis deinde floriferis; foliis ovatis vel ovato-lanceolatis acuminatis viridibus serrato-dentatis, majoribus 4–5.5 cm. longis, 2–3 cm. latis, venis lateralibus 5–8-jugis venis superioribus supra medium laminae exortis; dentibus calycis lanceolato-aristatis subaequalibus 2.5–3 mm. longis, plerumque trichoma longum flexuosum multicellare infra apicem gerentibus.—Dry sandy woods and clearings, southeastern Virginia; northeast of Homeville, Sussex County, July 20, 1936, *Fernald & Long*, no. 6380 (type in Herb. Gray.; isotype in Herb. Phil. Acad.); Kilby, Nansemond County, September 11, 1935, *Fernald, Long & Fogg*, nos. 5023, 5024 and 5025; all distributed as *P. clinopodioides* T. & G.

As noted, *Pycnanthemum monotrichum* (from the usually solitary long trichomes near the tips of the calyx-teeth) was distributed as *P. clinopodioides.* That was on account of the long flexuous bristle just referred to; but its calyx is nearly regular, with essentially uniform teeth, all 2.5–3 mm. long, whereas *P. clinopodioides* has the calyx definitely bilabiate, with the longer (lower) and merely acuminate (instead of aristate) teeth only 1–1.5 mm. long, while its leaves are membranaceous, those of *P. monotrichum* subcoriaceous. Grant & Epling have labelled all the specimens as a probable hybrid of *P. hyssopifolium* Benth. and *P. Tullia* Benth. (i. e. *P. pycnanthemoides* (Leavenw.) Fern., the name required by the International Rules but which Grant and Epling refuse to take up[1]). Just why it should be called such

[1] Dr. Epling rejects the name required by the International Rules, *Pycnanthemum*

a hybrid (see Grant & Epling, *Study of Pycnanthemum,* Univ. Calif. Pub. Bot. xx. no. 3: 234 (1943)) I do not know and such a disposition of it would certainly be better supported if the plant grew within flying-distance for bees of *P. pycnanthemoides!* *P. monotrichum* occurs in acid sandy woods of the Coastal Plain, near where both *P. hyssopifolium* and *P. setosum* Nutt. (see note at end of discussion, p. 178) are found, but the only station in Virginia cited by Grant & Epling for true *P. pycnanthemoides* (*P. Tullia*), on their p. 211, is in Patrick County at the base of the Blue Ridge, 150 miles west of the westernmost station for *P. monotrichum,* altogether too long a flight for the pollen-carrying bee![1] Their most eastern station in North Carolina (Durham County) is, to be sure, a little nearer, only 115 miles away, but even that would require a tremendous relay of bees to carry the necessary pollen-grain.

If *P. monotrichum* had been called a hybrid of *P. pycnanthemoides,* var. *viridifolium* Fern. in Rhodora, xxxix. 445 (1937), our plate 904, the relay of bees required would be less, but this plant, type from the inner Coastal Plain in Greensville County, Virginia, is treated by those authors as one of their so-called species, *P. viridifolium* (Fern.) Grant & Epling, l. c. (1943), which, in spite of the type-station on the Coastal Plain, is said in their key (p. 203) to be "plants of the Appalachian Mountains from Virginia and West Virginia to Alabama", not a significant morphological character. But even so, *P. pycnanthemoides,* var. *viridifolium* (plate 904) is a plant of richer, basic to calcareous soils and its nearest stations to *P. monotrichum* are too far away (18–35 miles) to make the guess very plausible. Incidentally, *P. pycnanthemoides* and its var. *viridifolium* would scarcely suggest themselves as related to *P. monotrichum* to those who know the plants. Besides the very large leaves and outer bracts and broad open inflorescences, with multicellular flexuous trichomes very numerous on calyx-teeth and inner bracts, *P.*

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*pycnanthemoides,* presumably because it seems meaningless. Would he carry this philosophy so far as to exclude *Arctostaphylos Uva-ursi* (*Arctostaphylos* being the Greek, *Uva-ursi* the Latin for bearberry), *Clethra alnifolia* (*Clethra* the ancient Greek equivalent of the Latin *Alnus*) and all others in which the trivial repeats the meaning of the generic name?

[1] Although radio-listeners have for several years gained the impression that "*The Flight of the Bumblebee*" is never ending, the flights of that busy individual are actually limited in extent, rarely two miles I am told.

*pycnanthemoides* and its variety have the calyx strongly bilabiate; and, as originally illustrated and described by Leavenworth, when he set up the genus *Tullia* with a single species, the corolla is very large for the genus, deep pink to purple and with the lateral lobes of the lower lip spreading-ascending. Unfamiliar with such striking field-characters, the recent monographers of *Pycnanthemum* made nothing of the large purple to deep pink corolla! In brief, *P. monotrichum*, with its nearly regular calyx, mostly solitary long trichomes on the aristate calyx-teeth, small whitish corollas, etc., shows no more influence of *P. pycnanthemoides* (or *Tullia*) than do *P. hyssopifolium* and *P. setosum*, i. e. none at all.

*P. monotrichum* seems to be a definite species of the sandy Coastal Plain. Although with broad foliage somewhat suggesting that of *P. setosum*, it differs in several characters from it. It is generally taller, its leaves are more ovate and acuminate, sharply serrate-dentate, its calyx-teeth 2.5–3 mm. long and usually with a subterminal divergent long trichome, the calyx-teeth of *P. setosum* (PLATE 905, FIG. 4) 1.3–2.5 mm. long and without the long trichome. In some characters *P. monotrichum* is as near *P. hyssopifolium* (PLATE 905, FIGS. 1–3), but that species is grayish in tone, not full green, commonly with many short and suppressed axillary branches, instead of elongate and finally flowering ones; its entire or subentire leaves are narrowly oblong to oblong-lanceolate or -linear, blunt, at most 0.5–1.5 cm. broad and with the uppermost of the 3–5 pairs of lateral veins arising at or below the middle of the blade (in *P. monotrichum* the serrate-dentate, ovate, acuminate leaves mostly 2–3 cm. broad, the uppermost of the 5–8 pairs of lateral veins borne well above the middle of the blade). In *P. hyssopifolium* the bristleless calyx-teeth are 2.3–5 mm. long; in *P. monotrichum* the usually bristle-tipped teeth only 2–3 mm. long.

The name *Pycnanthemum setosum* Nutt. in Journ. Acad. Phil. vii. 100 (1834) must, under the International Rules, replace *P. aristatum* Michx. Fl. Bor.-Am. ii. 8, t. 33 (1803). There is no question about the plant clearly described and illustrated by Michaux but, unfortunately, he cited as an unquestioned synonym of it *Nepeta virginica* L. (1753). That being his interpretation, he should have used the earlier specific name, for it had


*Photo. B. G. Schubert.*

PYCNANTHEMUM PYCNANTHEMOIDES, var. VIRIDIFOLIUM, all figs. from TOPOTYPE: FIG. 1, portion of inflorescence, × 1; FIG. 2, portion of glomerule, with corolla, × 8

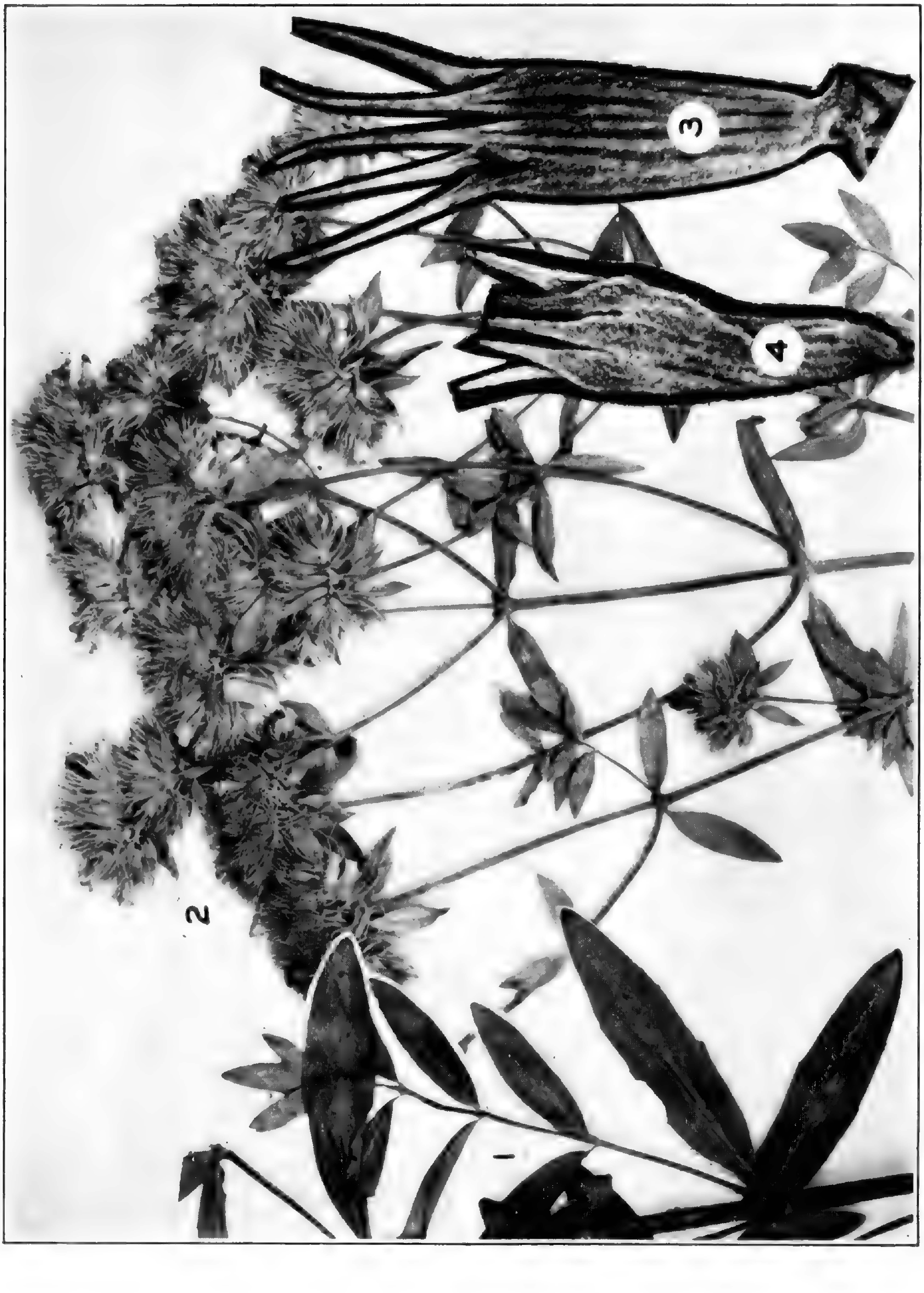


Photo. B. G. Schubert.

PYCNANTHEMUM HYSSOPIFOLIUM: FIGS. 1 and 2, foliage and inflorescence, × 1; FIG. 3, calyx, × 10 not then been used under *Pycnanthemum*. Under the International Rules the name *P. aristatum* is illegitimate.

*P. **umbratile,** sp. nov. (TAB. 906), a *P. clinopodioide* differt caule arcuato-pilosis nec divergente villosis; foliis ovatis obtusis viridibus integris vel subintegris basi late rotundatis subtus ad costas sparse puberulis, majoribus 2.5–3.5 cm. latis; corymbis terminalibus hemisphaericis bracteis externis foliaceis ellipticis vix reductis; bracteis internis breviter hirtellis; calycibus bilabiatis dentibus apice subulatis breviter hirtellis.—VIRGINIA: border of rich bottomland woods along Blackwater River, southeast of Ivor, Southampton County, September 16, 1937, *Fernald & Long*, no. 7595 (TYPE in Herb. Gray.).

*Pycnanthemum umbratile* (from the deep shade of its type-station) has been only once collected. The type, snatched at the end of the day, was found upon study to be unique in another sense. When we later returned for more of it, the road-machinery had done its work. Soil to the depth of several feet had been removed for use in construction of the neighboring 4-lane trunk-road and the station obliterated. The plant, obviously, will later be found elsewhere on the wooded bottomland where abound many other rather local species. I do not hesitate to describe the unicate, for it is very distinctive. By current treatments it would be placed with *P. clinopodioides* T. & G. The distinctions are as follows. In *P. clinopodioides* (PLATE 907) the short curving hairs of the stem are mixed with longer spreading trichomes; in *P. umbratile* the long and spreading hairs are wanting. *P. clinopodioides* has the pale green leaves lance-acuminate, tapering gradually to the petiole and often with sharp serrations, with the veins beneath hirtellous, the primary blades only 1–2 cm. broad; *P. umbratile* has the full green leaves oval, bluntish, essentially entire, broadly rounded to the petiole, and barely puberulent on the midrib beneath, the larger blades 2.5–3.5 cm. broad. In *P. clinopodioides* the glomerules terminate the branches or are verticillastrate; in the type of *P. umbratile* there is a single terminal, open corymb. In *P. clinopodioides* the calyx-teeth are appendaged near their tips, like the inner bracts, by long, flexuous, divergent multicellular trichomes; in *P. umbratile* these long trichomes are lacking. Until fuller material is at hand distinctions in the flowers cannot safely be stated.

*P. incanum (L.) Michx., var. **puberulum** (Grant & Epling), stat. nov. *P. puberulum* Grant & Epling in Univ. Calif. Pub. Bot. xx. no. 3: 212 (1943). Described from Florida and Alabama, northward into North Carolina and West Virginia. Virginia now comes into the range. Brunswick Co.: rich wooded bluff by Meherrin River at Westward Bridge (or Mill), no. 14,738. See p. 100.

Plate 903, Pycnanthemum monotrichum Fernald, all figs. from the type: fig. 1, plant, × ½; fig. 2, leaf, × 1; fig. 3, back of leaf, to show venation, × 4; fig. 4, portion of glomerule, to show flower, × 5; fig. 5, portion of glomerule, to show bristles, × 10; fig. 6, calyx, × 10.

Plate 904, P. pycnanthemoides (Leavenw.) Fernald, var. viridifolium Fernald: fig. 1, portion of inflorescence, × 1, of topotype, *Fernald & Long*, no. 11,130; fig. 2, portion of glomerule, to show flower and bristle-tipped calyx-segments, × 8, from no. 11,130.

Plate 905, figs. 1–3, P. hyssopifolium Benth.: figs. 1 and 2, foliage and inflorescence, × 1, from southwest of Cypress Bridge, Southampton Co., Virginia, *Fernald & Long*, no. 6374; fig. 3, calyx, × 10, from no. 6374. Fig. 4: P. setosum Nutt.: calyx, × 10, from Forked River, New Jersey, Sept. 3, 1893, *MacElwee*.

Plate 906, P. umbratile Fernald, all figs. from type: fig. 1, summit of plant, × 1; fig. 2, portion of stem, to show curving pubescence, × 10; fig. 3, lower surface of leaf, to show pubescence, × 10; fig. 4, calyx, × 10.

Plate 907, P. clinopodioides Torr. & Gray: figs. 1 and 2, portions of plant, × 1, from Rye, New York, *Asa Gray;* figs. 3, portion of stem, and 4, lower surface of leaf, to show pubescence, × 10, from the standard specimen, New Jersey, 1841, *Carey;* fig. 5, calyx, × 10, from Palisades, New Jersey, 1860, *C. F. Austin.*

Lycopus americanus Muhl., var. Longii Benner. Local range extended back into the outer Piedmont. Brunswick Co.: springy sphagnous and argillaceous bog, Ram-hole Swamp, Seward Forest, near Triplett, no. 14,740. See p. 103.

Var. *Longii* has been accredited an inland occurrence about the Great Lakes. It is, however, apparently confined to the Atlantic Coastal Plain and its intrusions into the Piedmont. The plant of the Interior is

Lycopus americanus Muhl., var. **scabrifolius,** var. nov., internodiis supernis villosis, villis multicellulis; foliis bracteatis lineari-lanceolatis superne scabro-puncticulatis.—Southern Michigan to Illinois, south to Louisiana and Texas. Type: wet sandy prairie, Havana, Illinois, August 15, 1903, *H. A. Gleason* in Herb. Gray.

Var. *scabrifolius,* at least of northern Indiana, as well as northern Ohio plants which I have not seen, was originally included in the Coastal Plain *L. americanus,* var. *Longii* Benner in Bartonia, no. 16: 46 (1934). The latter plant, occurring from Long Island, New York, to eastern Virginia, has the upper


*Photo. B. G. Schubert.*

PYCNANTHEMUM UMBRATILE, all figs. from TYPE: fig. 1, summit of plant, × 1; FIG. 2, portion of stem, × 10; FIG. 3, lower surface of leaf, × 10; FIG. 4, calyx, × 10


*Photo. B. G. Schubert.*

Pycnanthemum clinopodioides: figs. 1 and 2, portions of plant, × 1; fig. 3, portion of stem, × 10; fig. 4, lower surface of leaf, × 10; fig. 5, calyx, × 10 surfaces of the leaves smooth and not puncticulate. All the material I have seen from Michigan, Indiana, Illinois, Oklahoma, Louisiana and Texas has the upper surfaces harsh with minute crowded point-like trichomes. It seems to be a more inland and western extreme. Whether the gap in the representation in the Gray Herbarium—between Indiana and Illinois at the north and Oklahoma and Louisiana at the south—is to be overcome by collections from western Kentucky, western Tennessee and Missouri, must depend upon further collecting.

Dicliptera brachiata (Pursh) Spreng. To the single recorded Virginian station (bottomland of Meherrin River at Haley's Bridge, Southampton Co.) add an extensive one about 30 miles inland (much more as the river flows) farther up the valley. Brunswick Co.: wooded bottomland of Meherrin River at Westward Bridge (or Mill), no. 14,741. See p. 100.

*Ruellia Purshiana Fernald in Rhodora, xlvii, 27, t. 845 and t. 846, fig. 3 (1945).—Stations cited in Frederick, Rockingham, Rockbridge, Botetourt, Washington, Roanoke, Amelia and Henrico Cos.

*R. Purshiana, forma claustroflora Fernald, l. c. 29, t. 846, figs. 1 and 2 (1945).—Cited from Rockbridge Co.

*R. humilis Nutt. (typical). See Fernald, l. c. 52, tt. 854 and 855 (1945).—Cited from Giles Co.

*R. humilis, var. frondosa Fernald, l. c. 54, t. 857 (1945).—Cited from Shenandoah and Wythe Cos.

*R. humilis, var. calvescens Fernald, l. c. 60, t. 860 (1945).—Stations in Frederick and Shenandoah Cos.

*R. caroliniensis (Walt.) Steud., var. semicalva Fernald, l. c. 73, t. 864 (1945).—Type from Southampton Co.

R. caroliniensis, var. membranacea Fernald, l. c. 76, tt. 865 and 866 (1945).—The common plant which has passed, erroneously, as *R. parviflora*, *R. ciliosa* or *R. caroliniensis*. Cited from Fairfax, Alexandria, North, Middlesex, Mathews, Gloucester, York, James City, Charles City, Princess Anne, Norfolk, Isle of Wight, Surry, Southampton, Sussex, Greensville, Dinwiddie, Amelia, Brunswick, Campbell, Bedford and Rockbridge Cos.

*R. caroliniensis, var. membranacea, forma hypopsila Fernald, l. c. 78, t. 867, figs. 1–3 (1945).—Recorded from Elizabeth City, Norfolk, Surry, Southampton and Sussex Cos.

*R. caroliniensis, var. membranacea, forma laevior Fernald, l. c. 79, t. 868 (1945).—Recorded from Southampton, Greensville and Amelia Cos.

*R. caroliniensis, var. nanella Fernald, l. c. 79, tt. 869 and 870, fig. 1 (1945).—Cited from Nansemond and Princess Anne Cos.

*R. caroliniensis, var. nanella, forma eciliata Fernald, l. c. 80, t. 870, figs. 2–4 (1945).—Cited from Southampton and Sussex Cos.

*R. caroliniensis, var. cheloniformis Fernald, l. c. 80, tt. 871 and 872 (1945).—Recorded from Clarke, Northampton, Gloucester, Elizabeth City, James City, Princess Anne, Norfolk, Dinwiddie, Mecklenburg and Halifax Cos.

*R. caroliniensis, var. cheloniformis, forma **candida**, f. nov., corollis albidis.—Brunswick Co., Virginia: Triplett, 1945, *J. B. Lewis* (type in Herb. Gray.).

*R. caroliniensis, var. dentata (Nees) Fernald, l. c. 83, tt. 874 and 875 (1945).—Cited from Fairfax, James City, Henrico, Princess Anne, Norfolk, Isle of Wight, Sussex, Halifax and Orange Cos.

(*To be continued*)

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## NOTES ON THE COMPOSITAE OF THE NORTHEASTERN UNITED STATES. I. INULEAE

Arthur Cronquist

In the course of preparing a treatment of the *Compositae* for the new illustrated flora of the northeastern states, it becomes necessary to make a number of new combinations. These, with such comments as may seem desirable, will be published in advance. It is intended that automatic tautonyms, without citation, be used in the flora for nomenclaturally typical intraspecific units. Such of these as do not conflict with previously published names of the *typica* category will be validated in this series of papers.

In this work, as in previous work with certain western and southern groups, it is noteworthy how often I have been forced to return to a treatment approximating that of Asa Gray in the Synoptical Flora. In several instances in which the past 60 years have seen a marked increase in the number of generally accepted species, I have been unable to recognize or delimit satisfactorily the major part of the recent segregates. Such a case is furnished by *Antennaria.* Gray disposed of all our Antennarias as one variable species, *A. plantaginifolia.* Experience has shown this treatment to be too conservative, but even so it is more satisfactory than the treatments now in vogue. The chaotic condition which has been brought about in some European genera that also show well-developed apomixis, such as *Hieracium*, should give pause to those who have so multiplied our species. As Stebbins has shown (Bot. Gaz. **94:** 134–151. 1932; RHODORA **37:** 236. 1935), the sexual forms of the large-leaved and small-leaved eastern Antennarias hybridize, but the offspring show cytological irregularities and reduced fertility. These two groups thus behave about as we would expect two closely related but distinct species to do. Our plants may be segregated fairly readily into large-leaved and small-leaved forms (*A. plantaginifolia* and *A. neglecta*), although with some overlapping. The further segregation from *A. plantaginifolia* of the single-headed southern plant with certain habital peculiarities, *A. solitaria*, leaves us with three fairly well-marked species. The first two of these are highly variable, and may be separated into more or less evident varieties, although the distinctions sometimes become entirely arbitrary. I do not deny that some of these varieties may seem distinct in restricted areas, but when the whole region is considered the segregation becomes too dependent on temporary whim, or at best on individual opinion, to justify specific recognition. This should cause no surprise, since Fernald has pointed out (RHODORA **38:** 231. 1936) that certain groups which are largely apomictic in some areas are frequently sexual in others.

ANTENNARIA PLANTAGINIFOLIA (L.) Richards. var. **plantaginifolia** Cronquist, nom. nov. *A. plantaginifolia* (L.) Richards. App. Frank. Journ. ed. 2. 30. 1823. *Gnaphalium plantaginifolium* L. Sp. Pl. 850. 1753, sens. strict. Basal leaves tardily glabrate above; pistillate involucres mostly 5–7 mm. high.

A. PLANTAGINIFOLIA (L.) Richards. var. **ambigens** (Greene) Cronquist, comb. nov. *A. arnoglossa* Greene var. *ambigens* Greene, Pitt. **3:** 320. 1898. *A. fallax* Greene, Pitt. **3:** 321. 1898. Basal leaves tardily glabrate above; pistillate involucres mostly 7–10 mm. high.

A. PLANTAGINIFOLIA (L.) Richards. var. **arnoglossa** (Greene) Cronquist, comb. nov. *A. arnoglossa* Greene, Pitt. **3:** 318. 1898. *A. Parlinii* Fern. Gard. & For. **10:** 284. 1897. *A. Parlinii* var. *arnoglossa* Fern. Proc. Bost. Soc. Nat. Hist. **28:** 243. 1898. Basal leaves glabrous above nearly or quite from the first; pistillate involucres mostly 7–10 mm. high.

A. NEGLECTA Greene var. **neglecta** Cronquist, nom. nov. *A. neglecta* Greene, Pitt. **3:** 173. 1897, sens. strict. Basal leaves tardily glabrate above; stolons long, procumbent, with small and often few leaves; basal leaf-blades tending to taper gradually to the base; pistillate involucres mostly 7–10 mm. high.

A. neglecta Greene var. **Randii** (Fern.) Cronquist, comb. nov. *A. canadensis* Greene var. *Randii* Fern. Proc. Bost. Soc. Nat. Hist. **28:** 247. 1898. *A. canadensis* Greene, Pitt. **3:** 275. 1898. Basal leaves glabrous above nearly or quite from the first; leaves and stolons variable; pistillate involucres mostly 7–9 mm. high.

A. neglecta Greene var. **attenuata** (Fern.) Cronquist, comb. nov. *A. neodioica* Greene var. *attenuata* Fern. Proc. Bost. Soc. Nat. Hist. **28:** 245. 1898. *A. neodioica* Greene, Pitt. **3:** 184. 1897. Basal leaves tardily glabrate above; pistillate involucres mostly 7–10 mm. high; stolons relatively short and leafy, merely decumbent; basal leaf-blades tending to be abruptly contracted to the petiole-like base.

A. neglecta Greene var. **gaspensis** (Fern.) Cronquist, comb. nov. *A. neodioica* Greene var. *gaspensis* Fern. Ottawa Nat. **19:** 156. 1905. Similar to var. *attenuata*, but the leaves much smaller, not over 5 mm. wide, and generally narrower in shape.

A. neglecta Greene var. **argillicola** (Stebbins) Cronquist, comb. nov. *A. virginica* Stebbins var. *argillicola* Stebbins, Rhodora **37:** 232. 1935. *A. virginica* Stebbins, Rhodora **37:** 230. 1935. Similar to var. *attenuata*, but smaller in all parts, the pistillate involucres mostly 5–7 mm. high.

All of the varieties of the two preceding species, as I have delimited them, occur nearly or quite throughout our range, except for var. *gaspensis* and var. *argillicola*. The former is limited to the Gaspé region, the latter to the mountains of Virginia and adjacent areas. It is to be understood that the Antennarias of Newfoundland are excluded from consideration in the foregoing discussion.

Pluchea purpurascens (Sw.) DC. var. **purpurascens** Cronquist, nom. nov. *P. purpurascens* (Sw.) DC. Prodr. **5:** 452. 1836, sens. strict.

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# Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 47. June, 1945. No. 558.

## JUNCUS MERTENSIANUS AND ITS AUSTROLIMITAL SEGREGATE, J. DURANII

JOSEPH EWAN

(With one map)

FRANZ BUCHENAU wrote in 1906 that "*J[uncus] Mertensianus, nevadensis, Suksdorfii* et *columbianus* gregem polymorphum formant. Formae saepe difficillime distinguendae et in locis natalibus melius observandae." (Engler, Pflanzenreich **25:** 202.) Subsequent collections accumulating in our herbaria lend support to Buchenau's statement. But in plant species of wide distribution the geographically terminal populations may, under physiographic isolation, differentiate to a point where they can no longer, with morphologic consistency, be recognized as conspecific with the parent wide-ranging species. The degree of such departure from the characters of the species, along with the nature of the genus, determine whether the biologic unit shall be recognized as a species or subspecies. Juncus is generally admitted to be a natural genus; here the specific lines must be definitively and neatly drawn. Accordingly, I am distinguishing *Juncus Duranii* as the austrolimital Californian facies of the wide-ranging *J. Mertensianus.* The number of collections of *Juncus Duranii* available for study is unfortunately small. Moreover, the habitable areas where such a boreal Juncus might logically be expected in the San Gabriel Mts. are also limited. Dry seasons, particularly when repeated uninterruptedly for a span of years, force boreal plant species into dormancy. Close scrutiny of more cienegas along the highest coast-desert "divide" of the range may reveal additional colonies.

JUNCUS **Duranii,** n. sp. Slender perennial, rather densely tufted from a short usually matted vertical rootstock, glabrous throughout; stems erect, capillary, 10–20 cm. high, lightly compressed; leaves grass-like, all radical or nearly so, attenuate to a long tip, firm but not stiff, mostly shorter than the flowering stems, 7–15 cm. long, blades subterete, a little conduplicate below, the ligules prominent, rounded or cuspidate, straw-colored; bract of inflorescence subulate, usually 7–10 mm. long, early deciduous; heads solitary, 7–9 mm. across, rarely 2 in a short panicle, flattened-hemispherical; bractlets light-translucent, abruptly mucronate with a distinct awn; perianth-segments linear-lanceolate, 3 mm. long, pale chestnut-brown, the inner whitish on margins, the outer carinate; anthers equaling or a little longer than the filaments; capsule obtuse-obovoid (like *J. Mertensianus*), not stipitate at base; seeds narrowly lanceolate, 0.5 mm. long, honey-brown, obscurely longitudinally lineate.[1]

TYPE, *J. & N. Ewan 10060*, Lilly Spring, n. slope Mt. Hawkins, San Gabriel Mts., Calif., at COLO. *J. Mertensianus sensu* Parish, Muhlenbergia **6:** 123. 1910, as to so. Calif. colls. and sensu Johnston, Bull. S. Calif. Acad. Sci. **17:** 60. 1918, as to *Johnston 1502*, Kellys Cabin; cf. Johnston, Pl. World **22:** 83. 1919.

Known only from the San Gabriel, San Bernardino, and San Jacinto mountains of southern California where it is apparently localized about shaded mossy seeps in the White Fir-Lodgepole Pine association (*Abies concolor-Pinus contorta Murrayana*), often growing with *Mimulus moschatus* and other Canadian-Zone herbaceous species.

Colls. studied: San Gabriel Mts.: Mt. Islip, n. slope 7500 ft., *Fosberg & Ewan 4978* (LAM); Lilly Spr., Mt. Hawkins, TYPE; Kellys Cabin, 8350 ft., Ontario Peak, *Johnston 1502* (DS). Almost certainly *Johnston 1390*, Coldwater Fork Lytle Creek, in cienegas, 7000 ft., is this species but material not seen. San Bernardino Mts.: cienega in Mill Creek Canyon, ca. 6000 ft., *Parish 2522* (DS). San Jacinto Mts.: stream above Round Valley, *C. M. Wilder 924* (DS).

[1] JUNCUS **Duranii,** sp. nov. Herba perennis gracilis e rhizomate brevi verticali plerumque implexo subdense caespitosa omnino glabra; caulibus erectis capillaribus 10–20 cm. altis leviter compressis; foliis graminoideis omnibus basi vel basem versus gestis, in apicem longum angustatis, firmis plerumque quam caulibus floriferis brevioribus, 7–15 cm. longis, laminis subteretibus inferne leviter conduplicatis, ligulis prominentibus stramineis apice rotundatis vel cuspidatis; inflorescentiae bractea subulata plerumque 7–10 mm. longa mox decidua; capitulis solitariis 7–9 mm. diametro rarius 2 paniculam brevem formantibus depresso-hemisphaericis; bracteolis translucentibus abrupte mucronatis manifeste aristatis; tepalis lineari-lanceolatis 3 mm. longis pallide castaneis, interioribus margine albescentibus, exterioribus carinatis; antheris filamenta vel aequantibus vel paullum superantibus; capsulis obtuso-obovoideis basi estipitatis; seminibus anguste lanceolatis 0.5 mm. longis melleo-brunneis obscure longitudinaliter lineatis.

The *Juncus* here designated as *J. Duranii* was referred to *J. Mertensianus* by California authors, beginning with Samuel Bonsall Parish. However, it is almost as closely related to *J. nevadensis.* Table 1 brings out the morphological likenesses of

TABLE 1. COMPARISON OF THREE SPECIES OF JUNCUS

| *Juncus* | *Mertensianus* | *Duranii* | *nevadensis* |
|---|---|---|---|
| Flowering stems | rather tufted from an almost single compact root-crown, not spreading-rhizomatous | tufted, from a single congested rootcrown, not spreading-rhizomatous | not tufted, several, from a spreading rhizome |
| Leaves | somewhat gladiate, distinctly compressed laterally, not at all capillary | not at all gladiate, narrowly lengthwise compressed, capillary | scarcely gladiate but variable, from capillary to linear. |
| Ligule | prominent, broadly rounded or barely acute at tip, opaque | prominent, rounded or cuspidate, translucent | prominent, long-acuminate to an acute tip, translucent |
| Bract of head | spathe-like or flaring, clasping at base, tapering to a long-filiform erect or ascending tip | only a little broader at base, almost uniformly subulate, erect or apparently early withering and deciduous beyond head | inconspicuous, short-subulate, equaling or a little exceeding lowest head |
| Heads | solitary or as if so by crowding of 2 or 3 short-stalked clusters (rarely 2 or more in interrupted succession), rounded-hemispherical or as broad as high | solitary or rarely 2 in interrupted succession, flattened-hemispherical in outline | often 3 or 4 (or to 10) in an interrupted narrow panicle, flattened-hemispherical to turbinate or campanulate |
| Bractlets subtending each flower | tapering to a short awn-tip, dark brown, opaque | abruptly mucronate with a distinct awn ⅓ as long as bractlet, flesh-colored, translucent | ovate, acuminate to an awn-tip, flesh-colored, translucent |
| Perianth segments | long-subulate, wholly rich shining chestnut brown | linear-lanceolate, pale or dilute brown, whitish-hyaline-margined | lanceolate, wholly light brown |
| Stigmas | included or scarcely exserted | long-exserted | long-exserted |

*Juncus Duranii* with both cognate species. The seed characters are not definitive; both *J. Duranii* and *J. nevadensis* have minute seeds. The capsules of the three species are very similar and cannot be distinguished. In habit, leaf, bracts, heads, bractlets, and perianth *Juncus Duranii* combines the characters of *J. Mertensianus* and *J. nevadensis.*

*Juncus Duranii* bears the name of VICTOR DURAN, painstaking student of the flora of the White Mts. of the California-Nevada border (cf. Madrono **2:** 119), whose well prepared exsiccatae of the San Gabriel Mts., distributed by the University of California, have enriched our herbaria.

### JUNCUS MERTENSIANUS

*Juncus Mertensianus* Bong., Mem. St. Petersb. Acad. Sci. ser. 6. **2:** 167. 1832, based on a Mertens collection from "l'Ile de Sitcha", Alaska. Type presumably at Leningrad. In Prager Herb. (CAS) there is a sheet (no. 106338) bearing the label "Sitcha, ex Museo Petropolitani 160"; this may be an authentic specimen. The many Alaskan collections examined are in agreement with this Sitka plant. Carl Heinrich Mertens accompanied Lütke on the corvette *Senjavin*, visiting Sitka from June 24th to July 31st, 1827, *fide* Hultén.

Since the publication containing the original description of *Juncus Mertensianus* is rare in libraries, the description is reproduced here:

> "162. *Juncus Mertensianus n. sp.* Culmo erecto basi vaginato, folio uno alterove plano lineari basi vaginante; floribus capitatis, triandris, perigonii exterioris partibus carinatis subulatis interioribus paulo longioribus; capsula........
>
> Planta caepitosa [sic], spithamaea. *Culmi* basi vaginati, applanati, striati, glabri. Vaginae membranaceae basi laxae, aphyllae. *Folia* caulina 1–2, plana, linearia, acuta, glabra, striata, 1–2-pollicaria, basi vaginata; vaginis laxis, margine membranaceis, striatis. *Involucrum* foliis simile. *Flores* capitati, atro-purpurei. Capitula saepissime duo."

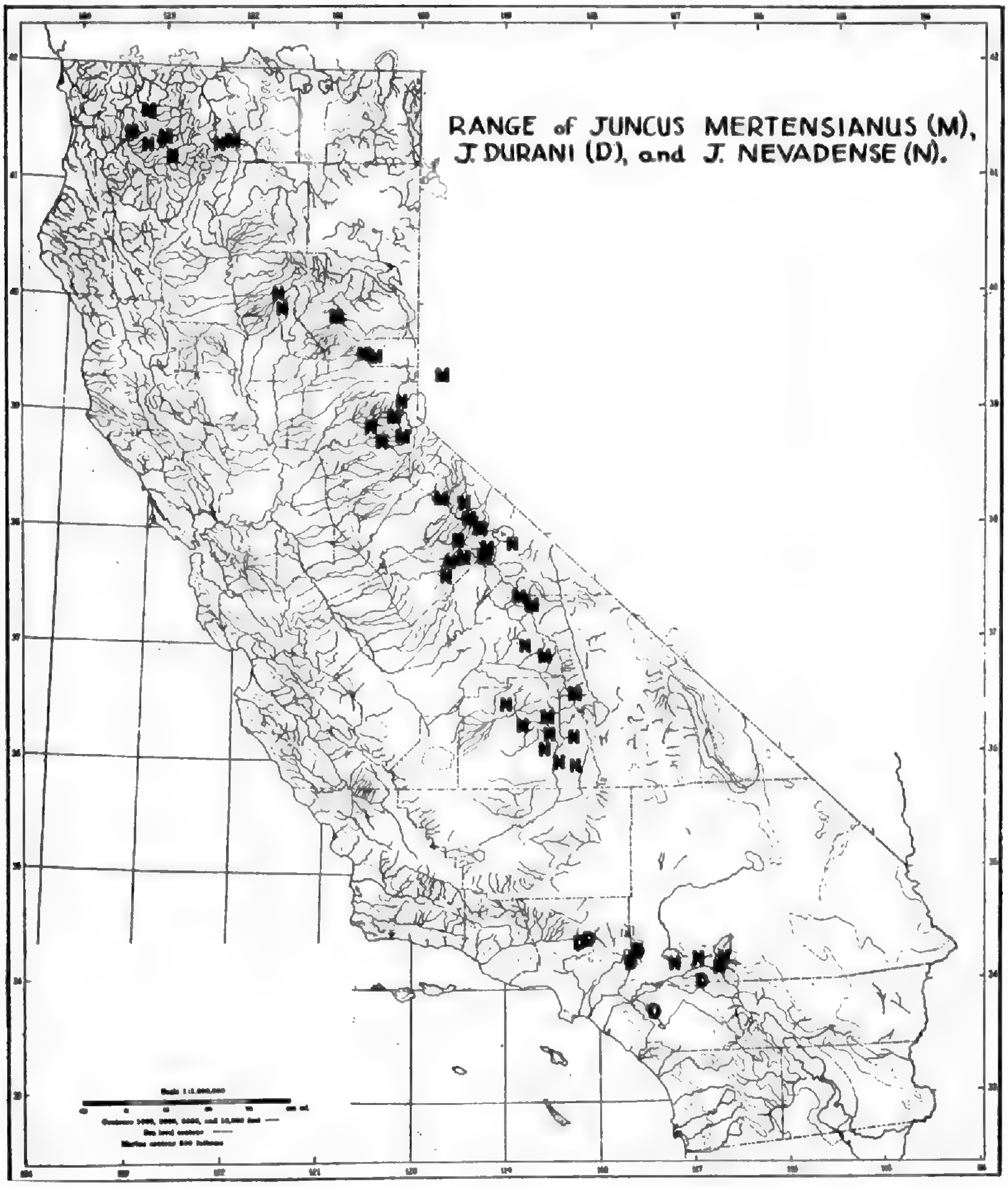
In the introduction to the florula of Sitka the statement is made that the enumeration is based on the collections of Mertens made on "l'Ile de Sitcha".

The published illustrations of *Juncus Mertensianus* are of varying usefulness and not all faithful to the habit of the plant. Both Buchenau (*op. cit.* fig. 96. 1906) and Jepson (Fl. Calif. fig. 42f and 42g. 1921) exaggerate the creeping rootstocks, as if the material from which the figure was drawn had been abnormally flattened out in the press. However, Jepson does not describe the plant as strongly rhizomatous (*op. cit.* **1:** 254. 1921), as it is illustrated. The illustration offered by Abrams (Ill. Fl. Pac. States 363. fig. 888. 1923) better indicates the short *vertical* rootstock of *Juncus Mertensianus.*

Representative colls.: Alaska: Old Harbour, Kodiak Isl., *Eyerdam 712* (DS); Yes Bay, 20 VIII 1895, *T. Howell* (DS); Unimak Isl., *Eyerdam 2021;* Atka, *Eyerdam 1174.* British Columbia: Big Bend district, Selkirks, 6000 ft., *Shaw 1093* (COLO), *982* (COLO); Glacier VII 1896, *Dudley.* Washington: Olympic Mts., *Elmer 2735.* Whatcom Co.: Welcome Pass, 5000 ft., *Thompson 8068.* Pierce Co.: Paradise glacier, Mt. Rainier, 6000 ft., *Vincent Nelson 2912* (COLO). California: Siskiyou Co.: Mt. Shasta summit trail, 8250 ft., *Cooke 16300* (COLO); Wagon Camp, Mt. Shasta, 5700 ft., *Cooke 13733* (DS); Rattlesnake Mdw., Preston Peak, 5500 ft., *Kildale 9035;* Medicine Lake, 7000 ft., *Heller 13715;* foot Mt. Eddy, 3700 ft., *Heller 12251.* Shasta Co.: Bumpas Hell trail, Mt. Lassen, 7000 ft., 7 IX 1931, *M. S. Jussel* (CAS). Butte Co.: Butte Creek House, *E. B. Copeland 348;* Butte Meadows, *Heller 14680.* Plumas Co.: Mud Lake, Mt. Elwell, 6800 ft., *Ewan 8274.* Sierra Co.: Lake of the Woods, vic. Webber Lake, 1 IX 1894, *Dudley.* Amador Co.: Emigrant trail summit, 8000 ft., Silver Lake, 24 VIII 1929, *Gwendolen Newell* (CAS). Eldorado Co.: Grass Lake, Lake Tahoe region, *Abrams 6793;* Glen Alpine, 1 VIII 1906, *Geo. B. Grant;* Desolation Valley, 8500 ft., *Abrams 12735.* Tuolumne Co.: summit Sonora Pass, 9000 ft., *Hutchinson 3777* (COLO). Mono Co.: Mill Creek, Lundy Canyon, 8200 ft., *Pierson 12200* (COLO); Mono Lake, *Abrams 13613;* Slate Creek Basin, *J. Clausen 967* (DS). Mariposa Co.: above Nevada Falls, Clouds Rest trail, 13 VI 1894, *Dudley;* Peregoy Mdws., 7200 ft., *Abrams 5457, 5462;* Yosemite Valley, *Abrams 4630.* Fresno Co.: upper Kings River, 23 VIII 1904, *Dudley.* Tulare Co.: Kaweah Peaks, 6000–8000 ft., *Dudley 2332;* above Bullion Flat, Mineral Gap, *Dudley 2582;* Hocket trail, *Dudley 1065;* upper Kern River, in 1875, *Rothrock 382* (DS). Inyo Co.: Rock Creek Lake Basin, 11,400 ft., *Peirson 9119* (COLO). Utah: Iron Co.: betw. Navajo Lake and Cedar Breaks, *Eastwood & Howell 7250* (more rhizomatous than Pac. coast colls.!). Colorado: Clear Creek Co.: meadow at upper Clear Cr. above Ski House, *Ewan 14646.*

## Excluded Species

*Juncus aseptus* Engelm. ex Buch. = *J. nevadensis* Wats., Proc. Am. Acad. Arts and Sci. **14:** 303. 1879. *Juncus aseptus* Engelm.




ex Buch. in Engler, Pflzr. **25:** 202. 1906, *nomen subnudum*, based on *Parish 3788*, from Bear Valley, San Bernardino Mts., Calif. Isotype (UC) studied.

"Juncus aseptus", an herbarium name bestowed by Engelmann, was first published by Buchenau and must rest nomenclaturally on *Parish 3788*. Parish was correct in pointing out (Muhlenbergia **6:** 123. 1910) that the name was first given to an earlier collection, also from Bear Valley, his *1439*, nevertheless his *3788* must be considered the type collection, contrary to Parish's holographic note accompanying *1439* in the Parish


*Photo. B. G. Schubert.*

EUPATORIUM CORDIGERUM: FIG. 1, portion of TYPE, × 1; FIG. 2, venation of lower leaf-surface, 1½; FIG. 3, old involucre, × 10


*Photo. B. G. Schubert.*

EUPATORIUM ROTUNDIFOLIUM: FIG. 1, TYPE, × 1/5, after *B. L. Robinson;* FIG. 2, median leaves, × 1; FIG. 3, venation of lower leaf-surface, × 2; FIG. 4, involucre, × 10

Herbarium (DS). The plants which Engelmann named *Juncus aseptus* are incompletely septate, but this condition is frequent over the entire range of *J. nevadensis*. Jepson's *diagnosticum:* "marked by its very narrow and erect strongly septate leaves with prominent ligules" for *Juncus nevadensis* is only partly true. The leaves are seldom "strongly septate" and not always "very narrow", though in general they are much more grass-like than those of *J. Mertensianus*. Both species have "prominent ligules". From the fact that Engelmann did not publish *J. aseptus* we may infer he concluded that the plant was indistinguishable from *J. nevadensis*, as Parish and Jepson subsequently decided.

Collections from the herbaria of Stanford University (DS), University of California, Berkeley (UC), California Academy of Sciences (CAS), Los Angeles Museum (LAM) and the University of Colorado (COLO) have been studied and selected collections are cited herein. Where the location of the collection may not be deduced from the collector's name, the herbarium of deposit is noted. To the personnel of these institutions who have made available this material I am indeed grateful.

Botanist with the Foreign Economic Administration

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## BOTANICAL SPECIALTIES OF THE SEWARD FOREST AND ADJACENT AREAS OF SOUTH-EASTERN VIRGINIA

M. L. Fernald

(*Continued from page 182*)

Cephalanthus occidentalis L., var. pubescens Raf. To the previously cited stations, on the Coastal Plain, add an extensive one in the outer Piedmont. Greensville Co.: border of Mitchell's Millpond, west of Brink, no. 14,665; the dull or lustreless foliage, downy beneath, strongly contrasting with the bright green foliage of typical glabrous *C. occidentalis*.

Elephantopus carolinianus Willd., forma vestitus Fernald in Rhodora, xliv. 458 (1942). To the single known station (in Nansemond Co.) add one in Brunswick Co.: woods along Meherrin River at Westward Bridge (or Mill), no. 14,742. See p. 100.

Eupatorium hyssopifolium L. (typical). See Rhodora, xliv. 459, pl. 737, fig. 1 (1942). Local range extended inland from the

Coastal Plain to BRUNSWICK Co.: springy sphagnous and argillaceous bog, Ram-hole Swamp, Seward Forest, near Triplett, no. 14,744. See p. 103.

E. **cordigerum** (Fernald), stat. nov. (PLATE 908). *E. rotundifolium* L. var. *cordigerum* Fernald in RHODORA, xlv. 477 (1943).

At the time I published *E. rotundifolium*, var. *cordigerum* I was following the interpretation of Fernald & Griscom in RHODORA, xxxvii. 180 and 181 (1935), in which all members of the *rotundifolium* series were merged as one variable species. In that paper, however, certain seemingly constant and morphologically significant characters were overlooked and too much weight was placed on the variable ones, like the occurrence of occasional alternate branching as opposed to predominantly opposite branching. No note was made of the very striking fact that in *E. rotundifolium* the principal cauline leaves (PLATE 909, FIGS. 1–3) have their bases straight, entire and subtruncate to broadly cuneate, with the toothing starting above this entire base; furthermore, it was not noted that in *E. rotundifolium* (PLATE 909, FIGS. 2 and 3) the ascending and prolonged prominent lateral veins arise from the base of the midrib. In the other three species, *E. verbenaefolium* Michx. (1803) = *E. lanceolatum* Muhl. ex Willd. (1804), our PLATE 910, *E. pubescens* Muhl. ex Willd. (1804), our PLATE 911, and *E. cordigerum*, PLATE 908, the principal leaves are toothed to the base and the elongating lateral veins tend to be united at base to the midrib, coming off from it well above its base. The uppermost leaves of *E. verbenaefolium* are greatly reduced, becoming narrowly lanceolate to linear and entire, while in the other three species they are more ovate and toothed. The involucre of *E. verbenaefolium* (PLATE 910, FIG. 4) is about 1 mm. shorter than in the others, the inner phyllaries rather abruptly tipped. Northeast of the upland region of Virginia and Kentucky *E. verbenaefolium* is primarily a coastwise plant, of acid peats and sands northeastward to southern New England. Reexamination of a photograph of Michaux's type (our PLATE 910, FIG. 1) indicates that an error was made when, in 1935, it was stated as identifiable with *E. pubescens* (PLATE 911). In regard to earlier names of Walter which, perhaps, might be applicable to *E. verbenaefolium*, it is unsafe to take them up until his plants can be actually studied. Walter's diagnoses were very brief, he did not realize the complexity of the genus in the Southeast, and his names could well belong to plants quite different from *E. verbenaefolium.*

*E. pubescens, E. cordigerum* and *E. rotundifolium* have the inner phyllaries attenuate to acute or slender tips. In *E. pubescens* the leaves are oblong to ovate, gradually rounded to base, the plant more general in the Piedmont area than *E. verbenaefolium,* occurring in moist or dry woods, thickets, etc., from Florida to Louisiana, northward to southern Maine, Massachusetts, southeastern New York, New Jersey, Pennsylvania, western Virginia and West Virginia.

*E. rotundifolium,* with characteristic straight and untoothed leaf-base, broadly deltoid-ovate to suborbicular rugose-veiny blades, with the prolonged ascending lower veins springing from the base of the midrib, characterizes siliceous, argillaceous or peaty soils from Florida to Texas, north only to Long Island, New Jersey, Maryland, Tennessee and Arkansas; while *E. cordigerum* is characteristic of river-marshes, swales and bogs of the Coastal Plain of southeastern Virginia and eastern North Carolina. Its strongly cordate-clasping leaves are unique in the group and their prolonged lateral veins are united to the midrib much higher than in the others, the type showing compound bases of the midrib up to 1.5 cm. long. In *E. rotundifolium* the inner phyllaries taper to slender pointed tips, in *E. pubescens* they are merely acuminate, but in *E. cordigerum* they are prolonged into long arching, linear, scarious appendages.

After several days of checking and rechecking the characters I feel that *E. verbenaefolium, pubescens, cordigerum* and *rotundifolium,* although some of them may hybridize, are quite as clear species as *E. rugosum* (*E. urticaefolium*) and *E. aromaticum,* or as *E. dubium* (*verticillatum*), *E. maculatum* and *E. fistulosum* of the *purpureum* series.

PLATE 908, EUPATORIUM CORDIGERUM Fernald: FIG. 1, portion of TYPE, ×1; FIG. 2, base of leaf, to show fusing of lateral nerves and midrib, × 1½, from TYPE; FIG. 3, involucre, × 10, from *Fernald,* no. 14,502.

PLATE 909, E. ROTUNDIFOLIUM L.: FIG. 1, TYPE (two stems), × ⅕, photo. by *B. L. Robinson;* FIG. 2, characteristic leaves, to show subtruncate and entire base and basal lower lateral veins, × 1, from south of Grassfield, Norfolk Co., Virginia, *Fernald & Long,* no. 4219; FIG. 3, base of leaf, to show venation, × 2, from no. 4219; FIG. 4, involucre, × 10, from no. 4219.

PLATE 910, E. VERBENAEFOLIUM Michx.: FIG. 1, TYPE, × ¼, photo. by *B. L. Robinson;* FIG. 2, characteristic foliage, × 1, from Winterham, Amelia Co., Virginia, *Fernald & Long,* no. 9168; FIG. 3, base of leaf, to show venation, × 2, from no. 9168; FIG. 4, involucre, × 10, from no. 9168.

Plate 911, E. pubescens Muhl.: fig. 1, type, × 1/4, photo. by *B. L. Robinson;* fig. 2, median leaves, × 1, from Auburn, New Jersey, *Long*, no. 18,060; fig. 3, base of leaf, to show fusion of lower lateral veins and midrib, × 2, from no. 18,060; fig. 4, involucre, × 10, from no. 18,060.

*E. aromaticum L., var. lacerum Gray.—Princess Anne County: rich woods, Virginia Beach, no. 5075 (distrib. as a hybrid). Sussex County: rich woods and bushy clearing north of Double Bridge, about 6 miles northwest of Jarratt, no. 11,452.

Typical thick-leaved *Eupatorium aromaticum* has the dark green leaves ovate, rounded to subtruncate at base, blunt and with blunt teeth. Var. *lacerum*, described from Florida, has the thinner, pale green, rhombic- or triangular-ovate, acuminate blades cuneate at base and sharply, sometimes lacerately, toothed, and on slender petioles. Transitions occur but the variety seems to be southern.

*E. sessilifolium L., var. Brittonianum Porter. Giles County: woods on dry shaly hillslope along New River, 1.5 miles south-southwest of Goodwin's Ferry, *Fogg*, no. 14,991.

Typical *Eupatorium sessilifolium* has relatively thin, lanceolate leaves, usually with rather prominent toothing. It is apparently frequent in calcareous areas in Virginia, where both vars. *Brittonianum* and *Vaseyi* (Porter) Fernald & Griscom are found. The species consists of three somewhat pronounced varieties, though, like all true varieties, their characters merge. As stated, the leaves of true *E. sessilifolium* are relatively thin, lanceolate and commonly with prominent teeth. It is rare and mostly uncharacteristic in New England and most of New York, where var. *Brittonianum* is the usual variety, this plant having firmer to subcoriaceous ovate-lanceolate to ovate leaves, with the teeth relatively fine. Like typical *E. sessilifolium* its leaves are slenderly acuminate and the larger ones range from 0.8–1.8 dm. long. Measurements of the thin- and lanceolate-leaved series (25 nos.) gives a range in size of the largest leaves of 0.9–1.8 dm. long by 2–4 cm. wide, with an average of 14 cm. long and 2.5 cm. wide, five to six times as long as broad. Var. *Brittonianum* (45 sheets), an isotype of which is before me, gives a range of 0.8–1.8 cm. long by 3–6 cm. wide, with an average of 12.9 cm. long by 4.4 cm. wide, about three times as long as wide. That these proportions are significant is apparent from the rarity of typical *E. sessilifolium* or its absence in New England, interior New York, Wisconsin, Illinois and Missouri, and the tendency of

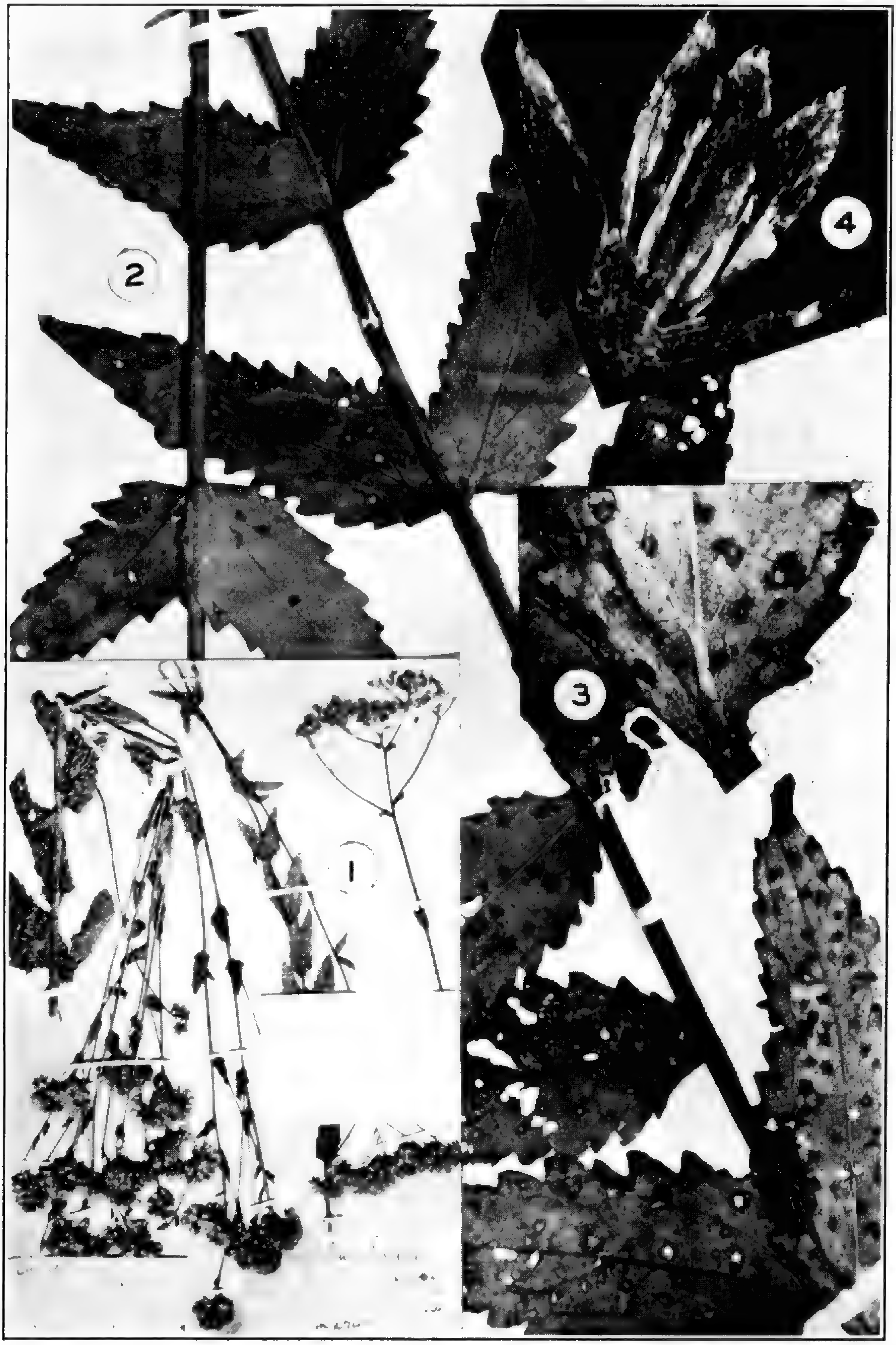


*Photo. B. G. Schubert.*

EUPATORIUM VERBENAEFOLIUM: FIG. 1, TYPE, × ¼, after *B. L. Robinson;* FIG. 2, foliage, × 1; FIG. 3, lower veins of lower leaf-surface, × 2; FIG. 4, involucre, × 10

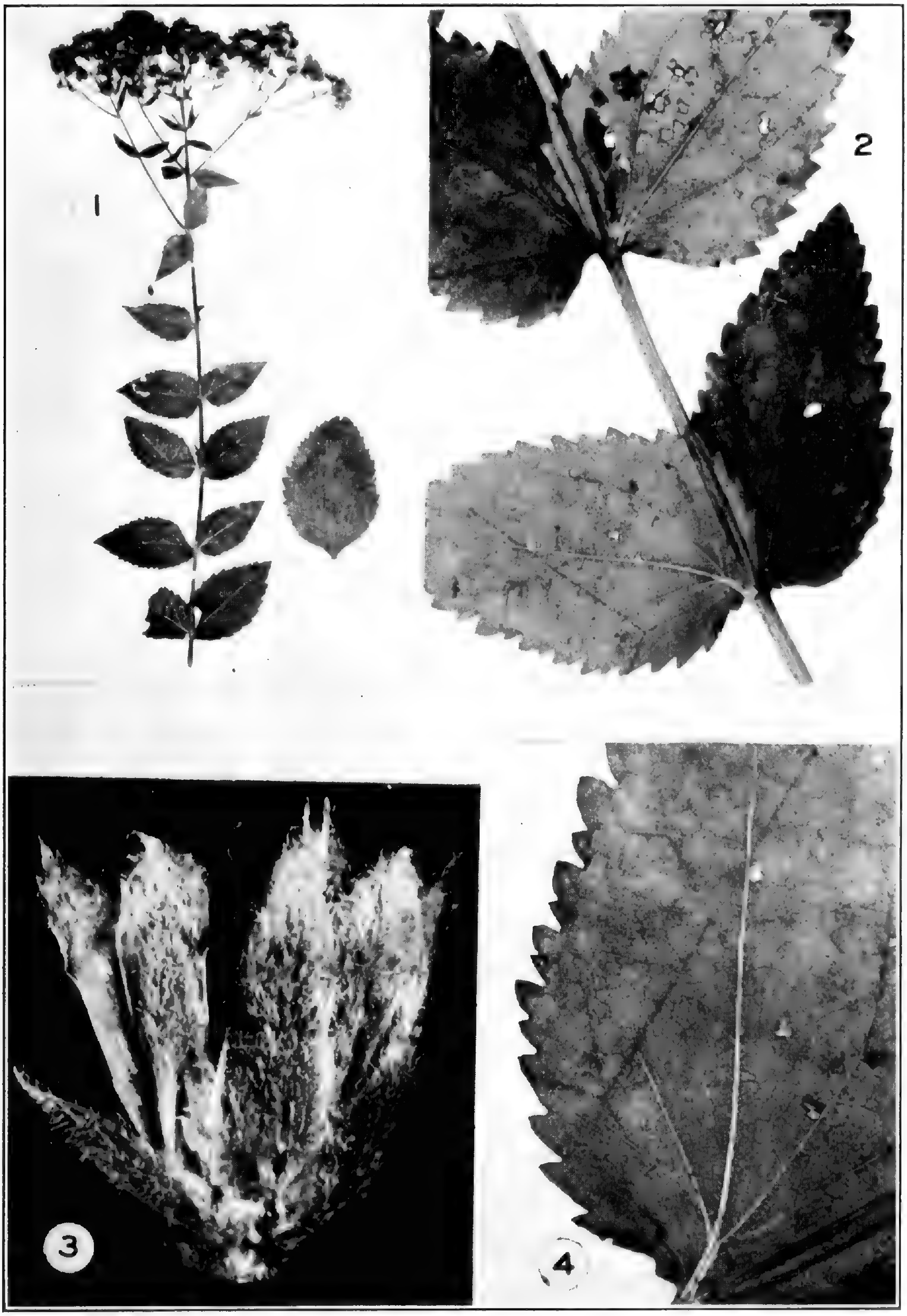


*Photo. B. G. Schubert*

Eupatorium pubescens: fig. 1, type, × ¼, after *B. L. Robinson;* fig. 2, median leaves, × 1; fig. 3, involucre, × 10; fig. 4, venation of lower leaf-surface, × 2 var. *Brittonianum* to follow the higher mountains to western North Carolina and eastern Kentucky.

Var. *Vaseyi* has the upper half of the stem puberulent or minutely pilose, sometimes glutinous, the duller green leaves oblong-ovate, merely acute or short-acuminate, the larger ones 4–12 cm. long by 2.3–6 cm. broad (about twice as long as broad) and scabrous beneath with minute puberulence. The type (U. S. Nat. Herb.) is quite characteristic of the narrower-leaved plants of this variety. It occurs in less calcareous habitats than the others, from southeastern Pennsylvania and eastern Maryland to West Virginia, south to eastern Virginia, North Carolina and eastern Tennessee.[1]

SOLIDAGO RUGOSA (Ait.), var. CELTIDIFOLIA (Small) Fernald. Local range extended inland from Coastal Plain to BRUNSWICK Co.: springy sphagnous and argillaceous bog, Ram-hole Swamp, Seward Forest, near Triplett, no. 14,751. See p. 103.

*HAPLOPAPPUS DIVARICATUS (Nutt.) Gray. (*Isopappus divaricatus* (Nutt.) T. & G.). Range extended northward into BRUNSWICK Co.: fallow field, south of Seward Forest Headquarters, Triplett, Nov., 1944, *Lewis*.

A characteristic erect and late-flowering southern annual of dry open woods, clearings and fields, often weedy. In his Genus Haplopappus, 212, 213 (1928), Hall gave its range, from Florida to Texas, northward to South Carolina and Arkansas, and its height as "2 to 7 dm." It has been found, however, in North Carolina: old field, McCuller's, Wake Co., Oct. 12, 1937, *Godfrey;*

[1] The following *Eupatoria*, although not from Virginia, may be noted here.

E. RESINOSUM Torr., var. **kentuckiense**, var. nov., *E. resinoso* habitu simillima; caulis internodiis supernis corymbi ramibusque pilosis, pilis elongatis curvatis.—Nelson County, KENTUCKY: marshy area, Bean's Lake, September 8, 1932, *Sister Rose Agnes* (TYPE in Herb. Gray).

Closely matching the endemic *Eupatorium resinosum* of pine-barren bogs of New Jersey and Delaware in habit, foliage, involucres, etc., but differing in the longer pubescence, typical *E. resinosum* being minutely puberulent. Sister Rose Agnes correctly identified the plant as *E. resinosum* but the late Dr. Robinson, evidently without a close study of the plant, relabeled it *E. perfoliatum*, var. *cuneatum* Engelm. The involucre and the narrow leaves without the broadly cuneate, entire base of *E. perfoliatum*, var. *cuneatum* are identical with those of the New Jersey plant.

E. DUBIUM Willd., forma **elutum**, f. nov., foliis ovatis triplinerviis subtus viscidogranulatis scabris; involucris floribusque albidis.—TYPE: low ground near Long Island Sound, Saybrook Junction, Connecticut, September 14, 1914 (colony of about 100 plants), *R. W. Woodward* in Herb. Gray.

E. MACULATUM L., forma **Faxoni**, f. nov., foliis anguste ovatis utrinque attenuatis irregulariter grosse serratis subtus scabris; corymbo supra complanato; phyllariis floribusque albidis.—TYPE: Gate of Crawford Notch, New Hampshire, September 2, 1884, *Charles E. Faxon* in Herb. Gray.

disturbed soil on sandhill, south of Aberdeen, Scotland Co., *Godfrey*, no. 6938; one of the Godfrey specimens 1 m., the other 1.4 m. high. Mr. Lewis states that his plant was 6 ft. (1.8 m.) high. Small individuals from Georgia are only 1.5 dm. high. The species, like most annuals of disturbed soils, will evidently respond to the amount of nutrition.

Boltonia caroliniana (Walt.) Fernald in Rhodora, xlii. 487, pl. 642 (1940). Range extended inland to western Brunswick Co.: bottomland woods along Poplar Creek, southwest of Ebony, no. 14,668. See p. 97.

*Boltonia caroliniana,* known only from eastern South Carolina and southeastern Virginia, is here found along Roanoke drainage. It is presumably along the lower Roanoke River and its tributaries in North Carolina.

*Polymnia Uvedalia L., var. densipila Blake in Rhodora, xix. 48 (1917). Brunswick Co.: rich low woods (bordering swamp of Quarrel's Creek), "Chamblis bigwoods", Seward Forest, near Triplett, no. 14,754. See p. 101.

Differing from typical *Polymnia Uvedalia*[1] and its var. *floridana* Blake in the very dense and essentially glandless pilosity of the branches of the inflorescence. Originally described from Louisiana, Oklahoma and Texas; also from Bermuda. More recently extended northward in the Mississippi Basin to Missouri. Its seeming isolation in southeastern Virginia reminiscent of several other plants.

Helianthus angustifolius L. Noted (but not collected) at several places in Brunswick Co. See p. 103.

Eclipta prostrata (L.) L. *E. alba* (L.) Hassk.—Common in the southeastern counties.

Here entered in order to call attention to the correct name, as taken up by Exell in his Cat. Vasc. Pl. S. Tomé, 225 (1944). The earliest names (omitting later ones for this cosmopolitan species) as enumerated by Exell are

> *Verbesina alba* L. Sp. Pl. ii. 902 (1753); *V. prostrata* L., l. c. (1753). *Eclipta prostrata* (L.) L. Mant. Pl. Alt. 286 (1771). *E. erecta* L. l. c. (1771), *nomen illegitimum*. *E. alba* (L.) Hassk. Pl. Jav. Rarior. 528 (1848).

[1] I am often asked about the specific name *Uvedalia*. The species was named for the Rev. Dr. Robert Uvedale (1642–1722), an English botanist, mentioned by Plukenet and a correspondent of Magnol, Sloane, Sherard and other leading botanists of his time. The genus *Uvedalia* was dedicated to him by Robert Brown.

Since *Verbesina alba* L. and *V. prostrata* L. are considered conspecific and are of even date, the first of them taken up must stand. This is *E. prostrata* (L.) L. (1771).

Cirsium virginianum (L.) Michx. Range extended inland to Brunswick Co.: springy sphagnous and argillaceous bog, Ramhole Swamp, Seward Forest, near Triplett, no. 14,757. Also noted in dry pine woods near by. See p. 103.

C. virginianum, forma revolutum (Small) Fernald in Rhodora, xlv. 509 (1943). Brunswick Co.: with the last, no. 14,758. See p. 103.

Some Inconvenient Upheavals of Familiar Names and Author-Citations.—Tiring of trying to find even recognizable formal, not to say varietal, differences in some recently proposed "subspecies", I turned, for a let-up in the tension, to the problem of exact dates of issue of certain publications which I had found cited. These involved three works of nearly competing dates: Sprengel, Florae Halensis Tentamen Novum, with the date on the title-page 1806; Sprengel, Mantissa Prima Florae Halensis, with the title-page dated 1807; and Persoon, Synopsis, pars ii. dated 1807. Fortunately the date of publication of pp. 1–272 of vol. ii. of Persoon was established by Blake in Rhodora, xvii. 134, footnote (1915), he correctly stating that:

> Although the second volume of Persoon's Synopsis is dated 1807, its first section (pp. 1–272) was issued in the autumn of 1806, as is shown by a review in the Regensb. Bot. Zeit. v. 321 (21 Nov. 1806).

That pushes a large part of Persoon's 2nd volume into competition with other publications of 1806. The resulting changes have not been checked.

My special purpose in the present notes is to draw attention to two other works, one of which seems to have been overlooked by the editors of *Index Kewensis* and by others who have followed that work in assigning many specific names to the wrong author. On May 30, 1807, Johann Friedrich Theodor Biehler issued his doctor's dissertation, printed in Halle. It was entitled Plantarum Novarum ex Herbario Sprengelii Centuriam . . . and it was reviewed in the Regensburg Botanische Zeitung for 15 October, 1807; in other words it was definitely published in late spring or summer of 1807. Biehler having done a piece of descriptive work considered by Sprengel sufficient for his thesis, Sprengel promptly absorbed it and as the second part of his own Mantissa Prima (pp. 27–58) put it out under his own name as *Novarum Plantarum ex Herbario meo Centuria.* The latter work, containing Biehler's unacknowledged descriptions and differently paged, did not come out in time to be reviewed in the Botanische Zeitung for 1807. Biehler's original publication was clearly the earlier of the two; yet all of the 100 species described are regularly cited from the second publication and Sprengel is as regularly and unjustifiably cited as the author. Some of the proposed species were described from garden plants, others from India, New Caledonia, New Zealand, St. Helena, The Caucasus, Cuban, Mongolia, etc., while a few were from North America, chiefly received from Muhlenberg. Since these, as well as the Old World species, have been regularly cited as of Sprengel, I am here noting such in our own flora as require the replacement of that author's name by Biehler's.

SCIRPUS LUPULINUS Biehler, Plant. Nov. Herb. Spreng. Cent. 4 (1807); Spreng. Mant. Prima Fl. Hal. 30 (1807). Generally identified with *Cyperus filiculmis* Vahl (1806).

PANICUM PENSYLVANICUM Biehler, l. c. 6 (1807); Spreng. l. c. 31 (1807). Not identified; type needs examination.

P. DISCOLOR Biehler, l. c. (1807); Spreng. l. c. (1807). Type needs critical examination.

POLYPOGON SETOSUS Biehler, l. c. 7 (1807); Spreng. l. c. (1807). Basis of MUHLENBERGIA SETOSA (Biehler) Trin. ex Jackson, Ind. Kew. iii. 209 (1894); Fernald in RHODORA, xlv. 237, plates 755 and 756 (1943).

AGROSTIS CLANDESTINA Biehler, l. c. 8 (1807); Spreng. l. c. 32 (1807). Basis of SPOROBOLUS CLANDESTINUS (Biehler) Hitchc. in Contrib. U. S. Nat. Herb. xii. 150 (1908).

AIRA NITIDA Biehler, l. c. 8 (1807); Spreng. l. c. 32 (1807). Basis of SPHENOPHOLIS NITIDA (Biehler) Scribn. in RHODORA, viii. 144 (1906).

A. PALLENS Biehler, l. c. (1807); Spreng. l. c. (1807). Basis of SPHENOPHOLIS PALLENS (Biehler) Scribn. l. c. 145 (1906).

POA CAROLINIANA Biehler, l. c. 10 (1807); Spreng. l. c. 33 (1807). Basis of ERAGROSTIS CAROLINIANA (Biehler) Scribn. in Mem. Torr. Bot. Cl. v. 49 (1894).

Although Hitchcock reduces *Poa caroliniana* to the synonymy of *Eragrostis pectinacea* (Michx.) Nees, emend., and illustrates the "linear" spikelets as 10–15-flowered, the original description of *P. caroliniana* called for "spiculis lanceolatis . . . quinquefloris". The "ligula abbreviata obtusa" of *P. caroliniana* does not well describe the long tuft of hairs at the orifice of the sheath in *E. pectinacea.* The type needs critical examination.

FESTUCA NUTANS Biehler, l. c. 10 (1807); Spreng. l. c. 34 (1807), not Moench (1794) and F. OBTUSA Biehler, l. c. 11 (1807); Spreng. l. c. (1807).

Since *Festuca nutans* of Sprengel (*i. e.* Biehler) has generally been referred to *F. obtusa,* it is noteworthy that both Biehler and Sprengel (neither of whom were "splitters") described them both "*E. Pensylvania. Mühlenberg*". Their *F. nutans* was strict, 3 feet high, with lanceolate leaves, the panicle erect but nodding at summit; the ovate-oblong, obtuse spikelets 5-flowered, the oblong glumes muticous; the grain oblong. *F. obtusa* had decumbent, geniculate and weak culms and glaucous, linear leaves; the panicle "aequali" (evidently equaling the culm), flaccid, with few spikelets, these pedicellate, oblong and 3-flowered, the unequal glumes much smaller than the lemmas. In other words, *F. obtusa* was the familiar, weak and usually sprawling plant with usually 3-flowered spikelets and soon diffuse panicle which correctly passes under that name (incorrectly as of Sprengel instead of Biehler); while for *F. nutans* Biehler gave a good description of *F. paradoxa* Desv. Opusc. 105 (1831) or *F. Shortii* Kunth ex Wood, Class-bk. 794 (1861), a species long known to grow in Muhlenberg's area, about Lancaster. The earlier *F. nutans* Moench (1794) invalidates *F. nutans* Biehler.

EPILOBIUM COLORATUM Biehler. l. c. 18 (1807); Spreng. l. c. 39 (1807); Muhl. ex Willd. Enum. Hort. Berol. 411 (1809).

Although *Index Kewensis* caught the Sprengel citation of 1807, it entered it as somehow secondary to that of Muhlenberg ex Willdenow (1809) and quite overlooked the earlier publication of Biehler, based on material sent by Muhlenberg to Sprengel. Biehler's detailed description in 12 lines is much more decisive than the 2-line diagnosis of Muhlenberg ex Willdenow. The easy-going faith in "authority" is illustrated by the regular taking up of *E. coloratum* as of Muhl. ex Willd. (1809), with the 1807 publication of the species by Sprengel (who absorbed it from the still earlier Biehler) as a secondary citation only. There seems to be no escape from writing E. COLORATUM Biehler.

SCUTELLARIA INCANA Biehler, l. c. 25 (1807); Spreng. l. c. 44 (1807).

Sprengel as the author must give way to Biehler. The plant was received from Muhlenberg as his *S. pubescens* Muhl. in Trans. Am. Phil. Soc. iii. 173 (1793), *nomen nudum*, but, published as a synonym of *S. incana*, it should have the following additional references: *S. pubescens* Muhl. ex Biehler, l. c. (1807) as synonym; Spreng. l. c. (1807) as synonym.

S. ELLIPTICA Muhl. ex Biehler. l. c. 26 (1807); Spreng. l. c. 44 (1807); but originally and legitimately published by Muhl. in Trans. Am. Phil. Soc. iii. 173 (1793).

*S. elliptica* Muhl. (1793) must take the place of *S. ovalifolia* Pers. Syn. ii. 136 (1806), the *S. pilosa* Michx. (1803), not Hill (1768). In his *American Species of Scutellaria*, Univ. Calif. Pub. Bot. xx. no. 1: 86 (1942), Epling cited *S. ovalifolia* as of Persoon (1807) but, as noted on p. 197, the first section of Pers. Syn. ii. came out in 1806. Under his needless *S. ovalifolia*, subsp. *mollis* Epling, l. c. (based on the same type as *S. ovalifolia*) he cites the valid publication of *S. elliptica* as starting with Sprengel, l. c., "probably based upon a specimen sent by Muhlenberg". Sprengel, literally copying from Biehler, left no "probably" in the matter since he definitely gave Muhlenberg as the author: "Sc. elliptica Mühlenb. *in lit.*", the plant "E. Pensylvania".

In the same treatment Epling cites as a synonym *S. elliptica* Muhl. in Trans. Am. Phil. Soc. iii. 173 (1793), "nomen nudum". Now, although most of the new names published by Muhlenberg in his *Index Florae Lancastriensis*, Trans. Am. Phil. Soc. iii. 157–184 (1793) and in his *Supplementum Indicis Florae Lancastriensis*, l. c. iv. 235–242 (1799) were merely *nomina nuda*, in a very few cases Muhlenberg based his species on plants collected by Clayton and described by Gronovius in his Flora Virginica, ed. 2 (1762) or described by Marshall or others. If the species of Linnaeus (or his contemporaries), based wholly on earlier polynomials of himself or others are valid, then, surely, Muhlenberg's binomials, given to clearly cited and earlier described plants of others are equally valid. In the case of *Scutellaria elliptica* Muhl. in Trans. Am. Phil. Soc. iii. 173 (1793) Muhlenberg was definite:

**Scutellaria elliptica, Claytoni.** 92. N. S.

That, expanded, is *S. elliptica* of Clayton (or Gronovius), Fl. Virg. ed. 2: 92 (1762). Turning to Gronovius (or Clayton) we find on p. 92 only one species of *Scutellaria,* described in perfectly clear terms:

SCUTELLARIA *foliis ovatis, utrinque acutis, obtuse serratis.*
Scutellaria virginiana foliis dentatis. *Moris. hist.* III. *p.* 416. *t.* 19. *f.* 3.
Cassida foliis Betonicae, flore ex albo & violaceo variegato. *Clayt. n.* 758.
OBS. *Bracteae seu folia floralia parva, ovata integerrima, corollis dimidio breviora.*

That is a perfectly good account of the common plant of eastern Virginia which has passed as *Scutellaria pilosa* Michx. and which has recently passed as *S. ovalifolia* Pers. Aside from the Clayton material, no. 758, Morison's *Scutellaria virginiana foliis dentatis* was cited. Morison's account and figure (Sect. 11, t. 19, fig. 23, miscited by Gronovius), were perfect, the latter showing the characteristic rhombic-oval leaves, and the description was adequate. Surely, when Muhlenberg based his *S. elliptica* upon such antecendent descriptions and figure he was not publishing a "nomen nudum". It may be inconvenient, but there seems to be perfectly sound reason for taking up

Scutellaria elliptica Muhl. in Trans. Am. Phil. Soc. iii. 173 (1793); ex Biehler, Plant. Nov. Herb. Spreng. Cent. 26 (1807); ex Spreng. Mant. Prim. Fl. Hal. 44 (1807). *S. integrifolia* L. Sp. Pl. 599 (1753), excl. Gronovian citation. *S. pilosa* Michx. Fl. Bor.-Am. ii. 11 (1803), not Hill (1768). *S. ovalifolia* Pers. Syn. ii. 136 (1806). *S. nemorosa* Raf. in Am. Mo. Mag. ser. 2. ii. 120 (1817). *S. teucrifolia* J. E. Sm. in Rees Cycl. xxxii. no. 15 (1819). *S. pilosa,* var. *ovalifolia* (Pers.) Benth. in DC. Prodr. xii. 423 (1848), nomenclaturally based on *S. ovalifolia* Pers. (which, according to Epling, l. c. 86, was "based apparently upon Plukenet's figure" of a plant from Virginia, so that it is difficult to follow him in his statement that *S. pilosa,* var. *ovalifolia* (Pers.) Benth. had its "type collected in New Jersey near Princeton (N. Y. Bot. Gard.)". It is probable that the Princeton specimen which Bentham cited, not as a "type", is in the Bentham or the DeCandolle Herbarium). *S. ovalifolia,* subsp. *mollis* Epling, l. c. 86 (1942).

The taking up of Scutellaria elliptica forces the following change:

Scutellaria elliptica Muhl., var. **hirsuta** (Short), comb. nov. *S. hirsuta* Short in Transylv. Jour. Med. viii. 582 (1836). *S. pilosa* Michx., var. *hirsuta* (Short) Gray, Syn. Fl. N. Am. ii[1].

379 (1878). *S. ovalifolia* Pers., subsp. *hirsuta* (Short) Epling, l. c. 86 (1942). *S. ovalifolia* Pers., var. *hirsuta* (Short) Fernald in Rhodora, xliv. 433 (1942).

It is in some ways fortunate that *Scutellaria elliptica* of Muhlenberg (1793) is so clearly applicable for we are thus saved from the complication started when Linnaeus became confused in publishing *S. integrifolia* L. Sp. Pl. 599 (1753). His account was as tangled as was his understanding of hosts of other American plants:

6. SCUTELLARIA foliis sessilibus ovatis: inferioribus obsolete serratis; superioribus integerrimis. *integrifolia.*
Scutellaria foliis integerrimis *Gron. virg.* 67.
Scutellaria caerulea virginiana, lamii aut potius teucrii folio, minor. *Pluk. alm.* 338. *t.* 313. *f.* 4.
Scutellaria, teucrii folio, marilandica. *Raj. Suppl.* 310.
*Habitat in* Virginia, Canada.

This was immediately followed by

7. SCUTELLARIA foliis lanceolatis. *Gron. virg.* 167. *hyssopifolia.*
Cassida mariana hyssopifolia. *Pet. act. angl.*
*Habitat in* Virginia.

The diagnosis "foliis . . ovatis: inferioribus obsolete serratis", the Plukenet description and drawing and the Ray account all belong to the plant above discussed as *S. elliptica*, while the Gronovian account and the Clayton specimen (photograph, × 1, before me) from which Linnaeus got the epithet *integrifolia* are of the plant currently so called; while the type of *S. hyssopifolia* (photograph, × 1, before me) is only a narrow-leaved individual of our familiar *S. integrifolia*. Neither element of the bipartite Linnean species is known from Canada!

Now, a complication might seem to arise from the treatment by J. E. Smith in Rees Cyclopaedia, xxxii. nos. 15 and 16 (1819). There Smith, possessor of the Linnean Herbarium, pointed out the original confusion, described as new *S. teucrifolia*, the ovate- and obsoletely serrate-leaved element of the Linnean bipartite *S. integrifolia* (excluding the entire- and narrow-leaved plant of Gronovius), and concluded, regarding the name *integrifolia*, "This appellation, however, being erroneous, and having caused much confusion among subsequent botanists, is best laid aside, and we have preferred one taken from the very apt synonyms of Plukenet and Ray." And, forthwith, Smith reduced to *S. hyssopifolia* L. (1753) the Gronovian element, "S. foliis integerrimis", of the original *S. integrifolia.* On its surface, since *S. hyssopifolia* was of the same date as *S. integrifolia,* that would seem to dispose of the latter in the current sense, since it was reduced by Smith to *S. hyssopifolia.*

Further search, however, shows that Michaux, Fl. Bor.-Am. ii. 12 (1803), had already restricted *Scutellaria integrifolia* to the plant with all but the lowest leaves "oblongis, integris" and clearly said under it: "*S. hyssopifolia.* L. hujusce varietas est". Aiton went further in Hort. Kew. ed. 2, iii. 428 (1811), there taking up *S. integrifolia* "foliis oblongis linearibusve obtusis integris . . . *Linn.* sp. pl. 836. (secundum synon. Gronovii; reliquis exclusis.)" and flatly citing *S. hyssopifolia* as an unequivocal synonym. We are, then, quite right in maintaining *S. integrifolia* as emended by Michaux and by Aiton.[1]

Turning again to Muhlenberg's new names published in his *Index Florae Lancastriensis* and its Supplement, most of them, as stated, are unquestioned *nomina nuda.* Some of them, like "Arabis integrifolia, Clayton 99. n. 745 ?", Muhl. in Trans. Am. Phil. Soc. iii. 174 (1793), must be left as they are because of the doubt expressed by Muhlenberg as to the identity. The following case, unfortunately, is clear.

ULMUS RUBRA Muhl. in Trans. Am. Phil. Soc. iii. 165 (1793).

Muhlenberg was renaming the perhaps misidentified *Ulmus americana* of Marshall:

Ulmus rubra. N. S. americana, Marshalli.

There is no question as to *Ulmus americana* Marshall, Arb. Am. 156 (1785). To the "larger" tree with "leaves . . . smooth on the upper surface, of thinner texture and softer than those of the first kind [Marshall's *U. americana*]. The seed-vessels . . . considerably smaller, end nicked or cleft, and ciliated or fringed on the margin" Marshall gave a new name, *U. mollifolia.* This, of course, was *U. americana* as commonly interpreted. Marshall's second species was

[1] Pursh, who got many clues from the more scholarly Flora Boreali-Americana of Michaux, took the hint conveyed by Michaux's statement under the emended *Scutellaria integrifolia,* "*S. hyssopifolia.* L. hujusce varietas est" and, in Pursh, Fl. Am. Sept. 413 (1814), formally made the varietal combination *S. integrifolia* β. *hyssopifolia.* This varietal combination is ascribed by Epling, l. c. 90, to "Millsp., Fl. W. Va. 427, 1892"; but Millspaugh simply listed the name without even any author and with no word of diagnosis nor bibliography.

Ulmus americana. *American rough leaved Elm-Tree,* rises to the height of about thirty feet, . . . with a lightish coloured rough bark. The leaves are oblong, oval and sharp-pointed, somewhat unequally sawed at the edges, . . . very rough on their upper surface and hairy underneath. The flowers are produced thick upon the branches, upon short, collected footstalks; and are succeeded by oval, compressed, membranaceous seed-vessels, with entire margins.

That is certainly Slippery or Red Elm, *Ulmus fulva* Michx. Fl. Bor.-Am. i. 172 (1803) the species which was later and independently described as *U. rubra* Michx. f., Hist. Arb. Am. iii. 278, t. 6 (1813). The younger Michaux, although not accepting the name given by his father but preferring to give a new one, unwittingly used the earliest name for the species, for there seems no way to avoid taking up for *U. fulva* Michx. (1803) the much earlier U. rubra Muhl. (1793).

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An Incomplete Flora of Illinois.—It is a subject for special note when one of our larger Universities produces what purports to be a "comprehensive treatment" of the flora of its state, and especially when another university in a neighboring state sponsors its publication. The state of Illinois has had in the past some very learned or scholarly students of its flora, for, although today, to the traveler who passes hastily across it, the state often looks botanically rather uninspiring, that was not always the case. Writing in 1882, the very keen and always helpful student of the flora of Illinois and neighboring states, the late M. S. Bebb[1], in his discussion of *Recently Introduced Plants in and about Rockford, Ill.,* said "I remember well . . . how here in Rockford, Ill., say twenty years ago, the indigenous plants of the prairie and oak-opening sprang up on every side in close proximity to the beaten paths of busy men. The industrious young botanist, collecting for exchange, found his only limitations in the quantity of driers he possessed, and the amount of time, energy and discretion he could bring to the work of using them well. Now we must go miles out into the country for material and count ourselves fortunate, even then, if the little vestige of the native flora which last season afforded us a dozen desirable specimens has not since been swept away by the plow; while in the central portion of the city scarcely a single native species remains to dispute possession with street weeds, mostly of European descent and training." Now, more than 60 years later, the native flora is still further diminished and that of "European descent and training" greatly increased.

The first botanist to explore Illinois was the greatest of them all, André Michaux, who, descending the Ohio in 1795, camped on the lower Wabash and then proceeded westward to the Mississippi, making a center at Kaskaskia and botanizing up and down the Mississippi and along the lower Ohio from August to October. This great pioneer in American botanical exploration

[1] Bot. Gaz. vii. 68–90 (1882).

carried his material back to Paris, where the great collection has long been available for ready reference. Michaux's monumental Flora Boreali-Americana (1803) contained scores and scores of records from Illinois and more than 60 new species with their TYPES from the southern portion of that state—the greatest series of new species of vascular plants ever collected by one man in Illinois.

After Michaux, the first three-fourths of the last century saw some remarkably strong botanists collecting assiduously or writing authoritatively upon the floral areas and the native and introduced plants of Illinois. Some, like the erratic Rafinesque or the learned and careful Louis C. Beck, who wrote as an introduction to his *Contributions toward the Botany of the States of Illinois and Missouri* (1826–28), "During my residence in Missouri in . . . 1820, 21, and 22, a portion of my time was occupied in the investigation of the vegetable productions of that and the adjoining state", came from outside. Others, like Samuel B. Mead, were content to collect discriminatingly and to refer their problems to masters at the older centers, with the result that we have a noble series of species, such as *Carex Meadii*, *Asclepias Meadii* and others discovered and modestly communicated by him. One of the first extensive lists of Illinois plants as such (Engelmann's *Catalogue of a Collection of Plants made in Illinois and Missouri by Charles A. Geyer* not discriminating often between the two states) was the cautious and very reliable *Catalogue of the Plants of the State of Illinois* (1856–57) by Dr. Increase A. Lapham, an amateur scientist of such scholarship and precision that he was awarded what few amateurs ever have received, one of the most distinguished honors open to American scholars, election to the American Philosophical Society. Besides his Catalogue of more than 1125 vascular plants then known in the state, Lapham published one of the most critical and accurate series of descriptions up to his time of *Native, Naturalized and Cultivated Grasses of the State of Illinois.* Another great scholar, Frederick Brendel, published in the Zeitschrift für die Gesammten Naturwissenschaften, xv. (1860) his *Verzeichniss der in Illinois wildwachsenden phanerogamischen und cryptogamischen Gefässpflanzen*, a catalogue of nearly 1200 species. This was followed by the publication at Budapest in Természetrajzi Füzetek, v. (1882) of his remarkably helpful *Flora Peoriana, die Vegetation im Clima von Mittel-Illinois.* This contained more than 1360 species, with indication of the geographic areas of the state where it occurred: if not near Peoria, then along the Mississippi ("Am Mississippi"), in the region of the Ohio ("Im Ohiogebiet"), along Lake Michigan ("Am Michigan-See"), etc. Here were the first records for a great number of plants in Illinois, with a scholarly discussion of the natural floral areas, a model of scientific presentation. Then, in English, Brendel published (1887) his *Flora Peoriana, the Vegetation in the Climate of Middle Illinois*, "the result of thirty-five years observations". To these add Patterson's Catalogue in 1876, Flagg's in 1878 and very many local floras and notes (a few of them cited in the bibliography of the new *Flora of Illinois* (1945)). George Vasey, Henry Eggert, E. J. Hill, M. S. Bebb, F. E. McDonald, Robert Ridgway and many others added materially to the published Catalogues, and John Wolf, too modest to publish, enriched our knowledge very materially, sending to others the specimens upon which were based such very unusual species as *Poa Wolfii* and *Eleocharis Wolfii.*

With such a background of sound enumerations of the vascular plants of the state or of sections of it, the student in 1945, hearing that a professor at the University of Illinois has published through Notre Dame University a new and up-to-date *Flora of Illinois,* naturally looks forward to an accurate recension of all this assembled matter. If, however, he has known these scores of discriminating lists and as many technical studies of genera or sections of genera in our flora, most of which I had long since had to digest in revising the Manual and which, consequently, were largely right at hand, he is in for a great disappointment. Therefore, when the editor of the new *Flora of Illinois,* by George Neville Jones,[1] asked me to review the book in RHODORA, I was obliged to write him that he had assigned me an unwelcome and highly unpleasant task. Of course some reviewers would easily say "It is finely printed, neatly bound and has very simple keys. It is, therefore, a great book". But, in view of the great mass of accurate data which has been neglected but which I had already taken into account in my own work, I cannot stop there; and I am sure that the more experienced living botanists of Illinois must react in the same way.

The first part of the book is made up of speciously simple keys—specious because they are so likely to mislead. On p. 8, Section 1 is defined as "1. Plants grasses, sedges, or rushes; perianth green or absent". How in the world does the beginner know whether the plant is a grass, sedge or rush, merely because it has a green perianth, or none? Scouring Rush (not a grass, sedge or rush) has no flowers. Turning to the fuller detail of Section 1 we are given the following key:

**Section 1. Grasses (or Grass-like Plants), or Sedges, and Rushes**

1. Flowers enclosed by chaffy scales; perianth none, or of bristles; fruit a grain or an achene.
   2. Stem usually cylindrical [etc.] . . . . . . . . . . . . . . . . . . . . . . . 22. GRAMINEAE
   2. Stem cylindrical or triangular. . .; fruit an achene. . . 23. CYPERACEAE
1. Flowers not enclosed by chaffy scales; perianth 6-parted; stems terete; fruit a capsule.
   3. Stem not glandular. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 30. JUNCACEAE
   3. Stem glandular. . . . . . . . . . . . . . . . . . . . . . . . *Tofieldia* in 31. LILIACEAE

Now, if the uninitiated get hold of almost any species of *Fimbristylis* or of *Cladium,* for instance, he will find the flower *subtended by* but not "enclosed by" a scale (in most *Gramineae* the "*enclosing*" is complete, but not in most *Cyperaceae,* except *Carex*); if he gets *Fuirena* he will find, as Dr. Jones states, on p. 69, a "perianth of 3 stalked sepals". And how can he know, when he gets green-flowered *Stenanthium gramineum,* with flowers constructed like those of *Juncus,* or of *Zigadenus* or Yellow-eyed Grass, *Hypoxis,* with their green-backed perianths appressed to the fruit, that it is not a grass-like plant with "perianth 6-parted; . . . fruit a capsule"? Furthermore, when he gets hold of a *Juncus* of the *Prophyllate* series (with chaffy scales "enclosing" the bases of the flowers) how can he be sure that they don't? And as to the

[1] GEORGE NEVILLE JONES: Flora of Illinois, containing keys for identification of the flowering plants and ferns. The American Midland Naturalist, Monograph No. 2. University of Notre Dame, Notre Dame, Indiana (1945). 317 pp. $4.00.

perianth of the *Juncaceae* being "green", only the green beginner will try to hold his Rushes to that definition. Just look at the brown or fulvous outer tepals (sepals) of many species of *Juncus* or of *Luzula!*

Having learned (we hope) that some plants with grass-like leaves and green perianths are not necessarily Rushes, the beginner tries another lot of specimens. He has come in from the dunes of Lake Michigan with a slightly frutescent little gray-pubescent plant with tiny scale-like leaves and bright yellow petals, surely an Angiosperm. Imagine his shock, if he has had even an elementary training in morphology, to find it placed with the Gymnosperms! The only excuse for here placing *Hudsonia* is that Gymnosperms are trees and shrubs with "Leaves needle-like (acicular), scale-like, or subulate, evergreen", though admittedly deciduous in *Larix* and *Taxodium* (in which some of the leaves are flat, as they are in *Tsuga!*). Certainly if the barely shrubby *Hudsonia* can be placed (with apologies, to be sure) with the Gymnosperms, then bushy-branched, though herbaceous *Asparagus* could be placed there; and why not *Belamcanda* with its naked seeds or *Reseda* with its seeds maturing in an open barrel-like capsule (*Reseda* is wild in Illinois, though not cited in the book). After struggling, to the point of inaccuracy or near-absurdity not to use technical terms, why give up and suddenly, in the keys, expect the ignorant beginner to understand "stamens hypogynous", "Corolla not papilionaceous", "corolla sympetalous"? If the student understands these terms he doesn't need the misleading pap.

Now to the Flora itself. Dr. Jones here carries out his oft-expressed admiration of Rydberg's inability to distinguish between species, varieties and forms. Consequently many plants which some pretty sound taxonomists rank as varieties or as mere forms (without different ranges) are here treated as species. In general, varieties and forms are not even mentioned but sometimes their names are bracketed as synonyms of the maintained specific one: under *Lathyrus*, for instance, "[*L. venosus* var. *intonsus* Butters & St. John] . . . *L. venosus* Muhl."; or under *Acalypha* "[*A. gracilens* var. *fraseri* (Muell. Arg.) Weatherby] . . . *A. gracilens* Gray". In at least three cases, however, the offending varieties or forms are not bracketed. These are under *Prunus virginiana* "The form with the lower surfaces of the leaves, young twigs, and rachis of inflorescence pubescent is f. *deamii* G. N. Jones"; under *Gleditsia triacanthos* "The spineless form is f. *inermis* (Pursh) Fassett"; and under *Psoralea psoralioides* "The plants of the Central States are less glandular and have been named *P. psoralioides* var. *eglandulosa* (Ell.) F. L. Freeman". When one notes that the combination under *Gleditsia* was used by Schneider in 1907, he has left as authors of an accepted form and an accepted variety G. N. Jones and F. L. Freeman (now Mrs. G. N. Jones). That is "keeping up with the Joneses" with a vengeance!

In carrying through his Rydbergian principle of species or nothing Dr. Jones treats the American variety of the circumboreal *Scheuchzeria palustris* as a species, *S. americana* (Fern.) Jones. Why stop there? Are not the American varieties of other circumboreal species quite as eligible? They are; but it is devoutly hoped that they will not be elevated to specific rank without sound morphological characters: our *Eleocharis pauciflora*, var. *Fernaldii* Svenson, *Scirpus cespitosus*, var. *callosus* Bigelow, *Juncus effusus*, var. *solutus* Fern. & Wiegand, *Menyanthes trifoliata*, var. *minor* Michx. ex Raf., etc., etc. But, if the *Eleocharis* is so treated, I hope against hope that its specific name will be allowed to retain its capital initial. In the new *Flora of Illinois* all personal genitives and all old generic names used as specific ones are decapitalized, in violation of good usage and in spite of the recommendation of the International Rules. Essentially all botanists of scholarly background, from Linnaeus down, have shown their understanding by using the capital; it was regularly used, even by Rafinesque, and by Torrey, Engelmann, Gray, Britton, Small and Jones's usual model, Rydberg, while the very distinguished founder of the American Midland Naturalist, Nieuwland, was too great a scholar to decapitalize such names.

Incidentally, followers of the new *Flora* should be warned against untenable specific names there used. Such a name as *Agropyron pauciflorum* (Schwein.) Hitchc. (1933 or '34) should not be used. There was already an *A. pauciflorum* Schur (1859); a matter discussed in Rhodora, xxxvi. 417–419 (1934) and again noted in xxxvii. 372 (1935).

In this *Flora* 2124 species and pseudo-species are enumerated as occurring in Illinois but, if the compiler had taken into account the published Illinois records, the number would be nearer 2325. It is unfortunate that the old and pretty sacred principle of state's rights should have been transgressed in making up the deficient total. For instance, *Eriocaulon septangulare* is formally entered (and presumably counted), with the Illinois occurrence stated as "Borders of ponds and lakes. Pepoon says ' . . . from East Chicago eastward'". That suggests Illinois to those who do not know local geography, but we learn over the radio, from the "Quiz Kids", that East Chicago is in Indiana, a fact corroborated by the Postal-Guide and the Atlas!; and Jones himself adds apologetically: "Locally abundant in northern Indiana, but no Illinois specimens seen". I have not taken the time to figure how many other species got entered without sustaining credentials. It is very certain, however, that fully 200 species or strongly defined geographic varieties with the best of credentials were not admitted to the official registration. Some of these, like *Scirpus Hallii* Gray, were christened from Illinois material and even named for Illinois botanists; others have merely been well known to grow there. Toward the end of the volume there is a brief bibliography in which a part, but scarcely half, of the papers or reports upon Illinois plants are cited. It is, then, to be regretted that the contents of even these, to say nothing of many other authoritative publications, were not more generally accepted or understood. Many of the names used in older reports are not now (since the principle of priority of specific names, instead of the first combination of generic and specific, came into vogue) known to the "younger generation"; but they should be quite identifiable by any one competent to rank as an authority on the flora. Even the great initial contribution of Michaux to our knowledge of the Illinois flora is quite ignored, for such an obvious grass as *Bouteloua curtipendula* (Michx.) Torr. is credited to "the n. half of Ill." only, although the type of the basic *Chloris curtipendula* Michx. was from Wabash. In fact, as already noted, more than 60 of Michaux's species had their types from

Illinois. They were known to Lapham, Brendel and their really careful followers; but since, on the first page of the present *Flora* we are told that "no comprehensive treatment of the botany of this state has hitherto been published", it is just too bad that so much of the work of Michaux and so many records of his successors were not included and, by implication, not comprehended. *Agrostis* [*Muhlenbergia*] *racemosa* Michx. is the bushy-branched species found on the driest of habitats from bluffs of the Mississippi across the Plains (not the simple-culmed species of bogs and wet shores); and, although Jones thinks *Croton capitatus* Michx. "probably adv. from s. U. S.", Michaux, discovering it in 1795 and describing it as a new species, did not so consider it; and the unique (and by Hitchcock wholly misunderstood) *Erianthus brevibarbis*, with its TYPE from southern Illinois, should have had due recognition; so should the conspicuous *Cardiospermum Halicacabum* which Michaux got near Kaskaskia. Furthermore, *Heteranthera limosa* (not in the new *Flora*) was beautifully illustrated and described as a new species, *Leptanthus ovalis*, by Michaux from "paludosis Illinoensibus".

Even though the author of a "comprehensive" state-flora may not have known the early history of botanical exploration of his region, he certainly knew of some catalogues and lists; at least he cites in the bibliography some of those of Brendel, Gleason, Higley & Raddin, E. J. Hill, Lapham, Mosher, E. J. Palmer and Patterson, as well as numerous others. Practically every one of the reports or papers of the above-mentioned students of the flora contains from 1 to 50 or more species not accounted for by the compiler of the "comprehensive" *Flora*. Even one of the very latest papers cited by him, E. J. Palmer's *Botanical Reconnaissance of southern Illinois* (1921), which, although cited, was apparently not carefully digested, would have yielded 28 additions to the *Flora: Justicia humilis* (*Dianthera ovata*), *Spilanthes americana, Corallorrhiza Wisteriana, Eupatorium incarnatum, Talinum calycinum, Vaccinium tenellum, Carya Pecan, Tilia floridana*, etc., etc. Since Palmer's report was primarily upon the trees, with herbs and shrubs only incidentally mentioned, one can only imagine the many other species new to Illinois in his extensive and discriminating collections. And when, as in *Strophostyles umbellata* (see p. 216) the author himself collected, correctly identified and distributed species but did not admit them to his *Flora*, it is evident that something slipped.

All this is very sad; one is sadder that it seems necessary to point it out. When the *Flora of Illinois* first came to my desk I expected a worthy book. Soon discouraged, as its inadequacy became more and more apparent, I jotted down a few (toward 100) members of the *Monocotyledoneae* and the *Archichlamydeae* (not attempting *Carex*, *Crataegus* and *Rubus*) which, although I had never been in Illinois except to lecture in Chicago, I knew to occur in that state. These memoranda, sometimes with some (but not all) supporting citations, were written out; then I balked. I had made no contract to prepare a new flora of the state. However, having made the partial enumeration, I here present it. It is obviously very incomplete and were the *Metachlamydeae* added one would have to start right out with such obvious omissions as *Lysimachia hybrida* Michx., *Fraxinus biltmoreana* Beadle, *Sabatia campestris* Nutt., and so on to *Sonchus uliginosus* Bieb. It is altogether too evident that here is another case of "boom-town" construction, the big-fronted upper story constructed without serious consideration given the necessary foundations.

## A PARTIAL SUPPLEMENT TO THE "FLORA OF ILLINOIS", MADE FROM A DESK-TOP IN MASSACHUSETTS

SPARGANIUM ANGUSTIFOLIUM Michx. "McHenry county, Vasey"—Patterson Cat.

NAJAS GRACILLIMA (A. Br.) Morong. "Wabash county, Schneck"—Patterson Cat.; "Im Ohiogebiet", Brendel, Fl. Peoriana (1882).

ECHINODORUS TENELLUS (Mart.) Buchenau. *E. parvulus* Engelm. in Gray, Man. ed. 2: 438 (1856); Robinson in RHODORA, v. 85–89, pl. 45, figs. 1–10 (1903). *Helianthium tenellum* (Mart.) Britton, Man. ed. 2: 54 (1904). *H. parvulum* (Engelm.) Small in N. Am. Fl. xvii[1]. 45 (1909). "Margin of shallow ponds, Michigan to Illinois and westward"—*Engelm.*, l. c.; "found . . . on the Illinois side of the Mississippi by Dr. Engelmann and by Mr. Henry Eggert"—Robinson, l. c. 89. Clearly cited also by Lapham, Patterson, Brendel and several others.

GLYCERIA STRIATA (Lam.) Hitchc., var. STRICTA (Scribn.) Fern. (*Panicularia rigida* (Nash) Rydb.). Skokie Marsh, Glencoe, June 12, 1911, *Sherff*.

Having been called a species by Rydberg this plant is certainly eligible under Jones's rules, even though only a northern variety.

G. ARKANSANA Fern. Mt. Carmel, 1874, *J. Schneck;* marsh northwest of Glencoe, June 12, 1911, *Sherff*. See RHODORA, xl. 386 (1938).

VULPIA OCTOFLORA (Walt.) Rydb., var. TENELLA (Willd.) Fern. (*Festuca oct.* Walt., var. *tenella* (Willd.) Fern.). Frequent in Illinois: Oakwood, *Pease*, no. 14,713A; between Oakwood and Collison, *G. N. Jones*, no. 13,872; Peoria, *McDonald;* Crawford, *Clokey*, no. 2445; Starved Rock, *Greenman, Lansing & Dixon*, no. 78; Hillery, *Gleason;* etc.

Differing at once from true *V. octoflora* in its lower glumes only 2.3–4 mm. long; awns 1–3 mm. long. This variety (why not, then, a species?) occurs across the continent, from Maine and southern Quebec to southern British Columbia, southward through much of the United States. True *V. octoflora*, described from South Carolina, is decidedly southern, from Florida to Texas, northward to southern New Jersey, southern Illinois (Makanda, *Gleason*), central Missouri and Oklahoma. Its lower glumes are 3.5–4.5 mm. long, the longer awns of the lemmas 3.5–7 mm. long.

Upon much diluter characters than these the author of the *Flora of Illinois* maintains as species in *Panicum* and *Paspalum* plants which pretty accurate and long-experienced students (like Wiegand, Witmer Stone, Deam, Weatherby and others) balk at so dignifying.

AGROSTIS HYEMALIS (Walt.) BSP. (*A. antecedens* Bicknell). See RHODORA, xxxv. 207, 208, pl. 246, figs. 3–5 (fig. 5 from Illinois): "extending north in the interior to . . . Illinois and Indiana."

The numerous sheets of *A, hyemalis*, in flower or fruit, in the Gray Herbarium from Illinois (northern limit of species) were collected in May and early June: Decatur, Peoria, Starved Rock, Glencoe, Marion Co., Hillery, Wady Petra and St. Clair Co. The coarser, later and generally more northern *A. scabra* is not represented from Illinois in the Gray Herbarium. The flowering material from Ohio was collected from July 17 to August 12; from Michigan

July 16 to August 22; from Wisconsin August 31 to September 13. Kneucker's Gram. exsicc. no. 569 from Wady Petra is a good example of *A. hyemalis*.

Higley and Raddin, in their Flora of Cook County, cite *A. scabra* as common there on prairies in July. That may well be the northern species.

Muhlenbergia curtisetosa (Scribn.) Bush. "Illinois (Clinton)"—Hitchcock, Man. 375.

M. setosa (Spreng.) Trin., var. cinnoides (Link) Fernald in Rhodora, xlv. 238, pl. 757 (1943). Formerly confused with the stiffly branching *M. racemosa* (Michx.) BSP. of dry bluffs and prairies from Wisconsin and Illinois westward, *M. setosa* (*M. glomerata*) is a much simpler plant of meadows, bogs and wet shores. Its var. *cinnoides* is common in Michigan, Wisconsin and Minnesota. Lapham (like most earlier authors) included them both under his *M. glomerata*, but the plant of "very wet meadows and swamps" was clearly *M. setosa*, var. *cinnoides*. So was Patterson's plant of "Bogs . . . northward".

Sporobolus canovirens Nash. Much material in Gray Herbarium from Illinois.

*Sporobolus canovirens* is very distinct from *S. clandestinus* (Biehler) Hitchcock. The type of the latter was from eastern Pennsylvania, the species with terminal panicle 4–10 cm. long, spikelets 6–8 mm. long, palea much prolonged beyond the lemma into a subaristate beak, found on the Atlantic slope from Connecticut to Florida, thence to Mississippi. I have seen none of it from Illinois. The plant of the latter region, *S. canovirens* –(type from Kansas) has the terminal panicle stouter and 0.5–2 dm. long, spikelets 5.5–6 mm. long, with merely acute lemma and palea subequal. It occurs from Indiana and Wisconsin to Kansas and south to Mississippi and Texas. The mere fact that Hitchcock could not see the differences should not forbid its recognition. Miss Edna Mosher, in her discriminating Grasses of Illinois, clearly recognizes *S. canovirens;* and her figures well show the contrasts between it and *S. clandestinus*.

Stipa avenacea L. Lapham, in his very accurate study of the Grasses of the State of Illinois, clearly described this species as growing in the state. Both his description and illustration are conclusive. Miss Mosher expresses the same view.

Leptochloa attenuata Nutt. Metropolis, Massac Co., *Benke*, no. 4679, as *L. filiformis*.

Although Hitchcock reduced outright to *L. filiformis* (Lam.) Beauv. the weaker and more flaccid *L. attenuata*, they are far more distinct than many so-called species separated by him: such fluctuating and intergrading complexes as *Panicum Werneri* Scribn., merely a glabrous or glabrescent *P. lineari-folium*, or *P. xalapense* HBK., with its assigned diagnostic characters hopelessly crossing those of *P. laxiflorum* Lam. *Leptochloa filiformis*, except in the smallest individuals, is commonly 0.7–1.2 m. high, with the leading panicles 1.5–6 dm. long, made up of stiff spikes up to 1.5 dm. long; its glumes merely acute, not at all or but rarely overtopping the 2–4 florets; the grain 0.7–0.9 mm. long. It is a wide-ranging weedy species from the West Indies and Florida to Mexico, north to Virginia, Indiana, Illinois, Missouri and Kansas. *L. attenuata* is weaker and softer, 1–6 dm. high, with the leading panicles rarely 3 dm. long, made up of flexuous spikes 2–11 cm. long; its slender glumes aristate, the 2d overtopping the lemmas, and its grains are 0.4–0.5 mm. long. It occurs from southern Illinois to Louisiana and Texas. Even though its doom has been settled by an edict from Washington it is well to study the plants themselves. If *L. attenuata* is not a good species it is, at least, a very strong (though physically weak and flaccid) variety. The great and wise soil-chemist, Hilgard, decrying the tendency of the uncritical majority to follow blindly and without careful checking the emanations from the government bureau which most concerned his field, used to refer to these uncritical flocks as being "under the divine official afflatus of that head center".

Paspalum laeve Michx. Stations cited by Edna Mosher.

P. setaceum Michx. Cited by Lapham, Patterson and most others, including Miss Mosher (with citation of specimens) but not by Jones.

P. setaceum, var. longepedunculatum (LeConte) Wood (*P. longepedunculatum* LeConte). Definite stations cited by Miss Mosher.

P. Bushii Nash. Stations cited by Miss Mosher.

Echinochloa pungens (Poir.) Rydb. (*E. muricata* (Michx.) Fern.). See Wiegand in Rhodora, xxiii. 57–60 (1921). Illinois specimens cited by Wiegand.

E. pungens, var. occidentalis (Wieg.) Fernald & Griscom. (*E. muricata*, var. *occidentalis* Wieg.; *E. occidentalis* (Wieg.) Rydb.) Type from Grand Tower, Illinois.

E. pungens, var. microstachya (Wieg.) Fernald & Griscom. (*E. muricata*, var. *microstachya* Wiegand; *E. microstachya* (Wieg.) Rydb.). Illinois material cited in Wiegand's original account.

Although Hitchcock (therefore the *Flora of Illinois*) could not see the specific characters which sharply separate the indigenous North American *Echinochloa pungens* from the introduced *E. crusgalli* (L.) Beauv., they were understood by Michaux (and Richard), by Poiret, Wiegand and some others. In the introduced *E. crusgalli* the nodes and rachis of the panicle bear slender bristles, such bristles wanting or few in *E. pungens*. In *E. crusgalli* the spikelets are subglabrous or with appressed setiform hairs on the surfaces, bulbous-based hairs, if present, marginal; while in *E. pungens* the glumes and sterile lemma are more often echinate, with some or all of the trichomes pustular-based. In *E. crusgalli* the coriaceous lemma is obtuse, with a soft and soon withering tip; while in the indigenous *E. pungens* the coriaceous lemma is acuminate or subacuminate to a firm (nonshriveling) tip.

In Illinois *Echinochloa pungens* is represented by three varieties, so different that, when he published them, Wiegand stated that in his first manuscript he had treated them as distinct species but that further study revealed some intergradation. Rydberg had no such hesitation. How torn the recent author must have been between the two culture-heroes, Hitchcock and Rydberg. Had he taken a cue from the scholarly and accurate Dr. Lapham *Echinochloa* might have been differently treated. In 1856 (or 57) Lapham wrote: "The Barn yard grass is a coarse species, introduced from Europe; but we have at least two varieties that are native, growing in moist rich grounds, and along the margins of lakes and streams". Lapham really saw something.

Erianthus brevibarbis Michx. The type, bearing Michaux's label "hab. in collibus desertis ab amnio Wabash ad Ostium Missouri 5 diebus distantibus", which, as indicated in Rhodora, xlv. 248 (1943) was "in southern Illinois, presumably between Jefferson County at the east and Randolph County at the west", was shown in RHODORA l. c. plate 759, while plate 760 showed a modern specimen from a tributary of the Mississippi farther south.

In the same paper (pp. 224–230, plates 749–752) it was shown that the name *Muhlenbergia mexicana* has been wrongly applied and that (pp. 255–258) the name *Andropogon furcatus* Muhl. (1806) was antedated by *A. Gerardi* Vitman (1792). Nevertheless, the *Flora of Illinois* continues the erroneous use of *Muhlenbergia mexicana* and prefers the latest of three specific names for the *Andropogon!*

CYPERUS VIRENS Michx. (*C. pseudovegetus* Steud.). See RHODORA, xlvii. 109, plate 876. Metropolis (gravelly creek-bank), *Gleason*, no. 2242.

FIMBRISTYLIS BALDWINIANA Torr. "west to Illinois", etc., Britton in Britton & Brown, Ill. Fl. ed. 2, i. 321 (1913); undoubtedly correct, there being characteristic material in the Gray Herbarium from eastern Missouri. Cited as *F. laxa*, by Lapham, Brendel and others.

SCIRPUS HALLII Gray. TYPE from "Along ponds, Mason Co., Illinois . . . , *E. Hall*"—Gray, Man. ed. 4, xcix (1863), error for Menard Co. Cited many times subsequently. TYPE in Gray Herbarium.

S. HETEROCHAETUS Chase. "ILLINOIS: Henderson Co., near Oqua[w]ka, *H. N. Patterson;* near Dupond [Dupont], *J. A. Steyermark* 4471; South Eastern Railroad, *H. Eggert* in 1876".—A. A. Beetle in Am. Journ. Bot. xxviii. 693 (1941).

S. RUBRICOSUS Fernald (*S. Eriophorum* Michx., illegitimate substitute-name). Open wet bottomlands, Makanda, *Gleason*, no. 2243 (as *S. lineatus*). Cited by both Patterson and Brendel.

COMMELINA DIFFUSA Burm. f. (*C. nudiflora* sensu many auth., not L.). Mound City, Aug. 1, 1862. *Geo. Vasey* (as *C. virginica*). Also cited by others from southern Illinois.

C. ERECTA L., var. ANGUSTIFOLIA (Michx.) Fernald in RHODORA, xlii. 439 (1940). Including *C. angustifolia* Michx., *C. Nashii* Small and *C. crispa* Wooton & Standley (enough binomials to make it eligible to the *Flora of Illinois*). Wooded dunes, Bath, Aug. 17, 1903, *Gleason:* Chandlerville, Aug. 13, 1886, *A. B. Seymour;* east of Havana, *Evers, Jones & Jones*, no. 588.

C. ERECTA, var. DEAMIANA Fernald, l. c. 440, pl. 631 (1940). Oquawka, *Gleason.*

HETERANTHERA LIMOSA (Sw.) Willd. Ponds, St. Clair Co., Aug. 2, 1877, *Eggert.* Lapham (Cat.) cited it in 1857 but his material was cited in Gray, Man. ed. 2: 485 (1856) from "Illinois". In fact, the Illinois records go way back to Michaux's Flora (1803), the Illinois material collected in 1795. Michaux described and illustrated (plate 5) *Heteranthera limosa* as a new species, *Leptanthus ovalis*, "*HAB.* in paludosis Illinoensibus. Augusto florens".

JUNCUS BREVICAUDATUS (Engelm.) Fernald (*J. canadensis*, var. *coarctatus* Engelm.). Cited by Patterson from Kankakee County; also cited by Brendel.

J. DEBILIS Gray. Cited by Patterson from "Southern Illinois".

CHAMAELIRIUM LUTEUM (L.) Gray. "Illinois"—Gray, Man. ed. 2: 478 (1856); also cited by Patterson and by Brendel. Fine specimen from Abingdon in Gray Herb.

SMILACINA TRIFOLIA (L.) Desf. Patterson (1876), Brendel and Higley & Raddin cite stations in northern Illinois.

SPIRANTHES LUCIDA (H. H. Eaton) Ames. "Menard county, Hall"—Patterson Cat.; "Among the drift hills near Mokena, south of Chicago . . . two specimens found"—E. J. Hill in Bull. Torr. Bot. Cl. xxvi. 306, 307 (1899). In both cases called *S. latifolia*, thus apparently unrecognized by the author of the new *Flora.*

MALAXIS BRACHYPODA (Gray) Fernald. *Microstylis monophyllos* sensu e. Am. auth., not (L.) Lindl. "Swamps. Menard county, Brendel; Elgin, Kane county, Vasey"—Patterson Cat.

SALIX LONGIPES Shuttl., var. WARDI (Bebb) Schneid. "In Illinois . . .

in St. Clair and Madison Counties"—Schneider in Journ. Arn. Arb. i. 28 (1919).

S. missouriensis Bebb. Little Wabash bottoms, Richland County, *Robert Ridgway*, no. 1580; "It occurs in Illinois along the Ohio River near its junction with the Mississippi"—C. R. Ball in Deam, Shrubs of Ind. 52.

Carya glabra (Mill.) Sweet, var. megacarpa Sarg. (*C. megacarpa* Sarg.). "Tunnel Hill, Johnson County"—Sargent, Trees and Shrubs, ii. 201.

Although later ranked as a strong geographic variety, this tree was originally treated as a species. That makes it eligible.

C. Buckleyi Durand, var. arkansana Sarg. (*C. arkansana* Sarg.), "southern Illinois"—Sargent, Man. Trees N. A. ed. 2: 199 (1922). Cited by Ridgway and others.

Fagus grandifolia Ehrh., var. caroliniana (Loud.) Fern. & Rehder. The tree of southern Illinois is so distinct from true northern *Fagus grandifolia* that it stands well apart. Clearly cited by E. J. Palmer.

Alnus glutinosa (L.) Gaertn., "naturalized in some places south of Jackson Park. It has spread into the wet land, making thickets . . . They fruit when at the height of four to six feet"—E. J. Hill in Bot. Gaz. xxi. 121 (1896). That sounds like naturalization.

Ulmus serotina Sarg., "southwestern (Grand Tower, Jackson County, *H. A. Gleason*) and southern Illinois (Richland County, *R. Ridgway*)"—Sargent, Man. Trees N. Am. ed. 2: 316 (1922).

Iresine rhizomatosa Standl. (*I. celosioides* Michx., not L.). "Im Ohiogebiet", Brendel, Fl. Peor. (1882). Cited by others.

Spergularia marina (L.) Griseb. "Chicago, . . . *Moffat* 283"—Ruth P. Rossbach in Rhodora, xlii. 128 (1940).

Although the author of the *Flora of Illinois* specially cites (p. 287) Mrs. Rossbach's monograph, he drew no sustenance from it, completely omitting the genus *Spergularia* from the enumeration.

Cerastium brachypodum (Engelm.) Robinson, "southwestern Illinois"—Britton in Britt. & Brown., Ill. Fl. ed. 2, ii. 48 (1913).

Stellaria crassifolia Ehrh. "Ringwood, Illinois, *Vasey*"—Gray, Man. ed. 3: 59 (1862); "Illinois, *Vasey, Hill*"—Robinson in Proc. Am. Acad. xxix. 286 (1894); "N. Illinois, *Vasey, Hill*"—Robinson in Gray, Syn. Fl. $i^1$. 235 (1897). Plenty of other citations, by Patterson, Brendel (1882 and 1887) and by Higley & Raddin (with record of a new station).

Dianthus deltoides L. Hillery, June, 1907, *Gleason*.

Claytonia caroliniana Michx. Records by Patterson, Brendel and Higley & Raddin.

Nuphar variegatum Engelm. "A few specimens near South Chicago"—Higley & Raddin.

Anemone quinquefolia L., var. interior Fernald. Illinois material cited in original description.

Argemone intermedia Sweet. Sands, banks of Illinois River, Mendosia. July 20, 1878, *A. B. Seymour*.

Rorippa obtusa (Nutt.) Britton. Old specimen marked in Hall's handwriting, "Illinois, *E. Hall*". Cited by Vasey in Trans. Ill. Nat. Hist. Soc. ed. 2, i. ser. 1. 140 (1862), by Patterson and by Brendel.

Descurainia Sophia (L.) Webb. "Thoroughly naturalized along the roadside", Fountaindale, *Bebb* in Gray. Herb. Cited by Patterson with note from Bebb.

Reseda alba L., "streets of Morgan Park"—E. J. Hill in Bull. Torr. Bot. Cl. xxvi. 309 (1899). Also later records.

Podostemum ceratophyllum Michx. "South Chicago"—Higley & Raddin.

Heuchera americana L., var. interior Rosend., Butt. & Lak. Many Illinois specimens cited in the Monograph by the authors of the variety.

H. Richardsonii R. Br., var. Grayana Rosend., Butt. & Lak. Many Illinois specimens cited in the Monograph. In the *Flora of Illinois* this is made a mere synonym of the very different *H. hispida* Pursh, a local montane species not occurring in Illinois.

Pyrus angustifolia Ait. (*Malus angustifolia* (Ait.) Michx.), "in southern Illinois (Pope and Johnson Counties. *E. J. Palmer*)".—Sargent, Man. Trees N. Am. ed. 2: 386 (1922). Listed by Patterson from "Washington county . . .; Wabash, Schneck"; also by several others.

Potentilla millegrana Engelm. "Illinois"—Rydberg in N. Am. Fl. xxii[4]. 305 (1908).

Geum rivale L. "Near Elgin, Kane county, Vasey; McHenry, Miss Holmes. Rare"—Patterson Cat. "Wet bogs and swamps; rare", Higley & Raddin.

Prunus Munsoniana Wight & Hedrick, "southern Illinois (Alexander, Gallatin, Pope, Johnson and Richland Counties)"—Sargent, Man. Trees N. A. ed. 2: 569 (1922). Palmer discusses its abundance.

Baptisia tinctoria (L.) R. Br., var. crebra Fernald. Many records (simply as *B. tinctoria*) by Lapham, Patterson, Brendel et al.

Lupinus perennis L., var. occidentalis S. Wats. Probably all Illinois material belongs to this chiefly inland variety.

Typical *Lupinus perennis*, with minutely pubescent to glabrous stems, occurs from southwestern Maine to New York and south to Florida. Var. *occidentalis*, with the upper half of the stem and upper (as well as lower) petioles with long spreading villi, occurs from New York to Ontario and Minnesota, south to Maryland, West Virginia, northern Ohio, Indiana and northern Illinois.

Trifolium resupinatum L. Mount Prospect, Cook Co., *Benke*, nos. 5598 and 5946.

Psoralea tenuiflora Pursh and var. floribunda (Nutt.) Rydb. (*P. floribunda* Nutt.).

Typical *P. tenuiflora* extends south to Texas, New Mexico and Arizona. Its racemes are 1.5–4 cm. long, with usually only 1 or 2 flowers at a node, these only about 5 mm. long, with calyx 2–2.5 mm. long. Var. *floribunda* is found southward only to Arkansas and Texas. Its racemes are up to 1 dm. long, with 2–4 flowers at a node, the calyx 3 mm. long, the corolla 6–7 mm. long. Since one of the very few geographic varieties not reduced to synonymy in the *Flora of Illinois* is *P. psoralioides*, var. *eglandulosa* (Ell.) F. L. Freeman, which differs in being "less glandular", one wonders why the much stronger *P. tenuiflora*, var. *floribunda* is suppressed. Typical *P. tenuiflora* is in the Gray Herbarium from Palatine, Lisle and Beardstown; var. *floribunda* (maintained by Rydberg as a species (*Psoralidium floribundum*) from Carlisle, Peoria, Joliet, Lemont, Athens and Malomet.

Amorpha nitens Boynton. "Illinois: Golconda, Pope County"—E. J. Palmer in Journ. Arn. Arb. xii. 177 (1931).

A. fruticosa L., var. tennesseensis (Shuttlew.) E. J. Palmer, l. c. 192 (1931). Illinois specimens cited.

A. frut., var. emarginata Pursh. Several Illinois specimens cited by E. J. Palmer, l. c. 196.

A. frut., var. croceolanata (P. W. Wats.) Schneider (*A. croceolanata* P. W. Wats.), "northward in the Mississippi valley to southern Illinois"—E. J. Palmer, l. c. 182.

Tephrosia virginiana (L.) Pers., var. holosericea (Nutt.) T. & G.; Fernald in Rhodora, xlv. 452 (1943) (*T. holosericea* Nutt.).

Typical *Tephrosia virginiana*, Florida to Texas, north to southern New Hampshire, Massachusetts, New York, southern Ontario, southern Michigan, southern Wisconsin and Missouri, is silky-villous, the upper internodes of the stem and the leaf-rachises with long spreading villi, the leaflets green and glabrous or only sparsely strigose. It is represented in the Gray Herbarium by Illinois material from Wolf Lake, Forest City and Makanda.

Var. *holosericea*, as its name implies, is silky-villous throughout, the leaflets densely silvery-silky above. It occurs from Michigan and Wisconsin to South Dakota, south to Arkansas, Oklahoma and Texas but not in the more eastern states. Illinois material in the Gray Herbarium is from Ottawa, Peoria, Olney and Havana.

Astragalus tennesseensis Gray (*Geoprumnon* Rydb.). "Ill., Morris (*Vasey*), Ogle Co. (*Bebb*)"—Robinson & Fernald in Gray, Man. ed. 7: 515 (1908); "Sandy banks of Rock River, Ogle county, 1858, but not since found, Bebb; Will county, Vasey"—Patterson Cat. Specimens from both Morris and Ogle County, also from Ottawa (*H. L. Boltwood*) in Gray Herb.

Stylosanthes biflora (L.) BSP., var. hispidissima (Michx.) Pollard & Ball. Herod, *Gleason*, no. 2903.

S. riparia Kearney. Grand Tower, *Gleason*, no. 2910.

Apios americana Medic., var. turrigera Fernald in Rhodora, xli. 546, pl. 575, figs. 1 and 2 (1939). Illinois specimens cited.

Strophostyles helvola (L.) Ell., var. missouriensis (S. Wats.) Britton (*S. missouriensis* (S. Wats.) Small).

The outright reduction of var. *missouriensis* to *S. helvola* can be justified only if one overlooks its coarser habit, much larger and unlobed blunt to merely acutish leaflets, larger flowers and legumes, and seeds 8–12 (instead of 6–9.5) mm. long, with hilum 5–7 (instead of 4–5) mm. long. See Rhodora, xliv. 421 (1942).

S. umbellata (Muhl.) Britton. Cobden, *Gleason*, no. 1311; Makanda, *Gleason*, no. 2440; Metropolis, *Gleason*, no. 2439; Coatsburg, Adams Co., *Evers, Jones & Jones*, no. 591, collected in 1941 and correctly identified!

The name *Phaseolus helvolus* sensu Torr. & Gray and authors up to 1889 was wrongly applied to this species. Consequently, records of that period under *P. helvolus* belong to *Strophostyles umbellata* (*S. peduncularis*). Under the name *P. helvolus*, the present species was listed by Lapham (1857) and by Patterson, and from "Sandboden" by Brendel (1882) and again in 1887. Higley & Raddin cite it as *Strophostyles peduncularis* Ell., with the clear explanation that it is "*Phaseolus helvolus*, of Manual, 5th Ed., not of L." That should have put on guard any compiler of a *Flora*, even though he lacked a background of knowledge of the bibliography and identities of plants of the state.

Geranium sibiricum L. "Illinois"—Hanks & Small in N. Am. Fl. xxv[1]. 7 (1907). Urbana, *Gleason*, no. 34.

Linum floridanum (Planch.) Trelease. See Rhodora, xxxvii. 430, pl. 396, figs. 11–14 (1935): "north to southern Illinois". Specimen without further data than "Illinois" in Gray Herbarium.

Croton texensis (Klotsch) Muell. Arg. "Illinois" with citation of specimens, Ferguson in Mo. Bot. Gard. Rept. no. xii. 68 (1901).

Tragia cordata Michx. Rocky woods bordering Ohio River, Golconda, Pope Co., *E. J. Palmer*, no. 19,582 (as *T. macrocarpa*). As far back as 1876 recorded by Patterson (Cat.) as *T. macrocarpa* Willd., from "Banks of the Ohio at Golconda, Pope county, Forbes."

Acalypha ostryaefolia Riddell (*A. caroliniana* Ell., not Walt.). Definitely in Lapham's Catalogue. By Patterson cited from "Near Jonesboro, Union county, Vasey; Wabash, Schneck".

Ilex opaca Ait., "southern Indiana and Illinois"—Sargent, Man. Trees N. A. ed. 2: 670 (1922).

Acer pensylvanicum L. Two stations near Chicago reported by Higley & Raddin.

A. rubrum L., var. trilobum K. Koch (var. *tridens* Wood; *Rubacer carolinianum* (Walt.) Small), "southern Illinois"—Sargent, l. c. 699. Cited and discussed by Palmer.

Quite as well defined, in its own way, as *Acer rubrum*, var. *Drummondii* (Hook. & Arn.) Sargent, which is glorified in the *Flora of Illinois* as a full species.

Cardiospermum Halicacabum L. Rich ground, St. Clair Co., Aug. 1878, *Eggert*. The first record from Illinois was by the first and greatest botanist to explore southern Illinois, André Michaux, who in 1803 recorded *Cardiospermum* from "juxta amnem *Kaskaskia*, ab occidente in flumen *Mississipi defluentem*". Lapham knew about it but Michaux's pioneer exploration from the lower Wabash to the Mississippi from August to October, 1795, with a base at Kaskaskia, seems not to have been known by the very modern author of the *Flora*.

Ceanothus americanus L., var. Pitcheri T. & G. Shirland, *Gleason;* Peoria, *McDonald;* Macon Co., *Clokey*, no. 2432; Champaign, *Pease*, nos. 12,405 and 13,003.

Distinguished from the acute- or acuminate-leaved typical *Ceanothus americanus* (with leaves green and glabrous above) by its blunt or round-tipped leaves pilose above. If *Rorippa islandica* (Oeder) Borbás, var. *hispida* (Desf.) Butters & Abbe is a species, as the *Flora of Illinois* maintains (p. 139), merely because it has "Stem hirsute" as opposed to the "Stem glabrous or nearly so" of true *R. islandica* (*palustris*), surely *Ceanothus americanus*, var. *Pitcheri*, known only from the Interior, is a sharply defined geographic variety.

Callirhoe alcaeoides (Michx.) Gray. Gravelly slopes, Peoria, *McDonald;* dry ground, recently introduced, Champaign, June, 1899, *Gleason*.

Hypericum ellipticum Hook. "St. Clair county, Brendel; Fulton, Wolf—Patterson Cat. "Sudwärts"—Brendel (1882). Specimen from Athens in Gray Herb. Cited without locality by Vasey in Trans. Ill. Nat. Hist. Soc. ed. 2, i. ser. 1. 140 (1862).

H. boreale (Britton) Bicknell. Olney, *R. Ridgway*, no. 820.

H. tubulosum Walt., var. Walteri (Gmel.) Lott (*H. petiolatum* Walt.; *Triadenum petiolatum* (Walt.) Britton). Vasey, l. c. (1862). "Wabash county, Schneck"—Patterson Cat. "Im Ohiogebiet" as *Elodes petiolata*, Brendel (1882). Several other records.

Bergia texana (Hook.) Seubert. "Found in St. Clair county, two miles south of St. Louis, by Mr. H. Eggert.—Engelmann"—Patterson Cat. Cited by Brendel in 1882 and 1887.

Passiflora lutea L., var. glabriflora Fernald.

True *Passiflora lutea*, occurring from Florida to southeastern Pennsylvania and Delaware, has the young stem pilose and the calyx pilose at base. The plant of the Interior (var. *glabriflora*) is glabrous throughout or only the stem rarely pilose. These are the characters used in the *Flora of Illinois* to distinguish two geographically inseparable "species" in *Rorippa*.

Mentzelia oligosperma Nutt. Cited by Lapham, also by Brendel (1882 and 1887). Fine sheet from Pike County, *Holton*, in Gray Herb.

Rhexia mariana L., var. leiosperma Fernald & Griscom. Specimen from Metropolis cited with original description.

Ludwigia palustris (L.) Ell., var. americana (DC.) Fernald & Griscom. The plant of North America is so different from the typical European *Ludwigia palustris* that it has three specific names. Although only a strongly defined North American variety of a European type, it is as strong as the North American variety of Eurasian *Scheuchzeria palustris*, which the author of the *Flora of Illinois* separates as an American species.

Myriophyllum exalbescens Fernald.

It is not indicative of close study that the American plant is reduced outright to the Eurasian *M. spicatum.* If it were called *M. spicatum* L., var. *exalbescens* (Fern.) Jepson there would be some evidence of understanding. The American and the Eurasian plants differ in many points. M. spicatum: old dried stems remaining fulvous or olivaceous; principal leaves of primary axis with 14–21 pairs of stiff linear segments; bracts rhombic-obovate; bractlets suborbicular or reniform, broader than long, 0.5–0.8 mm. long; anthers linear, 1.8–2.2 mm. long. M. exalbescens: old stems soon blanching; principal leaves of primary axis with 7–11 pairs of capillary soft (often flaccid) segments; bracts spatulate-obovate or oblong-cochleiform; bractlets ovate, longer than broad, 0.7–1 mm. long; anthers oblong, 1.2–1.8 mm. long.

It really does not clarify matters to merge them outright.

Proserpinaca palustris L.

True *Proserpinaca palustris*, occurring from the West Indies and Florida to Texas, and northward in the coastal states, has the thin- or wing-angled fruits with concave sides and 4–6 mm. broad (*P. platycarpa* Small). The plants of Illinois have smaller fruits (2.5–4 mm. wide). One, var. crebra Fernald & Griscom, has the fruits with flat to convex sides and subacute angles; the other, var. amblyogona Fernald (*P. amblyogona* (Fern.) Small) has the very plump fruits with broadly rounded or obsolete angles. These are real differences.

Hydrocotyle americana L. In Lapham's Catalogue; also listed by Higley & Raddin.

Ptilimnium costatum (Ell.) Raf. Characteristic material of this long-styled southern species from Mound City and Desoto, Aug., 1862, *Vasey*, distributed without identification. Listed in Patterson Cat.

Thaspium pinnatifidum (Buckl.) Gray. Waldron, Kankakee Co., 1870, *E. J. Hill*, and banks of Kankakee River, Momence, 1894, *Hill*, with detailed account of characters—E. J. Hill in Bot. Gaz. xxi. 118 (1896).

One seeks in vain for any "pattern" which may have governed the selection of species to be continued as admitted members of the *Flora of Illinois*, except the stated one that, for the most part, the author had personally examined them; as if Michaux did not know his own species (the specimens extant, and photographs of many of them in some of our herbaria), as if the identifications of woody plants by Sargent, Ridgway or Palmer (the specimens extant) must be excluded, or as if the identifications of Lapham, Bebb and Hill (specimens largely extant) were unreliable!

Very naturally, the earlier botanical explorers of Illinois (before there were well established institutional herbaria there) sent material of their more interesting plants or their puzzles to Torrey, Gray or Engelmann. It thus happens that great series of Illinois specimens are in the larger and older herbaria which, it would seem, were not critically canvassed in order that the already well accredited species of that state might be personally examined. In studying a single small genus I recently had before me the material from some of our larger herbaria. These showed from Illinois specimens from 33 botanists: in the Gray Herbarium alone from Babcock, Bebb, Benke, Wm. Boott, T. E. Boyce, V. H. Chase, Clokey, Eggert, Gleason, Greenman, Lapham, McDonald, Mead, E. J. Palmer, Patterson, Pease, Ridgway, Schneck, Seymour, Sherff and Umbach; while the Engelmann Herbarium had Illinois material from most of the same botanists as well as from Edgar Anderson, Bauer, Beckwith, Hitchcock, McCree and Pammel; the Torrey and Britton Herbaria material from many of the same collectors and from some others; the Philadelphia Academy similarly; while Duke has the very extensive Illinois herbarium of A. B. Seymour; the National Herbarium, Illinois material of many already cited, as well as of many others, including Crampton, Earle and Steele.

Nevertheless, some very local and not recently collected species are admitted and one which is "probably extinct". There seems no satisfactory excuse for the omission of any mention of 200 others, except what may be politely called lack of information, and for not examining (since that was a prerequisite) the larger and often older herbaria of the country for Illinois material of Bebb, Clokey (especially his own vast herbarium), Eggert (particularly at St. Louis), Gleason (largely at New York), Lapham, Mead, Palmer (very largely at St. Louis and at the Arnold Arboretum and, of course, in his extensive private herbarium), Pease, Ridgway (largely at the Arnold Arboretum and the Gray Herbarium), Seymour (his great herbarium at Duke), and many others. It is too bad that the old collections and records were not thoroughly checked.—M. L. Fernald.

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Geranium nepalense, var. Thunbergii in Massachusetts.—Last summer, while walking by an arbor-vitae hedge on my brother's place in Wellesley, I noticed a large patch of an unusual looking *Geranium* growing along the foot of the hedge and, on further examination, found it to be an abundant weed in a nearby garden. Being unable to find it mentioned in Gray's Manual or Britton & Brown, I took it to the Gray Herbarium, where Professor Fernald kindly identified it for me as *Geranium nepalense* Sweet, var. *Thunbergii* (Siebold & Zucc.) Kudo, a Japanese variety of a wide-spread Asiatic species not before reported from North America.

Later on, when I showed it to my brother, his only comment was: "That thing a rare plant! Why, I have been trying to weed it out of my garden for the last five or six years without success".

Professor Fernald has supplied the following description of *Geranium nepalense:*

Plant with stout rhizome; slender stems depressed or decumbent at base, prolonged to 4 dm., retrorse-hirsute; petioles similarly hirsute; larger (lower) leaf-blades with 3 or 5 deeply incised divisions; axillary peduncles up to 8 cm. long, with the usually 1 slender pedicel retrorse-hairy; the spreading-pubescent lanceolate sepals with a terminal mucro about 1 mm. long; the broadly obovate entire petals about equaling or but slightly exceeding the sepals; fruit about 1.7 cm. long, hirtellous, the short beak puberulent.

Var. *Thunbergii*, the Japanese variety which is established at Wellesley, has the divisions of the leaf only shallowly and bluntly toothed at summit, and the pedicels are usually 2.—Francis Welles Hunnewell, Wellesley, Mass.

---

Sorbus Andersoni, a new Name for an Alaskan Mountain-Ash.—*Sorbus alaskana*, described by the writer in 1939 from material collected near Lake Iliamna, Alaska, by M. W. Gorman in 1902, and subsequently by several other botanists in a number of other Alaskan localities, can not be correctly designated by that name. Mr. J. P. Anderson of Iowa State College has drawn my attention to the fact that the name *Sorbus alaskana* had been previously used for a fossil species by Arthur Hollick in 1930. I therefore take the opportunity to rename the living plant in honor of Mr. Anderson, who for many years has studied the botany of Alaska, and whose flora of that region is now being published serially by his college.

Sorbus **Andersoni,** nom. nov. *S. alaskana* G. N. Jones in Journ. Arnold Arboretum **20:** 24, pl. 226. 1939, non Hollick in U. S. G. S. Prof. Paper **159:** 97. 1930.

George Neville Jones, University of Illinois.

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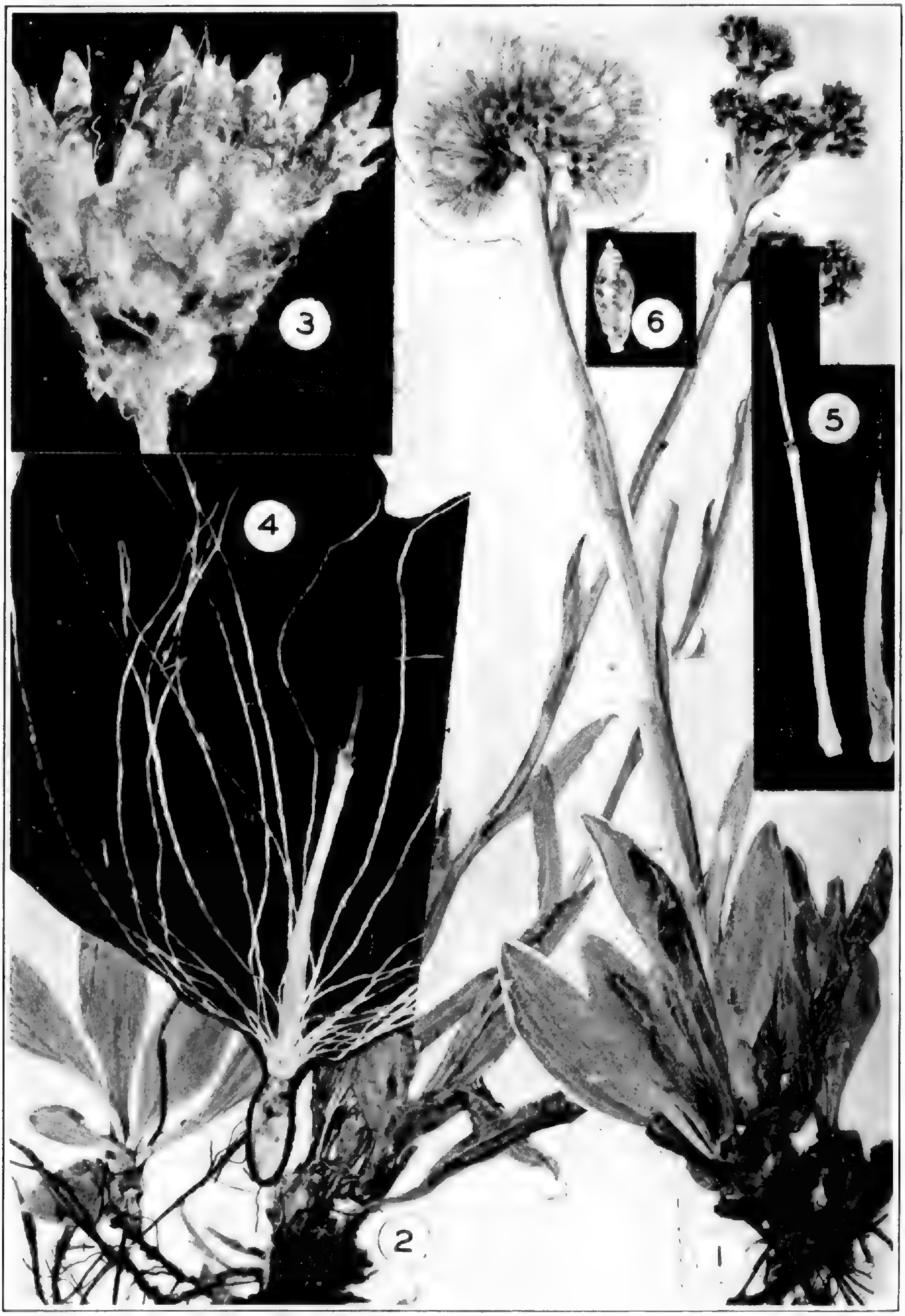


*Photo. B. G. Schubert.*

ANTENNARIA EUCOSMA: FIGS. 1 and 2, pistillate and staminate plants, × 1; FIG. 3, pistillate involucre, × 6; FIG. 4, pistillate flower, × 10; FIG. 5, pistillate corollas, × 10; FIG. 6, achene, × 10.

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## THE NEW ENGLAND BOTANICAL CLUB

Vol. 47. July, 1945. No. 559.

# CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY—NO. CLVII

M. L. Fernald

(Plates 912–962)[1]

During recent studies of four somewhat complex and often misinterpreted genera, as represented in northeastern America, the following notes have accumulated. Since the proper interpretation of many of the species and varieties is greatly aided by careful illustration, I have asked Dr. Bernice G. Schubert to prepare plates which show the essential characters, these derived chiefly from types, isotypes or other authentic specimens.

## I. KEY TO ANTENNARIA OF THE "MANUAL RANGE"

(Plates 912–958)[2]

From the time when its diversity and great interest first impressed our botanists in 1897 there was a concentration of our most active field-botanists upon this genus in the East for about thirty-five years. By the end of that period essentially all the wide-ranging species were apparently well collected and understood, although local or endemic species are still likely to be

[1] The cost of preparing the plates and of the engraver's blocks largely met through grants from the American Philosophical Society and from the Department of Biology of Harvard University.

[2] The cost of printing the plates met through a gift from Mr. Bayard Long, Associate Curator of Botany of the Academy of Natural Sciences of Philadelphia.

The inflorescences, especially whitish ones mounted on white paper, are most difficult to photograph. Their outlines, at least, are partly visible in the plates. It should be remembered that the fresh pistillate involucres are much more cylindric than the loosened ones of dried specimens, which alone are here shown.

found in unexplored areas of Newfoundland and perhaps of Gaspé. So thoroughly have these plants been studied and so clear-cut are their differential characters, ranges and flowering seasons that we more active explorers of the "effete East" thought that we had them well in hand. Beginning with the publication by Greene in May, 1897, of *A. neglecta*, PLATES 924–926, (and a few western species), the recognition of species in the region to be covered by the next "Manual" has proceeded until the differentiation by Stebbins in July, 1935, of a probable but tiny grandfather and grandmother of some of them, *A. virginica* (PLATE 937) of the ancient Appalachian Upland. So many morphological characters are found in habit, leaves, leaf-tips or appendages, pubescence, inflorescences, involucres and their phyllaries, receptacles, corollas, pappus and achenes, that keen students like the late B. L. Robinson, a life-long specialist on the *Compositae*, S. F. Blake, another sound and generally recognized specialist on the *Compositae*, and Ledyard Stebbins, outstanding morphologist and student of phylogeny, have clearly understood the differences; while some of us who have, through decades, had a tremendous experience with them in the field and the herbarium recognize the amazing stability of the essential characters. It is, then, at least surprising to be told by one "who blew in from the West" so recently that his field-experience with the plants of the "Manual range" as delimited by him (from Gaspé County, Quebec, to western Minnesota, south to southern Virginia, Kentucky and Missouri) must have been more limited than that of lifelong explorers of the area,—it is startling to be assured that in all this diverse area we have only "three fairly well-marked species", and that the segregations which have been recognized by a host of our best technical students and most observant amateurs are "too dependent on temporary whim, or at best on individual opinion, to justify specific recognition".[1]

Now it so happens that in the on-the-whole satisfactorily systematized series of eastern *Antennaria* (I can say nothing of the sort for the western species nor for the undifferentiated stacks in some other large herbaria) in the two collections before me, those of the Gray Herbarium and of the New England Botanical Club, there are approximately 2500 numbers or sheets of *Anten-*

[1] Cronquist, Rhodora, xlvii. 183 (1945).

*naria* from the "Manual range" (in my case including Newfoundland as well as Gaspé); and more than 700 of these were collected by myself or by my companions (Robinson, Wiegand, Collins, Pease, Long, Fogg, St. John, Stebbins, Weatherby or others) and me with such intelligence as the Lord vouchsafed us. It is, furthermore, amazing, if the recognition of our species is merely "dependent on temporary whim", that there should be, in case of all species in their own areas, essential unanimity in the identifications made by the 150 quite unwhimsical and lucid collectors and students of this vast series. I enumerate in the footnote[1] only about half of these students, none of them toadies and most of them ready to disagree if they cannot concur, some of them always seeking an opportunity to do so.

Since some readers, in spite of the stated editorial policy, still assume that everything published in RHODORA has the editorial stamp of approval, I hasten to put on record the key which is prepared for the next edition of Gray's Manual. That work will include Newfoundland; consequently 10 species here appear (nos. 1, 3, 4, 5, 6, 7, 9, 10, 13 and 14) which are outside the range covered by the projected Illustrated Flora. These are here included, although they were rather fully treated and illustrated in RHODORA, xxxv. 327–346, plates 263–268 (1933). Of the 22 species occurring from Gaspé Co., Quebec, to Minnesota and southward 8 are pontificated upon by Cronquist; the remaining 14 have not received his approval even as forms. Since, by his interpretation, they are presumable local whimsies I have asked Dr. Schubert to put concretely into plates some of the characters of most of those which have not previously been carefully illustrated. I am not at this time publishing the detailed drawings of them which have been prepared for the Manual.

It certainly would seem strange, if we have in the region from

[1] Allard, Ball (C. R.), Bartram (E. B.), Bicknell, Bissell, Blake (S. F.), Blanchard, Brainerd, Brunel, Bush, Chamberlain (E. B.), Chase (Agnes), Collins (J. F.), Deam, Deane, Dodge (C. K.), Eames (A. J.), Eaton (A. A.), Eggleston, Farwell, Fassett, Faxon (Edwin), Forbes (F. F.), Gates (F. C.), Greene, Greenman, Grimes, Griscom, Harper, Hermann, Herriot, Hill, (A. F.). Hill (E. J.), Holm, House, Hunnewell, Kennedy (G. G.), Klugh, Knowlton (C. H.), Krotkov, Lansing (O. E.), Long, Louis-Marie, McDonald (F. E.), Mackenzie, Macoun (John), Macoun (J. M.), Malte, Marie-Victorin, Maxon, Moore (J. W.), Muenscher, Palmer (E. J.), Parlin, Pease, Peck (C. H.), Rand (E. L.), Raup, Robinson, Rolland-Germain, Rousseau, Seymour (F. C.), Smith (L. B.), Standley, Stebbins, St. John, Tatnall (R. R.), Taylor (T. M. C.), Wahl, Weatherby, Webb (R. J.), Wiegand, Williams (E. F.), etc., etc.

Gaspé County westward and southward only three species, *A. neglecta, plantaginifolia* and *solitaria*, that two tiny plants, *A. vexillifera* (PLATE 913) and *A. Peasei* (PLATE 915), utterly unlike any of the three elect, should have taken the whim to isolate themselves near or above such arctic-alpine companions as *Lycopodium alpinum* L., *Deschampsia atropurpurea* (Wahlenb.) Scheele, *Carex nardina* Fries, *C. rariflora* (Wahlenb.) Sm., *Juncus castaneus* Sm., *Luzula confusa* Lindeb., *Salix herbacea* L., *Betula glandulosa* Michx., *Oxyria digyna* (L.) Hill, and others likewise never found with *Antennaria neglecta* of low altitudes much farther south. These being "small-leaved", they have to go, apparently, into Cronquist's hodgepodge "*A. neglecta.*"[1] True lowland *A. neglecta* (PLATES 924–926) has prolonged and nearly naked flagelliform stolons, the midrib of the basal leaves excurrent as a subulus, the inflorescence at first glomerulate but by elongation of the rachis (sometimes up to 1.5 dm. long) finally becoming spicate or racemose. As a result of the crazy whim by which, if the latest interpretation is valid, they isolated themselves on alpine and subalpine spots hundreds of miles away from the relatively southern true *A. neglecta*, they lost the flagelliform stolons and became compact, with crowded assurgent leafy offshoots, stubbed off the terminal subulus of the rosette-leaves (thus taking on a character of the large arctic-alpine series to which they really belong), and changed their inflorescences from ultimate racemes to mere unaspiring corymbs, and lost the characteristic papillae which occur on at least the young and undried achenes of *A. neglecta*, as well as of the other relatively southern species. In the latter character they belong with the great bulk of the Arctic and Eurasian series,[2] not with the common species of the eastern United States.

If, furthermore, the latest interpretation of *Antennaria* is not

[1] Although the title of Dr. Cronquist's paper emphasizes "the northeastern United States", his inclusion, as one of his varieties, of *A. gaspensis* indicates a broader eastern extension of his limits; for *A. gaspensis* is known only from the calcareous mountains, bluffs and slopes of easternmost Gaspé County (Mt. Ste.-Anne and coastal cliffs at Percé; Cap Gaspé; Le Forillon to Grande-Grève; Cap Rosier and Anticosti) and western Newfoundland. Since *A. gaspensis* of the extreme eastern tip of the Gaspé Peninsula is included by Cronquist it must be assumed that species found on the Peninsula farther west, *A. vexillifera, Peasei, subviscosa* and *appendiculata*, automatically come within his range, although he does not account for them in his "three fairly well-marked species" of the whole "Manual range".

[2] See the very significant article, *On the "Papillose" Achenes in the Genus Antennaria* by Morten P. Porsild in RHODORA, xxxiv. 213–222 (1931).

itself "too dependent on temporary whim" (as it seems to be) and is a sound and sensible treatment, we must also put *A. subviscosa* (PLATES 916 and 917) into all-inclusive *A. neglecta*, already defined, for, unlike the two alpine species just discussed, *A. subviscosa* has papillate achenes. If it is only *A. neglecta* in complete disguise it has been playing a great joke. *A. neglecta* has slender, lash-like stolons ending in tardily developed rosette-leaves, which are completely rotted off during the second year; its cauline leaves end in scarious appendages; its involucres are 6.5–9 mm. high; its corollas 5–6.2 mm. long; the style usually purple; the longer pappus-bristles 6–9 mm. long. Greatly excited, if the latest flash-interpretation is correct, by freeing itself from sex, which so generally characterizes *A. neglecta* and, therefore, by the theory involved, makes it a species, and getting into a sweeter soil than the sour and worn-out old fields and pastures where the relatively southern male and female *A. neglecta* persist in growing together, *A. subviscosa* must have taken a broad jump to the limestone walls which face north toward the vast lower River St. Lawrence and the Gulf, there finding new neighbors, Arctic, northern Cordilleran or North Pacific calcicolous specialties such as *Woodsia glabella* R. Br., *Festuca saximontana* Rydb., *Calamagrostis purpurascens* R. Br., *Carex concinna* R. Br., *Cerastium beeringianum* Cham. & Schl., *Arabis Holboellii* Hornem., *Saxifraga cespitosa* L., *Potentilla nivea* L., etc. Landed there, among neighbors who could never know of its earlier sexual existence farther south, and now safely apomictic, it further shook off any supposed alliance with *A. neglecta* by taking on a suffruticose habit, the larger plants (PLATE 916) trailing out as long-lived mats a full meter across, with the crowded branches heavily invested with long-marcescent basal foliage, the latter without the subulus of *A. neglecta*, the cauline leaves merely mucronate or subulate-tipped, the corymb viscid with glandular secretions, the pale involucre only 5–6.5 mm. high, the corollas shrinking down to a length of only 3.8–4.3 mm., the styles becoming diluted to a creamy tone, and the longer pappus-bristles shortening to only 4.5–5 mm. On the larger mats the old branches carry for many years the ancient flowering stems, holding on as marcescent remnants. Who ever saw any of our other eastern Antennarias do that? In fact, no one who understands *Antennaria* would guess that *A. subviscosa* belongs with or ever had anything to do with *A. neglecta.* That, however, is the only place for it if, in all the Manual range, we are given a choice of only "three fairly well-marked species".

These three species and many more from Gaspé or elsewhere in Canada and the northernmost states, as well as some from farther south, have real characters, as real as those of *Polygonum viviparum* L., *Saxifraga cernua* L. and a host of other sexless and morphologically definite plants; and by those who, happily, still believe the stable morphological characters of more importance than "large" or "small" leaves alone they will be maintained. Furthermore, if the recent student of the genus were consistently retaining as species and varieties of *Antennaria* only those which are bisexual, he would be at least logical; but he includes as a variety under his "*A. neglecta*", the strictly apomictic and tremendously isolated *A. gaspensis,* which differs from everything else he puts into *A. neglecta* in its receptacle being higher than broad (instead of broader than high), a character which in *Eupatorium* is considered subgeneric (or even generic). If his treatment of *Antennaria* is typical of what is to be expected for other groups in the new Illustrated Flora, it would seem that that work will be an abbreviated pocket-novel, the next Gray's Manual a family bible.

### Key to Antennaria to be used in the next Gray's Manual

*N. B.*—The pistillate involucres only are intended in the measurements (unless otherwise specified); the counts and descriptions of *upper* cauline leaves refer to those *below* the inflorescence and exclude the bracteal leaves in the corymb.

*a.* Basal leaves erect, oblanceolate to elliptic-acuminate, 2–18 cm. long, similar to the cauline ones; involucres of pistillate heads deep-brown to blackish; achenes glabrous, not papillate.
Flowering stem with 4–10 leaves; pistillate corollas 3–4.3 mm. long; exserted tip of mature style three-fourths as long as corolla; longer pappus-bristles 6–7 mm. long; phyllaries of staminate heads fuscous; staminate corollas 3–4 mm. long. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .1. *A. eucosma.*
Flowering stem with 6–12 leaves; pistillate corollas 4.5–5.2 mm. long; exserted tip of mature style at most one third length of corolla; longer pappus 9–11 mm. long; phyllaries of staminate heads whitish; staminate corollas 4–5 mm. long. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .2. *A. pulcherrima.*
*a.* Basal leaves spreading, forming depressed rosettes, strongly contrasting in outline with the cauline leaves; plants humifuse to stoloniferous. . . . *b.*

*b.* Larger basal leaves only 1–5 mm. wide, blunt or only obscurely mucronulate, whitened above; flowering stems only 0.05–1.8 dm. high; only pistillate plants known, their involucres deep-brown to blackish or, if pale, at most 7 mm. high. . . . *c.*

*c.* Cauline leaves 15–28, very crowded (except in old individuals), the upper 7–20 with twisted scarious tips 2–3 mm. long; taller stems up to 4 (rarely –6) cm. high; involucre with 3–4 very unequal series of conspicuously imbricated phyllaries; achenes glabrous. . . . . . . . . . 3. *A. columnaris.*

*c.* Cauline leaves 4–16, only the upper 1–7 with scarious tips; flowering stems mostly 4–18 cm. high; involucres with phyllaries subequal or in 2 or 3 unequal series (or in 4–6 series in no. 10, which has only 8–10 remote cauline leaves, with 3–5 appendaged, and pale involucres). . . . *d.*

*d.* Involucres deep-brown to blackish; phyllaries subequal or in 2–3 unequal series. . . . *e.*

*e.* Involucres with the lower half prolonged, green and viscid, the phyllaries closely and firmly appressed or agglutinated to form an ellipsoid-campanulate falsely gamophyllous cup 7–9 mm. high; corollas 5–5.5 mm. long; achenes glabrous. . . . . . . . . . . . . . 4. *A. Foggii.*

*e.* Involucres with loose and distinct phyllaries; corollas 3–5 mm. long. . . . *f.*

*f.* Phyllaries conspicuously unequal, in 3 series, the outer about half as long as the inner; corollas 4–5 mm. long

Cauline leaves 6–9, the 2 or 3 upper with unguiculate subulate tips 0.6–1.5 mm. long; involucres 6–7 mm. high, their outer and median phyllaries with scarious tips 1.2–2 mm. wide; style included or nearly so, subentire; achenes papillate, 1.1–1.4 mm. long. . . . . . . . . . . . . . 5. *A. Bayardi.*

Cauline leaves 8–14, the 4 or 5 upper with flat scarious tips 2–3.5 mm. long; involucres 7.5–9 mm. high, their outer and median phyllaries with scarious tips 2–2.5 mm. broad; style exserted, 2-cleft; achenes glabrous, 1.8 mm. long. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 6. *A. brunnescens.*

*f.* Phyllaries subequal, in 2 or 3 series, the outer nearly as long as the inner; corollas 3–4.5 mm. long; achenes glabrous. . . . *g.*

*g.* Flowering stems at most 1.2 dm. high, with 5–8 leaves; the 3–6 upper leaves with flag-like oblong-lanceolate flat tips.

Involucres 7–10 mm. high, with squarrose pale brown phyllary-tips 1.3–2 mm. broad; upper 3 or 4 cauline leaves appendaged; corollas 4–4.5 mm. long; achenes 1.2–1.4 mm. long. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 7. *A. cana.*

Involucres 6–7 mm. high, with ascending fulvous phyllary-tips rarely more than 1 mm. broad; upper 4–6 cauline leaves appendaged; corollas 3–4 mm. long; achenes 1.6–1.8 mm. long. . . . . . . . . . . . . . . . . . . . . . . 8. *A. vexillifera.*

*g.* Flowering stems slender, up to 18 cm. high, their 8–15 leaves mostly subulate-tipped, only the uppermost with lance- or linear-involute scarious tips; involucres 5–6 mm. high, the outer ascending tips 1–1.7 mm. broad.................................9. *A. confusa.*

*d.* Involucres milk-white or ochroleucous or pale brown; achenes glabrous....*h.*

*h.* Cauline leaves 5–10; involucres pale brown or stramineous, sometimes roseate or greenish, 5–7 mm. high; corollas 3.7–5 mm. long; mature pappus 4.5–5 mm. long....*i.*

*i.* Involucres of 4–6 series of conspicuously unequal phyllaries, stramineous to pale brown.....10. *A. straminea.*

*i.* Involucres of 2 or 3 series of subequal phyllaries.

Flowering stems 3–7 cm. high, not glandular; upper cauline leaves with oblong-lanceolate scarious appendages 2–3 mm. long; involucres not glandular; achenes glabrous...........11. *A. Peasei.*

Flowering stems 5–18 cm. high, glandular above; upper cauline leaves with subulate or involute tips; involucres glandular-viscid at base; achenes papillose.....................12. *A. subviscosa.*

*h.* Cauline leaves 9–15; involucres milk-white or ochroleucous, 4.5–6 mm. high; corollas 3–3.3 mm. long; mature pappus 4–4.3 mm. long...............13. *A. albicans.*

*b.* Larger basal leaves mostly wider, 0.2–5.5 cm. broad, usually distinctly apiculate or mucronate, green and glabrous to white-tomentose above; flowering stems, 0.4–5 dm. high; involucres whitish, greenish, pale brown or fulvous, 5–11 mm. high; staminate plants of some species known....*j.*

*j.* Rosette-leaves comparatively small, 0.2–2.1 cm. wide, with only the midrib prominent to the tip beneath, the lateral ribs short and evanescent....*k.*

*k.* Middle and upper cauline leaves of pistillate plants terminated by a flat or merely inrolled scarious appendage....*l.*

*l.* New rosette-leaves bright green and glabrous or promptly glabrate on the upper face....*m.*

*m.* Rosette-leaves spatulate to cuneate-oblanceolate or narrowly cuneate-obovate, scarcely petioled, rounded at tip or only subacute, terminated by a mucro less than 0.5 mm. long; heads 1–6; plants of Nfld. and e. Que.....*n.*

*n.* Basal offshoots crowded, scarcely elongate; basal leaves 6–13 mm. long, 2–4 mm. wide; flowering stem 5–13 cm. high, its longer leaves barely 1 cm. long; involucres brown, 6–8 mm. high; corollas 4.5 mm. long; achenes glabrous. 14. *A. Wiegandii.*

*n.* Basal offshoots elongate, when well developed cord-like; basal leaves 1–3.5 cm. long, 4–12 mm. wide; flowering stem 0.5–3 dm. high, its longer leaves 1–2.5 cm. long; involucres whitish, 7–11 mm. high; corollas 4.8–6 mm. long; achenes papillate.

Rosette-leaves broadly rounded at summit; lower and median cauline leaves obtuse, merely mucronate-tipped, the upper 1–3 with scarious appendages...........15. *A. spathulata.*

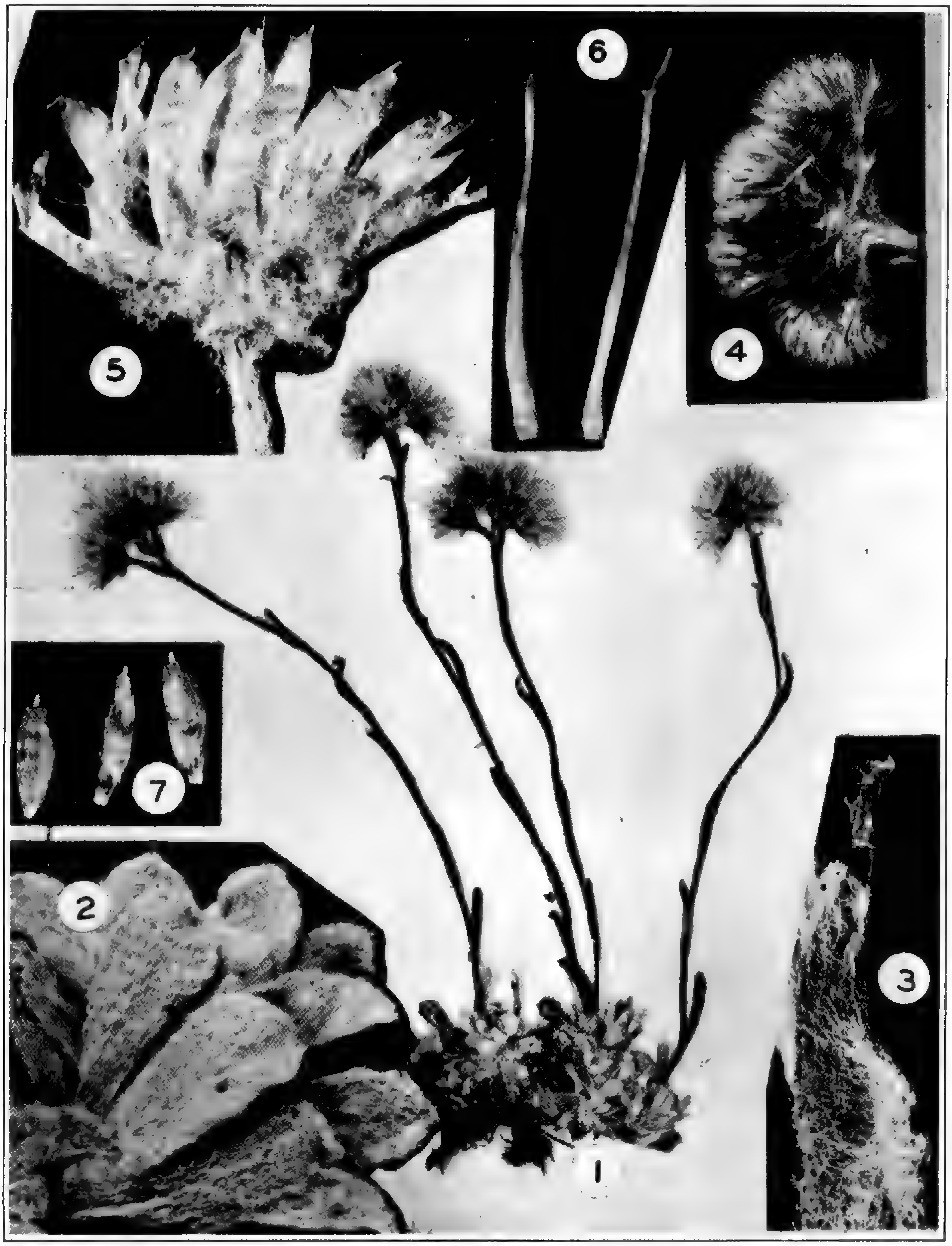


*Photo. B. G. Schubert.*

ANTENNARIA VEXILLIFERA: FIG. 1, plant, × 1; FIG. 2, basal rosette, × 5; FIG. 3, tip of cauline leaf, × 10; FIG. 4, inflorescence, × 2; FIG. 5, involucre, × 6; FIG. 6, corollas, × 10; FIG. 7, achenes, × 10.

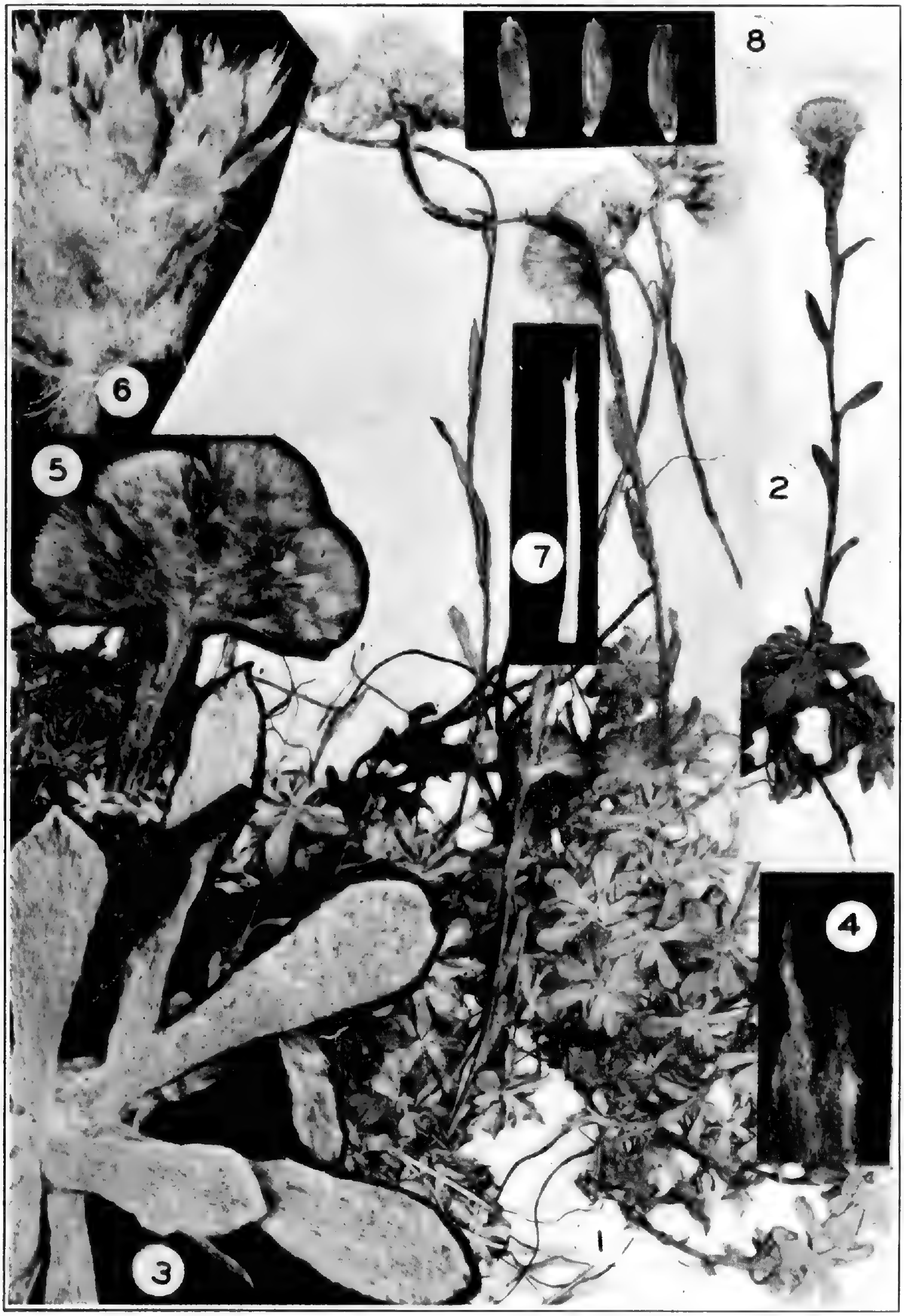


*Photo. B. G. Schubert.*

ANTENNARIA STRAMINEA: FIGS. 1 and 2, plants, × 1; FIG. 3, portion of basal rosette, × 5; FIG. 4, tips of cauline leaves, × 10; FIG. 5, inflorescence, × 2; FIG. 6, involucre, × 5; FIG. 7, corolla, × 10; FIG. 8, achenes, × 10.


*Photo. B. G. Schubert.*

Antennaria Peasei: fig. 1, plant, × 1; fig. 2, basal rosette, × 5; fig. 3, tip of cauline leaf, × 10; fig. 4, inflorescence, × 2.

*Photo. J. F. Collins.*

ANTENNARIA SUBVISCOSA: small portion of large plant, × $^2/_5$, trailing over limestone cliff.

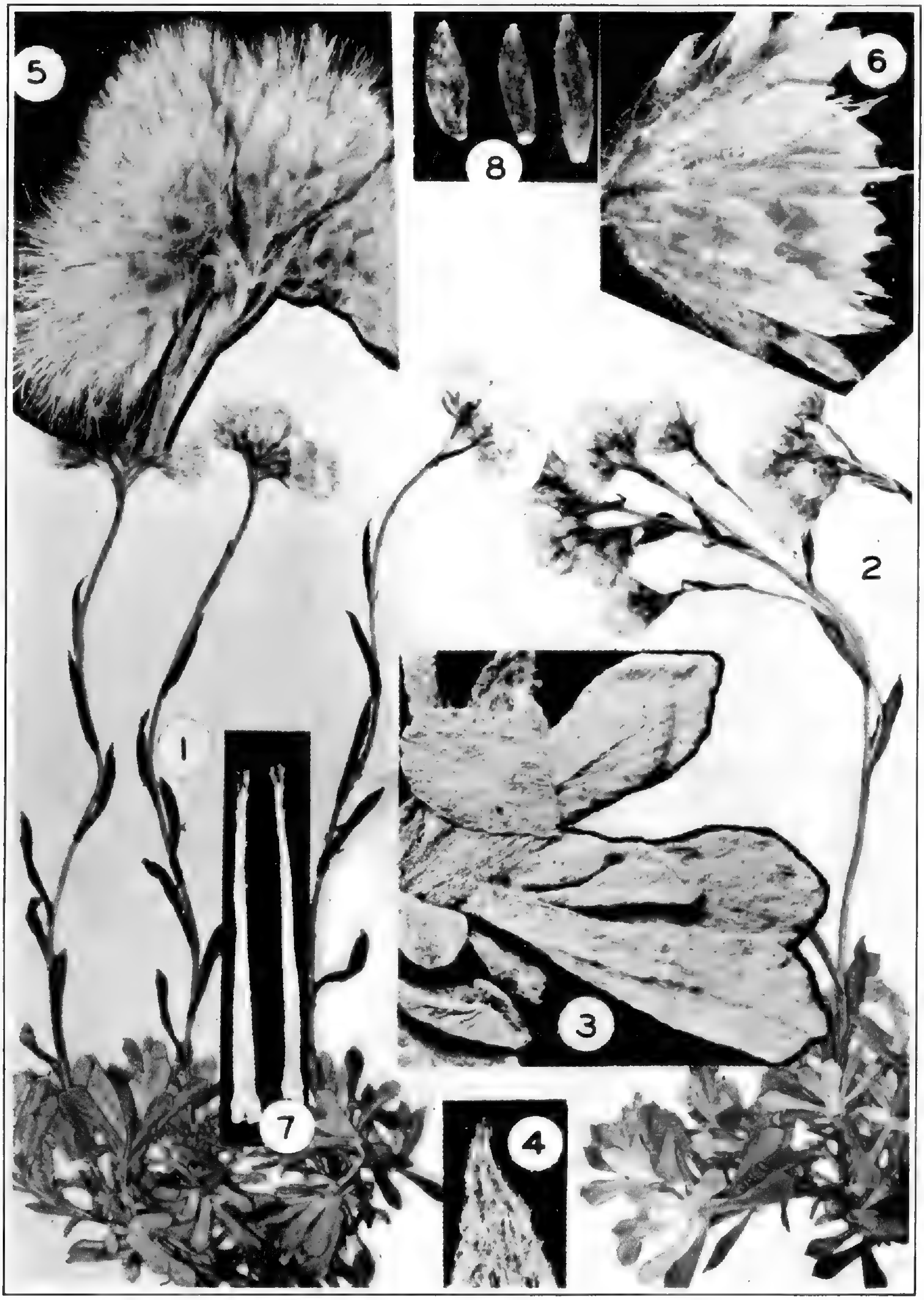


*Photo. B. G. Schubert.*

ANTENNARIA SUBVISCOSA: FIGS. 1 and 2, small plants, × 1; FIG. 3, basal leaves, × 5; FIG. 4, tip of cauline leaf, × 10; FIG. 5, inflorescence, × 2; FIG. 6, involucre, × 6; FIG. 7, corollas, × 10; FIG. 8, achenes, × 10.


*Photo. B. G. Schubert.*

ANTENNARIA ALBICANS: FIG. 1, plants, × 1; FIG. 2, basal rosettes, × 5; FIG. 3, tip of cauline leaf, × 10; FIG. 4, inflorescence, × 2; FIG. 5, pistillate flower, × 10; FIG. 6, achenes, × 10.


*Photo. B. G. Schubert.*

ANTENNARIA WIEGANDII: FIG. 1, plant and a basal rosette, × 1; FIG. 2, basal rosette, × 5; FIG. 3, inflorescence, × 2; FIG. 4, achenes, × 10.


*Photo. B. G. Schubert.*

ANTENNARIA SPATHULATA: FIGS. 1 and 2, plants, × 1; FIG. 3, portion of rosette-leaf, × 5; FIG. 4, inflorescence, × 2; FIG. 5, portion of involucre, × 5; FIG. 6, corollas, × 10; FIG. 7, achenes, × 10.


*Photo. B. G. Schubert.*

ANTENNARIA APPENDICULATA: FIGS. 1 and 2, portions of plant, × 1; FIG. 3, summit of basal leaf, × 5; FIG. 4, tip of cauline leaf, × 10; FIG. 5, corymb, × 2; FIG. 6, achenes, × 10.


*Photo. B. G. Schubert.*

ANTENNARIA CANADENSIS: FIGS. 1 and 2, pistillate plant, × 1; FIG. 3, tip of cauline leaf, × 10; FIG. 4, achenes, × 10.


*Photo. B. G. Schubert.*

Antennaria canadensis: fig. 1, staminate plant, × 1; fig. 2, basal leaves, × 5; fig. 3, pistillate corymb, × 2.


*Photo. B. G. Schubert.*

ANTENNARIA NEGLECTA: FIGS. 1 and 2, pistillate plant, × 1; FIG. 3, tip of cauline leaf, × 10; FIGS. 4 and 5, pistillate inflorescences, × 2.


*Photo. B. G. Schubert.*

Antennaria neglecta: figs. 1 and 2, broad-leaved plant, × 1; fig. 3, mature pistillate inflorescence, × 2; fig. 4, achenes, × 10.

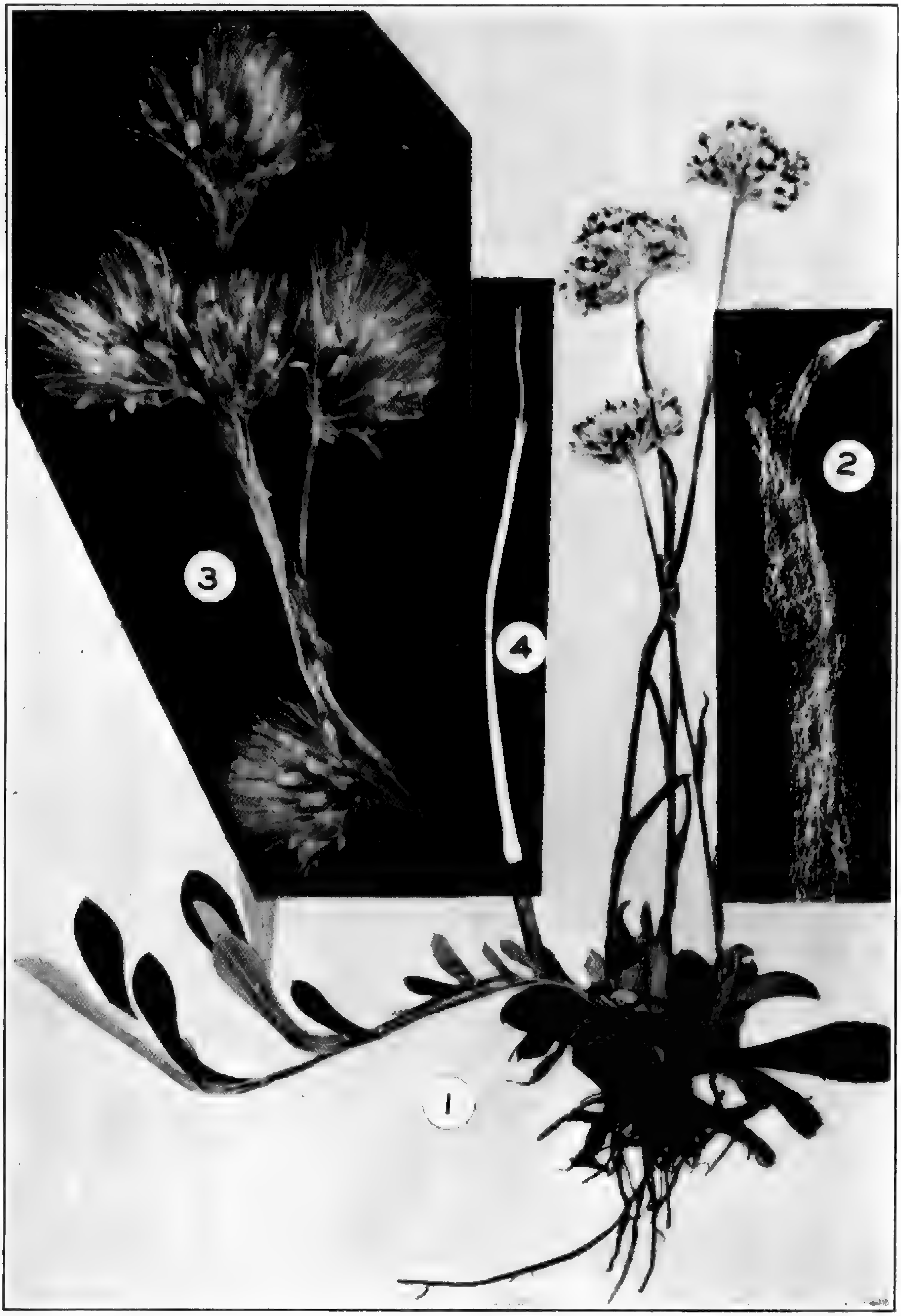


*Photo. B. G. Schubert.*

ANTENNARIA NEGLECTA: FIG. 1, staminate plant, × 1; FIG. 2, tip of cauline leaf, × 2; FIG. 3, upper half of mature pistillate raceme, × 2; FIG. 4, pistillate corolla, × 10.

*Photo. B. G. Schubert.*

ANTENNARIA NEGLECTA, forma SIMPLEX: plants, × 1.

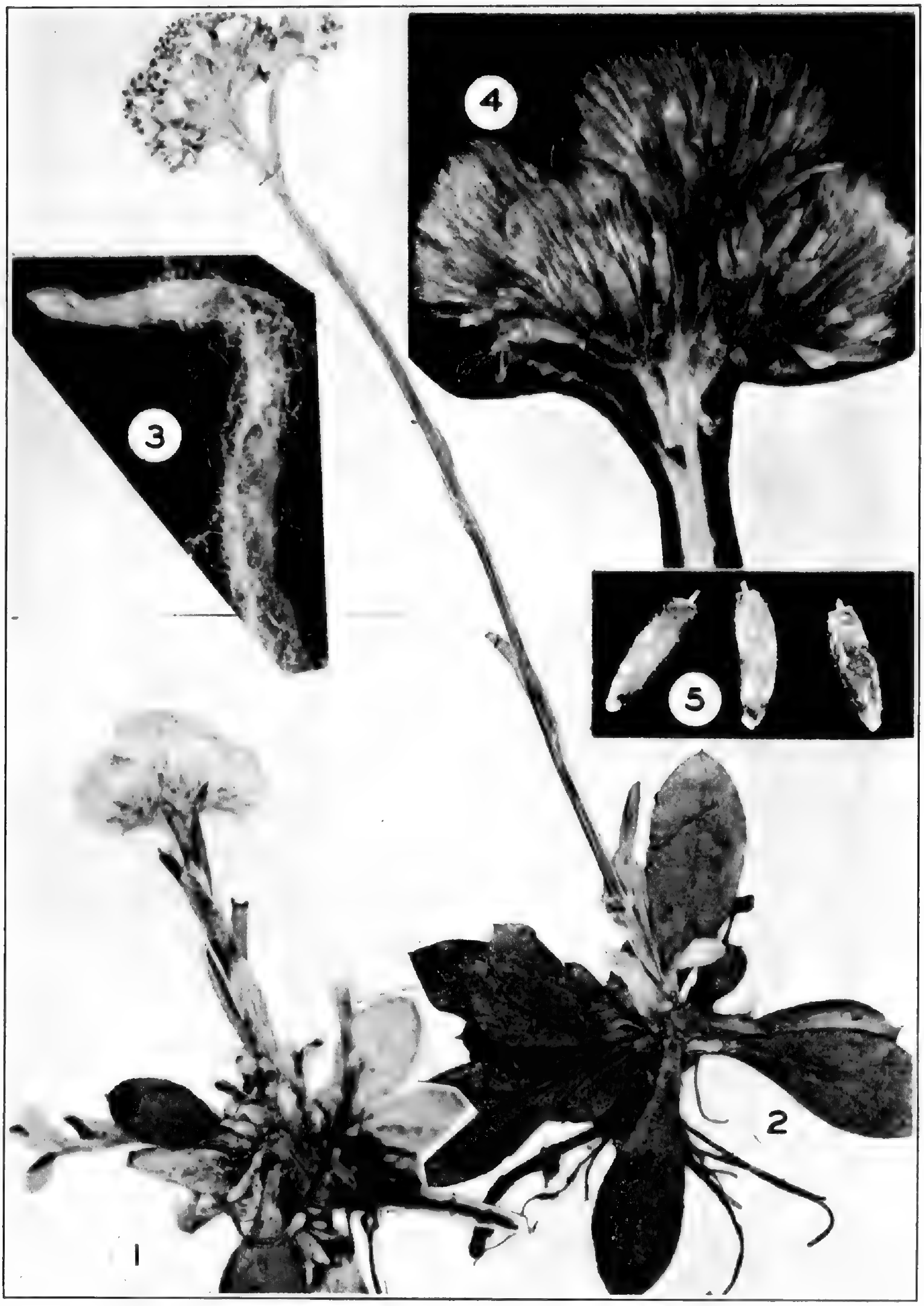


*Photo. B. G. Schubert.*

Antennaria campestris: fig. 1, pistillate plant, × 1; fig. 2, staminate plant, × 1; fig. 3, tip of cauline leaf, × 10; fig. 4, corymb, × 2; fig. 5, achenes, × 10.


*Photo. B. G. Schubert.*

ANTENNARIA RUPICOLA: FIG. 1, base of plant, $\times$ 1; FIG. 2, rosette-leaves, $\times$ 5; FIG. 3, tip of cauline leaf, $\times$ 10.


*Photo. B. G. Schubert.*

Antennaria rupicola: fig. 1, flowering summit of plant in plate 929, × 1; fig. 2, corymb, × 2; fig. 3, receptacle, × 10; fig. 4, achenes, × 10.

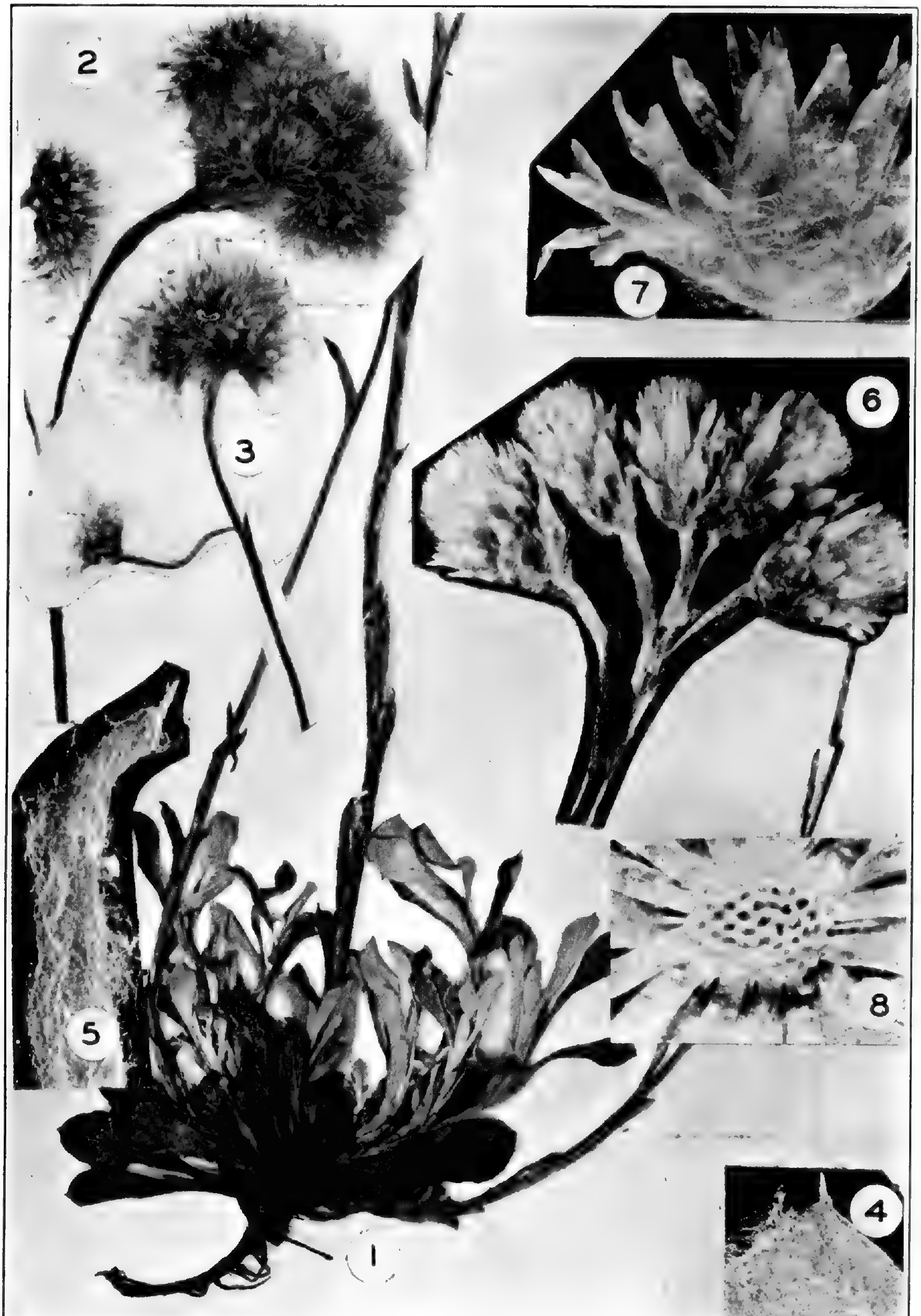


*Photo. B. G. Schubert.*

Antennaria neodioica, var. typica: figs. 1, 2 and 3, portions of isotype, × 1; fig. 4, tips of rosette-leaves, × 5; fig. 5, tip of cauline leaf, × 10; fig. 6, corymb, × 2; fig. 7, portion of involucre, × 5; fig. 8, receptacle, × 10.


*Photo. B. G. Schubert.*

ANTENNARIA NEODIOICA, var. TYPICA: FIGS. 1, 2 and 3, portions of staminate plants, × 1; FIG. 4, pistillate corolla, × 10; FIG. 5, achenes, × 10.


*Photo. B. G. Schubert.*

ANTENNARIA NEODIOICA, var. ATTENUATA: FIGS. 1 and 2, portions of plant, × 1; FIG. 3, tip of cauline leaf, × 10; FIG. 4, corymb, × 2; FIG. 5, portion of involucre, × 5.


*Photo. B. G. Schubert.*

ANTENNARIA NEODIOICA, var. INTERJECTA: FIG. 1, small plant and base and inflorescence of others, × 1; FIG. 2, tips of rosette-leaves, × 5; FIG. 3, tip of cauline leaf, × 10; FIG. 4, corymb, × 2; FIG. 5, corollas, × 10; FIG. 6, achenes, × 10.

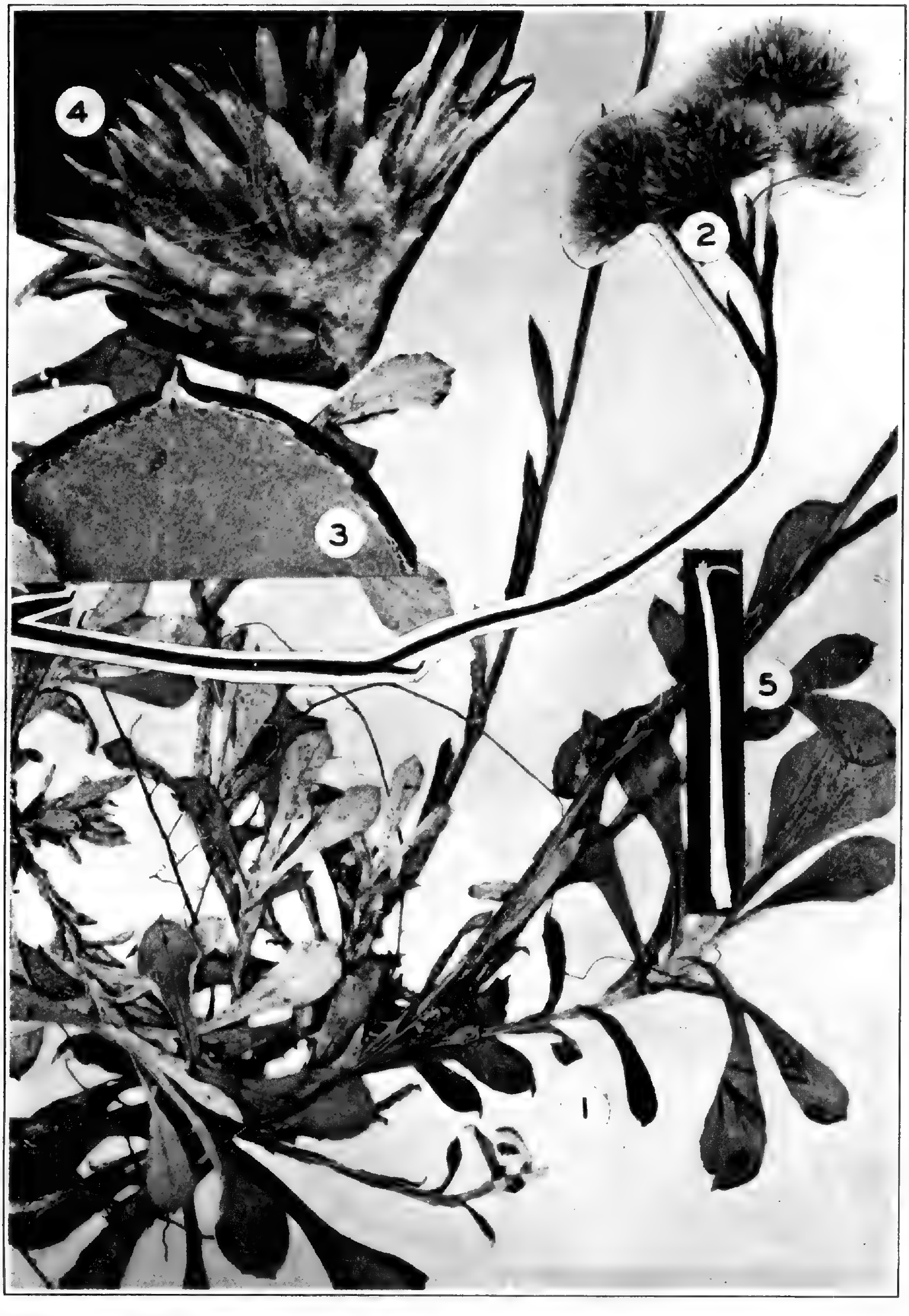


*Photo. B. G. Schubert.*

ANTENNARIA NEODIOICA, var. CHLOROPHYLLA: FIGS. 1 and 2, portions of plant, × 1; FIG. 3, tip of rosette-leaf, × 5; FIG. 4, involucre, × 5; FIG. 5, corolla, × 10.


*Photo. B. G. Schubert.*

ANTENNARIA NEODIOICA, var. GRANDIS: FIGS. 1 and 2, portions of plant, × 1; FIG. 3, two mature corymbs, × 1; FIG. 4, corollas, × 10; FIG. 5, achenes, × 10.

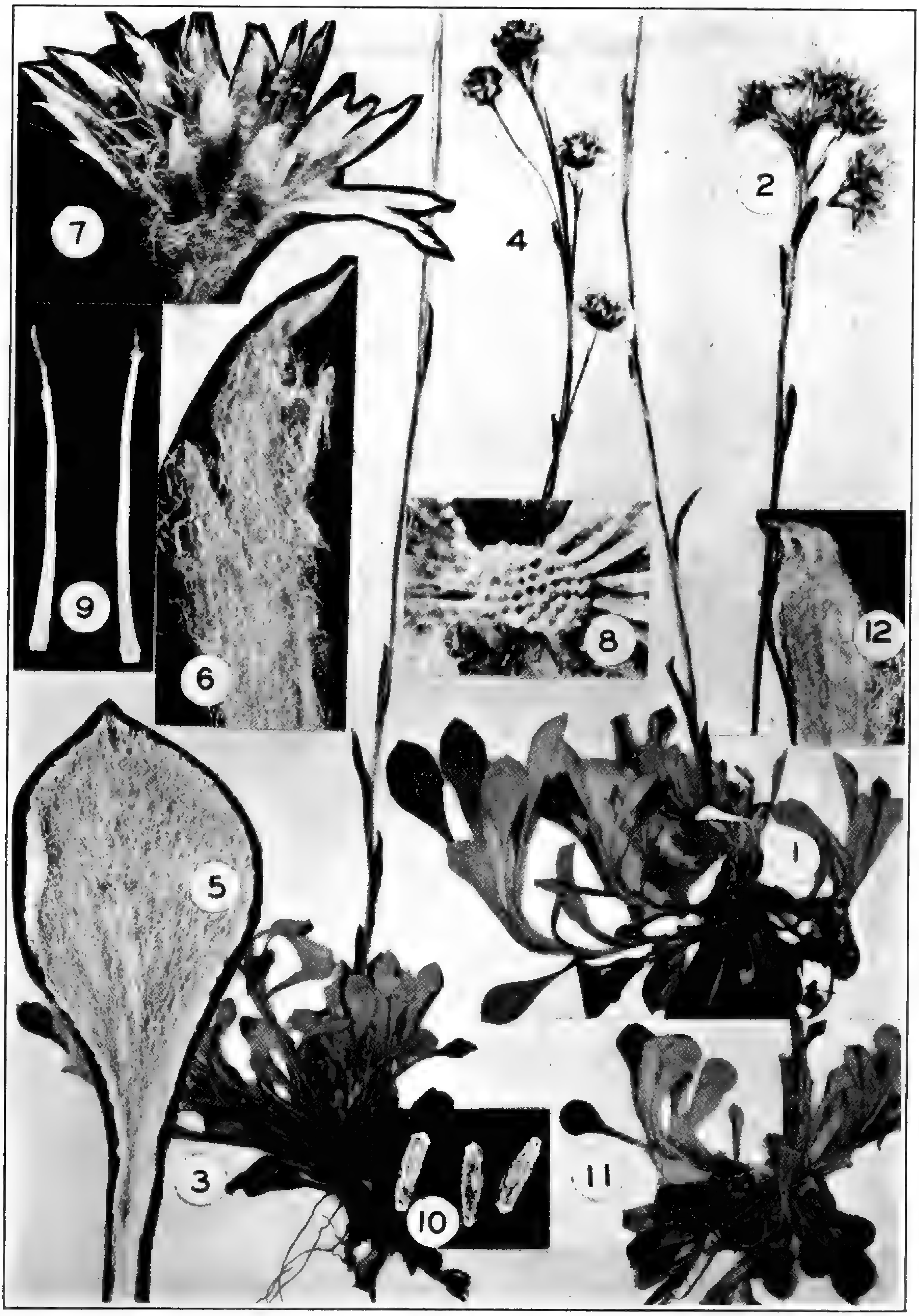


*Photo. B. G. Schubert.*

Antennaria virginica: figs. 1 and 2, pistillate plant, × 1; figs. 3 and 4, staminate plant, × 1; fig. 5, rosette-leaf, × 5; fig. 6, tip of cauline leaf, × 10; fig. 7, involucre, × 5; fig. 8, receptacle, × 10; fig. 9, pistillate corollas, × 10; fig. 10, achenes, × 10;
A. virginica, var. argillicola: fig. 11, base of plant, × 1; fig. 12, tip of cauline leaf, × 10.


*Photo. B. G. Schubert.*

Antennaria aprica: fig. 1, pistillate plant and corymb, × 1; fig. 2, corymb, × 2; fig. 3, pistillate corollas, × 10; fig. 4, achenes, × 10.


*Photo. B. G. Schubert.*

Antennaria aprica: fig. 1, staminate plant, × 1; fig. 2; rosette-leaves, × 5; fig. 3, tip of cauline leaf, × 10. fig. 4, involucre. × 5.


*Photo. B. G. Schubert.*

ANTENNARIA PETALOIDEA (typical): FIGS. 1, 2 and 3, portions of plant, × 1; FIG. 4, base of plant, × 1; FIG. 5, tip of cauline leaf, × 10: FIG. 6, portion of corymb, × 2.

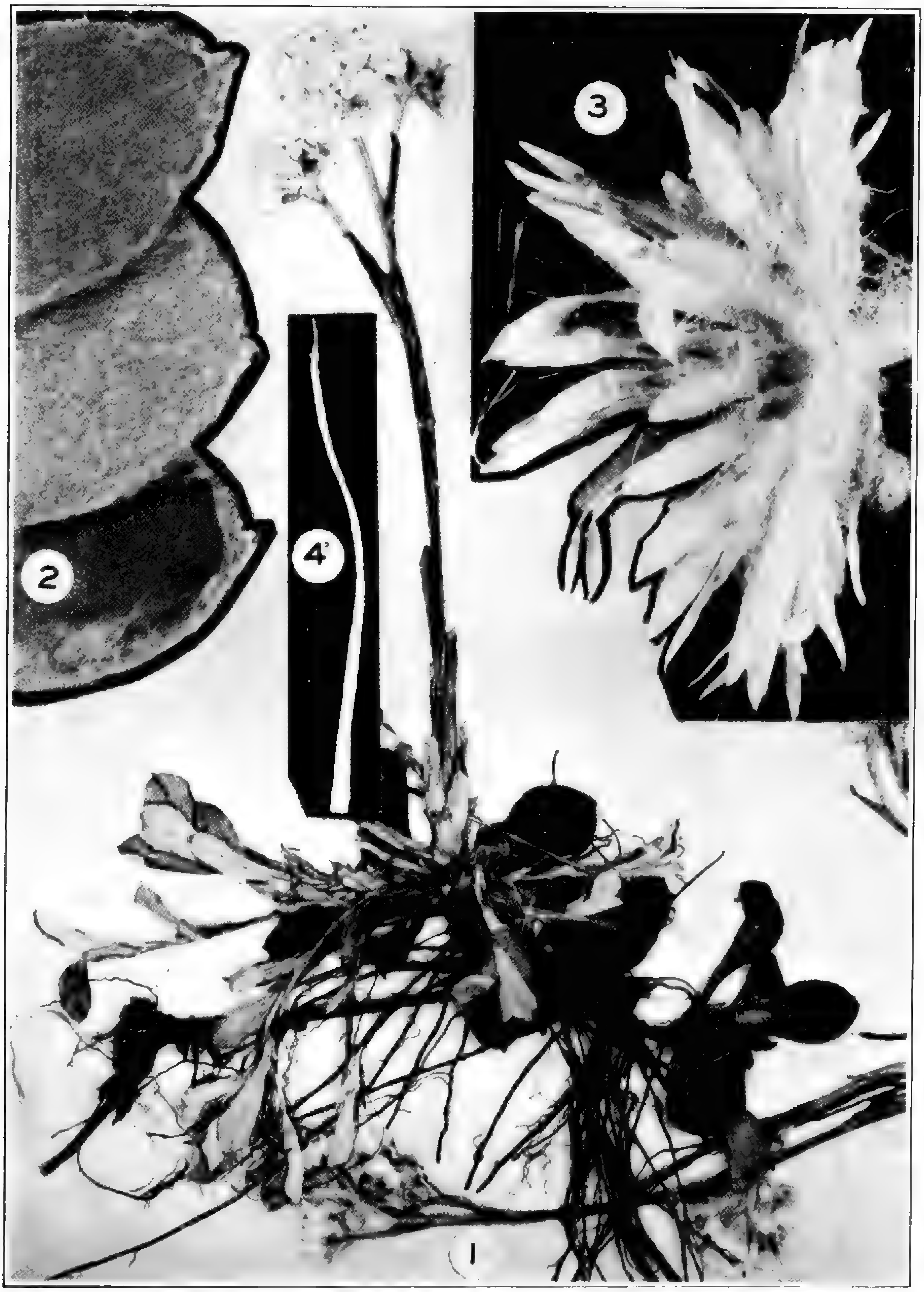


*Photo. B. G. Schubert.*

ANTENNARIA PETALOIDEA: FIG. 1, staminate plant, × 1; FIG. 2, tips of rosette-leaves, × 5; FIG. 3, involucre, × 5; FIG. 4, pistillate corolla, × 10.


*Photo. B. G. Schubert.*

Antennaria petaloidea, var. scariosa: figs. 1 and 2, portions of plant, × 1; fig. 3, corymb, × 2; fig. 4, exceptionally lax corymb, × 1; fig. 5, involucre, × 5.


*Photo. B. G. Schubert.*

ANTENNARIA PETALOIDEA, var. SUBCORYMBOSA: FIGS. 1 and 2, portions of plant, × 1; FIG. 3, tip of cauline leaf, × 10; FIG. 4, involucre, × 5; FIG. 5, corollas, × 10; FIG. 6, achenes, × 10.


*Photo. B. G. Schubert.*

ANTENNARIA PETALOIDEA, var. SUBCORYMBOSA: portions of large inflorescence, × 1; FIG. 2, the summit of inflorescence in fig. 1.

Rosette-leaves subacute to round-tipped; all or all but the very lowermost cauline leaves ending in prolonged scarious appendages. 16. *A. appendiculata.*

*m.* Rosette-leaves oblanceolate to narrowly obovate, somewhat narrowed to acute tip and tapering to a subpetiolar base, tipped by a sharp mucro 0.5–1.5 mm. long; heads 3–18; plant of broad continental range; achenes (at least when young) papillate........................17. *A. canadensis.*

*l.* New rosette-leaves grayish- or whitish-tomentulose or -sericeous on upper face; achenes (at least when young) papillate....*o.*

*o.* Rosette-leaves cuneate-oblanceolate, -obovate or -spatulate, mostly 1.5–6.5 cm. long, 0.5–1.8 cm. broad, the old ones becoming green with weathering; stolons filiform, lash-like or cord-like, elongate; heads crowded in a glomerule or becoming loosely racemose; corollas 5–6.2 mm. long; continental plants, both staminate and pistillate.

Stolons flexuous and lash-like; rosette-leaves cuneate-oblanceolate to -spatulate, narrowed to a subpetiolar base, 0.5–1.3 cm. broad; stems of pistillate plants elongating in fruit to 1.5–4 dm. high; pistillate heads in maturity becoming spicate to racemose; staminate involucres 4–6 mm. high; eastern species..18. *A. neglecta.*

Stolons stiffer, cord-like; rosette-leaves narrowly cuneate-obovate, broad-based, 0.6–1.8 cm. broad; stems of pistillate plants 0.4–2 dm. high; pistillate heads closely glomerulate; staminate involucres 6–8 mm. high; Great Plain species........................19. *A. campestris.*

*o.* Rosette-leaves oblanceolate or narrowly obovate, acute or acutish, 0.5–2 cm. long, 2–5 mm. broad, strongly whitened; basal offshoots crowded, very short and assurgent, consisting chiefly of depressed rosettes; heads loosely corymbose (or solitary); corollas 4–4.5 mm. long; staminate plant unknown; species of e. Que. and Nfld...20. *A. gaspensis.*

*k.* Middle and upper cauline leaves of pistillate plants blunt or with subulate or subulate-aristate tips (only those about the corymb with flat scarious appendages); achenes (at least when young) papillate....*p.*

*p.* Stolons and basal offshoots short and assurgent, ending in depressed rosettes; rosette-leaves oblanceolate to broadly obovate, often with definite petioles....*q.*

*q.* Rosettes-leaves and cauline leaves all or nearly all with a naked terminal mucro or subulus; eastern and northeastern species.

Basal leaves oblanceolate or narrowly spatulate-obovate, acute or subacute, scarcely petioled; flowering stem stiff, its 8–18 leaves subapproximate and evenly spaced; corymb compact; involucres greenish or light brown only at base, with firm chartaceous milk-white to creamy-brown blunt phyllaries mostly 1.4–2 mm. broad; pits of denuded receptacle narrower than the ridges....................21. *A. rupicola.*

Basal leaves narrowly to broadly obovate, mostly rounded to tip, petioled; flowering stem usually becoming flexuous upon elongation, its 4–10 (–14) leaves often becoming remote; pistillate involucres greenish-, purplish- or brown-tinged, their thin and usually scarious pale-tipped phyllaries 0.4–1.4 mm. broad; pits of old receptacle broader than ridges.

Plants all or chiefly all pistillate, these with stems 0.5–5 dm. high; rosette-leaves 1–5.5 cm. long, 0.3–2 cm. wide; lower cauline leaves 1.5–4 cm. long, 2–6 mm. broad; pistillate involucres 6–9 mm. high, with 30–60 or more phyllaries; florets 50–140; corollas 4–6 mm. long; pits of receptacle deep; staminate involucre 5–6.5 mm. high; wide-ranging from Nfld. to n. Ont., s. to N. S., N. E., L. I., Va., Ind., Wisc. and Minn.............................22. *A. neodioica.*

Plants about equally staminate and pistillate; the pistillate ones with very slender stems 0.6–2 dm. high; rosette-leaves 1–2.5 cm. long, 3–8 mm. wide; lower cauline leaves 1–1.3 cm. long, 1–2 mm. wide; pistillate involucre 5–7 mm. high, with 25–35 phyllaries; florets 40–70; corollas 3.2–4.5 mm. long; pits of receptacle shallow; staminate involucre 3.8–5 mm. high; plant of Appalachian Upland, Va., W. Va. and Pa., very locally to w. Vt.....................23. *A. virginica.*

*q*. Rosette-leaves and all or nearly all the cauline leaves blunt, without an evident subulus; Great Plains species............................24. *A. aprica.*

*p*. Stolons elongate, lash- or cord-like, only tardily developing terminal rosettes; rosette-leaves cuneate-oblanceolate to spatulate-obovate..........25. *A. petaloidea.*

*j*. Rosette-leaves comparatively large, 0.7–5.5 cm. broad, with 3–7 nerves somewhat prominent and prolonged beneath; achenes (at least when young) papillate....*r*.

*r*. Heads in corymbs; stolons assurgent and leafy or with assurgent leafy tips....*s*.

*s*. Pistillate involucres 7–11 (rarely only 6 in no. 30) mm. high; central corollas 4.5–7 mm. long; achenes 1.3–2.2 mm. long; mature pappus (longer bristles) 5.5–9 mm. long....*t*.

*t*. Rosette-leaves mostly subtruncate, abruptly constricted above the middle to a concave curve arching to the prolonged slenderly cuneate base; mature pappus 5.5–6 mm. long; local species of upper Great Lakes.....................26. *A. Farwellii.*

*t*. Rosette-leaves acutish or gradually rounded at summit, more gradually narrowed to the base; mature pappus 6–9 mm. long....*u*.

*u*. Blades of larger rosette-leaves 2.5–8 cm. long above the petiolar base, minutely canescent, or glabrous or glabrate; mature flowering stems (pistillate) 1.5–5 dm. high; involucres 7–11 mm. high; corollas 5–7 mm. long; longer pappus 6–9 mm. long.

Rosette-leaves spatulate to narrowly spatulate-obovate, strongly rounded at summit, closely canescent-tomentose above; heads glomerulate or densely crowded; longer mature pappus 8–9 mm. long; stems glandless. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .27. *A. munda.*

Rosette-leaves broadly obovate-spatulate to obovate and subacute to suborbicular and rounded above; heads densely to loosely corymbed; longer mature pappus 6–8.5 mm. long; stems frequently glandular above.

New rosette-leaves permanently and closely canescent-tomentulose above; stems and involucres rarely purple; mature achenes 1.3–1.6 mm. long, densely papillose, their longer pappus 6–8 mm. long; summit of plant glandless or glandular. . . . . . . . . . .28. *A. fallax.*

New rosette-leaves bright green and glabrous or only lightly canescent and glabrate; stems and involucres frequently purplish; mature achenes 1.6–2.2 mm. long, smooth or slightly papillose, their longer pappus 7.5–8.5 mm. long; summit of stem usually glandular. . . . . . . . . . .29. *A. Parlinii.*

*u.* Blades of larger rosette-leaves 1.5–3.5 cm. long, strongly rounded, loosely tomentose above; mature flowering stem (pistillate) 1.3–3.5 dm. high, with stipitate glands at summit and in the corymb; involucres 6–8.5 mm. high; corollas 4.5–5.5 mm. long; longer pappus 6–7 mm. long. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .30. *A. Brainerdii.*

*s.* Pistillate involucres 5–7 mm. high; central corollas 2.5–4.3 mm. long; achenes 1–1.5 mm. long; mature pappus 4–5.5 mm. long; rosette-leaves oblanceolate, obovate or suborbicular, minutely canescent above. . . . . . . . . . . . . . . . . . . . . . . . . . . .31. *A. plantaginifolia.*

*r.* Heads solitary; stolons filiform, lash-like, tardily producing terminal rosettes of sessile to broad-petioled obovate- to broadly oblong-spatulate leaves. . . . .32. *A. solitaria.*

1. A. EUCOSMA Fernald & Wiegand in RHODORA, xiii. 23 (1911); Fernald, l. c. xxxv. 330 (1933).—Straits of Belle Isle to Bay St. George, Nfld. Both staminate and pistillate. *Fl.* mid-July, Aug. PLATE 912.

2. A. PULCHERRIMA (Hook.) Greene, Pittonia, iii. 176 (1897). *A. carpatica* sensu Hook. Fl. Bor.-Am. i. 329 (1834), not Wahlenb. *A. carpatica*, γ. *pulcherrima* Hook. l. c. (1834).—Anticosti I., Gaspé Co., Que.; w. Ungava to n. Alta., s. in Rocky Mts. Both staminate and pistillate. June–early Aug.

3. A. COLUMNARIS Fernald in RHODORA, xxxv. 331, t. 263 (1933).—Near St. John and Ingornachoix Bays, Nfld. Pistillate only. July, early Aug.

4. A. Foggii Fernald, l. c. 332, t. 264 (1933).—Near St. John and Ingornachoix Bays, Nfld. Pistillate only. July, early Aug.

5. A. Bayardi Fernald, l. c. 333, t. 265 (1933).—Bonne Bay and Bay of Islands, Nfld. Pistillate only. July, early Aug.

6. A. brunnescens Fernald, l. c. 336, t. 266 (1933).—Alpine crest, Mt. Killdevil, Bonne Bay, Nfld. Pistillate only. Aug.

7. A. cana (Fernald & Wieg.) Fernald, l. c. xviii. 236 (1916) and xxxv. 337, t. 267 (1933). Straits of Belle Isle to Bonne Bay (ascending to alpine areas), Nfld.; n. B. C. Pistillate only. July, early Aug.

8. A. vexillifera Fernald, l. c. xxvi. 99, t. 142, fig. 4 (1924), xxxv. 338 (1933). Nw. Nfld.; Shickshock Mts. (at 3500 ft.), Gaspé Pen., Que. Pistillate only. July. Plate 913.

9. A. confusa Fernald, l. c., t. 268 (fig. at left) (1933). W. Nfld. Pistillate only. July, Aug.

10. A. straminea Fernald, l. c. xvi. 130 (1914), xxvi. 100, t. 145, fig. 8 (1924) and xxxv. 340 (1933). N. and w. Nfld. Pistillate only. July, early Aug. Plate 914.

11. A. Peasei Fernald, l. c. xxvi. 101, t. 142, fig. 11 (1924). Alpine region, Shickshock Mts., Gaspé Pen., Que. Pistillate only. July. Plate 915.

12. A. subviscosa Fernald, l. c. xvi. 131 (1914) and xxxv. 334 (1933). Rimouski Co. to Gaspé Co., Que. Late June, July. Pistillate only. Plates 916 and 917.

13. A. albicans Fernald, l. c. xvi. 197 (1914), xxvi. 100, t. 145, fig. 6 (1924) and xxxv. 340 (1933). W. Nfld. Pistillate only. July, early Aug. Plate 918.

14. A. Wiegandii Fernald, l. c. xxviii. 238 (1926), xxxv. 240 (1933). W. Nfld. Pistillate only. July, early Aug. Plate 919.

15. A. spathulata Fernald, l. c. xvi. 196 (1914), xxxv. 340 (1933). *A. canadensis*, var. *spathulata* Fernald, l. c. 132 (1914). *A. spathulata*, var. *continentis* Fernald & St. John in St. John, Bot. Exped. No. Shore Gulf St. Lawr. 55 (1922). Nfld. and St. P. et Miq.; Côte Nord, Anticosti and Lake Mistassini, Que. Pistillate only. Late June-early Aug. Plate 920.

16. A. appendiculata Fernald, l. c. xxiii. 295 (1922). Nw. Nfld.; Anticosti and Gaspé Pen., Que.; w. Ungava. Pistillate only. Plate 921.

17. A. canadensis Greene, Pittonia, iii. 275 (1898). Var. *Randii* Fernald in Proc. Bost. Soc. Nat. Hist., xxviii. 246 (1898). *A. neglecta*, var. *Randii* (Fernald) Cronquist in Rhodora, xlvii. 184 (1945). Gaspé Co., Que., to n. Man., s. to N. S., N. E., N. Y., mts. of Pa. and Va., n. Ind. and Mich. Pistillate chiefly; staminate plants comparatively rare. May–early July (–Aug. in mts.). Plates 922 and 923.

18. A. NEGLECTA Greene, Pittonia, iii. 173 (1897). *A. neglecta*, var. *neglecta* (Greene) Cronquist in RHODORA, xlvii. 183 (1945). N. S. and Me. to s. Ont., s. to Va., W. Va., O., Ind., Mo. and Kans. Both staminate and pistillate. Late April–July. PLATES 924–926.

*Antennaria neglecta* is the earliest-flowering species. In eastern Massachusetts (north of Cape Cod) its flowering period in normal seasons begins about April 20 and extends to May 20; that of *A. plantaginifolia* April 25–May 20; of *A. canadensis*, *A. neodioica*, *A. petaloidea*, *A. Parlinii* and *A. fallax* May 10–June 17; of *A. munda* May 20–June 15. When, watching for the coming of Spring, one finds the first expanded flowers of *A. neglecta* (exceptionally on April 1) he knows that *A. plantaginifolia* will soon follow, but that he must wait two or three weeks for the others and even a month for *A. munda*. These are not trifling differences nor "temporary whims", although the element of time is involved!

A. NEGLECTA, forma SIMPLEX (Peck) Fernald, l. c. xxxviii. 230 (1936). *A. simplex* Peck, Bull. N. Y. State Mus. lxvii. Bot. vi. 33 (1906). Sporadic, Me. and N. Y. PLATE 927.

19. A. CAMPESTRIS Rydberg in Bull. Torr. Bot. Cl. xxiv. 304 (1897). No. B. C. to Man., s. to Okla., e. to Thunder Bay Distr., Ont., Mich. and Mo. Both staminate and pistillate. Late April–June. PLATE 928.

20. A. GASPENSIS Fernald, l. c. xxxv. 341, t. 268, plant at right (1933). *A. neodioica*, var. *gaspensis* Fernald in Ottawa Nat. xix. 156 (1905). *A. neglecta*, var. *gaspensis* (Fernald) Cronquist, l. c. 184 (1945). W. Nfld.; Anticosti I. and e. Gaspé Pen., Que. Pistillate only. Late June–Aug.

21. A. RUPICOLA Fernald in RHODORA, i. 74 (1899) and xxxv. 342 (1933). *A. neodioica*, var. *rupicola* Fernald, l. c. xvi. 132 (1914). Nfld. and Anticosti to Magdalen Ids. and ne. Me.; L. Huron and L. Superior regions of Ont. and n. Mich. Pistillate only. June, July. PLATES 929 and 930.

22. A. NEODIOICA Greene, Pittonia, iii. 184 (1897).—Variable, with some pronounced varieties

*a.* Rosette-leaves 1–4 cm. long, 3–17 mm. broad; lower cauline leaves 1–3 cm. long, 1–5 mm. broad; involucres of pistillate heads greenish- or purple-tinged, with scarious tips; corollas 3.2–5 mm. long. . . *b.*

*b.* Rosette-leaves gray- or grayish-tomentose above. . . . *c.*

*c.* Flowering stems flexuous upon elongation, 1–5 dm. high; the 4–14 leaves becoming distant; rosette-leaves obovate, petioled; corymb open.

Outer and middle phyllaries of pistillate involucre obtuse to subacute . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Var. *typica*.
Outer and middle phyllaries lance- to linear-attenuate. Var. *attenuata*.

*c*. Flowering stems stiffly erect, 0.5–2.5 dm. high; the 8–14 leaves subapproximate or imbricated; rosette-leaves oblanceolate or narrowly obovate, acutish, cuneate at base; corymb subglomerulate, globose or hemispherical Var. *interjecta*.

*b*. Rosette-leaves green and glabrous above, 3–13 mm. wide; flowering stem 1.5–5 dm. high . . . . . . . . . . . . . . . . . . . . Var. *chlorophylla*.

*a*. Rosette-leaves 2–5.5 cm. long, 0.7–2 cm. broad; lower cauline leaves 2–4 cm. long, 3–6 mm. broad, often overlapping; flowering stems stoutish, 1.5–4.5 dm. high; corymb loose; heads very full; involucres (except in shade) reddish, their phyllaries with white petaloid tips; corollas 4.8–6 mm. long . . Var. *grandis*.

Var. TYPICA Fernald, l. c. xxxv. 345 (1933). *A. neodioica* Greene, l. c. Nfld. to Ont., s. to N. S., N. E., inland Va., Ind., Wisc. and Minn. Staminate plants few and rare. May–early July. PLATES 931 and 932.

Var. ATTENUATA Fernald in Proc. Bost. Soc. Nat. Hist. xxviii. 248 (1898). *A. neglecta*, var. *attenuata* (Fernald) Cronquist, l. c. (1945), as to basonym. Similar range. Staminate plant almost unknown. May–Aug. (northw.). PLATE 933.

Var. INTERJECTA Fernald in RHODORA, xxxv. 345 (1933). Gaspé and Rimouski Cos., Que.; n. shore, L. Sup., Ont., to e. Wisc. Staminate plant unknown. Mid-June–mid-July. PLATE 934.

Var. CHLOROPHYLLA Fernald, l. c. xxiii. 296 (1922). Nfld. to Wisc., s. to N. S., N. E. and N. Y. Staminate plant unknown. May–Aug. PLATE 935.

Var. GRANDIS Fernald, l. c. i. 73 (1899) and xxxv. 345 (1933). *A. grandis* (Fernald) House, Bull. N. Y. State Mus. no. 188: 60, 63 (1916), without indication of *specific* characters. N. S. and s. N. B. to s. Que., w. to Mich., s. to Mass. and N. Y. Staminate plant unknown. Late May–July. PLATE 936.

23. A. VIRGINICA Stebbins in RHODORA, xxxvii. 230 (1935). Appalachian Upland, Va., W. Va. and Pa., rarely to w. Vt. Staminate and pistillate plants both abundant. April–June. PLATE 937, FIGS. 1–10.

Var. ARGILLICOLA Stebbins, l. c. 232 (1935). *A. neodioica*, var. *argillicola* (Stebbins) Fernald, l. c. xxxviii. 230 (1936). *A. neglecta*, var. *argillicola* (Stebbins) Cronquist, l. c. (1945). W. Pa., e. W. Va. and w. Va. PLATE 937, FIGS. 11 and 12.

24. A. APRICA Greene, Pittonia, iii. 282 (1898). E. Man. to B. C., s. to w. Minn., Neb., N. M. and n. Mex. Both staminate and pistillate. May–July. PLATES 938 and 939.

25. A. PETALOIDEA Fernald, l. c. i. 73 (1899). *A. neodioica*, var. *petaloidea* Fernald in Proc. Bost. Soc. Nat. Hist. xxviii. 245 (1898). Three geographic vars.

Flowering stems 1–3 (–4) dm. high during anthesis, their leaves at almost regularly decreasing intervals up to the inflorescence; rosette-leaves 1.5–5 cm. long, 0.5–1.7 cm. broad, rounded to acute at summit.
Phyllaries with whitish petaloid tips; rosette-leaves round-tipped to subacute, up to 1.7 cm. broad....... A. *petaloidea* (typical).
Phyllaries scarious, lustrous, yellowish, long-attenuate; rosette-leaves acute, up to 1.2 cm. broad.............. Var. *scariosa*.
Flowering stems 2–5 dm. high, nearly or quite without leaves for a distance of 0.7–1.7 dm. below the inflorescence; phyllaries white-tipped; rosette-leaves acute or acutish, mostly 3–6.5 cm. long and up to 2.1 cm. broad............ Var. *subcorymbosa*.

A. PETALOIDEA (typical). Rimouski Co., Que., to Thunder Bay Distr., Ont., s. to s. N. B., N. E., N. Y., mts. of Pa., and W. Va., Mich. and Wisc. Staminate plant very rare. Mid-May–early July. PLATES 940 and 941.

Var. SCARIOSA Fernald in RHODORA, i. 73 (1899). Var. *modesta* E. Nelson in Proc. U. S. Nat. Mus. xxiii. 710 (1901). Local, centr. Me. to Vt. Staminate plant unknown. Late May, early June. PLATE 942.

Var. SUBCORYMBOSA Fernald, l. c. xvi. 133 (1914) and xxxv. 344 (map) and 346 (1933). *A. neglecta*, var. *subcorymbosa* Fernald in Proc. Bost. Soc. Nat. Hist. xxviii. 246 (1898). E. Nfld. and Anticosti, Que., s., especially in coastwise areas, to se. Mass. Staminate plant unknown. June, early July. PLATES 943 and 944.

(*To be continued*)

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UTRICULARIA INFLATA var. MINOR in Canada.—In RHODORA xliv. 235 (1942), I reported Mrs. Weatherby's and my collection of *Utricularia inflata* var. *minor* in Ponhook Lake, Queens County, Nova Scotia, as the first authentic record from Canada. In so doing, I overlooked an earlier one—Lake Sawlor, near Hubbard, Halifax County, Nova Scotia, *Margaret S. Brown* in Can. Field Nat. liv. 44 (1940), as *U. inflata.* Since only the variety occurs so far north, there can be no doubt that the plant was the same in both cases.

Correction of my report is hereby made, with apologies to the earlier collector.—C. A. WEATHERBY

A Bibliography of Canadian Botany.—The University of Montreal has recently issued a bulletin[1] which should prove of inestimable value to taxonomists everywhere and to all students of the flora of northern and northeastern America.

This Bibliography, so called, is in reality a cumulative index, in part, of the first forty-five volumes of Rhodora (1899–1943). Rhodora was chosen since it is the botanical journal most actively concerned with the Canadian flora. The present publication extends an earlier work by Jacques Rousseau covering the years 1899–1934.

The Bibliography is concerned not only with Canada proper but also with such closely related phytogeographic areas as Alaska, Newfoundland and Greenland. It consists of three parts.

Part I (pp. 9–103) comprises an alphabetical index of all new names proposed without regard to geographic location. Parenthetical as well as actual authorities are given.

Part II (pp. 105–275) consists of a list of all articles relating directly or indirectly to the flora of Canada, Newfoundland, St. Pierre et Miquelon, Greenland, Labrador and Alaska. This list is arranged alphabetically by authors. Following each bibliographic reference there appears a list of species and lesser entities mentioned in the article cited. In the case of articles directly concerned with the geographic areas mentioned above all the species, varieties and forms discussed are included. In those works dealing but indirectly with these areas, however, only those concepts are listed which are specifically cited in the articles as occurring in the regions under consideration.

Part III (pp. 277–367), a necessary complement, is an alphabetical index of all the species, varieties and forms mentioned in Part II.

This Bulletin may be obtained from Institut Botanique de l'Université de Montréal, 4101 est, rue Sherbrooke, Montréal, Canada at a cost of two dollars.—Albert F. Hill.

[1] Rouleau, Ernest: Bibliographie des travaux concernant la flore canadienne, parus dans "Rhodora", de 1899 à 1943 inclusivement, précédée d'un index alphabétique de tous les noms botaniques nouveaux proposés dans cette revue:—Contributions de l'Institut Botanique de l'Université de Montreal—No. 54. 1944.

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# Rhodora

JOURNAL OF

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## JUSSIAEA URUGUAYENSIS IN STATEN ISLAND, NEW YORK


JOSEPH MONACHINO


On Sept. 17, 1944, the writer discovered a large showy colony of Primrose-Willow in a pond located about 100 yards north of the corner of Richmond Valley Rd. and Arthur Kill Rd., Staten Island, Richmond Co., New York. The pond is a permanent one, apparently, and consists of fresh water separated from the Arthur Kill by a narrow stretch of sand; it is quite removed from immediate habitation. An area of several hundred feet of shore around this pond was densely populated with *Jussiaea*, which waded out into the water some two or three feet deep and formed an almost exclusive stand. Its only associate represented in an appreciable number was *Glyceria obtusa*.

The *Jussiaea* was extensively creeping, the flowering stems erect with the flowers large and striking (the fugacious petals about 2.5 cm. long and 1.5 cm. broad). The leaves on the upright stems were elliptic or lanceolate, narrowed at both ends, usually 5–9 cm. long inclusive of the petiole, 1–2 cm. broad; bracteoles lanceolate, about 1.5–1.6 mm. long; capsules 1.5–2 cm. long and 3–4 mm. diam. The plants were moderately to sparsely pilose, except for the calyx-tube which was rather densely so. A careful survey indicated this pubescence character to be quite uniform in all the plants examined.

On Dec. 3 of the same year the writer revisited the *Jussiaea* station. The aerial stems of the plants were completely withered, while the creeping rhizomes and shoots submerged beneath the frozen surface of the pond were in full vigor and with bright green leaves. Matured fruits were scarce.

The species has been known as *Jussiaea grandiflora* Michx., and it is given this name by Muenscher in his recent (1944) "Aquatic Plants of the United States." Hassler (Fedde Rep. Sp. Nov. **12**: 276. 1913) placed *J. grandiflora* in synonymy of *J. repens* L. subsp. *hirsuta* Hassler var. *grandiflora* (Michx.) Hassler. From the interpretation presented by P. A. Munz (Studies in *Onagraceae* XII. A Revision of the New World Species of *Jussiaea.* Darwiniana **4** (2–3): 190, 268, 269. 1942) the identity of our plant is *J. uruguayensis* Camb. var. *genuina* Munz. Concurring with Hassler in recognizing a very close affinity between the *repens* and the *grandiflora* elements, this authority stated that *J. uruguayensis* "is very near to *J. repens* and perhaps doubtfully distinct."

Search of literature failed to disclose any record of *J. uruguayensis* north of North Carolina. In the herbarium of the N. Y. Bot. Gd. there is a specimen of this species, ex herb. C. D. Lippincott, of a plant which grew in a garden from root originally brought from South Carolina by C. Williamson; coll. Lippincott, Swedesboro, N. J., 9–10–1900. (Identification confirmed by Munz.) The northernmost station for the species (var. *genuina*) cited by Munz in Darwiniana is from near Wilmington, N. Carolina.

M. L. Fernald (Rhodora **46**: 197. 1944) reports *Jussiaea Michauxiana* Fernald, which is a new name for *J. grandiflora* Michx. (not Ruiz & Pavon), as locally abundant on stream-banks in Berks County, Pennsylvania, where it was discovered by H. Wilkens in 1941. This plant was identified by Munz as *J. uruguayensis.* Subsequently, a second sheet of the same species, labeled *J. uruguayensis,* was sent to the Gray Herbarium, this collected by W. C. Brumbach at another station in Berks County, Pennsylvania. M. L. Fernald maintains these collections of *J. Michauxiana* as distinct from true *J. uruguayensis.* In a personal communication, Prof. Fernald kindly informed the writer that there is no doubt about the identity of his plant from Staten Island and that the eastern Pennsylvania species is not like it.

The 1867 edition of Gray's Manual notes *J. repens* as naturalized near Philadelphia. Munz cites several collections of *J.*

*repens* var. *glabrescens* Kuntze from the vicinity of Philadelphia: "New Jersey, Camden, *Parker in 1870, in 1866.* Pennsylvania, Philadelphia, without collector's name; Delaware Co., Hog Island, *Fogg 9775.*"

A letter was sent by the writer to William T. Davis inquiring about any possible information on the establishment of *Jussiaea* in Richmond Co., but he received the sad news from Mr. Coles, the Director of the S. I. Institute of Arts and Sciences, that the venerable authority on Staten Island had recently died. The query was transferred to Mr. Ellison, President of the Bird and Nature Club of Staten Island, who reported that none of the members of the club had observed *Jussiaea uruguayensis.*

Vouchers (*Monachino 427*) for the subject of the present discussion are deposited in the Gray Herbarium and the New York Botanical Garden.

New York Botanical Garden

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## CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY—NO. CLVII

M. L. Fernald

## I. KEY TO ANTENNARIA OF THE "MANUAL RANGE"

*(Continued from page 235)*

26. A. Farwellii Greene, Pittonia, iii. 347 (1898); Fernald in Rhodora, xxxviii. 230, t. 433, fig. 3 (1936). Very local, Bruce Pen., Ont., and Keweenaw Co., Mich. Staminate plant unknown. June, early July.

27. A. munda Fernald, l. c. 229, t. 433, figs. 1 and 2 (1936). *A. occidentalis* sensu Robinson & Fernald in Gray, Man. ed. 7, 821, fig. 879 (1908), not Greene. Centr. Me. to Thunder Bay Distr., Ont., s. to Mass., Ct., N. Y., e. Va. (local), W. Va., n. Ind., Wisc. and Minn. Staminate plant very rare. Mid-May–mid-June.

28. A. fallax Greene, Pittonia, iii. 321 (1898); Fernald in Rhodora, i. 74 (1899). *A. arnoglossa,* var. *ambigens* Greene, Pittonia, iii. 320 (1898). *A. Parlinii,* var. *ambigens* (Greene) Fernald in Proc. Bost. Soc. Nat. Hist. xxviii. 244 (1898). *A. ambigens* (Greene) Fernald in Rhodora, i. 150 (1899). *A. plantaginifolia,* var. *ambigens* (Greene) Cronquist, l. c. 183 (1945). Centr. Me. to s. Ont. and Minn., s. to Va., Tenn., Ark. and e. Tex. Staminate plants abundant southw. and westw., rare northeastw. April–July. Plates 945 and 946.

Var. calophylla (Greene) Fernald, l. c. xxxviii. 230 (1936). *A. calophylla* Greene, Pittonia, iii. 347 (1898). Ga. to Tex., n. to s. Md., Va., s. Mich., s. Ill. and Mo. Plates 947 and 948.

29. A. Parlinii Fernald in Gard. and For. x. 287 (1897), in Asa Gray Bull. v. 92, t. 2, figs. 1–5 (1897) and in Proc. Bost. Soc. Nat. Hist. xxviii. 243 (1898). Western N. B. and se. Me. to s. Ont., s. to Ga., O., Ind., Ill. and Ia. Staminate plants freq. southw. and westw., rare northeastw. April–early June. Plates 949 and 950.

Var. arnoglossa (Greene) Fernald in Proc. Bost. Soc. Nat. Hist. xxviii. 244 (1898); Rhodora, i. 151 (1899). *A. arnoglossa* Greene, Pittonia, iii. 318 (1898). *A. plantaginifolia*, var. *arnoglossa* (Greene) Cronquist, l. c. (1945). Similar range, s. to N. C., Tenn. and Mo. Late March–early June. Plate 951.

30. A. Brainerdii Fernald in Rhodora, i. 153 (1899). W-centr. Me. to Ont., s. to Ct., N. Y., mts. of Va., and n. Mich. Staminate plant unknown. Mid-May–mid-June. Plates 952 and 953.

31. A. plantaginifolia (L.) Hook. Fl. Bor.-Am. i. 330 (1834), as to basonym only; Greene, Pittonia, iii. 173 (1897). *Gnaphalium plantaginifolium* L. Sp. Pl. 850 (1753), typified by the Plukenet plant but excluding the Gronovian, which belongs to the next species. *G. plantagineum* L. Syst. ed. 12: 545 (1767), with same description, with phrases rearranged, as of his *G. plantaginifolium* (1753), therefore an illegitimate substitute. *G. dioicum*, β. *plantaginifolium* (L.) Michx. Fl. Bor.-Am. ii. 128 (1803) as to basonym and as to plant "corymbo", not as to plant "unifloro; flore manifeste majore". *A. plantaginea* (L.) R. Br. in Trans. Linn. Soc. xii. 123 (1818); Richardson in Append. Frankl. Narr. ed. 2: 758–repr. 30 (1823)—Richardson often erroneously given as author of the combination *A. plantaginifolia*, including later auth., for instance Fernald in Asa Gray Bull. v. 92, t. 2, fig. 6 (1897), the fig. showing the Plukenet type, and in Proc. Bost. Soc. Nat. Hist. xxviii. 242 (1898). *Disynanthus* Raf. in Am. Mo. Mag. ii. 268 (1818), undefined generic name based on the confused *Gnaphalium plantaginifolium* L. *Disynanthus plantagineus* (L.) Raf. ex Jackson in synonymy in Ind. Kew. fasc. ii. 782 (1893), this illegitimate combination based on an illegitimate (substitute) name united with a nonvalid (undefined) generic name for a wholly mixed basic specific concept (great work!). *A. decipiens* Greene, Pittonia, iii. 278 (1898). Sw. Me. to Minn., s. to Ga., Ala. and Mo. Staminate and pistillate plants abundant. April–June. Plates 954 and 955. Passing into

Var. petiolata (Fernald) Heller, Muhlenbergia, i. 5 (1900). *A. plantaginea*, var. *petiolata* Fernald in Proc. Bost. Soc. Nat. Hist. xxviii. 242 (1898). Sw. Me. to e. N. Y., s., locally, to Va. Plate 956.

32. A. SOLITARIA Rydb. in Bull. Torr. Bot. Cl. xxiv. 304 (1897). *Gnaphalium plantaginifolium* L. Sp. Pl. 850 (1753) as to description in part and including the Gronovian *Gnaphalium stolonibus reptatricibus longissimis, foliis ovatis, caule capitato* (our PLATE 957). *G. dioicum*, β. *plantaginifolium* (L.) Michx. Fl. Bor. Am. ii. 128 (1803) in part, the plant "caule breviore, unifloro; flore manifeste majore . . . in occidentalibus *Alleghanis* montibus". *A. plantaginifolia*, β. *monocephala* Torr. & Gray, Fl. ii. 431 (1843). *Gnaph. monocephalum* Carpenter ex Torr. & Gray, l. c. in synonymy (1843). *A. monocephala* (Torr. & Gray) Greene, Pittonia, iii. 176 (1897), not DC. (1837). Md. and w. Pa. to Ind., s. to Ga., Ala. and La. Staminate and pistillate plants about equally abundant. April, May. PLATES 957 and 958.

Although *Antennaria solitaria* was not at first specifically separated from the utterly different *A. plantaginifolia*, as typified by Plukenet's plant, it was well known to Clayton and Gronovius, as well as to Linnaeus. Those who are familiar with the plant could scarcely confuse it with anything else. Nevertheless, this was done until Michaux in 1803 commented on it as a variation but without formally separating it. Cronquist, in the most recent discussion of the genus (preceding the present one) concedes that the two species which were elements of the Linnean *Gnaphalium plantaginifolium* are really distinct species, *A. solitaria*, "the single-headed southern plant with certain [unstated] habital peculiarities". He admits just one more species in all our diversified area, *A. neglecta*, which, like *A. solitaria*, has flagelliform stolons. When, in forma *simplex*, *A. neglecta* puts its whole vigor into one exceptionally large head, as in Peck's original material (our PLATE 927) of what avail are the "certain habital peculiarities" without the technical morphological ones, especially when the rosette-leaves of *A. neglecta* are 1.5–6.5 cm. long and up to 1.3 cm. broad (PLATE 925), while those of *A. solitaria* are 2–8 cm. long and, in the smaller specimens, down to only 1.5 cm. broad (PLATE 958, FIG. 2)? The treatment of eastern North American *Antennaria* of two centuries ago was inadequate and confused. The latest student of the genus in our area, although not reuniting it with *Gnaphalium*, has otherwise got back essentially to the pre-Linnean stage. As Mary, Queen of Scots, is reputed to have said when her regal career was coming to its tragic conclusion, "In my end is my beginning".

I was once told, by one whose voluminous errors were too apparent, that I should not "knock" the assertive errors of men younger than myself; that I should expect them not to get many of their facts straight. When, however, a comparative beginner on our eastern flora urges me to see through the press his characterization, as "too dependent on temporary whim", of my species, which have been defined after intensive field- and herbarium-study over a period of a third of a century, it is surely not unreasonable to expect him to show evidence of at least an elementary understanding of the very numerous characters of our eastern species. It must be assumed, apparently, that his very off-hand reduction of one of the few plants which fully satisfies his theoretical requirement (abundance of both sexes) for a species, Stebbins's presumably ancestral *A. virginica* of the ancient Appalachian Upland, and the reduction of or complete ignoring of my 11 described species from Gaspé County, Quebec, westward and southward—it must be assumed that, if he fails to uphold such a theoretically ideal species as *A. virginica*, he would similarly wipe out of consideration the embarrassing scores of species known, locally, from Newfoundland to Greenland and across boreal America and defined by Ostenfeld, Ekman, the Porsilds, Malte, Polunin and, obviously, myself. It is well to be forewarned of their impending doom and to prepare to lie down and meekly to watch them degraded!

In view of the actual situation in *Antennaria* and that in *Hieracium*, Cronquist's warning that "The chaotic condition which has been brought about in some European genera that also show well-developed apomixis, such as *Hieracium*, should give pause to those who have so multiplied our species", is worth a moment's consideration. There seems here to be an assumption that the behavior of apomicts in *Antennaria* and *Hieracium* (perhaps also *Taraxacum*) is comparable. It is, but certainly not identical nor very similar. Those who have lived and explored all their lives in eastern North America are painfully aware of the dominating aggressiveness and rampageous destructiveness, beginning in the late '70's and expanding almost daily in the open season, of the small host of apomicts in *Hieracium* from the very modern flora of Europe, the various species known as King Devil, Devil's Paint-brush and other equally contemptuous names. They also know that, except for occasional crossing of *H. Gronovii* or *H. scabrum* with *H. venosum*, our native *Hieracia* are relatively well-behaved. Similarly the mass of inextricable apomicts known as *Taraxacum officinale* Weber [I was in error when I identified them with *T. palustre* (Sm.) Blytt] are among the most aggressive of all our weeds; but how many of our eastern botanists know the strictly indigenous and morphologically very definite species of our area: *T. phymatocarpum*, *T. ceratophorum*, *T. laurentianum*. *T. dumetorum* or *T. Longii?* Very few, because they are conservative and local species which have to be sought; they do not intrude upon us like the more familiar apomicts of the genus or of *Hieracium*. Now, in *Antennaria* our nonapomictic species, *A. virginica* (PLATE 937), *A. neglecta* (PLATES 924–926), *A. plantaginifolia* (PLATES 954–956) and *A. solitaria* (PLATES 957 and 958), for example, are abundant and as nearly dominating as any members of the genus with us; but, as compared with the apomictic *Pilosella* group of *Hieracium* or the heteromorphic apomicts of *Taraxacum officinale*, they are shy and retiring amateurs. And, whereas the endless apomicts in European *Hieracium* and in the European *Taraxacum officinale* bunch are unrestrainedly aggressive, the unisexual (apomictic) *Antennarias* are local and relatively rare and usually highly selective as to habitat: *A. columnaris*, a species with remarkable individuality and with corollas only 4 mm. long, the achenes 1.2 mm. long, known only on the barrens at the base of Pointe Riche in Newfoundland, there associated with the utterly different *A. Foggii*, unique in having the outer phyllaries agglutinated and thus forming a falsely gamophyllous cup, the corollas 5–5.5 mm. long and the achenes 1.7 mm. long; *A. vexillifera* (PLATE 913), discussed on p. 224, one of the tiniest of species, with 4–6 of the cauline leaves terminated by broad pennant-like scarious appendages 1.5–3 mm. long, known only from an alpine barren in Gaspé and similar barrens in Newfoundland; *A. subviscosa* (PLATES 916 and 917), discussed on p. 225, forming dense carpet-like mats (with crowded trailing branches up to 5 dm. long and heavily covered with marcescent leaves) on the calcareous north-facing cliffs near the lower St. Lawrence from Rimouski Co. to Gaspé Co., Quebec, the upper nodes of the stem and the inflorescence viscid, the cauline leaves with subulate or involute (instead of flat and pennant-like) tips, the viscid pale involucres often pink-tinged. Other chiefly pistillate but sometimes staminate species, like *A. canadensis* (PLATES 922 and 923), *A. petaloidea* (PLATES 940–944) and *A. munda*, occur over broader ranges; while species such as *A. Parlinii* (PLATES 949–951) and *A. fallax* (PLATES 945 and 946), abundantly bisexual southward or westward but wholly or chiefly pistillate northeastward, are as wide-spread as any. If there is a universal rule for apomicts, *Hieracium*, *Taraxacum* and *Antennaria* do not make it perfectly clear.

### Explanation of Plates 912–958

PLATE 912. ANTENNARIA EUCOSMA Fernald, all figs. from TYPE-series: FIGS. 1 and 2, a pistillate and a staminate plant, × 1; FIG. 3, pistillate involucre, × 6; FIG. 4, a single pistillate flower, × 10; FIG. 5, pistillate corollas, × 10; FIG. 6, achene, × 10.

PLATE 913. A. VEXILLIFERA Fernald: FIG. 1, pistillate plant, × 1, from TYPE-series; FIG. 2, basal rosette, × 5, from Boat Harbor, Straits of Belle Isle, Newfoundland, *Fernald, Wiegand & Long*, no. 29,172; FIG. 3, tip of cauline leaf, × 10, from Cook Point, Pistolet Bay, Newfoundland, *Fernald & Gilbert*, no. 29,171; FIG. 4, inflorescence, × 2, from no. 29,171; FIG. 5, involucre, × 6, from TYPE; FIGS. 6 and 7, pistillate corollas and achenes, × 10, from Eastern Point, St. John Bay, Newfoundland, *Fernald, Long & Fogg*, no. 2085.

PLATE 914. A. STRAMINEA Fernald: FIGS. 1 and 2, two plants, × 1, from TYPE-sheet; FIG. 3, portion of basal rosette, × 5, from TYPE; FIG. 4, tips of two cauline leaves, × 5, from St. John Island, St. John Bay, Newfoundland, *Fernald, Wiegand, Long, Gilbert & Hotchkiss*, no. 29,170; FIG. 5, inflorescence, × 2, from no. 29,170; FIG. 6, involucre, × 5, from TYPE; FIGS. 7 and 8, corolla and achenes, × 10, from no. 29,170.

PLATE 915. A. PEASEI Fernald, all figs. from TYPE: FIG. 1, pistillate plant, × 1; FIG. 2, basal rosette, × 5; FIG. 3, tip of cauline leaf, × 10; FIG. 4, inflorescence, × 2.

PLATES 916 and 917. A. SUBVISCOSA Fernald: PLATE 916, small portion of one large plant, × 3/5, trailing down a limestone wall, Bic, Quebec, *Fernald & Collins*, no. 1195, part of TYPE (note marcescent old flowering stems), after photo. by *J. F. Collins*. PLATE 917, FIGS. 1 and 2, two small plants, × 1, from TYPE-series; FIG. 3, basal leaves, × 5, from TYPE; FIG. 4, tip of cauline leaf, × 10, from TYPE; FIG. 5, mature inflorescence, × 2, from Gros Morne, Gaspé Co., Quebec, *Fernald & Weatherby*, no. 2475; FIG. 6, involucre, × 6, from TYPE; FIGS. 7 and 8, corollas, × 10, and achenes, × 10, from Cap Pleureuse, Gaspé Co., Quebec, *Fernald, Weatherby & Stebbins*, no. 2474.

PLATE 918. A. ALBICANS Fernald: FIG. 1, group of plants, × 1, from TYPE-sheet; FIG. 2, basal rosettes, × 5, from TYPE; FIG. 3, tip of cauline leaf, × 10, from Eastern Point, St. John Bay, Newfoundland, *Fernald, Long & Fogg*, no. 2083; FIG. 4, inflorescence, × 2, from no. 2083; FIG. 5, pistillate flower, × 10, from TYPE; FIG. 6, achenes, × 10, from TYPE.

PLATE 919. A. WIEGANDII Fernald: FIG. 1, plant and basal rosette, × 1, from TYPE-sheet; FIG. 2, basal rosette, × 5, from Eastern Point, St. John Bay, Newfoundland, *Fernald, Long & Fogg*, no. 2098; FIG. 3, inflorescence, × 2, from TYPE; FIG. 4, achenes, × 10, from TYPE.

PLATE 920. A. SPATHULATA Fernald: FIG. 1, two plants, × 1, from Table Mountain, Port-au-Port Bay, Newfoundland, *Fernald & St. John*, no. 10,870; FIG. 2, base, to show repent habit, × 1, from Pointe Riche, Newfoundland, *Fernald, Long & Fogg*, no. 2109; FIG. 3, portion of rosette-leaf, × 5, from no.

10,870; FIG. 4, inflorescence, × 2, from Pointe Riche, *Fernald & Wiegand*, no. 4143; FIG. 5, portion of involucre, × 5, from no. 10,870; FIG. 6, corollas, × 10, from St. John Island, St. John Bay, Newfoundland, *Fernald, Wiegand, Long, Gilbert & Hotchkiss*, no. 29,183; FIG. 7, achenes, × 10, from no. 29,183.

PLATE 921. A. APPENDICULATA Fernald, all figs. from TYPE: FIGS. 1 and 2, portions of plant, × 1; FIG. 3, upper half of rosette-leaf, × 5; FIG. 4, tip of cauline leaf, × 10; FIG. 5, corymb, × 2; FIG. 6, achenes, × 10.

PLATES 922 and 923. A. CANADENSIS Greene: PLATE 922, FIGS. 1 and 2, pistillate plant, × 1, from Franconia, New Hampshire, June 13, 1897, *Edwin Faxon;* FIG. 3, tip of cauline leaf, × 10, from same collection; FIG. 4, achenes, × 10, from St. Ours, Co. de Richelieu, Quebec, *Rolland-Germain*, no. 43,516. PLATE 923, FIG. 1, staminate plant, × 1, from Ile Perrot, Quebec, *Victorin*, no. 28,256; FIG. 2, basal leaves, × 5, from Manchester, Vermont, June 30, 1898, *Mary A. Day;* FIG. 3, corymb, × 2, from Masardis, Maine, *Fernald*, no. 2363.

PLATES 924–926. A. NEGLECTA Greene: PLATE 924, FIGS. 1 and 2, pistillate ISOTYPE, × 1; FIG. 3, tip of cauline leaf from ISOTYPE; FIG. 4, pistillate inflorescence, × 2, from Menands, Albany Co., New York, May 24, 1916, *House;* FIG. 5, pistillate inflorescence, × 2, from Brookland, D. C., May 2, 1900, *Holm.* PLATE 925, FIGS. 1 and 2, broad-leaved plant, × 1, from Ardsley, Montgomery Co., Pennsylvania, May 17, 1909, *B. Long;* FIG. 3, pistillate inflorescence, × 2, from southeast of Ligonier, Noble Co., Indiana, *Deam*, no. 27,459; FIG. 4, achenes, × 10, from Upland, Grant Co., Indiana, *Deam*, no. 15,779. PLATE 926, FIG. 1, staminate ISOTYPE; FIG. 2, tip of cauline leaf, × 10, from staminate ISOTYPE; FIG. 3, pistillate inflorescence, × 2, from Vaughan, New York, June 1, 1916, *Burnham;* FIG. 4, pistillate corolla, × 10, from no. 15,779.

PLATE 927. A. NEGLECTA, forma SIMPLEX (Peck) Fernald: ISOTYPE, × 1.

PLATE 928. A. CAMPESTRIS Rydb.: FIG. 1, pistillate plant, × 1, from Custer, South Dakota, *Rydberg*, no. 794 (PARATYPE-collection); FIG. 2, staminate plant, × 1, Deadwood, South Dakota, *E. J. Palmer*, no. 37,137; FIG. 3, tip of cauline leaf, × 10, from Charlot Pt., Lake Athabaska, Saskatchewan, *Raup*, no. 6079; FIG. 4, corymb, × 2, from no. 6079; FIG. 5, achenes, × 10, from Charlot Pt., *Raup*, no. 5283.

PLATES 929 and 930. A. RUPICOLA Fernald: PLATE 929, FIG. 1, base of one of TYPE-specimens, × 1; FIG. 2, rosette-leaves, × 5, from TYPE; FIG. 3, tip of cauline leaf, × 10, from TYPE. PLATE 930, FIG. 1, flowering summit of same plant as in plate 929, fig. 1; FIG. 2, corymb, × 2, from TYPE; FIG. 3, receptacle, × 10, from Grand Falls, Newfoundland, *Fernald, Wiegand, Bartram & Darlington*, no. 6344; FIG. 4, achenes, × 10, from same station and same collectors, no. 6343.

PLATES 931 and 932. A. NEODIOICA Greene, var. TYPICA Fernald: PLATE 931, FIGS. 1, 2 and 3, portions of ISOTYPE, × 1; FIG. 4, tip of rosette-leaf, × 5, from northeast of Wenksville, Adams Co., Pennsylvania, *L. F. A. Tanger*, no. 4383; FIG. 5, tip of cauline leaf, × 10, from ISOTYPE; FIG. 6, corymb, × 2, from Mickleton, Gloucester Co., New Jersey, *B. Long*, no. 20,454; FIG. 7, portion of involucre, × 5, from ISOTYPE. PLATE 932, FIGS. 1, 2 and 3, portions of staminate plants, × 1, from Frazer, Chester Co., Pennsylvania, May 7, 1910, *Bartram;* FIG. 4, pistillate corolla, × 10, from ISOTYPE; FIG. 5, achenes, × 10, from ISOTYPE.

PLATE 933. A. NEODIOICA, var. ATTENUATA Fernald: FIGS. 1 and 2, portions of TYPE, × 1; FIG. 3, tip of cauline leaf, × 10, from Orono, Maine, *Fernald*, no. 2356 (PARATYPE); FIG. 4, inflorescence, × 2, from no. 2356; FIG. 5, portion of involucre, × 5, from Sangerville, Maine, July 7, 1897, *Fernald* (PARATYPE).

PLATE 934. A. NEODIOICA, var. INTERJECTA Fernald, all figs. from TYPE: FIG. 1, small plant and base and inflorescence of others, × 1; FIG. 2, tips of rosette-leaves, × 5; FIG. 3, tip of cauline leaf, × 10; FIG. 4, corymb, × 2; FIG. 5, corollas, × 10; FIG. 6, achenes, × 10.

PLATE 935. A. NEODIOICA, var. CHLOROPHYLLA Fernald, all figs. from TYPE: FIGS. 1 and 2, portions of plant, × 1; FIG. 3, tip of rosette-leaf, × 5; FIG. 4, involucre, × 5; FIG. 5, corolla, × 10.

PLATE 936. A. NEODIOICA, var. GRANDIS Fernald: FIGS. 1 and 2, portions of a plant, × 1, from South Ashburnham, Massachusetts, May 30, 1904, *F. F. Forbes;* FIG. 3, two mature corymbs, × 1, from Somesville, Maine, July 1, 1897, *E. L. Rand;* FIG. 4, corollas, and FIG. 5, achenes, from last collection.

PLATE 937, FIGS. 1–10. A. VIRGINICA Stebbins: FIGS. 1 and 2, pistillate, and 3 and 4, staminate plants (TYPE) × 1; FIG. 5, rosette-leaf, × 5, from TYPE; FIG. 6, tip of cauline leaf, × 10, from East Furnace, Shenandoah Co., Virginia, *Lena Artz*, no. 4; FIG. 7, involucre, × 5, from Hanging Rock, Hampshire Co., West Virginia, *W. M. Frye*, no. 4 (PARATYPE); FIG. 8, receptacle, × 10, from last no.; FIG. 9, pistillate corollas, × 10, from no. 4; FIG. 10, achenes, × 10, from no. 4.

PLATE 937, FIGS. 11 and 12. A. VIRGINICA, var. ARGILLICOLA Stebbins: FIG. 1, base of TYPE, × 1; FIG. 2, tip of cauline leaf, × 10, from TYPE.

PLATES 938 and 939. A. APRICA Greene: PLATE 938, FIG. 1, pistillate plant and corymbs, × 1, from near Deadwood, South Dakota, *E. J. Palmer*, no. 37,116; FIG. 2, pistillate corymb, × 2, from Perham, Ottertail Co., Minnesota, May 31, 1912, *Z. L. Chandonnet;* FIG. 3, pistillate flower and corolla, × 10, from Mouth of Qu'Appelle River, Manitoba, *Wm. Herriot*, Geol. Surv. Can., no. 72,845; FIG. 4, achenes, × 10, from no. 72,845. PLATE 939, FIG. 1, staminate plant, × 1, from Valentine, Nebraska, June 30, 1891, *J. M. Bates;* FIG. 2, basal rosette, × 5, from same specimen; FIG. 3, upper half of cauline leaf, × 10, from Perham, Minnesota, *Chandonn t;* FIG. 4, pistillate involucre, × 5, from *Herriot*, no. 72,845.

PLATES 940 and 941. A. PETALOIDEA Fernald (typical): PLATE 940, FIGS. 1, 2 and 3, portions of TYPE, × 1; FIG. 4, base of plant, to show repent habit, × 1, from Foxcroft, Maine, *Fernald*, no. 2390; FIG. 5, tip of cauline leaf, × 10, from TYPE; FIG. 6, half of corymb, × 2, from TYPE. PLATE 941, FIG. 1, staminate plant, × 1, from Harwich, Massachusetts, *Fernald*, no. 19,243; FIG. 2, tips of basal rosette, × 5, from Milo, Maine, Sept. 2, 1897, *Fernald;* FIG. 3, pistillate involucre, × 5, from TYPE; FIG. 4, pistillate corolla, × 10, from TYPE.

PLATE 942. A. PETALOIDEA, var. SCARIOSA Fernald: FIGS. 1 and 2, portions of TYPE, × 1; FIG. 3, corymb, × 2, from a TYPE-specimen; FIG. 4, exceptionally lax corymb, × 2, from TYPE-series; FIG. 5, involucre, × 5, from TYPE.

PLATES 943 and 944. A. PETALOIDEA, var. SUBCORYMBOSA Fernald: PLATE 943, FIGS. 1 and 2, portions of TYPE-series, × 1; FIG. 3, tip of cauline leaf, × 10, from TYPE; FIG. 4, involucre, × 5, from TYPE; FIG. 5, pistillate corollas, × 10, from near Charlottetown, Prince Edward Island, *Fernald & St. John*, no. 11,205; FIG. 6, achenes, × 10, from no. 11,205. PLATE 944, FIG. 1, portions of two large inflorescences, FIG. 2, summit of inflorescence at right, × 1, from Cemetery, Jordan Pond Road, Mt. Desert Island, Maine, June 4, 1901, *E. L. Rand.*

PLATES 945 and 946. A. FALLAX Greene: PLATE 945, pistillate plant: FIGS. 1 and 2, base and summit of flowering plant, × 1, from Chestnut Hill, Pennsylvania, May 3, 1889, *Heller;* FIG. 3, corymb, × 1⅞, from same collection; FIG. 4, achenes, × 10, from Ferrisburg, Vermont, *Eggleston*, no. 2645. PLATE 946, FIG. 1, staminate plant, × 1, from Agricultural College, Michigan, May 6, 1898, *C. F. Wheeler;* FIG. 2, involucre of pistillate head, × 6, from Chevy Chase Lake, Maryland, *Maxon & Standley*, no. 291; FIG. 3, pistillate corollas, × 10, from *Eggleston*, no. 2645.

PLATES 947 and 948. A. FALLAX, var. CALOPHYLLA (Greene) Fernald: PLATE 947: pistillate plant: FIGS. 1 and 2, portions of base and summit, × 1, of plant from Cape Girardeau, Missouri, *E. J. Palmer*, no. 39,081; FIG. 3, portion of involucre, × 6, from same no. PLATE 948, FIG. 1, staminate plant, × 1, an ISOTYPE from Cobden, Illinois, June 15, 1898, *E. L. Greene;* FIG. 2, pistillate inflorescence, × 1¾, from *E. J. Palmer*, no. 39,081.

PLATES 949 and 950. A. PARLINII Fernald: PLATE 949, pistillate plant: FIGS. 1 and 2, base and summit, × 1, of one of TYPE-specimens; FIG. 3, summit of flowering stem, to show dark glands, × 10, from Foxcroft, Maine, *Fernald*, no. 2340; FIG. 4, corymb, × 3, from TYPE; FIG. 5, achenes, × 10, from TOPO-

TYPE, June 5, 1897, *Parlin*. PLATE 950, FIGS. 1 and 2, staminate plant, × 1, from TYPE-locality, May 28, 1899, *Parlin;* FIG. 3, portion of pistillate involucre, × 6, from TOPOTYPE; FIG. 4, pistillate corollas, × 10, from TOPOTYPE.

PLATE 951. A. PARLINII, var. ARNOGLOSSA (Greene) Fernald: FIGS. 1 and 2, portion of base and summit, × 1, of ISOTYPE; FIG. 3, involucre, × 6, from ISOTYPE.

PLATES 952 and 953. A. BRAINERDII Fernald: PLATE 952, from ISOTYPE, Barber's Meadow, Addison, Vermont, May 27, 1899: FIGS. 1 and 2, base and summit of plant, × 1; FIG. 3, summit of stem, to show dark glands, × 10; FIG. 4, an inflorescence, × 6; FIG. 5, achenes, × 10. PLATE 953, FIG. 1, portion of base, showing unusually large leaves, × 1, from Mt. Battie, Camden, Maine, July, 1902, *G. G. Kennedy;* FIG. 2, loose pubescence of upper surface of rosette-leaf, × 10, from same specimen; FIG. 3, involucre, × 6, from TYPE; FIG. 4, corollas, × 10, from TYPE.

PLATES 954 and 955. A. PLANTAGINIFOLIA (L.) Hooker: PLATE 954, pistillate plant: FIGS. 1 and 2, base and summit of plant from type-region, × 1, west of Williamsburg, Virginia, *Grimes*, no. 2543; FIG. 3, involucre, × 6, from no. 2543; FIG. 4, corollas, × 10, from no. 2543. PLATE 955, FIG. 1, staminate plant from type-region, × 1, from west of Lake Matoka, James City Co., Virginia, *J. T. Baldwin*, no. 204; FIG. 2, inflorescence, × 6, from *Grimes*, no. 2543; FIG. 3, achenes, × 10, from no. 2543.

PLATE 956. A. PLANTAGINIFOLIA, var. PETIOLATA (Fernald) Heller, all figs. from TYPE-series: FIGS. 1 and 2, small fruiting plant, × 1; FIG. 3, staminate plant, × 1.

PLATES 957 and 958. A. SOLITARIA Rydberg: PLATE 957, FIG. 1, tracing, × 1, of the Gronovian element, of *Gnaphalium plantaginifolium* L., "Gnaphalium stolonibus reptatricibus longissimis, foliis ovatis, caule capitatis. *Gron. virg. 95"*, after *B. L. Robinson;* FIG. 2, one of the TYPE-specimens (pistillate), × 1, of *A. plantaginifolia, β. monocephala* Torrey & Gray (basis of *A. solitaria*), coll. Louisiana, *Carpenter*. PLATE 958, FIG. 1, average plant (staminate), × 1, from Williamsburg, Virginia, *Fernald, Long & Abbe*, no. 14,241; FIG. 2, very small plant (staminate) × 1, from Chapel Hill, North Carolina, *Pease*, no. 26,998; FIG. 3, achenes, × 10, from north of Medora, Jackson Co., Indiana, *Deam*, no. 24,771.

## II. TRANSFERS IN AND ANIMADVERSIONS ON ARTEMISIA

ARTEMISIA GLAUCA Pall., var. **dracunculina** (S. Wats.), comb. nov. *A. dracunculina* S. Wats. in Proc. Am. Acad. xxiii. 279 (1888). *A. Dracunculus* L., subsp. *dracunculina* (S. Wats.) Hall & Clements, Phylogen. Meth. in Taxon. 116 (1923). *A. dracunculoides* Pursh, var. *dracunculina* (S. Wats.) Blake in Journ. Wash. Acad. Sci. xxx. 472 (1940).

I get no satisfaction in trying to separate *Artemisia dracunculoides* Pursh (1814) from *A. glauca* Pallas (1804). At best they seem to be confluent forms of one species, the degree of pubescence or glabrousness and of glaucescence or greenness being most difficult to distinguish. Var. *dracunculina* is more tangible, with its loose inflorescence and nodding or pendulous long-pedicelled heads. In the type the filiform pedicels are 4–8 mm. long (Watson said "2 to 4 lines"), in *Hartman* no. 778, also from

Chihuahua, up to 9 mm., and extreme specimens, such as *J. H. Oyster*, no. 2 from Kansas, and *Bush*, no. 4121 from Greenwood, Missouri (distrib. as *A. mexicana* Willd.), have them (or the filiform minutely bracteate monocephalous branchlets) prolonged to 2–3.5 cm.!

Some botanists, overlooking the fact that the name *Artemisia glauca* Pall. (1804) antedates *A. dracunculoides* Pursh (1814), are using the combination *A. dracunculoides*, var. *glauca* (Pall.) Munz, Man. So. Cal. Bot. 575 and 601 (1935).

A. ludoviciana Nutt., var. **cuneata** (Rydb.), stat. nov. *A. cuneata* Rydb. in N. Am. Fl. xxiv³. 269 (1916).

A. ludoviciana Nutt., var. **Brittonii** (Rydb.), stat. nov. *A. Brittonii* Rydb. in Bull. Torr. Bot. Cl. xxxii. 129 (1905).

A. ludoviciana Nutt., var. **pabularis** (Nelson), comb. nov. *A. rhizomata* Nelson, var. *pabularis* Nelson in Bull. Torr. Bot. Cl. xxvii. 34 (1900). *A. pabularis* (Nelson) Rydb. in Bull. Torr. Bot. Cl. xxxiii. 137 (1906).

A. ludoviciana Nutt., var. **americana** (Bess.), comb. nov. *A. vulgaris* L., var. *americana* Besser in Linnaea, xv. 105 (1841) in part.

A. ludoviciana Nutt., var. **mexicana** (Willd.), comb. nov. *A. mexicana* Willd. ex Spreng. Syst. iii. 490 (1828). *A. indica* Willd., var. *mexicana* (Willd.) Besser in Nouv. Mém. Soc. Nat. Mosc. iii. 56 (1834). *A. vulgaris* L., var. *mexicana* (Willd.) T. & G. Fl. N. Am. ii. 421 (1843). *A. vulgaris*, subsp. *mexicana* (Willd.) Hall & Clements, Phylogen. Meth. Tax. 80 (1923) in part.

I get no intellectual satisfaction from the treatment of *Artemisia* by Hall & Clements. Although published under the sophisticated title "The Phylogenetic Method in Taxonomy", this treatment, it seems to me, does serious injury to sound taxonomy and its natural ally, sound phylogeny. My chief objection is, that fundamental characters in growth-habit, such as one would expect to be given real weight, were ignored or, apparently not recognized. Under the single blanket-name, *A. vulgaris*, Hall & Clements amassed plants of most diverse habit: species with rounded and deeply dissected leaves with stipule-like appendages at the base, others with comparable leaves but no appendages; species with strictly entire long-attenuate leaves, others with them variously dissected; species with heavy ligneous and non-stoloniferous crowns, others with herbaceous slender rhizomes and prolonged lash-like stolons; plants with densely tufted habit,


*Photo. B. G. Schubert.*

ANTENNARIA FALLAX: FIGS. 1 and 2, base and summit of pistillate plant, × 1; FIG. 3, corymb, × 2; FIG. 4, achenes, × 10.

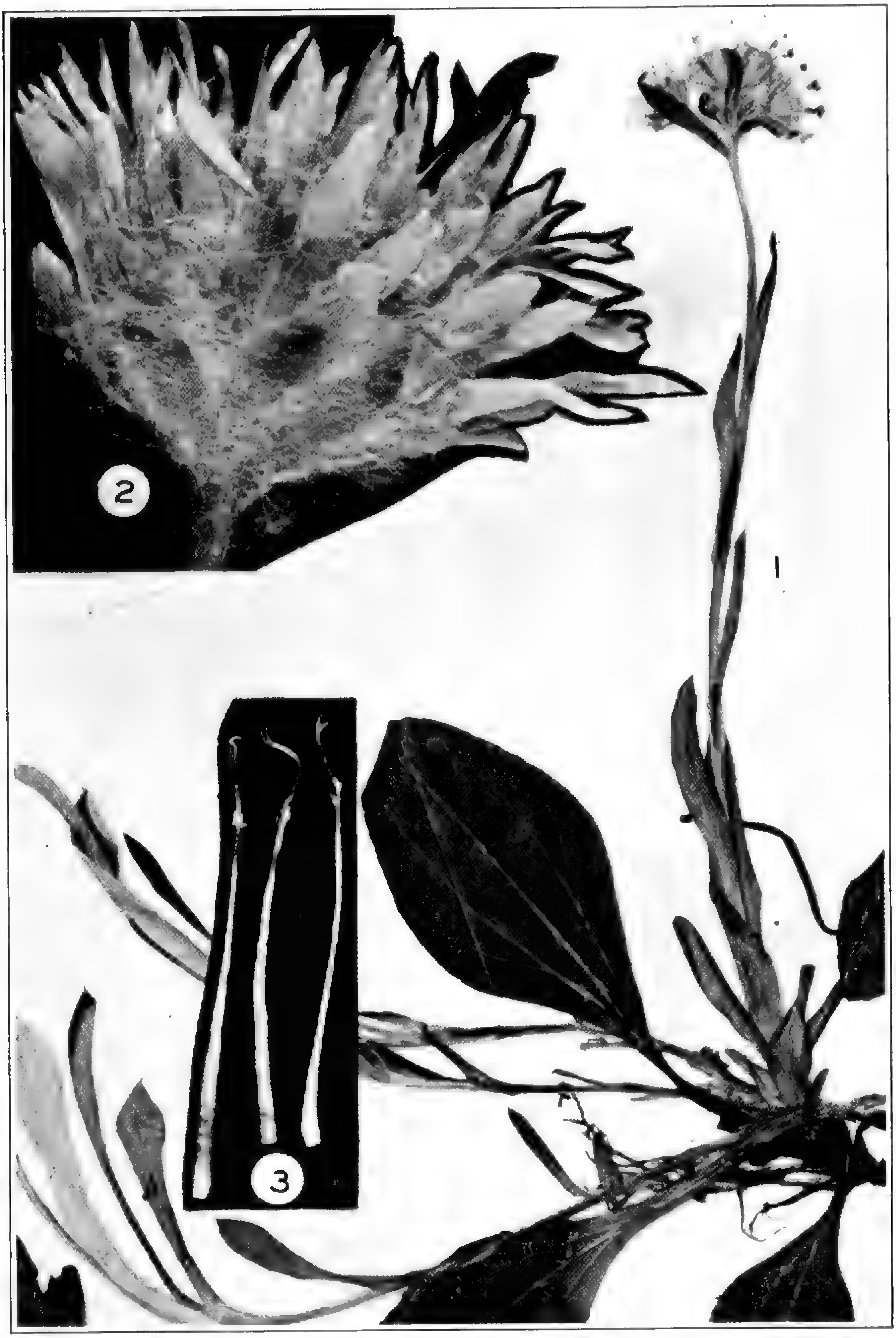


*Photo. B. G. Schubert.*

Antennaria fallax: fig. 1, staminate plant, × 1; fig. 2, pistillate involucre, × 5; fig. 3, pistillate corollas, × 10.


*Photo. B. G. Schubert.*

ANTENNARIA FALLAX, var. CALOPHYLLA: FIGS. 1 and 2, portions of base and summit of pistillate plant, × 1; FIG. 3, half of involucre, × 5.


*Photo. B. G. Schubert.*

ANTENNARIA FALLAX, var. CALOPHYLLA: FIG. 1, staminate plant, × 1; FIG. 2, pistillate corymb, × 2.


*Photo. B. G. Schubert.*

ANTENNARIA PARLINII: FIGS. 1 and 2, base and summit of plant, × 1; FIG. 3, summit of flowering stem, showing glands, × 10; FIG. 4, corymb, × 2; FIG. 5, achenes, × 10.


*Photo. B. G. Schubert.*

Antennaria Parlinii: figs. 1 and 2, base and summit of staminate plant, × 1; fig. 3, half a pistillate involucre, × 5; fig. 4, pistillate corollas, × 10.


*Photo. B. G. Schubert.*

ANTENNARIA PARLINII, var. ARNOGLOSSA: FIGS. 1 and 2, portions of base and summit of plant, × 1; FIG. 3, involucre, × 5.


*Photo. B. G. Schubert.*

Antennaria Brainerdii: figs. 1 and 2, base and summit of plant, × 1; fig. 3, summit of stem, showing glands, × 10; fig. 4, corymb, × 2; fig. 5, achenes, × 10.

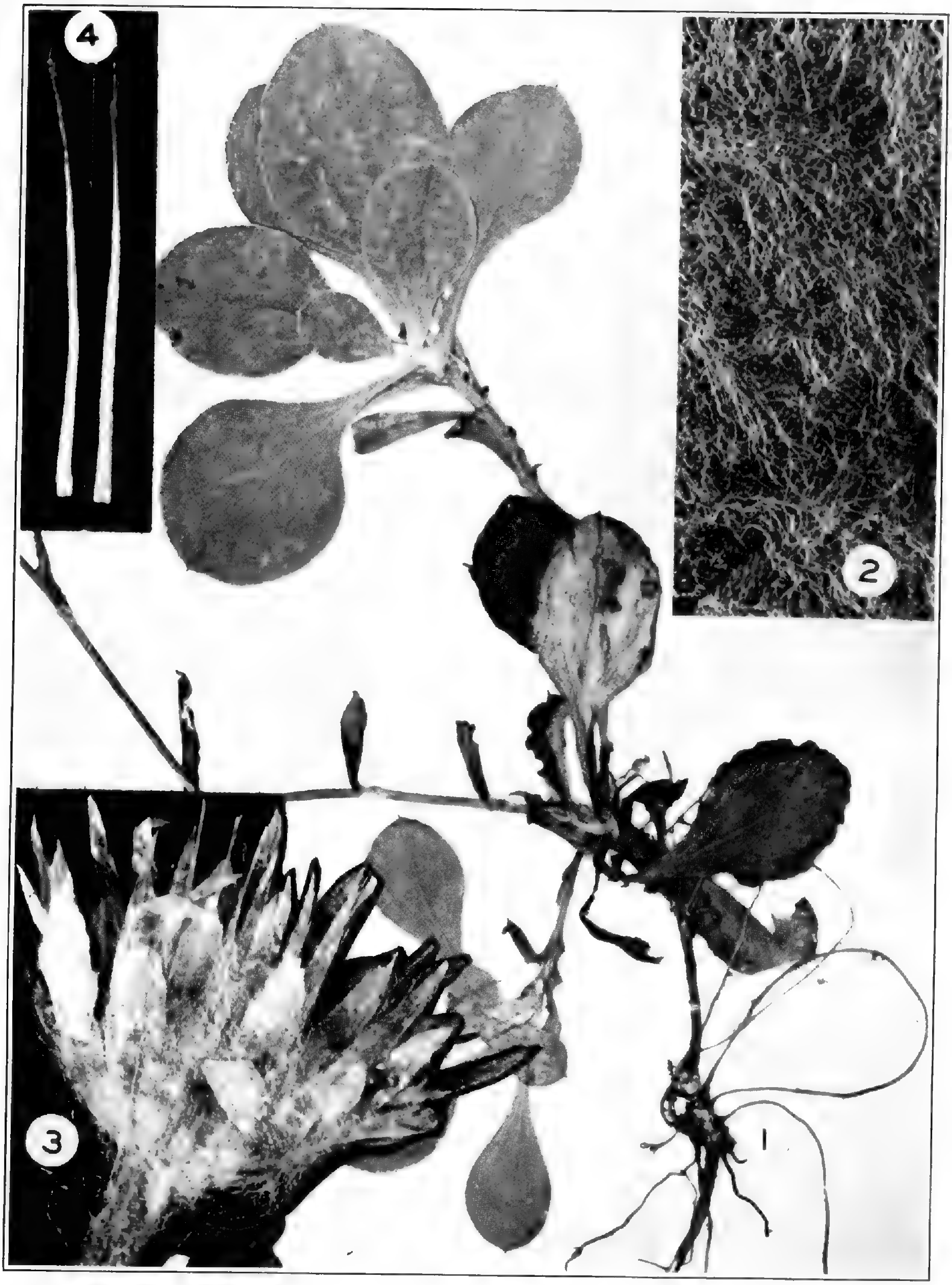


*Photo. B. G. Schubert.*

ANTENNARIA BRAINERDII: FIG. 1, base of large-leaved extreme, × 1; FIG. 2, upper surface of rosette-leaf, showing long tomentum, × 10; FIG. 3, involucre, × 5; FIG. 4, corollas, × 10.


*Photo. B. G. Schubert.*

ANTENNARIA PLANTAGINIFOLIA: FIGS. 1 and 2, base and summit of pistillate plant, × 1; FIG. 3, involucre, × 5; FIG. 4, corollas, × 10.


*Photo. B. G. Schubert.*

ANTENNARIA PLANTAGINIFOLIA: FIG. 1, staminate plant, $\times$ 1; FIG. 2, pistillate corymb, $\times$ 2; FIG. 3, achenes, $\times$ 10.


*Photo. B. G. Schubert.*

Antennaria plantaginifolia, var. petiolata: figs. 1 and 2, small fruiting plant, $\times$ 1; fig. 3, staminate plant, $\times$ 1.


*Photo. B. G. Schubert.*

Antennaria solitaria: fig. 1, tracing by *B. L. Robinson* of the Gronovian plant included by Linnaeus in his *Gnaphalium plantaginifolium;* fig. 2, one of type-specimens, × 1.


*Photo. B. G. Schubert.*

Antennaria solitaria: fig. 1, average staminate plant, × 1; fig. 2, small staminate plant, × 1; fig. 3, achenes, × 10.


*Photo. B. G. Schubert.*

Senecio congestus: fig. 1, isotype, × 1; fig. 2, summit of pedicel and base of involucre, × 10.
Var. palustris: fig. 3, inflorescence, × 1; fig 4, summit of pedicel and base of involucre, × 10.


*Photo. B. G. Schubert.*

Senecio congestus, var. tonsus: fig. 1, inflorescence of type, × 1; fig. 2, summit of pedicel and base of involucre, × 10.

forming cespitose clumps, others with the stems scattered and arising from the tips of elongate stolons, thus forming loose colonies. It is as if one united as a single species all the members of *Solidago* with the panicle made up of secund branches: calling *S. sempervirens* the maritime fleshy-leaved and, because of its habitat, the large-headed phase; *S. uniligulata* (*neglecta*) a thinner-leaved and, because of its occurrence in eastern acid peat, a smaller-headed phase; *S. missouriensis* a phase developed on the western prairies and, on account of its crowded habitat, sending up only one flowering stem at a time and spreading by prolonged subterranean stolons; and so on through many species. That would be easy and hopelessly superficial; it would be neither sound taxonomy nor phylogeny nor sensible ecology. That Hall, whose work up to the *Artemisia*-period had been sound and free from vagaries and who understood the taxonomic significance of growth-forms when associated with other characters, should suddenly have coöperated in such a confused and unclarifying piece of work is at least amazing.

In attempting to get some workable mean between this treatment and the extreme splitting of Rydberg and to put the many pigeon-holes of undigested material in the Gray Herbarium into such order that it could be readily available I have been handicapped by lack of field-experience with most of the species; but in this case I have temporarily adopted the sophistry of a student of one technical field who, venturing into another with which he was not too familiar, wrote: "It is conceivable that one who is, in a way, an amateur may be more likely to appreciate the more salient features . . . than the specialist".[1] At least the growth-habit, as shown by the few well collected specimens in the collections before[2] me, is highly suggestive of real specific differentiation.

A. VULGARIS L., the Eurasian species much naturalized in the northeastern States, Canada and Newfoundland, forms vase-like clumps arising from a thick but scarcely ligneous forking rhizome, only tardily sending out short stolons. It is tall, with glabrescent stems up to 2 m. high, and its large roundish-ovate to -obovate

[1] Campbell, Douglas Houghton, Outline of Plant Geography, v (1926).

[2] Ninety per cent of so-called specimens in this group are not specimens at all; they are lazily plucked bits, their collectors taking no pains to get the subterranean parts or to show the habit or the lower leaves. That would require work and acuteness.

leaves are green and glabrous or promptly glabrate above, deeply cleft, and bearing at the base of the petiole 4 to 8 obvious leaflet- or stipule-like appendages. It occurs with us as three varieties. Typical *A. vulgaris* has the leaves cleft to midrib into lacerate or cut-toothed lance-acuminate divisions, this plant found from Newfoundland to Ontario, south to Nova Scotia, New England, New Jersey, Pennsylvania, casually to Georgia, Michigan and Wisconsin. Var. *glabra* Ledeb. is similar but with the narrowly lance-acuminate divisions of the primary leaves entire. It is local, from northwestern New England to Ontario, south to Connecticut, Ohio, Michigan and Kansas. Var. *latiloba* Ledeb. has thinner leaves, the principal ones less deeply cleft, the broadly obovate or rhombic terminal divisions and the oblanceolate to oblong lower ones and their few teeth blunt or merely acutish, the panicle but slightly developed. It is local in Quebec and New England. Only one other species of the few in the "Manual range" merged by Hall & Clements with the Old World *A. vulgaris* has stipule-like appendages. This is

A. Serrata Nutt., indigenous on bottoms, on prairies or in rich thickets from Wisconsin to North Dakota, south to Illinois, Missouri and Kansas. Hall & Clements treat it as a subspecies of *A. vulgaris*, but its uncleft lance-attenuate sharply fine-serrate primary leaves are only 1–3 cm. broad, their basal appendages small and lance-subulate. I have not seen a base but it is evidently near the next species in which the base has been well collected.

A. Herriotii Rydb., found on plains, dry ridges and gravelly shores from Minnesota to northern Alberta and South Dakota. Rhizome stout, woody, without evident stolons; leaves linear-attenuate, without basal appendages, entire or with few falcate lobes, the larger ones 1–2 dm. long (twice or thrice length of leaves of *A. vulgaris*) and only 0.5–1.5 cm. wide (many times narrower than in *A. vulgaris*). Hall & Clements get rid of this characteristic species of the northern Plains (east of the Rocky Mts.) by pushing it into the "the *douglasiana* form" of their *A. vulgaris*, subsp. *heterophylla*, i. e. *A. Douglasiana* Besser, a big species of the Pacific slope, from southern British Columbia to Lower California, with the rhizome or its branches long and creeping, suggesting thick rope, the "principal leaves oblanceolate or broadly elliptic in outline, somewhat spatulate, . . . 1.5–

5 or 10 cm. wide . . . all . . . tomentulose . . . above" (H. & C.). Naturally, to those who place *A. serrata* and *A. Douglasiana* in the Old World *A. vulgaris*, the Great Plain species, *A. Herriotii*, with strong woody base, narrowly long-attenuate leaves glabrous above, and elongate (instead of campanulate) involucre 4–5 (instead of 3–4) mm. long, could make no appeal. But it looks like a real species and its base is similar to that of

A. LONGIFOLIA Nutt., occurring on dry plains or in alkaline situations from western Ontario and Michigan to the Rocky Mts., a plant with hard woody bases (without stolons) branching into crowns up to 2 cm. thick, the many stems clustered, the very narrow linear-attenuate entire leaves gray-puberulent above, with revolute margins, the principal ones 3–10 cm. long and mostly 2–5 mm. broad, etc.

When we come to *Artemisia ludoviciana* Nutt. the situation seems to be different. This is an aggressive and "weedy" species "varying all over the lot", all over the lot because it is loosely stoloniferous, the long and lash-like stolons enabling it to form loose colonies with more or less circular outline. It is this highly inconstant series which has spread eastward along railroads, roadsides and in litter to Quebec, the Maritime Provinces and the Atlantic States. The growth-habit of its base is very definite; its foliage, whether entire, falcately cleft or merely toothed, hopelessly indefinite. Yet Hall & Clements toss them all into their all-inclusive *A. vulgaris*, not as one subspecies but as three: two of them, their *A. vulgaris*, subspp. *ludoviciana* and *gnaphalodes*, which differ only in that the former has the wool of the upper leaf-surface less permanent than in the latter, each being considered by them as equivalent in value (as subspecies) to true nonstoloniferous Eurasian *A. vulgaris*, the big *A. Douglasiana* of the Pacific Slope, the woody-based and nonstoloniferous more eastern campestrian *A. longifolia*, the campestrian *A. serrata*, and others quite as definite. The attempt, however, in view of the very real character of the rhizome and stolons, to keep *A. gnaphalodes* more than weakly varietally apart from typical *A. ludoviciana* has thus far proved hopeless. In fact, these two are really somewhat intermediate variations in a series which includes plants with upper leaf-surfaces lanate or others, with distinctive ranges, with them bright green and glabrous from the first. In the limited area of Gray's Manual I am recognizing the following, all as varieties of *A. ludoviciana* which stands apart from *A. serrata*, *Herriotii* and *longifolia* in its loosely colonial habit, the slender cord-like rhizome freely stoloniferous, the stolons slender and elongate, the primary leaves either entire or variously lobed or cleft. Since the abundance as weeds in the East varies, I shall be glad of information regarding additional areas invaded by them.

*a.* Young leaves tomentose or lanate on upper as well as lower surface....*b.*
*b.* Pubescence of upper surfaces of primary and often rameal leaves loosening and rather deciduous, the older leaves becoming glabrate and bright green above; leaves entire or some of the lower and median ones with falcate-lobed margins.................................*A. ludoviciana* (typical).
*b.* Pubescence of upper as well as lower surfaces persistent, the upper surface remaining whitish or gray....*c.*
*c.* Principal leaves lance-linear, lanceolate, oblong or oblanceolate, entire or with marginal falcate teeth or divisions, the blades soft and pliable, heavily tomentose, many times longer than broad....*d.*
*d.* Leaves flat, mostly straight, ascending or spreading.
Blades lanceolate, acute or attenuate, longer ones 5–10 cm. long, ascending; stem usually simple below or to summit, without or more often with short suppressed axillary branches..........Var. *gnaphalodes.*
Blades oblong, oblong-elliptic or oblong-oblanceolate, blunt or merely acutish, 2.5–7 cm. long, loosely ascending or spreading; stems frequently with loosely spreading or divergent elongate branches....................................Var. *latifolia.*
*d.* Leaves mostly plicate, widely spreading or recurving, often twisted, the longer ones 2.5–5 cm. long; stem or its erect basal branches with suppressed axillary branchlets....................................Var. *pabularis.*
*c.* Principal leaves broadly oblong, with few coarse teeth around the summit, firm and thick, rather hard, only two to four times as long as broad; axillary branches short and suppressed..........................Var. *Brittonii.*
*a.* Young leaves glabrous (or only obscurely puberulent) and bright green above from the first, blades linear to lanceolate, entire or with long falcate lobes, they and the lobes attenuate.
Panicle open and leafy, virgate or with virgate branches; involucre globose-hemispherical; stem usually covered with dense continuous felt...........................Var. *americana*
Panicle dense, pyramidal; involucre cylindric or cylindric-ovoid; stem thinly tomentulose to puberulent, often glabrescent.....................................Var. *mexicana.*

A. ludoviciana, typical (*A. vulgaris*, subsp. *ludoviciana* (Nutt.) Hall & Clements, in part).—Native of prairies and dry open soils or thin woodland, Michigan to Washington, south to Illinois, Arkansas, Texas and Mexico; spread eastward along railroads, roads, in waste ground, dooryards, grassland, cemeteries, etc., to New England, New York, New Jersey and Virginia.

Var. GNAPHALODES (Nutt.) T. & G. (*A. gnaphalodes* Nutt.; *A. vulgaris*, subsp. *gnaphalodes* (Nutt.) Hall & Clements, in part). —Native of prairies, etc., southern Ontario and Michigan to southern British Columbia, south as in the preceding; naturalized eastward to Quebec, New England, New Jersey and Delaware.

Var. LATIFOLIA (Bess.) T. & G. (*A. Purshiana* Bess., var. *latifolia* Bess.; *A. vulgaris*, subsp. *gnaphalodes*, in part, of Hall & Clements).—Native from Manitoba and Minnesota to southern British Columbia, south to Iowa, Kansas and New Mexico; naturalized eastward to Quebec, New Brunswick and New England.—One of the more marked extremes of the species on account of its short and broad leaves, tendency to divergent branching and relatively loose tomentum. The following are characteristic: QUEBEC: Lac des Chênes, *Rolland*, no. 6121; Notre-Dame-de-la-Dore, Co. Lac-St.-Jean, *Victorin et al.*, no. 30,517; L'Annonciation, Co. Labelle, *Victorin et al.*, no. 384. NEW BRUNSWICK: Fairville, *Fernald*, no. 2268. MAINE: Portland, July 19, 1910, *A. R. Stubbs;* North Berwick, Sept. 1895, *Parlin.* NEW HAMPSHIRE: south of Cold River Station, Walpole, July, 1901, *Blanchard.* MASSACHUSETTS: Newbury, Aug. 7, 1899, *Williams;* Lee, Sept. 3, 1920, *Hoffmann.* MICHIGAN: Keweenaw Co., *Farwell*, no. 427. INDIANA: Kokoma, Aug. 28, 1942, *C. M. Ek.* ILLINOIS: Chicago, *Lansing*, no. 2635. MANITOBA: Cedar Lake, Riding Mountain National Park, *Scamman*, no. 2967. MINNESOTA: Lake Vadnais, *Rosendahl*, no. 5180. IOWA: Estherville, *Wolden*, no. 1264. NORTH DAKOTA: Leeds, Aug. 14, 1900, *Lunell;* Jamestown, *O. A. Stevens*, no. 302. SOUTH DAKOTA: Redfield, *Brenckle*, no. 40-74. KANSAS: Ellis, July 21, 1935, *Bondy.* SASKATCHEWAN: ex Hook. (ISOTYPE). ALBERTA: Rosedale, *Moodie*, no. 1183. MONTANA: Silver Bow, *H. M. Hall*, no. 11,492, in part. WYOMING: Upper Tongue R., Bighorn Mts., July 22, 1900, *J. G. Jack.* NEVADA: Truckee Valley, *W. W. Bailey*, no. 640. BRITISH COLUMBIA: Beavermouth, *C. H. Shaw*, no. 1153.

Var. PABULARIS (Nelson) Fernald, supra. Native from Manitoba and Minnesota to Oregon, south to Iowa, Nebraska and Colorado; adventive eastward to Michigan.—One of the most characteristic varieties on account of its longitudinally folded and recurving or arching leaves. The following are characteristic. MICHIGAN: River Rouge, *Farwell*, no. 4375, in part. MINNESOTA: Brown's Valley, Sept., 1893, *Sheldon;* Muskoda, *Ballard*, no. 3120. IOWA: Iowa Falls, Aug. 1928, *M. E. Peck;* Estherville, *Wolden*, no. 1264a. NORTH DAKOTA: Leeds, Aug. 20, 1900, *Lunell*, as *A. longifolia;* Fargo, Aug. 19, 1901, *Waldron & Manns.* SOUTH DAKOTA: Brookings, Sept. 1894, *Thornber;* Iriquois, Aug. 11, 1894, *Thornber.* NEBRASKA: Kennedy, Oct. 15, 1900, *Bates;* Hazel Creek, *Fred Clements*, no. 2917; Thedford, *Rydberg*, no. 1725. Wyoming: Creston, *Nelson*, no. 4426 (isotype). Colorado: Palmer Lake, Sept. 3, 1919, *H. M. Hall.* Oregon: Upper Klamath Lake, *M. E. Peck*, no. 9523.

Although Hall & Clements call var. *pabularis* merely "A slender competition-form of *A. vulgaris gnaphalodes*" with "Leaves only 2 to 5 mm. wide", it seems to have won its competition and to grow successfully over a vast area.

Var. Brittonii (Rydb.) Fern., supra. A local extreme of Montana to Colorado, etc., casually adventive in Maine: about wool-waste, Sept. 10, 1895, *Parlin.*

Var. americana (Bess.) Fern., supra. Native from Alberta to Texas and northern Mexico; casually adventive in Massachusetts. The following, often confused with var. *mexicana*, are characteristic. Massachusetts: dry sandy field, not scarce, Clam Shell Bluff, Concord, Aug. 11, 1938, *R. J. Eaton.* Tennessee: Nashville, *Gattinger.* Kansas: Poola, *Oyster.* Texas: *Lindheimer*, fasc. iii. no. 442; Weathersford, *Tracy*, no. 8135; Graham, *Reverchon*, no. 3283; Tarrant Co., *Ruth*, no. 320; Briscoe, *Cory*, no. 17,314; Boat Springs, Chisos Mts., *Cory*, no. 7258. British North America: *Richardson.* Alberta: below McKay, Lower Athabasca River, *Raup*, no. 6001. Idaho: Twilight Gulch, *Macbride*, no. 485, as *A. atomifera* Piper. Colorado: Engelmann Cañon, *Clements & Clements*, no. 57; Norwood Hills, *E. P. Walker*, no. 455; Naturita, *Payson*, no. 590. New Mexico: Cloudcroft, *E. D. Schulz*, no. 308. Arizona: Marshall Gulch, *Shreve*, no. 5398; Mule Mts., *Harrison & Kearney*, no. 6238.

Besser's original description of *Artemisia vulgaris*, var. *americana* (as *americanum*) was based primarily on a "specimen Hookerianum e Britt. N. America", the plant with laciniate leaves "supra glabris", ½ inch [1 cm.] wide, with lanceolate laciniae 1½–3 lines wide, the virgate panicle with hemispherical heads. It seems to be the plant here called *A. ludoviciana*, var. *americana*, although Hall & Clements place it in the very striking *A. Tilesii* Ledeb. (their *A. vulgaris*, subsp. *Tilesii*), a plant of eastern Siberia and Pacific America from Alaska to Oregon, etc., with "principal leaves ovate or broadly elliptic in outline, . . . 3–7 cm. wide", etc. I have seen no authentic material and my interpretation may be incorrect; but the general placing of these specimens in var. *mexicana*, simply because the leaves are bright green above and often slenderly dissected, overlooks the important characters of the latter, the densely pyramidal panicle of cylindric-ovoid heads or, as Willdenow's original diagnosis said, "panicula pyramidali subfoliata, floribus ovatis subsessilibus bracteis tomentosis", such a plant as abounds in much of Mexico.

Var. MEXICANA (Willd.) Fern., supra. Mexico and Texas, extending northeastward to barrens and sands of Missouri. The following are typical. MISSOURI: Dodson, *Bush*, no. 7844; Courtney, *Bush*, no. 6509. ARKANSAS: *Engelmann*, ISOTYPE of the 2d plant described by Besser as *A. vulgaris*, var. *americana*. TEXAS: *Lindheimer*, fasc. iii. nos. 442, 443, and 444; Polytechnic, *Ruth*, no. 320; Brown Co., *Cory*, no. 15,855. MEXICO: *Berlandier*, no. 1253; *Bourgeau*, no. 832; *Ghiesbrecht*, no. 155; *Hinton*, no. 1847; *Lyonnet*, no. 435; *Palmer*, nos. 597, 600 and 602; *Parry & Palmer*, nos. 530 and 531; *Pringle*, nos. 290, 7929, 8765, 9848 and 11,481; *Schaffner*, no. 277.

One other species which has spread into the Northeast is the very characteristic *Artemisia Carruthii* Wood (*A. kansana* Britton; included under their *A. vulgaris*, subsp. *Wrightii* (Gray) Hall & Clements), with the somewhat ligneous crown producing abundant prolonged and often leafy-tipped stolons (in some specimens these freely forking and 3 dm. long), the short (1–5 cm. long) elliptic to oblanceolate leaves essentially all pinnately dissected to the midrib into narrowly linear or linear-filiform lobes only 3–10 mm. long and 0.1–1 mm. broad. Native on plains and in dry scrub from western Kansas and Colorado to western Texas, New Mexico and Arizona, this aggressive and vegetatively rapidly reproducing plant has come east. The following eastern specimens are before me. RHODE ISLAND: Pawtucket, October, 1898, *M. L. McCudden*. INDIANA: Miller's, October, 1898, *Umbach*. MISSOURI: Sheffield, *Bush*, nos. 1838 and 3333.

Allied to these and likely to wander eastward (especially since it is here cultivated as SILVER-KING ARTEMISIA) is the characteristic *Artemisia albula* Wooton, of western Texas, New Mexico, Arizona, southern California and northern Mexico. Although this small-leaved and small-headed white or whitish plant was given no recognition by Hall & Clements, except as a reduced "form" of their too inclusive *A. vulgaris*, subsp. *gnaphalodes*, they did see something in it: "but with distinctive habit, very narrow leaves, widely branched inflorescence, and exceptionally small heads, the involucres 3 mm. high". The "distinctive habit" was unexplained, but *A. albula* forms dense or cespitose clumps and, instead of spreading as do *A. ludoviciana* and its many varieties (including *gnaphalodes*) by slender elongate stolons, its basal offshoots, as shown by material from careful collectors like Charles Wright, are assurgent or erect from the subligneous crown and with well developed leaves. This is a "distinctive habit" similar to that of the woody-based *A. Michauxiana* Bess. (*A. discolor*). That it was not noted by Hall & Clements is natural. Of the 54 sheets of it in the Gray Herbarium 38 indicate no attempt to collect the characteristic base, most of them nipped-off bits without even the distinctive leaves of the main stem—the kind of rubbish which some think we must house in our limited space because, forsooth, these snips have numbers!; in such disgraceful witnesses to laziness the diagnostic characters are mostly lacking. These points were strongly emphasized by Dr. Merrill in his foreword to Johnston's most helpful and practical "The Preparation of Botanical Specimens for the Herbarium"[1], a pamphlet which should be carefully studied by all who attempt to make herbarium-specimens.

## III. SENECIO CONGESTUS

(Plates 959 and 960)

Senecio congestus (R. Br.) DC., var. **palustris** (L.), stat. nov. *Cineraria palustris* L. Sp. Pl. ed. 2, 1243 (1763). *S. palustris* (L.) Hook. Fl. Bor.-Am. i. 324 (1834), not Velloso (1827). *S. tubicaulis* Mansfeld in Fedde, Rep. Spec. Nov. xlviii. 264 (1940). Plate 959, figs. 3 and 4.

S. congestus, var. **laceratus** (Ledeb.), comb. nov. *S. palustris*, $\gamma$. *laceratus* Ledeb. Fl. Ross. ii. 648 (1845), excl. syn.

S. congestus, var. **tonsus,** var. nov. (tab. 960), habitu a var. *palustre* differt corymbo aperto vix lanato-villoso, pedicellis hirtellis sparse villosisque.—Alberta to Wisconsin and Minnesota. The following are characteristic. Alberta: Gov. Hay Camp district, Slave River, about 59° 31′ N., 111° 28′ W., Aug. 4, 1928, *Raup*, no. 3384; Reed's Portage, upper Embarras River, about 58° 28′ N., 111° 32′ W., Aug. 15, 1930, *Raup*, no. 3383. Manitoba: Clear Lake, alt. 2016 ft., Riding Mountain National Park, Aug. 29–Sept. 2, 1941, *Scamman*, no. 2970. Wisconsin: La Chapelle, July 16, 1897, *L. S. Cheney*, no. 7419 (type in Herb.

[1] Johnston, I. M., The Preparation of Botanical Specimens for the Herbarium. Published by the Arnold Arboretum of Harvard University. 1939.

Gray.). MINNESOTA: sandy lake-shore, Detroit, June 20, 1909, *H. F. Bergman.*

Unfortunately the name *Senecio palustris* (L.) Hook. (1834) is a later homonym, excluded by *S. palustris* Velloso (1827). When Mansfeld published for it the new binomial *S. tubicaulis* in 1940 he evidently overlooked *S. congestus* (R. Br.) DC. Prodr. vi. 363 (1837), which rests upon *Cineraria congesta* R. Br. in Parry, 1st Voyage, App. 279 (1824), the arctic extreme with the densely congested corymb and the leaves heavily villous-lanate, the plant treated as *S. palustris*, var. *congestus* (R. Br.) Hook. by Hooker, l. c., by Ledebour, l. c., and which in the Synoptical Flora, $1^2$. 394 (1884) Gray placed under *S. palustris* (L.) Hook., with the comment: "*C[ineraria] congesta*, R. Br. in Parry, Voy., Richards., & c., only an arctic and woolly condensed form, var. *congesta*, Hook.".

Typical arctic *Senecio congestus* (PLATE 959, FIGS. 1 and 2, from ISOTYPE) extends south at least to the southeastern coast of Labrador, but more generally across North America it is represented by var. *palustris* (PLATE 959, FIGS 3–4), which I cannot separate from the wide-ranging plant of Eurasia with an open corymb but with copious long villosity or wool on the expanding corymb and more or less permanent dense villi on the pedicels and involucre. This variety extends south with us to the Côte Nord, Quebec, the foot of James Bay, and northern Iowa.

Var. *laceratus*, described from western Alaska, is an extreme with all the leaves lacerate-pinnatifid.

Var. *tonsus* (sheared) has almost or quite lost the long and dense villous-tomentum. Its open corymb has merely hirtellous or short-pilose pedicels or the long villi very few and scattered (PLATE 960).[1]

In PLATE 959, FIG. 1 is an ISOTYPE, × 1, of SENECIO CONGESTUS; FIG. 2, summit of pedicel and base of involucre, × 10, of ISOTYPE. FIGS. 3 and 4, var. PALUSTRIS: FIG. 3, inflorescence, × 1, from Vartofte-Asaka, Sweden, Aug., 1907, *Karl Wigardt;* FIG. 4, summit of pedicel and base of involucre, × 10, from same plant.

PLATE 960. S. CONGESTUS, var. TONSUS: FIG. 1, inflorescence of TYPE, × 1; FIG. 2, summit of pedicel and base of involucre, × 10, from TYPE.

(*To be continued*)

[1] A discoid form of the boreal *Senecio Pseudo-Arnica* Less. is S. PSEUDO-ARNICA Less., forma **Rollandii** (Victorin), stat. nov. *S. Pseudo-Arnica*, var. *Rollandii* Victorin, Mém. Soc. Roy. Canada, sér. 3, xix. 87, t. 4 (1925). *S. Rollandii* (Victorin) Victorin, Contrib. Lab. Bot. Univ. Montréal, no. 13: 26 (1929).

FILAGO ARVENSIS IN NORTH AMERICA.—Specimens of *Filago arvensis* L. collected on July 31, 1942, by Mary Johnstone at Kitchener, British Columbia, close to the southeastern boundary of the Province, apparently provide the first record of this species for the continent. The collection-note states "growing on roadsides and appears to be spreading all over the district".

In response to a request for further material Mr. W. B. Johnstone of Cranbrook collected an excellent series of specimens at the same station in 1943. In August of the same year Mr. J. W. Eastham found it "in a barnyard" at Erickson, some ten miles south of Kitchener. This would indicate that it is established over a considerable terrain and may well spread over a much larger area or until it reaches the limits of adaptability.

This plant has a superficial resemblance to species of *Gnaphalium*. It is by no means inconspicuous, as it attains a height of from 2 to 4 decimetres. It is not known to have any economic significance. The species is a native of Eurasia where it grows in dry sandy or stony soils. I am indebted to Dr. M. L. Fernald of the Gray Herbarium, Harvard University, for his kindness in verifying the determination.—GEORGE A. HARDY, Provincial Museum, Victoria, B. C.,

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INJURY TO HERBARIUM-SPECIMENS BY EXTREME HEAT.—Ever since the use of corrugated pasteboard in drying specimens has come into vogue there has been a tendency to try very rapid drying by placing the presses of "ventilated" specimens over heat. The belief has been propagated that this method tends to keep the natural colors—when it does not steam and blacken specimens not sufficiently dried before being subjected to heat. The late Dr. M. O. Malte made wonderfully fine specimens on his trips to Labrador and the Hudson Bay area by placing the presses, on shipboard, over the grills from the engine-room. Mr. Long and I similarly used the heat from the engine-room on Newfoundland steamers—thus providing diversion and subjects for inquiry for the other passengers. In our case, however, great care was taken to give the specimens a full twenty-four hour period between driers ("blotters"), then to straighten foliage, etc., and even then to give another day or two between driers to all juicy plants, for fear of steaming them or boiling them, if transferred to ventilators, by giving them too much heat while they were still actively sweating.

In recent studies I have had occasion to note the ill effects of too much heat applied to certain plants which are characterized by waxy coats or glaucous foliage. It is well known that the late Professor Karl M. Wiegand devised a carrying-rack for his presses, which he placed over the engine of his automobile. He thus was able to hasten the drying of specimens on long journeys. Similarly, the late Marie-Victorin and his associates dried their ventilated presses over artificial heat. Now, if one examines the specimens prepared by Victorin and his companions of *Salix glaucophylloides*, *Primula laurentiana* or *Mertensia maritima*, all of which are characterized by having a white bloom or a waxy coat on the leaf (on the lower surface in the *Salix* and the *Primula*) he will find this striking and diagnostic character melted off—the bloom of youth and naturalness is gone and the foliage has lost its original color. Similarly with Wiegand's material. In checking the specimens of *Magnolia virginiana* (*M. glauca*), which is characterized by the very white bloom of the lower leaf-surface, to see if there is any stability to the varieties of *M. glauca* proposed by Aiton and taken up by Pursh, I became impressed by the complete lack of bloom on the lower surfaces of several specimens from the Southeast, while others, like them in all other characters, had the white lower surface. Separating out the green-leaved specimens it was at once clear that they were all collected by Wiegand and Manning on their remarkably productive trip of the summer of 1927 from the Coastal Plain of Virginia to that of the Gulf.

Another point constantly noted, is that specimens too rapidly dried soon become brittle. They are easily fractured and in a few years make an unfavorable showing beside specimens carefully dried in the slower and more thorough period.

Since the above went into type I have received from the most careful maker of specimens, Mr. Bayard Long, the following note, which further emphasizes my last point. It is worth quoting.

Your note on excessive heat in drying specimens is very much to the point and I hope it strikes home. I wish you would elaborate a bit more on the BRITTLENESS induced AND the inevitable lack of "fixing" of the specimens. This has been impressing me very strongly the past few years, in material received from some of our local collectors. Of course it saves "busy" men much labor but it produces a very unsatisfactory grade of specimens. They get dried without even being examined again (while green and fresh) and, of course, there is no opportunity (if desire) to straighten leaves, draw flowers or fruit into view, or any of the other desirable "fixing" which results in good specimens. They become invariably badly wrinkled (often with leaves crumpled across the stems) and so brittle that the first handling starts their disintegration, a process greatly accelerated by mounting and surely continuing to the end of their existence. Foliage nice and *green* BUT only fragments remaining!

It is evident that we must remember the old saying, that "haste makes waste".—M. L. Fernald.

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Bingham's Flora of Oakland County, Michigan.—This flora may stand as a rather successful example of what is sometimes called humanized science—non-technical and pleasantly written exposition with a solid core of observation and knowledge. It is an account of the vascular vegetation of a county in southern Michigan from an ecological point of view. It accomplishes the somewhat unusual feat of defining intelligibly numerous plant associations without the use of a single Latin name. Details—such as species of *Carex* and *Juncus*—are filled in by a list of all species known or reported to occur in the county, with the associations in which each is found. In this list, naturally, Latin names are used—mostly those from the seventh edition of Gray's Manual, with occasional interpolation of the results of later studies.

Some items in the list seem to need verification. I know of no evidence that "*Aspidium spinulosum* var. *dilatatum* forma *anadenium*", for instance, occurs in Michigan except in the extreme north (old reports of this cannot be relied upon); and *Vaccinium arboreum* appears to be an unorthodox extension of range from the Mississippi Embayment. Nevertheless, the list shows plain evidence of care in preparation and (in spite of some misprints) attention to technical detail; and it is backed by specimens at the Cranbrook Institute.

The Flora is well printed and well illustrated; it will have real usefulness for anyone interested in the flora of Michigan.[1]—C. A. Weatherby.

[1] Bingham, Marjorie T. The Flora of Oakland County, Michigan: a study in Physiographic Plant Ecology. Cranbrook Institute of Science, Bulletin no. 22. May, 1945. 155 pp., 30 ill., maps. $1.00 at the Institute, Bloomfield Hills, Michigan.

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# Rhodora

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## AN UNTENABLE GENERIC NAME IN ACANTHACEAE

William A. Dayton

In June, 1944, Dr. Burch H. Schneider of the department of animal husbandry of West Virginia University wrote Mr. Harlan P. Kelsey, chairman of the editorial committee of Standardized Plant Names, stating that, at the request of the animal nutrition committee of the National Research Council, he was preparing a monograph on the composition of feeding stuffs and their digestibility by farm animals. He sought help with regard to certain scientific and common plant names not appearing in Standardized Plant Names. Mr. Kelsey referred this request to me and, since that time, Dr. Schneider has addressed a number of inquiries to me.

Among the plants discussed by Dr. Schneider is the acanthaceous *Disperma trachyphyllum* Bullock of Tanganyika. I called Dr. Schneider's attention to the untenability of this name and told him I was referring the matter to Mr. E. C. Leonard of the Smithsonian Institution, one of whose specialties is *Acanthaceae*, with the suggestion that he rename the plant. Mr. Leonard later informed me that he had discussed the matter with his chief, Dr. W. R. Maxon, who, in turn, communicated with Dr. E. D. Merrill, and that Dr. Merrill advised that Mr. Leonard recommend the name *Disperma* for conservation. Despite my urging, Mr. Leonard has declined to do this and suggests that I publish a note on the matter myself.

Under Art. 61, the name *Disperma* is clearly illegitimate. I seriously doubt that the genus is sufficiently prominent, large, or economically important to justify overriding that rule by conserving the name, or that the name conforms to such conservation standards as are set up by Art. 21. I propose, therefore, to rename the genus as follows, and with as little alteration from the original as possible:

**Duosperma** nom. gen. nov. DISPERMA C. B. Clarke in W. T. Thiselton-Dyer, Fl. Trop. Afr. **5** (1): 79 (1899), not *DISPERMA* J. F. Gmelin, Linn. Syst. Nat. ed. 13, **2:** 885, 892 (1791).

Gmelin's monotypic *Disperma* is, of course, a synonym of the rubiaceous partridgeberry (*Mitchella repens* L.). Clarke's homonymous *Disperma* belongs to *Acanthaceae*, tribe *Ruellieae*, with close affinities to *Hygrophila* and *Dyschoriste.* The genus consists of perhaps a dozen, mostly rather small, shrubby, undershrubby, herbaceous or somewhat scandent plants native to tropical Africa, except for one species in the Cape region. The leaves mostly are rather small; the mostly small flowers are in axillary clusters; calyx 4- or 5-cleft or parted, the lobes narrow; bracts oblong, about equalling the calyx; stigmas 2; anthers 4; ovules 1 in each cell but sometimes with an abortive extra ovule present. In erecting this genus its author emphasizes its small, brown, woody, shining, *much flattened, ellipsoid, 2-seeded* capsules.

Clarke designated no type. Presumably the first species he describes, *Disperma kilimandscharicum*, should be accepted as the type species. This is a small pubescent shrub, with small obovate toothed leaves; small hairy flowers, the calyx subequally 5-fid half way to base, the lobes of a linear-lanceolate type. The type locality is the base of Mt. Kilimanjaro, the twin-peaked highest mountain in Africa. This species is here renamed

**Duosperma kilimandscharicum** (C. B. Clarke), comb. nov., based on *Disperma kilimandscharicum* C. B. Clarke in W. T. Thistelton-Dyer, Fl. Trop. Afr. **5** (1): 80 (1899).

Concerning the economic significance of *Disperma trachyphyllum* Dr. Schneider writes me as follows: "The leaves . . . were fed to sheep in experiments reported by M. H. French in the Tanganyika Territory Report of the Department of Veterinary Science and Animal Husbandry for the year 1932. The digestibility of these leaves was determined. They do not appear to be of a very high nutritive value, but may possibly be fed in certain localities during times of great feed shortage."

It seems desirable to give the above plant a legitimate name:

**Duosperma trachyphyllum** (Bullock), comb. nov., based on *Disperma trachyphyllum* Bullock, Kew Bull. Misc. Inf. 1933 (10): 476 (1933).

This species is a "subshrubby herb", locally known as "Asbestos-bush", growing up to about 4 feet high and reported to form impenetrable thickets on stony hill slopes in the neighborhood of 4,000 feet elevation in Dodoma Province, Tanganyika. It has lightly puberulent to glabrate, quadrangular stems; elliptic to ovate leaves up to about 2 inches long and 1 inch wide, scabrous but not bristly above, and white flowers about 13 mm. long with a cylindric tube 8 mm. long.

It does not seem desirable to attempt any additional transfers of species to the generic name *Duosperma* at this time; that had probably best be referred to some future monographer or to the African botanists who know these plants well under field conditions.

Forest Service, Washington, D. C.

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Leptoloma in New England.—Leptoloma cognatum (Schultes) Hitchcock has a very limited range in New England. Not yet reported from Maine or Rhode Island, it is known from the following localities in New Hampshire, all in the valley of the Merrimac River, listed in order, beginning with the northernmost: Concord, coll. *F. W. Batchelder;* Hooksett, coll. *F. W. Batchelder;* Bedford, coll. *M. L. Fernald & Ludlow Griscom;* Merrimack, coll. *M. L. Fernald & Ludlow Griscom;* Litchfield, coll. *C. A. Weatherby & Ludlow Griscom;* Hudson, coll. *C. A. Weatherby & Ludlow Griscom.*

Two stations are known in Vermont through collections from Hartford in the valley of the White River by *E. M. Kittredge;* and from Townshend in the valley of the West River by *Leston A. Wheeler.*

The only locality in Connecticut where it is known to occur is New Haven, which is not in a river valley. There it has been collected by *C. H. Bissell, R. W. Woodward and A. E. Blewitt.*

As to Massachusetts, Hitchcock in his Manual of the Grasses of the United States mentions no station from this State.[1] The occasion of this article is to draw attention to the first and to report a second collection in Massachusetts. The first was made by Dr. *H. D. House* in Shelburne Falls in the valley of the Deerfield River. The second was made by Dr. *Burton N. Gates* in Upton, Worcester County, in the valley of the West River, in 1944. Here Dr. Gates found it in a spot which was supposed to have been a sidewalk, but which had been completely overrun by grass. West River, or a pond made by damming up the river, was a few hundred yards away. The presence of a house about fifty feet from the spot suggests the possibility of its having been introduced with filling. However, neither Dr. Gates nor the writer, who accompanied him, observed any evidence that it was introduced.

There were several clumps, abundantly fruiting. Growing side by side with *Eragrostis spectabilis* (Pursh) Steud., the two at a distance were not easily distinguishable. Without more than casual inspection, this species is easily confused with *Panicum capillare* L., also. Perhaps careful examination of supposed colonies of those species will disclose more stations for *Leptoloma cognatum*.

At a later date, the writer returned to the station and collected sufficient material so that it will be distributed as no. 171 in a new century of Grasses and Grass-like Plants of North America about to be issued by the writer.

It is suggested that further careful search is likely to reveal this species growing in a number of localities where it is not at present known.

The help of Dr. Lyman B. Smith in identification of the specimens and in ascertaining the known occurrence in New England is acknowledged with appreciation.—Frank C. Seymour, Lancaster, Mass.

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Viburnum acerifolium L., forma **Collinsii,** f. nov., differt a typo petalis roseis.—Rhode Island: Lincoln, Providence County. June 16, 1926, *J. F. Collins* (type in Herb. New England Botanical Club, isotype in Gray Herbarium).—Ernest Rouleau, Gray Herbarium.

CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY—NO. CLVII

M. L. Fernald

(*Continued from page 257*)

## IV. NOTES ON EASTERN AMERICAN LUZULA

(Plates 961 and 962)

Luzula sudetica (Willd.) DC., var. **frigida** (Buchenau), comb. nov. *L. campestris* (L.) DC., var. *frigida* Buchenau in Oesterr. Bot. Zeitschr. xlviii. 284 (1898). *L. frigida* (Buchenau) Samuelsson in Lindm. Svensk Fanerogamfl. 161 (1918). Plate 961, figs. 7–9.

I am unable to separate specifically *Luzula campestris*, var. *frigida* or *L. frigida* and *L. sudetica* (figs. 1–6). They have the same aspect and habit, dark perianths, castaneous to blackish capsules, and seeds only 1–1.6 mm. long and tipped by a minute caruncle only 0.1–0.2 mm. long. Whereas true *L. sudetica* has the perianth 2–2.5 mm. long, with the broadly lance-ovate sepals nearly equaled or exceeded by the capsule, var. *frigida* (figs. 7–9), theoretically at least, has the perianth mostly longer, 2.2–3 mm. long, with the narrowly lance-attenuate and slender-tipped sepals clearly overtopping the capsule. The difficulty is that in too many specimens, often under the same number, transitions occur and separation becomes arbitrary. Typical *L. sudetica* extends southward in eastern America to Newfoundland and the Shickshock Mountains in the Gaspé Peninsula, Quebec. I refer the following relatively southern specimens to true L. sudetica:

Newfoundland: shelves and talus of diorite cliffs, Western Head, entrance to Bonne Bay, *Fernald, Long & Fogg*, no. 1512, as *L. campestris*, var. *alpina* Gaudin; meadow near Frenchman's Cove, Bay of Islands, *Mackenzie & Griscom*, no. 10,202, as *Juncoides multiflorum* (Ehrh.) Druce, var.; turfy slopes near the sea, Seal's Nest Island, Bay of Islands, *Fernald, Long & Fogg*, no. 180, as *L. campestris*, var. *frigida*.

The interpretation by Wiegand and me in Rhodora, xv. 42 (1913) of *Luzula campestris* var. *frigida* was a confused one, the plants of southern New Brunswick and eastern Maine being really quite different from the original Labrador material. We were misled by Buchenau's citation of *Robinson & Schrenk*, no.

85, from St. John's, Newfoundland; but a rereading shows that the Robinson & Schrenk plant was not considered by Buchenau as typical: "Ich lernte diese Form [var. *frigida*] zuerst aus Labrador kennen, wo sie mehrfach gesammelt wurde. Sehr ausgeprägt findet sie sich ferner auf . . . Alberta . . . Etwas weniger characteristisch ist die Pflanze von St. Johns auf Neufundland (R o b i n s o n und S c h r e n k, Nr. 85)." The Labrador plant which closely matches Buchenau's description is, as stated, an extreme of *L. sudetica* with more slender and elongate perianth-segments. The southernmost stations of var. *frigida* are along and near the Straits of Belle Isle in

Newfoundland: margin of pond back of St. Anthony, *E. C. Abbe*, no. 201; turfy slopes of slaty hills, Little Quirpon, *Fernald, Gilbert & Hotchkiss*, no. 27,809; springy swale and turfy upper border of strand, Anse au Sauvages, Pistolet Bay, *Fernald, Wiegand & Long*, no. 27,810; turfy limestone barrens, Cook Point, Pistolet Bay, *Fernald & Gilbert*, no. 27,808; swamp, Flower Cove, July 28, 1920, *M. E. Priest.*

Much of the material heretofore misidentified with *Luzula campestris* var. *frigida*, including the *Robinson & Schrenk* material doubtfully cited by Buchenau, belongs to L. multiflora (Retz.) Lejeune, var. fusconigra Čelak., at least *sensu* Samuelsson in Lindman, Svensk Fanerogamfl. 161 (1918). See plate 962, figs. 4 and 5. Its seed is decidedly not that of *L. sudetica*, but is characteristic of *L. multiflora:* 1.5–2 mm. long, with a round-tipped bulbiform caruncle 0.4–0.7 mm. long. From the common and wide-spread fulvous or paler *L. multiflora* it differs in its relatively narrow leaves, slender, stiff and low (1–4 dm.) stems, dark brown to fuscous sepals (with pale margins) and dark chestnut to blackish capsules. It is northern and relatively local with us. The following specimens have been seen (distributed as *L. campestris*, var. *frigida* unless noted) of what I take to be L. multiflora var. fusconigra.

Newfoundland: peaty limestone barrens about Flower Cove, Straits of Belle Isle, *Fernald, Long & Dunbar*, no. 26,504; boggy spots on the rocky crests, Twillingate, Notre Dame Bay, *Fernald, Wiegand & Bartram*, no. 5169: dry turf, Old Perlican, Trinity Bay, *G. S. Torrey*, no. 38; dry open turfy slopes of sandstone and arenaceous slate hills back of Carbonear, Conception Bay, *Fernald & Wiegand*, no. 5166 (dwarf, with unusually capitate inflorescences); rocky hills, St. John's, *Robinson & Schrenk*, no.

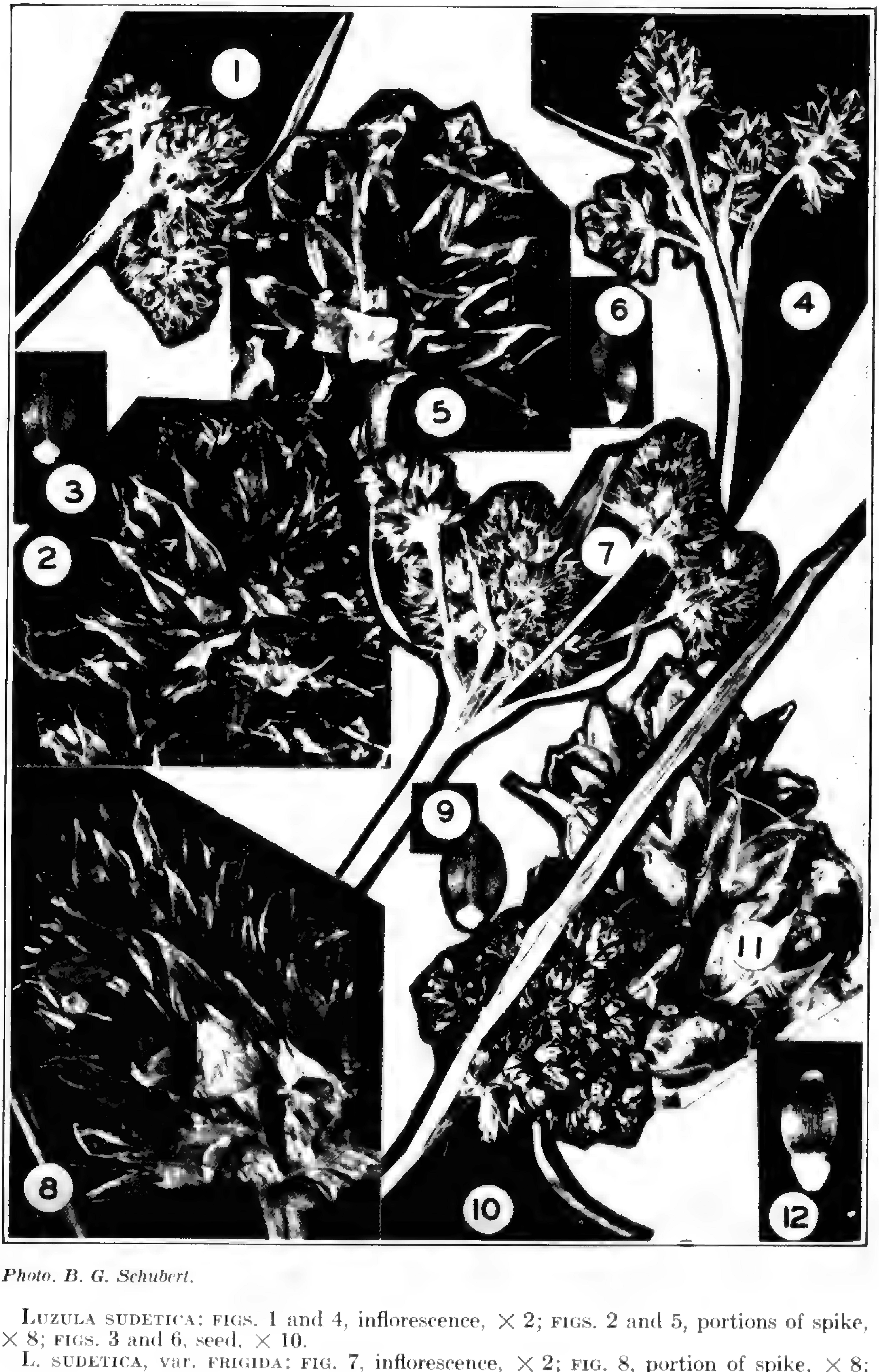


*Photo. B. G. Schubert.*

Luzula sudetica: figs. 1 and 4, inflorescence, × 2; figs. 2 and 5, portions of spike, × 8; figs. 3 and 6, seed, × 10.
L. sudetica, var. frigida: fig. 7, inflorescence, × 2; fig. 8, portion of spike, × 8; fig. 9, seed, × 10.
L. multiflora, var. congesta: fig. 10, inflorescence, × 2; fig. 11, portion of spike, × 8; fig. 12, seed, × 10.

85, as *L. arcuata* Meyer; by rill on seepy silicious slope of Joan Plains Hill, Bay Bulls, *Fernald, Long & Dunbar*, nos. 26,502 and 26,503, as *L. campestris*, var. *multiflora;* Spreadeagle, June 30, 1893, *Waghorne*, as *L. campestris;* dry field near sea-level, Bay of Islands, *Eames & Godfrey*, no. 5985. QUEBEC: Rivière du Loup, *Pease*, no. 2259, as *L. campestris*, var. *multiflora*. PRINCE EDWARD ISLAND: damp clearing, Morell, *Fernald & St. John*, no. 10,992, as *L. camp.*, var. *mult.* NOVA SCOTIA: wet peaty and rocky ground, Shag Harbor, *Fernald, Bissell & Linder*, no. 20,727, as *L. camp.*, var. *mult.* MAINE: turf, Tenant's Harbor, *Pease*, no. 26,067; Isle au Haut, July 8 and 10, 1920, *N. T. Kidder*. NEW HAMPSHIRE: field, Wolfeboro, *H. E. Sargent*. MASSACHUSETTS: swamp, Nantucket Island, *Bicknell*, no. 260a, unidentified. NEW YORK: low mossy meadow in rather heavy mucky soil, alt. 1840 ft., Parker's (Montague), Lewis Co., *Hotchkiss*, no. 2321; heavy rather dry meadow-soil, alt. 1800 ft., Rector (Montague), Lewis Co., *Hotchkiss*, no. 2323; heavy soil of meadow, alt. 1680 ft., northeast of Mohawk Hill (West Turin), Lewis Co., *Hotchkiss*, no. 2274.

Some material, wrongly distributed as *Luzula campestris*, var. *frigida*, differs at once from *L. multiflora* and its var. *fusconigra* in the very condensed umbel, usually with several sessile or subsessile spikes, with or without stiff rays up to 3.5 cm. long, the pale perianth 3–4 mm. long and greatly exceeding the capsule, the seeds only 1.5–1.7 mm. long and with conically tapering caruncle. This is

L. MULTIFLORA (Retz.) Lejeune, var. **acadiensis** (Fernald), comb. nov. *L. campestris*, var. *acadiensis* Fernald in RHODORA, xix. 38 (1917). Originally described from Prince Edward Island, Nova Scotia, and New Brunswick, var. *acadiensis* is now known from Newfoundland, the Gaspé Peninsula and southeastern Maine, as well. PLATE 962, FIGS. 6–8.

Although often merged with *Luzula campestris* (L.) DC. the common species across North America is abundantly distinct. *L. campestris* is a low plant with scattered tufts of narrow and very silky leaves separated by slender rhizomes and stolons up to 3 cm. long, each tuft with a usually solitary decumbent to ascending flowering stem, bearing 2–6 subglobose spikes, all but the central spike on divergent to recurving rays; the anthers two to five times as long as the filaments. In North America it is apparently native in woods and openings of the Avalon Peninsula of Newfoundland, along with scores of other typical Europeans (*Pedicularis sylvatica, Sieglingia decumbens*, etc., etc.). In 1920 the late C. E. Robbins found it naturalized in a lawn at Wareham, Massachusetts. *L. multiflora* (PLATE 962, FIGS. 1–3), on the other hand, is densely cespitose, nonstoloniferous, with numerous erect (up to 9 dm. high) flowering stems, the anthers shorter than to about equaling the filaments.

The only other variety of *Luzula multiflora* in the "Manual range" is var. CONGESTA (Thuill.) Koch, Syn. 734 (1837), based on *Juncus congestus* Thuill. Fl. Env. Paris, ed. 2, ii. 179 (1799). Var. CONGESTA (PLATE 961, FIGS. 10–12) is frequent in

NEWFOUNDLAND: Baccalieu Island, July, 1902, *Sornborger* (misidentified by Fernald & Wiegand as *L. campestris*, var. *comosa*); Whitbourne, *Fernald & Wiegand*, no. 5168 (a lax form with elongate rays, misidentified like the last); Murray's Pond, 1931, *Agnes Ayre;* Trepassey, *Fernald, Long & Dunbar*, no. 26,505 (misidentified as *L. campestris*, var. *frigida*); Port Saunders *Fernald & Wiegand*, no. 3056 (misidentified like the last); Port aux Basques, *Fernald, Long & Dunbar*, no. 26,500.

I am retaining the long familiar name *Luzula multiflora* but as starting with *Juncus multiflorus* Retzius, Fl. Scand. Prodr. ed. 2: 82 (1795), who first properly published it. Ordinarily, as in Index Kewensis, the writings of Ascherson & Graebner and of Buchenau and others, the basic *Juncus multiflorus* is cited, to quote Ascherson & Graebn. Syn. Mitteleur. Fl. ii². 523 (1904), as "*Junc. multiflorus* Ehrh. Calam. No. 127 (etwa 1791). Hoffm. Deutschl. Fl. I. 169 (1800)", with *Juncus intermedius* Thuill. Fl. Env. Paris, ed. 2: 178 (1799), *J. liniger* With. Syst. Arr. ed. 4, ii. 343 (1801) and *J. erectus* Pers. Syn. i. 386 (1805) as synonyms. So far as I can find the properly described *Juncus multiflorus* Retzius (1795) has usually come into the picture only as a negative element, for, according to Index Kewensis *J. multiflorus* Retz. " = capensis", i. e. *J. capensis* Thunb. Prod. Pl. Cap. 66 (1794). Just how, to use an American idiom, the original editors of Index Kewensis "got that way," unless a probable *Luzula campestris* got entered as *Juncus capensis,* is not clear. In fact, one soon learns to take the attempted identifications in the original volumes with much more than the conventional grain of salt; for, as in this case, every careful student of the *Juncaceae* or of the flora of The Cape of Good Hope, Ernst Meyer, Buchenau, Baker (in Flora Capensis) and others, have regularly and rightly recognized *Juncus capensis* Thunb. as a true *Juncus,* with long and very slender, linear-subulate, glabrous leaves, naked or scapose flowering stems, and very many muticous seeds about 0.6 mm. long. It is in no wise a *Luzula*, with flat leaves, leafy stems and 3 large carunculate seeds. In describing his *Juncus multiflorus* (1795) Retzius was not accounting for the flora of the Cape of Good Hope! His Florae Scandinaviae Prodromus was, to quote his title-page, an enumeration of the plants of Sweden, Lappland, Finland and Pomerania, as well as of Denmark, Norway, Holstein, Iceland and Greenland, a large enough task without dragging in the Antipodes (especially without any mention of them). Retzius had the usual northern European species of *Juncus* (*J. acutus, conglomeratus, effusus, filiformis, trifidus* and so on to *J. biglumis* and *J. triglumis*), followed by the species which constitute *Luzula: J. vernalis* or *pilosus, J. parviflorus, J. maximus, J. multiflorus* (as new), *J. campestris* and *J. spicatus*. His description was clear:

> 435*. *J. multiflorus*, foliis planis nudis, culmo basi folioso, corymbo subramoso, capitulis multifloris terminalibus axillaribusque. *Juncus* Hall. St. Helv. 1329? *d*) P. sylv.

To those who know *Juncus capensis* the "Foliis planis" and "culmo basi folioso", to say nothing of its Scandinavian occurrence, might have been suggestive! In fact, Buchenau in Das Pflanzenreich correctly cites *J. multiflorus* Retzius as identical with the reputed *J. multiflorus* Ehrh. and graciously notes it as "in Ind. Kew. errore calami = *J. capensis* dicitur"—one of the cases where the pen was mightier than the brain. Furthermore, it is clear that Retzius was not basing his *Juncus multiflorus* (1795) on a reputed *J. multiflorus* Ehrh. (1791–1793[1]). Whether Ehrhart ever published such a species seems open to question. All the bibliographies, Index Kewensis, the citations by Buchenau and others, for instance, take the name back to Ehrhart, the former compendium saying, rather cryptically, under *Juncus*, "*multiflorus*, Ehrh. [Calam.]. 127; ex Hoffm. Fl. Deutschl. i. 169." Hoffm. l. c. (1800), properly publishing *J. multiflorus*, ascribed it

[1] The title-page of Ehrh. Beitr. vi. says 1791 and this date is commonly accepted. Buchenau, however, in Engler, Pflanzenr. iv[36]. 94 (1906) and elsewhere, said "ca. 1791", while von Hayek, Fl. Steierm. i. 106 and elsewhere (1908) gives the unquestioned date 1793. Schneider, too, in his Ill. Handb. Laubholzk., after citing Beitr. vi. consistently as published in 1791, said in his Nachtrag, ii. 886, "Nähreres 1793". If the exact dates of Ehrhart's different volumes have been worked out I shall welcome a reference to the publication.

to "EHRH. *gram. n.* 127", while Buchenau, in Engl. Pflanzenr. iv[36]. 91 (1906), gives the more detailed "*J. multiflorus* Ehrh., Calam., Gram. et Tripet. exsicc. (ca. 1791)." With the aid of Miss Ruth D. Sanderson, Librarian of the Gray Herbarium, I have made a long and fruitless search for any published description by Ehrhart of *J. multiflorus.* Search of Pritzel's Thesaurus and other reliable bibliographies reveals no book by him entitled either "Calam." (the title in brackets given in Index Kewensis), "gram." (the title given by Hoffmann) nor even "Calam., Gram. et Tripet. exsicc.", as cited by Buchenau. In Ehrhart's Beiträge zur Naturkunde, vi. (1791–1793) the 8th article is "Index Calamariarum, Graminum et Tripetaloidearum Linn., quas in usum Botanophilorum collegit et exsiccavit Fridericus Ehrhart, Helveto-Bernas". This, pp. 80–84, consists merely of a list of names, without descriptions, of twelve decades of the Exsiccatae, ending with no. 120 and dated October, 1790. The names of plants of Linnaeus and others of earlier date are of species already published but throughout the list are several new names of Ehrhart, all *nomina nuda* and of no nomenclatural standing until taken up and defined by subsequent authors. To this group of original *nomina nuda* belong nos. 66, *Juncus acutiflorus* Ehrh., 76, *J. obtusiflorus* Ehrh., 85, *J. glaucus* Ehrh. and 86, *J. setifolius* Ehrh.; but there is no number 127, *J. multiflorus*, the twelfth decade ending, naturally, with no. 120. Until it is is shown to be otherwise, we must infer that decades of the exsiccatae following the 12th may have been issued with names on the labels (including specimens numbered 127 and called *J. multiflorus*), but the first description of *J. multiflorus* as of Ehrhart was by Hoffmann in 1800. In the meantime, under that name and without any reference to Ehrhart, Retzius in 1795 described the New Scandinavian species which he thought might be the same as a Swiss plant of Haller. *Juncus multiflorus* Retzius (1795) apparently has the right-of-way.

The error which Buchenau charitably called a slip of the pen, by which Index Kewensis identified *Juncus multiflorus* Retz. (1795) with the South African *J. capensis* Thunb. (1794), at once intrigued some, who promptly altered names without checking the fundamental data. Thus in Bull. Torr. Bot. Cl. xxxii. 610

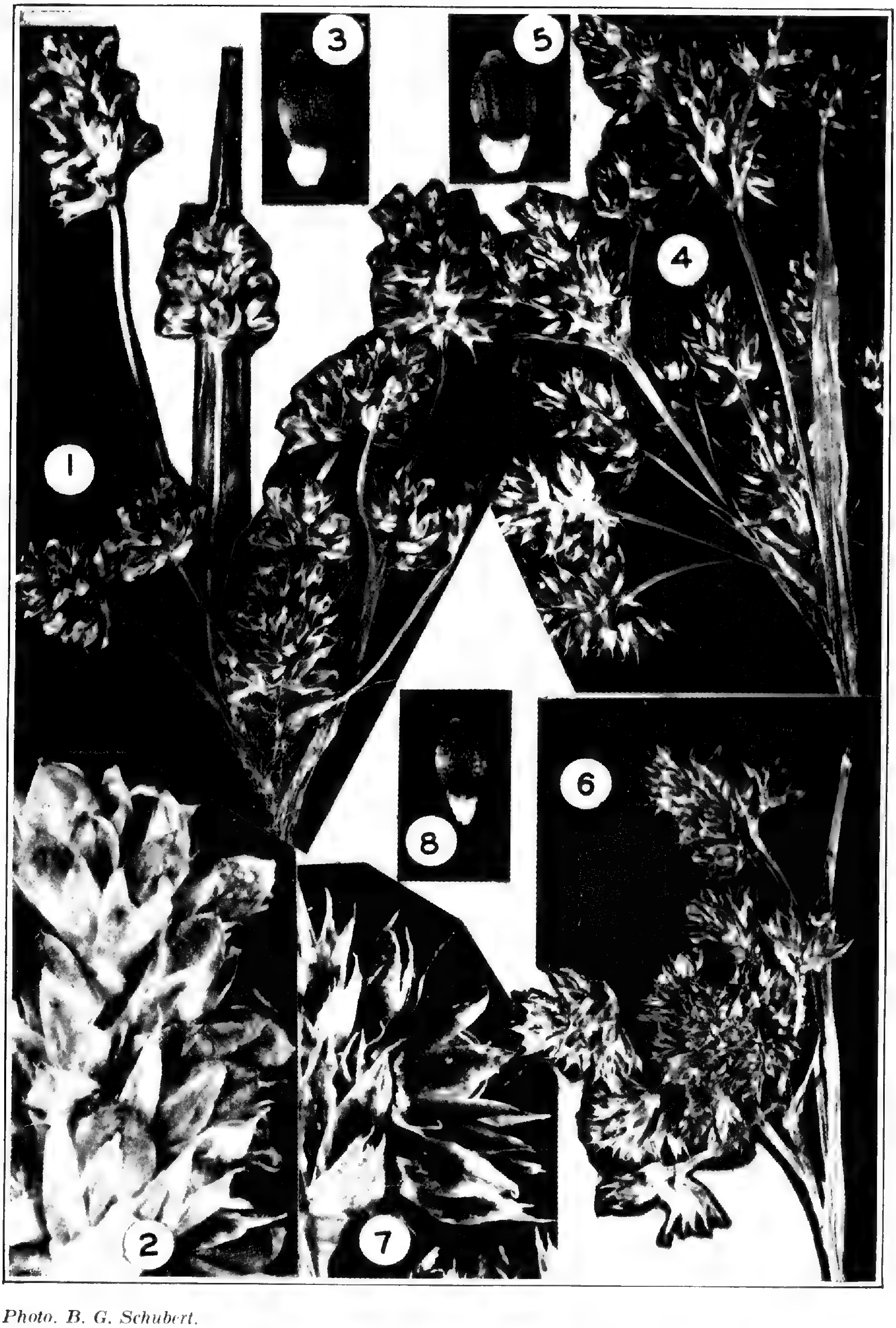


*Photo. B. G. Schubert.*

Luzula multiflora: fig. 1, inflorescence, × 2; fig. 2, portion of spike, × 8; fig. 3, seed, × 10.

L. multiflora, var. fusconigra: fig. 4, portion of inflorescence, × 2, fig. 5, seed, × 10.

L. multiflora, var. acadiensis: fig. 6, inflorescence, × 2; fig. 7, portion of inflorescence, × 8; fig. 8, seed, × 10.

(1905), Rydberg, accepting unquestioningly the "lapsus calami", published the new combination

**Juncoides intermedium** (Thuill.) Rydb.

*Juncus intermedius* Thuill. Fl. Env. Paris, ed. 2, 178. 1799.
*Juncus multiflorus* Ehrh.; Hoffm. Fl. Deutschl. [i. e. Deutschl. Fl.] ed. 2, **1:** 169. 1800. Not *J. multiflorus* Retz. 1795.

Rydberg added, what seems to be the case, "The name *Juncus multiflorus* dates back as far as 1791, when Ehrhart issued his set of grasses, sedges, etc., but, as far as can be ascertained, it was never published for this plant before 1800, in the revised edition of Hoffmann's Flora". Promptly Professor Aven Nelson, apparently accepting Rydberg's copied statement that *Juncus multiflorus* Retz. is not the same as *J. multiflorus* Ehrh. ex Hoffm., published *Luzula intermedia* (Thuill.) A. Nels. in Coult. & Nels. New Man. Bot. Centr. Rocky Mts. 109 (1909), he evidently not realizing that the identical combination, as a substitute for *Juncus multiflorus*, was published 84 years earlier: *L. intermedia* Spenner, Fl. Friburg. i. 178 (1825), with the synonym "Juncus multiflorus. Hoffm. germ. ed. 2". Incidentally two other species were named *L. intermedia* early enough to find entry in the original Index Kewensis.

In PLATE 961, FIGS. 1–6 are of LUZULA SUDETICA (Willd.) DC.: FIG. 1, inflorescence, × 2, from Varmland Grännark, Sweden, June 17, 1918, *Samuelsson;* FIG. 2, portion of spike, × 8, from same plant; FIG. 3, seed, × 10, from same plant; FIG. 4, inflorescence, × 2, from Seal's Nest Island, Bay of Islands, Newfoundland, *Fernald, Long & Fogg*, no. 180; FIG. 5, portion of spike, × 8, from no. 180: FIG. 6, seed, × 10, from no. 180. FIGS. 7–9, L. SUDETICA, var. FRIGIDA (Buchenau) Fernald: FIG. 7, inflorescence, × 2, from Fullerton, Hudson Bay, lat. 63° 57′, *J. M. Macoun*, no. 79,215; FIG. 8, portion of spike, × 8, from no. 79,215; FIG. 9, seed, × 10, from no. 79,215. FIGS. 10–12, L. MULTIFLORA (Retz.) Lejeune, var. CONGESTA (Thuill.) Koch: FIG. 10, inflorescence, × 2, from Port Saunders, Newfoundland, *Fernald & Wiegand*, no. 3056; FIG. 11, portion of spike, × 8, from no. 3056; FIG. 12, seed, × 10, from no. 3056.

PLATE 962, FIGS. 1–3. L. MULTIFLORA (Retz.) Lejeune: FIG. 1, inflorescence, × 2, from Grindstone Island, Magdalen Islands, Quebec, *Fernald et al.*, no. 7188; FIG. 2, portion of spike, × 8, from no. 7188; FIG. 3, seed, × 10, from no. 7188. FIGS. 4 and 5, L. MULTIFLORA, var. FUSCONIGRA Čelak.: FIG. 4, portion of inflorescence, × 2, from Shag Harbor, Nova Scotia, *Fernald, Bissell, & Linder*, no. 20,727; FIG. 5, seed from no. 20,727. FIGS. 6–8, L. MULTIFLORA, var. ACADIENSIS Fernald: FIG. 6, inflorescence, × 2, from Windsor, Nova Scotia, *Fernald, Bartram & Long*, no. 23,584; FIG. 7, portion of inflorescence, × 8, from TYPE; FIG. 8, seed, × 10, from no. 23,584.

SPOROBOLUS ASPER IN QUEBEC.—St. Paul Island (more familiarly called Nuns' Island) is one of the few spots around Montreal which has retained much of its primitive flora. This is why I began a few years ago to compile a list of plants from that island.

In August, 1943, on the rocky shores of the St. Lawrence River I collected a strange *Sporobolus* that did not fit well with the species then known for Quebec. Specimens, studied by Brother Rolland-Germain, proved to be *Sporobolus asper* (Michx.) Kunth. Dr. M. L. Fernald has kindly corroborated this identification.

This *Sporobolus* had been collected previously in nearly all of the northern States adjacent to Quebec. This collection is, then, a very interesting addition to the Canadian flora. It was growing with *Verbena simplex* Lehm. (known from only three localities in Quebec) and *Scutellaria parvula* Michx. (rare in the Montreal region, although Michaux's type had been collected there).

Specimens have been deposited in the Victorin Herbarium of the University of Montreal and in the Gray Herbarium of Harvard University. Duplicates will be sent to other institutions on our next distribution of duplicates. The known distribution is as follows: southwestern Quebec, Massachusetts, Vermont and eastern New York, south to eastern Virginia; Ohio to North Dakota, south to Tennessee, Louisiana and Texas.

Other plants of this flora worthy of mention are *Carex Sprengelii* Dewey (forming a dense grassy carpet at the top of the shore-line), *Floerkea proserpinacoides* Willd. (fairly abundant in a damp *Ulmus americana* wood, and the only known locality in Quebec). Both species will be distributed in the next century of the Plantae Exsiccatae Grayanae. In a marsh along the shore there was a great abundance of *Decodon verticillatus* (L.) Ell., var. *laevigatus* Torr. & Gray, also infrequent in Quebec.—ERNEST ROULEAU, Institut Botanique, Université de Montréal.

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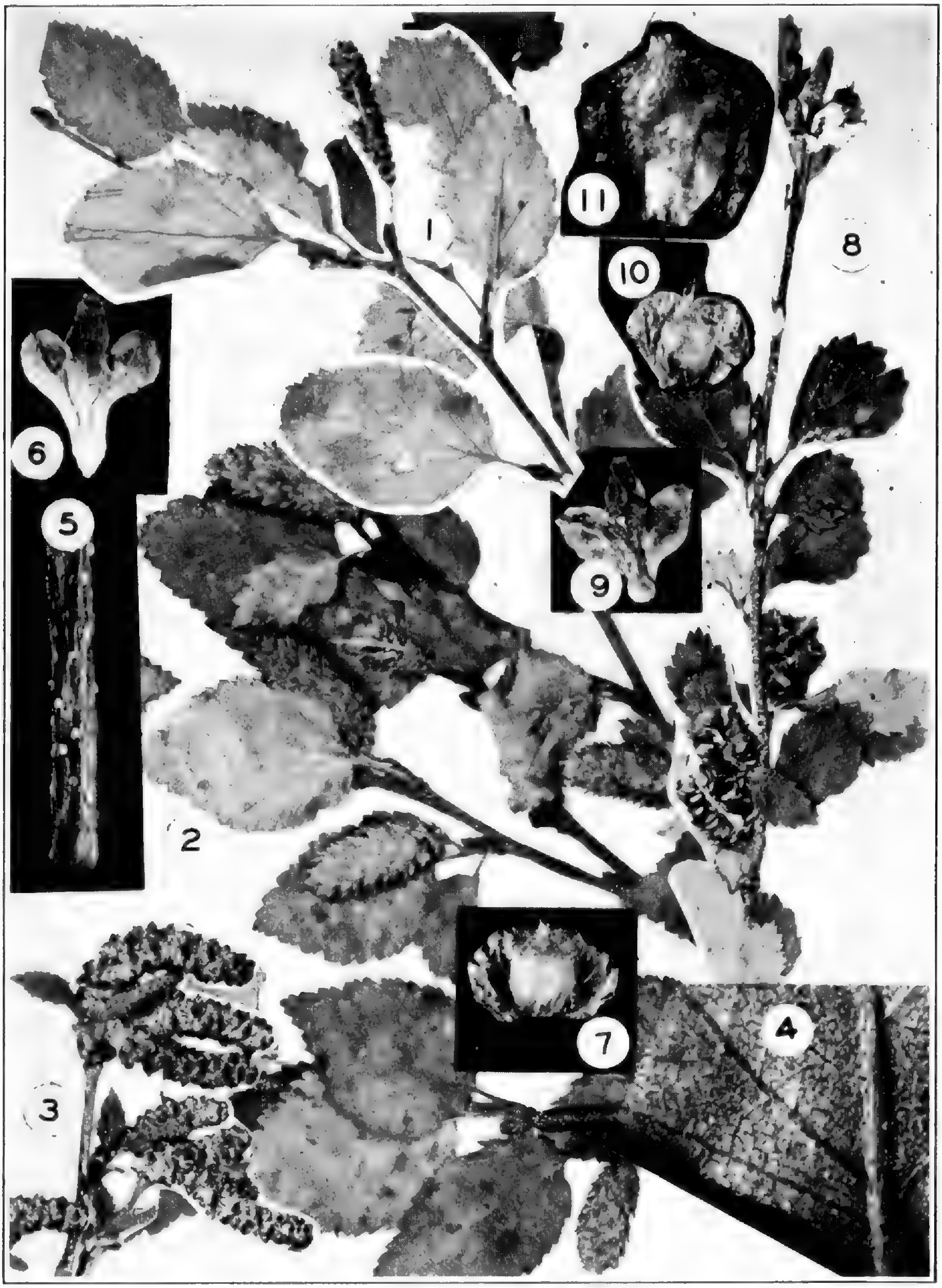


*Photo. B. G. Schubert*

BETULA MINOR: FIG. 1, portion of TYPE, × 1; FIG. 2, fruiting branch, × 1; FIG 3, staminate aments, × 1; FIG. 4, lower surface of leaf, × 5; FIG. 5, branchlet, × 10; FIG. 6, fruiting bract, × 4; FIG. 7, samara, × 4.

B. MICROPHYLLA: FIG. 8, fruiting branch (probably of ISOTYPE), × 1; FIG. 9, fruiting bract, × 4; FIG. 10, samara, × 4.

B. ALBA, var. TORTUOSA: FIG. 11, samara, × 4.

# Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 47. October, 1945. No. 561.


## ON THE DESCRIPTIVE METHOD OF LINNAEUS*


H. K. Svenson


(Plates 990 and 991)

"There are as many various forms in the world as there are individuals, and no two are found which are perfectly alike; therefore Nature may be said to display herself in variation . . . The older naturalists saw that there was order in nature which consisted in the similitude of things, but they were unable to combine the similar and to separate the dissimilar. They saw the chain of nature but could not forge the links. The links of this chain . . . the Creator has thrown into the world without order; thus it is of wisdom to inquire into these, and to search out their similitudes and dissimilarities and to combine those which should be combined; whence at length results the *Ordo naturalis*, which presents the mundane things mutually combined so that an affinity of these appears, which extending itself throughout the whole reign of Nature is the ultimate end of the systematic order". From Introductio ad Ordines Naturales Linnaei, Mss. Fabricius (1792), ed. Schuster, 1926.

*Species Plantarum*, published in 1753 by Carl Linnaeus (1707–1778),[1] has been chosen as the starting point of modern botanical nomenclature, and as such it represents perhaps the most important work in systematic botany. But various interpretations show that there is not a clear understanding of the method by which the book was written, and of its purpose. Consequently there have been many unnecessary changes of names in recent times, due primarily to a lack of understanding of Linnaean procedure. The subject is therefore of vital importance in the development of a stabilized nomenclature, a goal toward which all systematic botanists are bent, at least nominally. Spring (Ueber


* Brooklyn Botanic Garden Contribution no. 103.


[1] In formal Latin this becomes "Carolus Linnaeus"; the form "Linné", obviously of French origin, was later in common use by Linnaeus.

die naturhistorischen Begriffe von Gattung, Art, und Abart und über die Ursachen der Abartungen in den organischen Reichen. Leipzig. 1838, pp. 14–24) gives a good general account of pre-Linnaean nomenclature. Of Linnaeus (p. 18) he says: "What he differed in from all his predecessors, and what will always remain as his greatest accomplishment is the *sequence* with which he built up a system of nature, and the precision and clarity with which he formulated the rules and principles of the subject. In this respect he has been the law-giver for all succeeding time."

By Linnaeus *Species Plantarum* was looked upon as a compendium without descriptions, except in some ambiguous[2] cases, and the number of species *described* within its covers was relatively few. The names of species go back in general to earlier dates, usually within the fifty to eighty preceding years, and especially to Linnaeus' earlier works. Many names were based upon illustrations. Where there is a description to be found, Linnaeus marks the reference with an asterisk. Binomial nomenclature was not intended by Linnaeus to supersede the polynomial specific name, and Linnaeus when later citing specific names used the binomial no more than he did the polynomial nomenclature. Despite statements in text books the polynomial specific name, especially as developed by Linnaeus[3], was not so cumbersome and could readily be cited by use of dots for the abbreviated portion. No one would want to give up the binomial system of today, but that does not preclude the fact that modern botanical nomenclature lacks some of the flexibility of the Linnaean polynomial.

Much of the misunderstanding of the Linnaean method is due to a lack of comprehension of definitions[4]. The term "method"

[2] No definite explanation of the word "ambagibus" is given by Linnaeus, but its application is apparent once the usage of the Linnaean term "descriptio" has been recognized. On page 18 of the preface to *Flora Zeylanica* (1747), Linnaeus mentions both *obscure* and *dubious* plants. *Obscure* plants are defined as those of which the fructification is but little, or insufficiently, known; in *dubious* plants the fructification is lacking. These terms apparently were not carried over into *Species Plantarum*.

[3] Composed of not more than twelve words, differentiating the species from all others of the genus according to rules laid down in *Critica Botanica* (1737). Differentiae were called "essential" when only a single idea was emphasized, as *Claytonia foliis linearibus*, or synoptic when (as in large genera) a series of ideas was necessary.

[4] Linnaeus was a rapid worker, and at times careless in details, especially as to bibliographic references. Many of these minor errors were corrected in the second edition of *Species Plantarum* (1763), but some of the mistakes ascribed to him were rather the mistakes of recent interpreters. Such, for example, is the idea that *Scirpus geniculatus* was based on the plant with rounded spikelets, or that *Dioscorea sativa*

applies here to a formal arrangement of material especially dealing with phrase-names and synonymy, such as, for example, Gronovius employed when he followed the Linnaean "method" in his *Flora Virginica* (1739). The term "specific name" applies only to the phrase-name[5]. This has been more clearly recognized in recent years, and the term "specific epithet" is sometimes used in place of the Linnaean "trivial name". The term "description" applies to an actual, more or less detailed, description of the plant.[6] Short comments following a discussion of a species in *Species Plantarum* should be classed as "observations". Examples of the *descriptio* are given in *Philosophia Botanica*, that of *Passiflora foetida* being considered by Linnaeus as ideal. The

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is an oriental species. The latter is unknown in the Old World, as the species of the genus are recognized in modern literature, and nearly all of the Linnaean references point to a New World species, which the habitat "in Indiis" does not preclude. The editing of some of Linnaeus' works was done hurriedly and sometimes by students. In a letter to Beck ((Hulth no. 785; May 29, 1753) he says of *Species Plantarum:* "Salvius demanded a prompt recension. I asked a student to make it. Salvius improved it." Kalm, writing on Oct. 15, 1752 (Hulth no. 1614) urged Linnaeus to write a "Synonymia Plantarum", offering "to take it upon myself to edit half the book, though I should have to sit night and day to write; only so that the book might come out".

The exacting and often discouraging task of writing *Species Plantarum* was carried out in the years 1749–1752, and its progress may be followed in letters to Beck (edited by J. M. Hulth, 1909) from which excerpts are quoted in translation. No. 671, Oct. 6, 1749: "I am beginning to drop *Species Plantarum* from my mind; since autumn I have not had time to look at it. I have worked along to the *Polyandria*, but it will be impossible with a whole year's steady work to finish them. I feel like leaving what is done as an inventory after me, so that posterity might see that I could have done it if I had had the time and energy. Why should I work myself to death and lose contact with the world? What does one gain? One does not become wise till the end". No. 728, Nov. 12, 1751: "I am working on *Species Plantarum* and have come to *Icosandria*". No. 738, Dec. 1751: "I am like a setting hen on its eggs, hatching out species, but the hatching time is much longer, so that I have got only to the *Diadelphia*, though I work night and day". No. 741, March 6, 1752: "Now I have reached to the *Syngenesia* with my *Species*, and think I shall rest for a few days". No. 752, June 5, 1752: "I have finished my *Species*".

[5] It is strange that a person as well versed as DeCandolle (Théorie élémentaire de la Botanique 1813, p. 223) should have so misunderstood the situation: "Linné . . . propose . . . que le nom d'un être naturel serait composé de deux mots: le premier, qu'il appela le nom *générique*, serait commun à toutes les espèces d'un genre; par exemple, *Rosa, Trifolium;* le second, qu'il nomma *spécifique*, devait être propre a chaque espèce d'un genre."

[6] cf. Richter, Codex Botanicus Linnaeanus, p. xi. (1840): "Signum* in Spec. pl. adhibitum, teste praefatione significat *descriptionem* in aliquo citato opere dari . . . Hoc signo nonnulli, qui leviter inspexerant *Species Plantarum*, decepti sunt, ut crederent opus praecipuum et prae ceteris fidum eo indicare, id quod nunquam in mentem venit Linnaeo." [The asterisk, used in *Species Plantarum*, signifies (according to the introduction) that a description is given in the work cited. . . . By this sign, some who have casually examined *Species Plantarum* have mistakenly believed that a work more important than the others was indicated by him, something which had never entered Linnaeus' mind].

term "diagnosis" does not occur in Linnaean works except in connection with the generic name; it has been adopted by some as a substitute for the Linnaean specific phrase-name, but in modern usage it may lack entirely the differential character of the Linnaean specific phrase-name. There is nothing to support the statement of some botanists that a new specific phrase-name ("diagnosis") was based upon herbarium specimens which Linnaeus had before him. The new specific name was, on the other hand, a most important feature in the Linnaean method, by which old phrase-names were brought into conformity with the other specific names in the genus, in whatever new work was under way by Linnaeus or his collaborators.[7] Such new specific names, quite obviously, do not constitute a quotation from some previous work, as do the majority of Linnaean specific [phrase] names in *Species Plantarum*. The Linnaean specific name was not only a definition of the species, but essentially an all-inclusive key to the species, corresponding to the distinctions in dichotomous keys of our current manuals. A new specific name represented either a new species or the reformation of an older specific name; in the latter case the old name became a synonym taking its place at the head of the list. Such synonyms were *names*, in general comprehensive and accumulative, i. e. including various figures, descriptions and specimens, and were not ordinarily, as in modern usage, based on single specimens. The Claytonian reference in Gronovius' *Flora Virginica* was not a true synonym; it was a brief description of the Clayton specimen, now being assigned to a proper specific name under the Linnaean method. These descriptive notes, accompanying specimens, which Clayton wrote in English, were translated into Latin by Gronovius and appended to his treatment of the individual species. Misunderstandings as to the nature of Gronovius' synonyms have led, in the author's opinion, to many unnecessary changes in the names of American timber trees, and this subject is therefore one of great practical importance. This procedure will be discussed in detail under the heading "The Species".

[7] Cf. *Fl. Suecica* (1745), introd.: "The majority of the specific [phrase] names are new. I have sometimes changed specific names, not because I considered the previous ones as erroneous, but because these new ones are clearer and easier to understand. When more species have been observed and their outstanding characteristics detected, and more apt terms struck, it will be necessary sometimes to emend the differentiae, though previously they may have been very good."

Whatever thread is followed into the tangled skein of comment and literature on the *Species Plantarum*, general conclusions or points of view are reached that would also have been attained by some other angle of approach. The term "method" is a comprehensive one, but, as I have stated, it has a certain connotation in respect to the Linnaean works. I have found it expedient to treat the subject both from a historical point of view and as an elaboration of the important elements of the method. Perhaps the most outstanding asset of Linnaeus was "common sense". In the reforms of botanical nomenclature which will come within the next few decades, I believe the method of Linnaeus will play an important part. Since so much has been written about the artificial as compared with the natural system of botany, I have included at the end a resumé of the Linnaean natural system, as recorded by his students, Fabricius and Giseke. It will be seen that many things that the present-day botanist thinks of as recent developments, such as the reticulate nature of evolution, and graphic presentations of the relationship between families and genera, had already been elaborated by Linnaeus and his students. It is strange that no botanist to whom I have shown Giseke's account in the course of the last ten years (during which I have from time to time been occupied with this paper) had ever seen, or more than glanced at the work.

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As early as the spring of 1733, Linnaeus (then twenty-six years old and recently returned from his Lapland journey) had preliminary drafts of *Species Plantarum* and a general outline of the botanical works, that he was to publish from time to time. To Cronhjelm[8], then chancellor at Lund, he wrote:

"I have worked with the greatest diligence on a new System, based on a wholly new principle. Having assembled a herbarium of some thousand plants, I have examined as many species as possible, with dissection of three to four thousand flowers. From this work has come six or seven small volumes, including *Bibliographia Botanica*, which shows at a glance what each botanist has written, and an account of all previous botanical systems; *Philosophia Botanica*, which sets up rules, with examples, showing

**[8] cf. T. M. Fries, Bref och Skrivvelser af och till Carl von Linné, vol. 1, pt. 5: letter no. 1233. Vol. 1 (1907–1922), containing letters to and from correspondents in Sweden, consists of 8 parts but reaches alphabetically only through Laxmann. There are 1670 letters in this volume of which parts 7 and 8 are by J. M. Hulth. He also edited the second volume, which contains correspondence with foreign botanists, but reaches only from Adanson through Brünnich.**

the reasons for many botanical errors, which are now becoming aggravated; *Homonyma Botanica*, dealing with all the names of plants which botanists have postulated (in large measure groundless), and showing that of 2000 gèneric names scarcely 200 are correct, and of some 1000 species names hardly 100—since botanists have not understood varieties. which they hold to be distinct species; *Species Plantarum*, in which I intend to show that though botanists pride themselves on having 20,000 plant species[9], there are not more than 8000 when varieties have been placed under their proper species. Each species is to be recognized at first glance without the presence of description or figure".[10]

This new method was not perfected until 1753, with the publication of *Species Plantarum*. The species contained in this work were derived from five sources:

1. Publications dealing with plants which Linnaeus had seen growing under natural conditions, as *Flora Suecica* and *Flora Lapponica*.
2. Publications based on cultivated plants which Linnaeus had seen in a living state, as *Hortus Cliffortianus* and *Hortus Upsaliensis*.
3. Publications based on herbarium specimens, as Gronovius' *Flora Virginica* and Linnaeus' *Flora Zeylanica*.
4. Specimens in Linnaeus' own herbarium and in the herbaria of other botanists.
5. Figures, such as those of Plukenet, and of Cornut's *Canadensium Plantarum Historia* (1635), and Sloan's *History of Jamaica*, of which Linnaeus had seen no herbarium specimens.[11]

[9] Compare the notation in the introduction to *Species Plantarum;* "I have judged with satisfactory calculation that the number of species in the entire world is much less than is commonly believed, and that it hardly reaches 10,000". Considering this figure, it must be kept in mind that Linnaeus' conception of species in general was a much broader one than that of the present day. According to A. P. DeCandolle (Théorie élémentaire de Botanique 1813) Linnaeus had 7540 species in 1260 genera in the second edition of *Species Plantarum* (1763). On page 23 DeCandolle says: "There are 30,000 species of plants known in the world; 40,000 if we include all that are unnamed in our collections; and there will probably be more than 60,000 when all the continents are well investigated."

[10] In the preface to *Critica Botanica*, written from Cliffort's Museum in 1737, Linnaeus states: "As to specific names I have mentioned hardly any examples, since there are but few that are meritorious, and to very few botanists (even at this date, when we take pride in a flourishing botanical science) is it certain which plants are varieties and which are species; therefore in *Hortus Cliffortianus*, which is soon to be published through the liberality of my generous patron, I have worked hard to reduce varieties to their species, and to provide the species with specific names."

[11] Of the nineteenth century botanists, C. B. Clarke had perhaps the best understanding of Linnaean procedure. In Journ. Linn. Soc. Bot. **30**: 299. 1894, he writes: "A 'species' in his Sp. Pl. is made up of 4 (or fewer) parts, viz. (a) the citations of his predecessors; (b) the citations of pictures; (c) the diagnosis of Linnaeus himself; (d) the authentic examples in Linnaeus's herbarium. Perhaps the most important of these four is the first: Linnaeus meant invariably that his species should be the sp.

Here is bound up the most significant feature of *Species Plantarum,* a recension of previously published work [of comparatively recent authors], in which species are for the first time[12] differentiated. Previous works such as Bauhin's *Pinax* had treated various "kinds" of plants as units of equal rank. A corollary to this idea, as Lindman and E. L. Greene have already pointed out, is that varieties were first distinguished from species by Linnaeus.

In *Species Plantarum,* the species are treated from a wholly practical point of view. It was not meant to be otherwise. As a philosophical treatise on the species problem it offers little or nothing; the work is an artificial[13] system based on the number of pistils and stamens, which, as Linnaeus was wise enough to see, could not in his day be replaced by a natural system satisfactory for the practical identification of plants.

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From a philosophical point of view Linnaeus was clearly a disciple of Ray, and through Ray, of Morison. It may be added that the technical approach of *Species Plantarum,* the *methodus,* is modeled also on the work of Ray. Linnaeus' philosophical concept of species follows quite a different trend from that of *Species Plantarum* and is based mostly on experimental evidence; Ray's work forms the basis of the *Critica Botanica* and the *Philo-*

auct. of his day; Linnaeus generally draws his diagnosis by directly copying from his predecessors, only altering it so far as to make it include his authentic specimens."

[12] This does not include such fragmentary forerunners as Linnaeus' *Amoenitates Academicae* and *Flora Suecica,* the treatments of which were usually incorporated directly into *Species Plantarum.*

[13] This was only one of a number of artificial systems current at the time (cf. the fructification system of Hermann, the calyx system of Magnol, and the corolla system of Rivinus. These various systems formed the taxonomy of DeCandolle (1813), p. 24: "After having devised successfully in many groups the individual names of the plant world, we arrive at a sure means of identifying those which interest us: it is this part of plant study which I designate by the name *taxonomie botanique.*" Practically all parts of the plant were used in various schemes. Thus, as Usteri (Magazin für die Botanik 1: 15–48. 1787, under the title *Nachtraege und Fortsetzung der Linneischen Sammlung botanischer Systeme*) says (p. 16): "To proceed along the way that had been shown, and to make it the more passable, was the effort of every worthy botanist. But the nature of the thing was such that they did not work together, but went along different ways; this differentiation was, however, only superficial—for fundamentally they all worked toward the same goal—and in order to attain this goal, all the various ways had to be used, for by one way alone it could not be achieved. These various ways were the fundamental parts upon which they built their divisions, and such a foundation every part of the plant could give. There are systems which are based on all observed parts of the plant, at least in contemplation, and the greater number of them have already appeared."

*sophia Botanica*, as these works deal with the fundamental problem of species. The "constancy" of species as stated in Linnaeus' earlier works was an answer to the "transmutation" ideas of the naturalists who came before Redi, and whose influence still lingered on into the eighteenth century.[14] In rejecting ideas of direct transmutation of species, which had been based on faulty experimental evidence, Linnaeus was abreast of, or ahead of his time—as a matter of fact no one up to the present time has directly perceived the transmutation of one species into another.

It is quite fitting to quote here Chapter xxi of Ray's *Historia Plantarum* (1704), in translation:

"Plants which derive their origin from the same seed, and again propagate themselves in sowing, we may consider as belonging to a single species; for those variations of leaves, colors of roots, taste, or even colors of fruits and seeds, we conclude to be neither characters nor indices of what is called specific diversity. But this quality, however constant it may be as a sign of species, is not perpetual or infallible. Experiments have been made to try to show that some seeds degenerate and produce plants, though rarely, of diverse species from the mother . . . Galen once sowed *Triticum* and *Hordeum*, and having selected out all of the seeds which were admixed, he could with certainty tell whether *Lolium* and *Aegilops* had arisen from a 'mutation' of these, or whether each had its own appropriate seed. For, if by chance one of these made its appearance among pure seeds, as *Lolium* frequently does among *Triticum*, or the vigorous *Aegilops* among *Hordeum*, the aggressor was evident . . . These experiments, from various workers both ancient and modern, appear very similar to some of our own; partly because through error the cause was not recognized, partly because they owe their origin to philosophers or the overcredulous or to the less circumspect in tracing a phenomenon to its causes—for these reasons we hold these experiments as uncertain and suspicious. Thus we think that the father of Galen was deceived in the rationalizing of phenomena. For it does not follow that because *Lolium* is often found in *Triticum* that the *Triticum* has changed into *Lolium:* the *Lolium* might well have arisen from *Lolium* seed from a previous year. And so as to the *Aegilops:* I myself have observed that in a certain field where pure *Triticum* had been sowed, that the potent *Aegilops* had lain fallow after a whole year. Then the *Aegilops* owes its appearance to its own seeds and not to those of *Triticum*". And on p. 40: "Thus as to plants of specific conformity: there is certainty that they came from the seed of the same plant, whether as species or individual. For those which differ as species preserve their species in perpetuity, and one does not arise from the seed of the other, or vice versa."

This problem and the associated problem of the continuity of species was discussed by Hornborg under the supervision of Linnaeus in volume 5 of the *Amoenitates Academicae* (1757):

[14] This situation is well described by Bateson, Problems of Genetics, p. 3, 1913.

"The ancients thought that many plants were produced from seeds sown at the creation of the earth, when they observed various plants springing forth from soil recently dug up. Some thought that pines, when burned, turned into oak; others thought that fungi, mosses and other minute plants, as well as minute animals, originated by spontaneous generation, or by putrefaction or fermentation. This hypothesis endured until the time of Harvey, who dared to assert that all life came from the egg, and was similar to the mother . . . Nor was Redi able to obtain animalcules in putrid meat unless insects had access to lay their eggs". And in part x: "Turning our attention to plants we see the trunk of the tree extending into branches. We may compare this type of multiplication with that of *Taenia*, where any single articulation may produce a new individual . . . Or we may compare it with *Sertularia* . . . Similarly to be compared are the roots of grasses and cereals which have numerous joints creeping below the surface of the ground; . . . these plants often form gemmules which reproduce the entire plant. What mortal has ever seen a branch of a tree, of herb, of grass, or any other vegetation, however much it may be dissected, ever change its nature, or produce other plants or species? *Ligustrum*, *Tilia*, or any other tree may be repeatedly trimmed by the topiarist, as is the custom in our gardens; but no mortal has ever seen new branches of any different species regenerate . . . Nature is a law of God; constant, ever constant, is this law of nature, that organisms give rise to similar ones, and that ferocious eagles do not produce peaceful doves". Cf. also one of Linnaeus' letters to Beck (Hulth no. 657, written in 1746): "It is apparent that polyps lead a vegetable life. They increase by seeds as do plants; they increase by stems or roots as do *Salices*. Good God! the animal and vegetable kingdoms approach each other so much that we shall soon have to have a new set of surveyors to make the division lines".

These introductory statements on the constancy of species, as seen by Linnaeus in his earlier years, may be brought to a close with the related philosophical arguments on the nature of varieties, propounded by Linnaeus in section 271 of *Critica Botanica* (1731):

"All species number their origin first from the hand of the Omnipotent Creator: for species having been created, the Author of Nature has imposed the eternal law of generation and multiplication within the species itself. It is conceded that the external appearance often deviates, but there is never a metamorphosis from one species into another. Hence there is today a double differentiation among plants; one a diversity produced by the wise hand of the Omnipotent, the other of sportive Nature, showing variety in the external crust. If the garden is sowed with a thousand diverse seeds, the diligent care of the gardener aids in the production of monstrosities; and after some years it will contain six thousand varieties, which the ordinary botanist calls species. I therefore distinguish species of the Omnipotent Creator or true species from the monstrous varieties of the Horticulturist . . . These monstrosities luxuriate in variegations, multiplications, doublings, proliferations, and fascinate the eyes of the beholders with their protean variation, as long as the gardeners make daily sacrifices for their idols. If they are neglected, these ghosts of variability fall into ruin."

## The Genus

The *Genus* was elaborated in Linnaeus' *Genera Plantarum* (1737)[15]. As I have pointed out, it may be considered the oldest of the botanical groups. Genera of Bauhin contained, more or less indiscriminately, items which were placed by Linnaeus under their proper species and varieties. Generic names frequently came from Tournefort or even older writers, but some were based on collections of Gronovius and the American plants obtained by Kalm. Thus in *Amoenitates Academicae*, generally accepted as the work of Linnaeus[16], his student Chenon (**3**: 1–27. 1751) states under the title "Nova Plantarum Genera": "Since Professor Kalm, lately returned from Canada, has detected many new genera . . . (p. 3), with these brief remarks I proceed to propose as new those genera which are established by Kalm's plants, together with his notes which were communicated to me." These new genera are: *Lechea*, *Sarothra*, *Alethris*, *Helonias*, *Dirca*, *Kalmia*, *Gaultheria*, and *Polymnia*. These genera were incorporated without further change into the first edition of *Species Plantarum*, an example (*Lechea major*), being as follows:

2. Lechea foliis ovati-lanceolatis, floribus lateralibus vagis.
   Gen. nov. 1074. f. 4*.
   Habitat in Canada aridis.

The *genus* and *species*, under the Linnaean method, were the stable and fundamental categories, i. e. they were "natural" units (Philosophia Botanica, section 162). Superior groups, the *class* and *order*, were to be considered as both natural and artificial; the lower group, the *variety*, was in general to be considered the product of cultural conditions. The *character*, or definition of a genus (Phil. Bot. sect. 186) was of three grades, depending upon the amplification:

[15] This publication, dealing with the larger, relatively simpler group, i. e. the genus, was a forerunner of *Species Plantarum*. In par. xxvii: "Species heic nullas trado; quas diagnoscere facillimum erit Botanico ex datis Characteribus; qui has desiderat ex meis principiis, eas partim in *Flora Lapponica* quaeret, sed maximum numerum ex *Horto Cliffortiano* petat". . . [I treat no species here; these can be easily distinguished by the botanist from the given characters; whoever wishes these species, based on my principles, will find them partly in *Flora Lapponica*, but for the greater part in *Hortus Cliffortianus*.]

[16] B. D. Jackson, Authorship in the Amoenitates Academicae, Journ. Bot. 51: 101–103. 1913: "He [Linnaeus] (p. 102) plainly looked upon these productions as entirely his own."

(1) The *natural character* (189) was the basis of all systems, and included all possible *notae* of the genus, both macroscopic and microscopic (191), except for such common *structurae naturalissimae* as only idiots (59) bothered to describe. "The *natural character* is absolutely fundamental for the recognition of plants and cannot be neglected; it is, however a work of infinite labor before characters are evolved which accord with all the species of the genus. The experienced botanist alone (193) can best make the *natural character*, which should be drawn up from an accurate description of the *primae speciei*[17], with which all other species of the genus should be carefully compared, in order to exclude all discordance. No character is infallible until it has been applied to all the species of the genus. Difference in structure of the fructification (92) is the basis of genera.[18]

(2) The *factitious character* distinguishes a genus from all other genera of the same artificial order (188). The few *notae* (which are taken from the *natural character*), suffice to distinguish genera. The *factitious character*, or *diagnosis* (188)[19], as Linnaeus states, was defined by Ray (188): "the characters of a genus are not to be multiplied except from necessity, and not more are to be assembled than are necessary for definitely determining the genus." *Factitious characters* (190) have been proposed by those who introduce *notae* in an artificial method, by which they are able to distinguish genera placed within the same order; thus they were used by Ray, Tournefort, Rivinus, and many previous authors.

(3) The *essential character* (187) distinguishes the genus by a single peculiar or unusual character (such as the nectariferous

[17] This is the only reference I have found in Linnaean literature to the "type method". It does not necessarily refer to the first species published under the genus in *Species Plantarum*.

[18] Every *nota characteristica* depends on the *number*, *figure*, *proportion* and *place* of the differentiating parts of the fructification (86). These are: calyx (including glumes of grasses, spathes, bracts of aments, involucrum of *Umbelliferae*, etc.), corolla (including petals and nectaries), stamens, pistils, pericarp (capsules, legumes, pomes, etc.) seeds, and receptacle. These various parts (167) of the fructification number 38. When multiplied by 4 (number, figure, situs, and proportion), 152 combinations are possible; by recombination of the 38 parts, there are 5776 possibilities, far more than sufficient for the number of genera.

[19] This is the only instance where I have seen this term used by Linnaeus. It has been misapplied to the Linnaean specific name. At the present time it is used much in the manner of the *factitious character* of Linnaeus for a brief condensation of the description of a genus or of a species, but without the differential feature which was fundamental to the Linnaean specific name.

pores at the base of the petals in *Ranunculus*, or the capitate fruit of *Magnolia* with seeds pendent by threads (105). It is the easiest way to know plants, and is used to distinguish genera of close affinity in a natural order by one or two *notae*. It is selected from the *natural character*. "If the essential characters of all the genera could be detected the recognition of plants would be easy, but whoever thinks that he can know botany from the *essential character* to the neglect of the natural character deceives himself. In the detection of new genera, without the *natural character* there would always be doubt (191)[20]."

The foregoing three characters of the genus—which have been quoted from *Philosophia Botanica*—show different human aims. The *natural character* represents the complete description of the genus, upon which the natural system could be based. This type is the basis of *Genera Plantarum*. The *factitious character* was a selection of characteristics, such as would suffice for separation of genera in an artificial system or key. It has been in use from time immemorial. The *character essentialis* represents the simplest method of recognition. This triple method of working out the genus, it will be seen, was also a prototype for the Linnaean treatment of the species.[21]

Genera were described in *Genera Plantarum*, and in conformity with the conciseness characteristic of Linnaeus, the genera were not again treated in *Species Plantarum*. The preface to *Genera Plantarum* contains a number of statements of importance in the Linnaean method, though the idea of fixity of species expressed in this early work was considerably modified in later years. The most important ideas (from our point of view) are perhaps the following:

[20] The question whether a generic character (in the modern sense) can delimit a genus *per se* arises constantly. The *essential character* of Linnaeus (such as thread-pendent seeds of *Magnolia*) was founded only on unusual structures.

[21] The factitious, essential, and natural characters were briefly discussed by Thornton, Elements of Botany (1812) p. 83–85, without much understanding:

1. The *factitious character* is employed in tables to discriminate all the *genera* falling under each particular Class and Order (*Vide* our British Flora).

2. The *essential generic character* comprehends all the distinctions requisite to discriminate any *genus* from all the other genera in the world . . . the multitude of genera is great, amounting . . . to considerably more than 2000.

3. The *natural generic character* is a careful description of all parts of the fructification, as the *Calyx*, *Corolla*, *Stamina*, *Pistilla*, *Pericarp* and *Seed;* and this was what Linnaeus particularly prided himself in . . .

"Names of plants are generic and specific (in case there is more than one species in the genus). There are as many species as there are diverse forms produced by the Infinite Being in the beginning; these forms have produced descendents, but always similar, according to the known laws of generation, so that the species which we now have are no more than there were in the beginning. Therefore species are as many as there are diverse forms or structures of plants occurring today, excepting those in which habitat or some other cause has produced differentiation (i. e., *varieties*). Genera (section 6), therefore, are as many as there are common attributes next [in rank] to those of distinct species, such as were created in the beginning: this is confirmed by revelation, experiment and observation. Hence *all genera and species are natural.* We must attentively and assiduously, by observation, inquire into the limits of genera. These limits may be difficult to determine, but *confusion in genera means confusion in everything.* I inculcate on all true botanists, if stability in this art is to be desired, that *all genera and species are natural;* unless this principle is assumed there can be no soundness in the art.

Natural genera (section 10) being assumed, there are two requirements for maintaining them sound: that only true species and no others be placed in the genus; that each true genus be circumscribed by limits and terms which we call the *generic character*. No authority except dissection in the herbarium should be acknowledged.

Icones (section 13) are not recommended for determination of genera: before the development of the alphabet it was necessary for things to be expressed in pictures where speech was not possible. Upon written words a genus can be more firmly based, and it is not always practicable to publish a picture. In a given genus the shape and number of parts differs in the various species, and the position and proportion of the parts must be established with care. This cannot be done in an illustration unless figures of all species are given. Thus for fifty different species, there should be that number of illustrations. Therefore, to omit the differential characters and describe only similarities is far less work and easier to understand".[22]

As Spring (op. cit.) states (1838, p. 88) most genera in practice are artificial, inasmuch as they do not actually represent the next entity above the species, but only the relative goal of easier classification. But all should [theoretically] be natural, since (1) they have natural entities [i. e., species] as their base, and are built up on the same principles as are species; and (2) genera must (of necessity) be set up if there is a similarity which affects the whole plant and not merely the individual parts, and if a disconformity (Bildungsabschnitt) or change in nature is suspected. The existence of genera in Nature is apparent only by induction. Di-

[22] The reader will realize how difficult it is to illustrate a genus pictorially, and that illustrations of genera are almost invariably delineations of individual species. This question was discussed by a nomenclature committee in Journ. Bot. **30**: 242. 1892: "But a picture can never show the special characteristics alone, which raise the genus above the other of its affinity. A genus only gains priority by a verbal diagnosis".

rect proofs of the existence of genera fail us. But this is true also of species and no one doubts that there are natural species. Both are abstractions (p. 89), for the individual alone appears bodily in Nature. That natural genera exist is shown in their unrestricted sense in the speech of various peoples. Everywhere one finds similar species consolidated under a single genus name, but seldom do vernacular names conform to true species (p. 90). Even among uneducated peoples, the pink, the rose, tulip, grass, the owl and the eagle are seen as genera. As natural history rose among the Greeks and Romans, genus names increased accordingly, while species were differentiated only by occasional and changeable names. It is, as a rule, easy to recognize concretely what differentiates and what binds together (p. 96); "but to find the exact point wherein things differ and where they are similar, and to explain the situation in measurable terms, is very difficult."

This question as to whether or not genera are "natural" came up at an early date, and still persists in some form or other.[23]

[23] Cf. the question, "Which in your opinion is the more natural unit among the flowering plants, the genus or the species? (i. e., which of the two more often reflects an actual discontinuity in organic nature) by Anderson in the "Concept of the Genus", Bull. Torrey Club **67**: 364. 1940. I believe that I was one of the few who replied that the question was meaningless, for the *genus* and the *species*—at least in Linnaean taxonomy—are both natural by assumption, hence the limits of these entities are represented by discontinuities. As revealed by the answers, the hypothetical question was understood as, "On the basis of *present* (or *past*) *taxonomic usage* is a discontinuity found between genera more frequently than between species?" The difficulty and necessary ambiguity in answering this question becomes apparent from Weatherby's statement in Rhodora **44**: 160. 1942, "So long as we have to rely on judgment at all, the accuracy and soundness of any taxonomic category, definition or no definition, will be in direct proportion to the accuracy and soundness of the individuals who apply it".

It was precisely here that Lamarck differed from the Linnaean point of view, to quote from Lamarck, Illustration des Genres, p. xv. 1791 (in translation): "If Linnaeus, instead of attributing genera to Nature, had considered them as assemblages of species approaching one another in most respects, and at the same time of assemblages well detached from one another by artificial limits . . . he would have prescribed laws convenient for guiding the establishment of limits of these assemblages. By these laws he would have prevented and moderated the arbitrariness which exists among nearly all botanical authors, who, without any rule which suits them well, continually are making innovations. Some reunite many genera into one, but more often form several genera from the species of a genus already established, which they distinguish by certain considerations chosen for this genus alone. The essential object in the formation of genera is to diminish the quantity of names to be retained in the memory, a quantity which would be enormous if a simple name were given to each plant . . . Two forces must of necessity be taken into consideration in the establishment of genera, that is to say, in the distribution of separating lines which one chooses for the genera: 1) it is important that genera should not be too numerous in species; 2) genera must not be too much reduced, and they should comprise, as far

Thus, in Ortega's edition of *Philosophia Botanica* (1792), in the "Annotationes, Explanationes, et Supplementa" (p. 410) there is a discussion of the Linnaean precept, "*Omnia Genera et Species naturales esse, confirmant revelata, inventa, observata*". Of this phrase Ortega says:

"That species of plants were created by God at the beginning of the world and do not change into other species, and are therefore *natural*, and that they remain unchanged to the present day no sane person will doubt; the confusion which would arise from the change of one *Species* into another, to the detriment of mankind, would not be allowed by the most provident Maker. And *Genera*, inasmuch as they are composed of *natural species* might also be said to be natural: but that God, all powerful in creation, has made the *Species* of plants with similar marks and characters, so to be distinguished that all of these species fall into certain *Genera*, just as families are diverse from one another, I do not dare to affirm. *A posteriori*, certainly many *Species* are to be observed with so many characters, especially of the fructification, in turn consistent with or different from other *Species*, that they can readily be referred to the same *Genus* in conformity with our art. But on the other hand, there are individual *Species* which could in no way be associated with others to constitute a *Genus*. And the idea of a *Genus*, if I am not mistaken, always involves the idea of several species similar to one another, and

as possible, a certain set number of species". And p. ix: "Linné, wishing apparently to give to genera a consideration which they did not have, pronounced anathema against those who were assured that there were no genera in Nature. He had, without doubt, more ability in supporting his opinion by trenchant decision, and by the pretended axioms and laconic maxims with which he has filled his *Philosophia* and his *Critica Botanica*, than by solid proofs which alone would convince those whom he could not win over by authority; proofs that he always forgot to establish."

The opinion of Asa Gray was still different (Structural Botany, p. 323, 1879): "Constituted as the vegetable and animal kingdoms are, the recognition of genera or groups of kindred species, is as natural an operation of the mind as is the conception of species from the association of like individuals . . . The number of species in a group is immaterial, and in fact is very diverse. A genus may be represented by a single known species, when its peculiarities are equivalent in degree to those which characterize other genera . . . If only one species of Oak were known, the Oak genus would have been as explicitly discerned as it is now that the species amount to three hundred; and better defined, for now there are forms quite intermediate between Oak and Chestnut . . . (p. 324) So that the recognition of genera even more than of species is a matter of judgment, and even of conventional agreement as to how and where a certain genus shall be limited, and what particular association of species shall hold the position of genus".

Linnaeus gave the clever answer to this problem by stating that the genus was "natural", but that the limits could not be determined until all the species of the genus were known. He wisely left the differentiation of genera to a succeeding generation. The real question at hand is whether we wish to have all of our genera "natural", that is bounded by discontinuities, and I think that our answer, as it was with Asa Gray, is "No!" No more disastrous way could be found for destroying the stability of our nomenclature. In large genera only a very few species approach the theoretical boundary line against which the adjacent "unnatural" genera eventually impinge, the point at which there should be "conventional agreement as to how and where a certain genus should be limited". As in many other things, we must formulate here a compromise between the practical and the theoretical.

Linnaeus himself says (Canon 159): 'There are as many genera as there are similar structures of fructification produced by diverse natural *Species*'. The similitude cannot exist unless it is shared by at least two species, despite whatever Linnaeus may have precariously asserted in Canon 203. For of the species which he had considered as solitary, several have proved not to be so, since congeners have been detected in *Dodartia, Hydrophyllum, Corymbium*, and *Gloriosa;* as to the others it is prudent neither to assert or deny what may be their future status . . . We do not wish to raise the nominal question whether plants have really been formed by God into *Natural Genera;* we rather offer the definition of a genus in the judgment of the learned, as follows: 'There are as many genera as the *Natural Species* show different forms of fructification'."

The modern problem of the limits of genera thus had raised itself at an early date. Ortega (op. cit.), in discussing the statement of Linnaeus (Phil. Bot. 160) that "*artificial classes are a substitute for the natural until all the natural classes have been detected, and because many genera are as yet unknown, the limits of classes present the greatest difficulties,*" says that the same, in his judgment is true of the limits of genera. If all plants (cf. Linnaeus, Phil. Bot. 77) show an affinity on either side, then that affinity would increase more and more if all species were detected. And he quotes from Oeder (Fl. Danica, Fasc. 2, introd. p. 12); "If we are really willing to confess, it is not allowed us or ever will be, to know the differences which exist between plants or to set up invariable limits of genera or of superior or inferior groups. Not only may the author of such limits modify these limits from time to time, but others may be led by sufficiently strong arguments to acknowledge these changes".

The younger Linnaeus, in the preface to *Supplementum Plantarum* (1780), was cognizant of some of the difficulties:

"I have tried, as far as possible, to make few new genera; whatever plants could be transferred to some genus already recognized without danger to the character essentialis, I have assigned to the genus, even though there might be only a single character in diagnosing them. In this respect I am in disagreement with many botanists of our time, who seem to be persuaded that *the genus produces the character*. For I have found in my experience, that too numerous genera unnecessarily extend the science, separate affinities, multiply difficulties in distinguishing the genera, and furthermore impede the perception of the character essentialis".

Thus the character or *nota* appeared—and this is true also in modern taxonomy—as a sort of "doctrine of signatures" which revealed to what genus the species was to be allocated. And the variation in human judgment in selection of characters and their delimitation has produced a sort of fantasy which has its main significance and stabilization in the historical view which is called "usage". To this stabilization the "doctrine of descent" has not added as much as was anticipated in the late nineteenth century; as a matter of fact, by injecting the additional dimension of "time", the evolutionary point of view has sometimes complicated rather than simplified the situation, leading to many tenuous modifications of nomenclature based on theoretical phylogeny.

As A. P. DeCandolle explains it (Théorie de Botanique . . . 187. 1813): "The second rule Linnaeus announces to us in his laconic style in the words *character non facit genus*, that is to say, in order to make a genus it is not sufficient to have any isolated character, taken from the fructification and separating one or many plants from those that resemble it, but it is also necessary that the plants themselves be distinguished from others and approach them in 'l'ensemble de leur végétation'. This sage principle is the veritable touchstone of genera, and should always be in the eyes of the naturalist". Cf. *Critica Botanica*, 169: "Characterem non constituere Genus, sed Genus characterem". [The character does not make the genus, but the genus makes the character].[24] The corollary is the Linnaean statement that the limits of a genus cannot be definitely determined until all the species of the genus are known.

As to any single character alone characterizing a genus, the opinion of Linnaeus was probably much like that of many modern botanists, such as that of Pittier (Contrib. U. S. Nat. Herb. **20**, pt. 2:40. 1917): . . . "the differential characters of the genus (*Lonchocarpus*) are never absolute when taken singly . . . Every one of these characters, considered separately, will be found to be shared with other more or less related genera,

[24] Cf. the footnote in Ruiz & Pavon, Fl. Peru. Prodr. p. 41: "This genus (Gilibertia) and the preceding (Tovaria) were opposed by Cavanilles because, as he says, they were founded without any criteria. Though there may be only one species in *Tovaria*, he says there is nothing constant in *Tovaria stigmata peltata et septemfida* to be a generic character, since the number of parts of the fructification is *sometimes eight or rarely nine*, as was mentioned in the *Observ.* . . . It might be noted, as Ruiz has added, that there is no genus if there is only one recognized species . . . For it is well known to all that no generic character is well constructed, or at all stable, unless all species of the genus are discovered and recognized. For this principle Linnaeus, 'Botanicorum facile Princeps', set up Canon 193 in his *Philosophia Botanica*, where he says: 'No character is infallible until it has been applied to all the species of the genus.'".

but it is their concurrence upon which the genus *Lonchocarpus* is based". There seems to be such a thing as a generic character *per se* only in the relatively unusual *nota singularis* of Linnaeus.

The most important statements of Linnaeus as regards the Genus are in sections 169 and 170 of *Philosophia Botanica*, and these all tend to emphasize the relatively unstable limits of the genus as compared with the species:

"*Notae characteristicae* which serve for stabilization in a certain genus may be of little value in some other genus. For you know that the character[25] does not constitute the Genus, but the Genus the character; that the character flows from the Genus, and not the Genus from the character; the character is set up, not that the Genus shall be made, but that the Genus shall be known. Therefore the greatest botanical heresy is to set up innumerable spurious genera, to the detriment of botany. A genus is rarely observed in which some part of the fructification[26] is not aberrant. Many *genera ficta* have arisen from species diverse in some part of the fructification: e. g. in *Carduus*, *Euphorbia*, *Hibiscus*, *Ranunculus*, *Gentiana*, *Primula*, *Bidens*, etc. Unless this principle is assumed there will be as many genera as there are species".

Linnaeus has something to say, also, on the opposite side of the question:

"In many genera a *nota singularis*[27] of the fructification will be observed, but if it is not present in all the species of the genus, care must be taken that several genera were not originally included—for example, *Erica* and *Andromeda* were formerly placed in one genus, but the awned anthers are peculiar to *Erica; Aloe* and *Agave* formerly constituted a single genus, but the stamens of *Agave*, inserted on the corolla and not part of the receptacle, distinguish the two genera. The more constant a part of the fructification may be in many species, the more certain it is that a generic character (*nota*) is present [174]. In some genera one part, in other genera another part of the fructification will be found the more constant; but none are absolutely constant. If the flowers are the same, but the fruit differs, all other things being equal, the genera should not be separated [176]".

And in *Critica Botanica* (section 281):

"Generic characters [*notae*] used for [specific] differentiae[28] are absurd. The beginner, when he first starts to examine the fructification, finds so

[25] This term, as I have mentioned, is used in the sense of "generic" description; for the individual "character", in our sense, Linnaeus uses the term "nota".

[26] This Linnaean term includes also the flower.

[27] Based on the number, figure, proportion and site of various parts of the flower and fruit (Phil. Bot. 92) a triple classification is to be derived: *Naturalissimam*, *Differentem*, and *Singularem*, and upon these are based respectively the Natural, Factitious, and Essential Characters of the Genus.

[28] It should be emphasized here that the species within a genus were distinguished and delimited by the *differentiae* which were part of the specific name. This was not done for genera by Linnaeus, the genus being set up merely as a synthesis of species. The limits of genera are, in common experience, more vague and less easily drawn than are

many individual characters [notas singulares], almost infinite, that he believes that no one before him has examined the flowers, and that there are almost as many new genera as there are species; but when several years have passed in such examination, he first finds the essential generic characters, and begins to distinguish them. Then he easily falls into the other extreme, and has doubts in everything."

The following translated quotations from letters of Linnaeus (Hulth 1907–1912) provide a commentary:

No. 545. To Bergius, Dec. 12, 1770. "*Erica* is undoubtedly one of the most difficult of genera. If it is at any time to be worked out, I think the following would be necessary: 1) sufficient *differentiae specificae,* so that the species could be clearly and securely distinguished; 2) *correct descriptions* and *figures;* 3) synonyms, preferably from accurate figures. As far as synonyms are concerned, I think it is better to have a few sure ones, for many figures are uncertain, and when we do get them they are often distorted. To get figures accurately made here, has been and will always be impossible for me.[29] I believe that if you and I should go into partnership, that we would have most of the Ericas. You have seen how difficult, if not impossible it was to evaluate certain synonyms, until a great many species were made known. I could have sworn that your *E. Plukenetii* and mine were the same species if I had not seen both of them."

No. 620. Browallius to Linnaeus, Jan. 24. 1745. "From Kalm's letter I see how your *Peloria* has caused alarm in the ranks; but I really think you should not be troubled too much about it, since if it throws over some of the *principles assumed for setting up genera,* so much to the good. And you well know that you have never thought otherwise than, since genera are the work of man, that man can also be mistaken. But one should especially be careful of the dangerous statement that this species might have been produced after the Creation. Species the

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the limits of individual species. Between many genera,—such as *Aster* and *Erigeron, Oldenlandia* and *Houstonia,* or *Rynchospora* and *Dichromena*—the distinctions become merely academic, or indeed invisible. The situation may be compared to the contiguous or separated circles which illustrate the relationship of the orders in Linnaeus' Natural System (see discussion at the end of this paper) and which are graphic illustrations of his statement: "Natura non facit saltus. Plantae omnes utrinque affinitatem monstrant, uti Territorium in Mappa geographica". From a dynamic point of view we may think of genera as broadening concentric circles such as the rings formed by pebbles thrown into water: the initial impact representing the type species of the genus, and the resulting concentric rings the accretion of species through historical usage. Not until such a circle impinges upon other circles is the practical problem of generic limits involved. This problem may be solved by somewhat arbitrarily dividing the few transitional species which occur at the borderline, chiefly according to usage, between the component genera, or of combining the two genera into one. The first method gives us stability of generic nomenclature. The second leads us to eternal instability, in an attempt to complete the "chain of nature" or the "phylogenetic tree". In the flowering plants, at least, our progress does not seem to have been very marked during the past century.

[29] Linnaeus was never able to obtain funds at Upsala or Stockholm for sumptuously illustrated botanical works, such as were published in Holland or England. For further notations on synonymy and illustrations the reader is referred to succeeding sections of this paper.

Creator has determined through [unchanged] *propagation by seeds.* Genera are the first and smallest group of species, and they do no good except to bring simplicity into the study of elementary botany. And things should not seem too strange if a new observation discloses something that goes against previous rules. One must in such cases cling to Newton's rule: *against truths established on the basis of a comprehensive and certain experience, no objections are admissable except those drawn from experience; then first should a doctrine be offered, bounded by these limitations.* The same thing can happen in botany that we have seen in the history of magnetism, electricity, and endless other things".

As a final word on the Genus, I quote from A. P. DeCandolle's "Théorie de Botanique" (1813), p. 260–261, to show how much the understanding of Linnaean method had already gone astray.

"Generic characters vary, according to whether they represent a natural or an artificial order. Linnaeus distinguished two sorts of characters: one, which he called *essential*, stated only what he considered necessary to distinguish a genus from others in the same class; the other, which he called with reason *natural*, contained a short description of all the parts of the fructification. Distinction between these two types of characters was indispensable in an artificial system. One can, in an artificial order, understand very well the essential character of a genus without having the least idea of the real form or of its nature or relationships, which are what one finds in the natural character . . . all that one finds in the natural characters of Linnaeus is implicitly stated in the character of the family and the tribe . . . If a genus has several characters particular to it, one does not fear to use all: thus my generic characters are somewhat longer than the essential characters of Linnaeus, but we avoid also the descriptive or natural characters. The generic characters should be treated in a sequence similar to those of a family: 1) the reproductive structures, which are to be considered as the true distinctive character; 2) the vegetative organs; 3) observations peculiar to the genus and showing the natural affinities."

## The Species

"The Ariadnean thread of the systematists terminated in *Genera*, but I have attempted to extend it so far as *Species*, for which I have made proper differentiae; so that by these differentiae they may endure, for all true recognition begins with the recognition of species. Whatever botanists had built formerly is now collapsed, for it lacked a suitable foundation. But a strong botanical science has grown up in the last eighty years, now so firm that there seems no possibility of its collapse. For there is a solid foundation of species and a definite certainty in genera; for if genera are confused, then everything is confused." Linnaeus, Introduction to *Species Plantarum*.

## The Specific Name

The principle element of *Species Plantarum* was the polynomial specific name, and upon its construction Linnaeus lavished his skill and placed his greatest emphasis.[30] The specific name was a series of descriptive words (*differentiae*) selected according to rules laid down in *Philosophia Botanica*, by which each species was to be differentiated at first glance from all others in the genus. This method had already been in use in Linnaeus' earlier works and in those of Gronovius and Royen, who were both under the tutelage of Linnaeus.[31] Indeed these polynomials are the definition or boundaries of the individual Linnaean species, which represent units of practical usage within the "compendium" (i. e., "Species Plantarum") of virtually all previously published names, figures, and descriptions. In other words the synthesis of these names, figures and descriptions, together with associated herbarium specimens, constitutes the "species" of Linnaeus. It will be noted that these Linnaean species are in general more comprehensive than species of present usage. The Linnaean species was a somewhat arbitrary unit—according to our standards of today—separated from all other species of the genus by means of the differentiae within the specific name, the entire treatment being comparable to, or even identical with, our modern keys to the species within a genus. These specific names were arranged in numerical order, each preceded by the generic name, with a "trivial" name added in the margin. As an example, with synonyms and bibliographic references omitted, may be cited the first genus treated in *Species Plantarum:*

1. Canna foliis ovatis utrinque acuminatis nervosis. *Indica.*
2. Canna foliis lanceolatis petiolatis nervosis. *angustifolia.*
3. Canna foliis lanceolatis petiolatis enervibus *glauca.*

When genera came to be revised in *Species Plantarum* from their treatment in earlier Linnaean works, a revision of specific names was often necessary in order to provide adequate differentiae. Thus we have (p. 113):

1. Plantago foliis ovatis glabris, nudo scapo tereti, spica flosculis imbricatis. *major.*
   Plantago foliis ovatis glabris. *Hort. Cliff*. . . .

[30] Introd. Sp. Pl.: "To set up the essential characters for the specific name is not an easy task; for it requires an accurate knowledge of many species, a most attentive investigation of the parts, the selection of differentiae, and finally the proper application of the art of terminology, in order that the briefest and most effective name may be arrived at."

[31] Introd. Sp. Pl.: "Differentias specificas antehac Plantis non paucis imposui in Flora Lapponica, Suecica, Zeylanica, in Horto Cliffortiana, Upsaliensi. Iisdem principiis institere Botanici Gronovius, Royenus, etc.".

contrasted with a new species:

2. Plantago foliis ovatis glabris, scapo angulato, spica flosculis distinctis. ***asiatica.***
   [Here follows a short description].
3. Plantago foliis ovato-lanceolatis pubescentibus, spica cylindrica, scapo tereti. *Hort. Cliff.* 36. *Fl. Suec.* 123. etc. ***media.***
4. Plantago foliis lanceolato-ovatis pubescentibus subdenticulatis, spicis cylindricis pubescentibus, scapo angulato. *Gron. virg.* 16. ***virginica.***

The characteristics of the specific name and rules for its formation I have extracted from paragraphs in *Philosophia Botanica* (1751), together with some of the longer explanatory notes provided in "Critica Botanica" (1737).

256. A plant is perfectly named when it has a generic and a specific name. The idea of a species lies in the essential character by which alone the species is distinguished from its congeners. The *differentia specifica* contains the characters (*notae*) by which a species is distinguished from its congeners. Therefore the specific name contains the essential characters of the *differentia.*[32]
257. The specific name should distinguish the true plant from all congeners. This is the fundamental rule for specific names; if neglected, all will be confusion. All nomina specifica which do not distinguish a plant from the congeners are false; and all nomina specifica which distinguish the plant from others not in the same genus are false. The *nomen specificum* is therefore the *differentia essentialis.*
258. The specific name makes the plant recognizable at first glance, since it contains the differentia inscribed in the plant itself. The *character naturalis* of a species is the *Descriptio;* but the *character essentialis* is the *Differentia.* I was the first to base *nomina specifica* on essentials; previously no differentiae of value had been set up. My *nomina specifica* are based on *Differentiae* taken from the *Descriptio;* from the *Differentiae* is traced out the *character essentialis* in which nomina specifica are constant. Some of the recent botanists, such as Royen, Gronovius, Guettard, and Dalibard have accepted this method in entirety; Haller, Gmelin, and Burmann have accepted it in part. To be excluded from the specific name are all accidental things not existing in the plant itself or things which are intangible, such as place, time, duration, or use.
282. Every differentia is of necessity derived from the number, figure, place and proportion of variable parts of plants. These four fundamentals are the same as in genera, and they are constant everywhere: in the

[32] It would be quite possible to have a specific name without differentiae. Such, in general, were the pre-Linnaean specific names. Only in the Linnaean method did the specific names become mutually dependent on the adjacent specific names. More extended accounts of a species, such as a *descriptio*, might also have *differentiae;* but such as were selected for use in the specific name became the *differentia specifica.* Since in the specific name only restricted or essential differentiae were permitted, the *nomen specificum* became actually the *differentia essentialis* (cf. 257 and following sections).

[living] plant, in the herbarium, and in icones. (Critica Botanica: On these four fundamentals—number, figure, proportion and place—depend the external structure of the plant by which alone its difference from others is represented to us. It is these characteristics and no others which we represent in icones. It is these which we preserve in the herbarium, for all others may be accidental. • No character in any part of the plant which cannot be referred to one of these four, can we assume as perfect and certain).

283. Care must always be taken that the variety is not used in place of the species. This is a difficult problem and must be looked into with the greatest of care. Errors arise and we are frequently blind, the chief causes being as follows: 1) the diversity and variability of nature, never ceasing in its operation; 2) the diversity and peculiarities of regions and climates; 3) remote places of origin; 4) the brevity of human life, which by fate perishes at an early day. (Critica Botanica: Figure, number, proportion, and location give us clear ideas, nor do they ever fail us; but, assuming them to be of fundamental importance, it is necessary to apply them to stable and not variable parts. Figure, number, proportion, and location do vary in plants, though rarely, and not all at the same time, nor in all parts of the plant at the same time. They vary, though less than other characteristics, and not enough to cause structural differences. Thus the task of the botanist in *differentiae* is double: to distinguish varieties from species and to express in exact words the characters which are inherent in distinct species. . . . The botanist who is more accustomed to the herbarium than living plants thinks the smallest difference to be the character of a distinct species, but he who has gone through the fields finds new species more difficult to discover. Likewise, they who cultivate plants in gardens only, where plants often change, commonly believe that they have more species than actually is the case, if they do not take the trouble to examine wild plants. To prevent unnecessary species there is no more apt and certain method than: 1) a careful examination of all parts of the plant, especially the fulcra [i. e., stipules, bracts, etc.]; 2) careful study of the ovary in all its parts; 3) a search for the most apparent differentiae in related species, for Nature does not make a *saltus*, but commonly uses the same method in a single genus; 4) a search for affinities or diversities, if any, in species which have been placed under another and adjacent genus because of diverse habits; 5) cultivation in diverse soils, which often change species already transformed by culture).

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To separate species or genera by a single character, if possible, has always been a goal of systematists, ancient and modern. Such a single character is seen in "*Eriophorum spicis pendulis*" in *Flora Lapponica*, and it constitutes a *nomen specificum essentiale*. Where several characters are necessary, the specific name becomes *synoptic*, as in "Salix *foliis subintegerrimis lanceolato-linearibus longissimis acutis: subtus sericeis, ramis virgatis*" of *Flora Suecica*. For these procedures, the following extracts from *Philosophia Botanica* and *Critica Botanica* are quoted:

288. The true nomen specificum is either *Synoptic* or *Essential*. Nomina specifica distinguish species definitely, easily, and with certainty. A selection should be made from all possible differentiae of the species, from which the most outstanding are chosen, so that, finally, the species will be clearly recognized. (*Critica Botanica:* The *nomen specificum* is worthless unless there is a primary characteristic taken from the differentiae, by which I can rapidly, surely, and easily distinguish the species from all others in the same genus. Therefore all nomina specifica are false and not genuine, which include other characteristics (notae) than those distinctive of the species, since then the treatment runs into a *descriptio*. If I find no characteristic [nota] alone peculiar to the species, it is necessary to look for a few characters common to a few species of the same genus, but not to all the species; and these characters being found, then one peculiar in a higher degree, until I finally come to the ultimate subdivision. Hence all specific names are said to be either *essential* or *synoptic*. The differentia may be partly essential, partly synoptic; for if I begin a specific name by synoptic division, as soon as possible I shall use an essential character by which the name may be readily shortened).

289. The synoptic name employs semi-dichotomous characters for the plants of a genus. Where the *notae essentiales* cannot be found, it is necessary to make the differentia by synopsis; therefore the synopsis is a substitute for the *differentia essentialis*. In large genera we must usually employ the synoptic method.

290. The *nomen specificum essentiale* (288) has a single character of differentiation, peculiar to this species alone. It is presented in one or two words, or as a single idea. When genera and species have been stabilized, limited by the *differentia essentialis*, we have reached the highest point in *re Herbaria*. This name commends itself in brevity, facility, and certainty. A synopsis should not be admitted into the *differentia specifica* when a *nomen essentialis* has been detected; when the *nomina essentialia* have been worked out, we have reached the final goal.

294. Whoever discovers a new species adds not only the differentia of this species, but emends the differentiae in other species of the genus, so that the species may be distinguished in posterity.

Closely bound up with this last statement is the practical usage of synonyms. Under section 318, Linnaeus mentions that the earliest botanists were content with generic names.

"Succeeding botanists applied names arbitrarily, but Caspar Bauhin (1622) combined the names of these previous authors and reduced them to 6000. The 'Curiosi', interested only in new plants, doubled the number of names which previous authors had made. Bauhin's 'Pinax' was continued by Sherard, and in 1728 he left it to Dillenius, who died in 1747 with the work still uncompleted. Haller, in various publications, elaborated the absolute synonymy of the plants of Switzerland. A work of absolute synonyms is of the greatest necessity to botanists, for if the name of one author is detected all [the synonyms] are known."

Among synonyms (319) the best name leads the list, and it should be so chosen by the author, either from among his own names or from someone else's. Synonyms (320) may be arranged in two ways, either descending (from the oldest to the newest) or ascending (from the new to the ancient). In the *descending*, the author's name heads the list, and the synonyms are arranged chronologically, as with Haller and Dillenius. In the *ascending*, names are arranged by genera [i. e., not mixed], and these proceed from the more recent to the ancient; this form has most often been used by me.[33]

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With this account of the specific name and its differential function together with a very brief review of synonymy, we are in a position to treat the subject from the practical view of modern nomenclature. In 1939[34] I came to the conclusion that the recent change in the name of the northern red oak (*Quercus rubra*) was wholly unnecessary. And the same applies to many other Linnaean names that have been shifted about, chiefly, it seems to me, from a lack of understanding of the Linnaean method. The Linnaean treatment of the American oaks, with the exception of *Q. Phellos*, is reproduced here from the first edition of *Species Plantarum:*

[p. 995] 6. QUERCUS foliis ovatis indivisis spinoso-dentatis glabris. *Roy. lugdb.* 8. *Coccifera.*
Quercus foliis ovatis dentato-spinosis, glandibus sessilibus. *Sauv. monsp.* 96,
Ilex aculeata cocciglandifera. *Bauh. pin.* 425.
Ilex coccifera. *Cam. epit.* 774.
*Habitat in* G. Narbonensi, Hispania. ♄

7. QUERCUS foliis obovatis utrinque acuminatis sinuato-serratis: denticulis rotundatis uniformibus. *Hort. cliff.* 448. *Gron. virg.* 117. *Roy. lugdb.* 80. *Prinus.*
Quercus, castaneæ foliis, procera arbor, virginiana *Pluk. alm.* 309. *t.* 54. *f.* 3. *Raj. hist.* 1916. *Catesb. car.* 1. *p.* 18. *t.* 18.
*Habitat in* America *boreali.* ♄

8. QUERCUS foliis cuneiformibus obsolete trilobis. *Gron. virg.* 117. *nigra.*
Quercus folio non serrato in summitate quasi triangulo. *Catesb. car.* 1. *p.* 20. *t.* 20.

[33] A. DeCandolle. Lois de la Nomenclature Botanique. 1867, p. 8. "I may say, in commencing, that there is a certain inquietude today caused by the great complication of synonymy. The botanists with but little experience will not be greatly affected. They will not adopt new names unless the necessity for them is stated, or at least until they are sure that the names have been approved, after examination by many competent men. After all, synonymy is not without merit. It constitutes the history of the science. Completely given, in order of dates, it is often instructive and interesting . . . Will the increase of synonyms continue in the same manner for a long time? That does not seem to be at all probable."

[34] Rhodora 41: 521–524.

[p. 996] β. Quercus marilandica folio trifido ad sassafras accederdente. *Raj. Catesb. car.* 19. t. 19.
*Habitat in* America *septentrionali.* ♄

*rubra.* 9. QUERCUS foliis obtuse-sinuatis setaceo-mucronatis.
Quercus foliorum sinubus obtusis: angulis lanceolatis seta terminatis integerrimis vix divisis. *Gron. virg.* 117.
Quercus esculi divisura, foliis amplioribus aculeatis. *Pluk. alm.* 309. *t.* 54. *f.* 4. *Catesb. car.* 1. *p.* 23. *t.* 23.
β Quercus foliorum sinubus obtusis: angulis acutis seta terminatis: intermediis vix tridentatis margine integerrimo. *Hort. cliff.* 448. *Roy. lugdb.* 80.
Quercus carolinensis, virentibus venis muricata. *Catesb. car.* 1. *p.* 21. *t.* 21. *f.* 1.
Quercus virginiana venis rubris muricata. *Pluk. alm.* 309. *t.* 54. *f.* 1.
*Habitat in* Virginia, Carolina. ♄

*alba.* 10. QUERCUS foliis oblique pinnatifidis: sinubus angulisque obtusis.
Quercus foliis superne latioribus opposite sinuatis, sinubus angulisque obtusis. *Gron. virg.* 117.
Quercus alba virginiana. *Catesb. car.* 1. *p.* 21. *t.* 21. *f.* 2.
*Habitat in* Virginia. ♄

With the help of Mr. Savage I examined the specimens of *Quercus* in the Linnaean Herbarium in London in 1937, representing the following trivial and specific names:

| | | |
|---|---|---|
| 7. | (Prinus) | Quercus foliis obovatis utrinque acuminatis sinuato-serratis: denticulis rotundatis uniformibus. Hort. Cliff. etc. |
| 8. | (nigra) | Quercus foliis cuneiformibus obsolete trilobis. Gron. Virg. |
| 9. | (rubra) | Quercus foliis obtuse-sinuatis setaceo-mucronatis. |
| 10. | (alba) | Quercus foliis oblique pinnatifidis: sinubus angulisque obtusis. |

In *Q. Prinus* and *Q. nigra* the specific names were taken over without change from their usage in *Hortus Cliffortianus*, Gronovius' *Flora Virginica*, and Royen's account of the Leyden Garden. In the case of *Q. rubra* the synoptic specific names from these same sources were combined into a simple essential name according to the rules laid down in section 290 of *Philosophia Botanica*, but one of the synoptic names was retained as the var. β., which was differentiated by the somewhat 3-toothed apices of the leaf lobes. The specific name of *Q. alba* was a modification of the Gronovian name to form a better differential with the European *Q. Robur.* It should be noted that the older specific name now has become a synonym. It is of great importance to recognize that the individual Linnaean synonyms were *nomina*, often used successively in various publications for objects of entirely different origin (often from our present point of view applied to objects which we regard as representing distinct species). To Linnaeus they all represented variability within the same species. Such for example is *Quercus esculi divisura, foliis amplioribus aculeatis* derived by Linnaeus from the illustrations of Plukenet and of Catesby; in this case Catesby had used Plukenet's name for quite a different kind of oak. It is quite evident that the Linnaean species was an aggregate of wild plants, as treated in *Flora Suecica;* cultivated plants, as in *Hortus Upsaliensis* and *Hortus Cliffortianus;* herbarium specimens in the Linnaean Herbarium, and those seen by Linnaeus in other herbaria; and lastly, figures and descriptions of which herbarium specimens were not seen. This is substantially the opinion to which C. B. Clarke[35] came, and likewise Spencer Savage, our foremost authority on Linnaean procedure[36]:

> "A considerable number of the plants described in the first edition of the 'Species Plantarum' cannot be said to have type-specimens in the ordinarily accepted sense. Linnaeus renamed and placed systematically a large number of plants that had been known to botanists for centuries,—a different thing from naming and describing a species for the first time. The Linnaean 'type' of any such well-known species will surely be found to consist of *all* the surviving herbarium specimens determined by Linnaeus at the time he wrote the diagnosis. A 'species' in Linnaeus's sense was not founded on an individual specimen, but was rather an intellectual concept of a natural group, even though that group was part of an artificial system. The specimens he determined he considered to be typical of such a group".

This subject will be discussed further under the heading of "Herbarium", but I wish to point out that the Linnaean species from one point of view was the synthesis of all bibliographic citations under the species, together with Linnaean herbarium specimens, whether or not they were associated with citations. From a second point of view, and a very important one, the species represented that portion of a genus which was included

[35] Journ. Linn. Soc. 30: 299. 1895. "Linnaeus conceived a species as an entity and did not suppose that it could be restricted to one 'type'. A 'species', in his Sp. Pl., is made up of 4 (or fewer) parts." See footnote 11.

[36] Catalogue of the manuscripts in the library of the Linnaean Society of London. Part II. Caroli Linnaei determinationes in hortum siccum Joachimi Burseri. Ed. Spencer Savage, 1937, p. 5.

under and defined by the specific name, of which the differential character has been discussed. It may be argued that this was not the idea of species of the present day, which in general are drawn on narrower lines. The corollary is that most species of *Species Plantarum* comprise two or more species as recognized in the modern consensus. It must be remembered that *Species Plantarum* was a tentative and artificial system. Natural species, as Linnaeus recognized, should be based on experimental cultivation, i. e., they were plants which came true to seed. But neither in Linnaeus' day or in the present day could a comprehensive classification be made on the basis of experimental data. The synthetic nature of species as treated in *Species Plantarum* was emphasized by the fact that the work was primarily without descriptions, and that reference to a description was made by the use of an asterisk.[37] "Only in obscure cases has it been necessary to add descriptions, and these are without ambiguity, so that I may keep the handbook acceptable to the beginner."[38]

Especially as knowledge of the American and Asiatic floras increased, these Linnaean species were subjected to analytic treatments by later writers, and broken up into smaller units. As to the limits of species there is no unity even among botanists of the present day.[39] By Linnaeus himself specific names were corrected and restricted in succeeding editions of *Species Plantarum*.[40]

[37] Cf. Scirpus culmo nudo setaceo, spicis lateralibus subsolitariis sessilibus. it. scan.* (Sp. pl. p. 49), and Scirpus culmo triquetro nudo, umbella simplici, spicis ovatis. Fl. zeyl. 38*. (Sp. pl. p. 50).

[38] Introd. Sp. Pl.: Descriptiones tantum in obscuris adhibere necessum fuit, easque sine ambagibus, ut obtinerem compendium tironibus gratum. Cf. Rhodora 41: 139–140. 1939. It is obvious that Linnaeus placed the asterisk after the word "DESCRIPTIONES", in ed. 2, to call attention to the fact that the sign meant a cited description.

[39] Bentham, perhaps the greatest of systematic botanists (Trans. Linn. Soc. 27: 507. 1871): "whether we follow Closs in breaking it (*Cassia Candolleana*) up into three species, or with Vogel regard it as a single representative species, or, as suggested by some others, reduce it to a variety only of the widely spread *C. bicapsularis*, its geographical and natural relations remain the same. I have, in the following enumeration, after much hesitation classed it as a variety; but all that is thereby meant is that, upon weighing all the evidence afforded by the materials at my disposal, it has appeared to me that its relationship to the other forms of *C. bicapsularis* is rather of that degree which botanists whose views I adopt call varieties than of the remoter degree which they term species."

[40] Thus in the second edition of *Species Plantarum*, *Scirpus geniculatus* was restricted to the plant with articulate culms and elongated spikes, whereas in the first edition it had included also the round-headed plant, *Scirpus* (*Eleocharis*) *caribaeus*

Several fallacies have crept into the interpretation of Linnaean procedure, one being that a new specific name ("diagnosis") is based on herbarium specimens at hand.[41] Such a new specific name was (as previously mentioned) either 1) a new name constructed according to the rules in *Philosophia Botanica*, as in the example (*Quercus foliorum . . . divisis*) in Gronovius' *Flora Virginica*, 117 (1739):

*Quercus foliorum sinubus obtusis, angulis lanceolatis seta terminatis integerrimis vix divisis.*

Quercus Esculi divisura, foliis amplioribus aculeatis. *Plukn. Alm.* p. 309, t. 54, f. 4. **Red-Oak**. Catesb. Hist. Carol. vol. I. t. 32.

Quercus rubra seu Hispanica hic dicta, foliis amplis varie profundeque incisis. *Clayt.*;

or 2) a shortening of the specific name from synoptic to essential form (cf. *Quercus foliis obtuse-sinuatis setaceo-mucronatis*. Sp. Pl. p. 996); or 3) change in an adjacent name due to interpolation of a new species into the genus. In the citation just made from Gronovius' Flora, the old specific name of Plukenet was taken up

(or *S. capitatus*, according to a specimen placed later by Linnaeus in his herbarium, but not according to the immature specimen which Linnaeus had formerly seen in the Gronovian herbarium and which formed the basis of the treatment in the first edition).

Following Gronovius, *Cerasi similis arbuscula mariana, padi folio, flore albo parvo racemoso* of Plukenet and Catesby was included by Linnaeus as a synonym under *Prunus floribus racemosis, foliis deciduis basi antice glandulosis* Sp. Pl. 473. 1753. This Linnaean species quite evidently included the species now recognized as *Prunus virginiana* L., *P. serotina* Ehrh. and *Itea virginica* L. Between the issue of the first and second editions of *Species Plantarum*, Linnaeus realized that the Plukenet figure represented *Itea virginica*. Torrey & Gray, Fl. N. Am. 1: 410. 1840, discussed the situation as follows: "The Prunus Virginiana of Linnaeus was founded on the present species (the Choke-Cherry), as appears from his description [i. e., specific name] and herbarium: but the synonym adduced from Gronovius relates to the succeeding species [*P. serotina*] that of Plukenet (omitted in ed. 2) to Itea Virginica! and that of Catesby (which was afterwards erased by Linnaeus in his own copy of the Species Plantarum) to Cerasus Caroliniana."

In passing, it might be mentioned that the difficulties in the interpretation of dioecious vines such as *Dioscorea* and *Cissampelos* from pictures and meager herbarium specimens was exceedingly difficult.

Plukenet's figure representing *Bryoniae similis floridana* listed by Linnaeus under *Dioscorea villosa*, Sp. Pl. p. 1033, represents the staminate flower of *Cissampelos Pareira*.

[41] In the treatment of *Hedysarum violaceum* (Sp. Pl. 749) there is a new specific name, and one might say on the basis of this argument that Linnaeus had derived this new name ("diagnosis") from a specimen at hand, since a real *description* is appended to the treatment. But in discussing *Lespedeza violacea*, Britton (Trans. N. Y. Acad. Sci. 12: 62. 1893) says: . . . "as illustrated by his own [Linnaeus'] herbarium the species is complex, but the specimens are not the types of the species." The Gronovian reference [based supposedly on a specimen not to be found at the British Museum] is taken as the type. Schindler (Bot. Jahrb. 49: 587. 1913) intimates that Linnaeus had a Gronovian specimen under his eyes.

also by Catesby, but merely in a bibliographic sense, and applied by Catesby to a wholly different plant—as we see it today. This old Plukenet name now became a synonym. To this treatment was added the phrase from Clayton, which was in no sense a name or synonym, but merely a translation into Latin by Gronovius of the original English descriptive notes which accompanied the numbered (and unnumbered) specimens. It is quite evident from the much longer descriptive account of *Ruellia* (Fl. Virg. p. 73) that such descriptive notes were not specific names according to the Linnaean method under which Gronovius worked:

Ruellia foliis petiolatis, fructu sessili conferto. *Linn. Hort. Cliff. p.* 318. *n.* 1.

Ruellia strepens, capitulis comosis. *Dill. Hort. Elth. p.* 300. *T.* 240. *f.* 321.

Ruelliae Species flore amplo coerulea inferne tubulato, superiore in quinque segmenta expanso, cito marcescente, in summo caule & ad nodos florens, foliis oblongis hirsutis serratis ex adverso binis, vasculo longo rotundo, bicapsulari, semine compresso. *Clayt. n.* 85 & 98[42].

*(To be continued)*

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Senecio Smallii Britton, forma **tristis,** f. nov., ligulis nullis.—Virginia: a single clump at the dry border of "Ram-hole Swamp," Seward Forest, near Triplett, Brunswick Co., May 12, 1945, *Fernald,* no. 14,859 (type in Herb. Gray.).

As I have elsewhere predicted, sooner or later a discoid form may be found in any member of § *Aurei,* so that the character "discoid", as opposed to "radiate", is not a sound one for use in keys.—M. L. Fernald.

[42] A description of *Ruellia strepens* was first given by Linnaeus in Mantissa 2: 422. 1771.

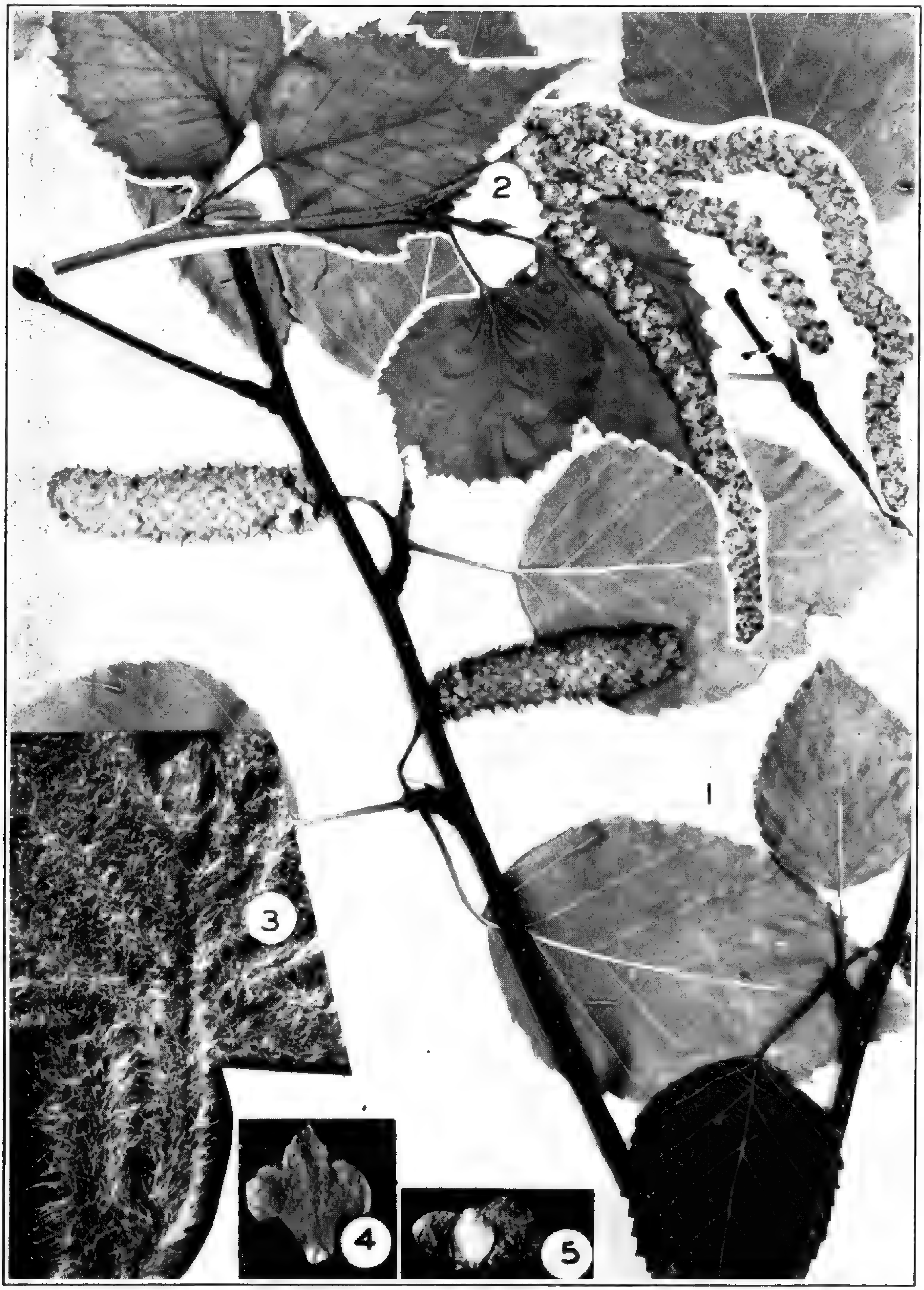


*Photo. B. G. Schubert*

Betula papyrifera: fig. 1, fruiting branch, × 1; fig. 2, staminate aments, × 1; fig. 3, tip of young shoot, × 5; fig. 4, fruiting bract, × 4; fig. 5, samara, × 4.

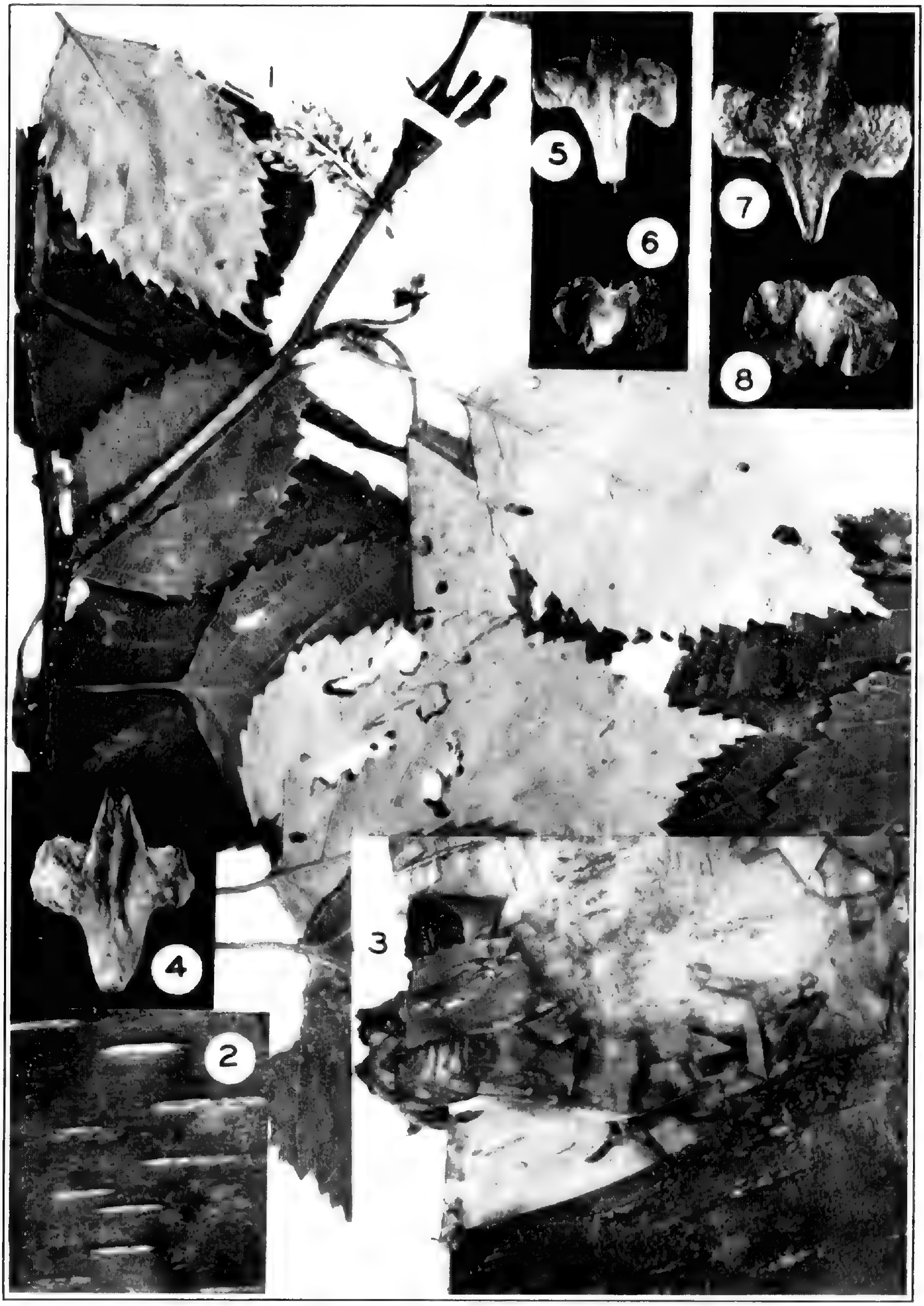


*Photo. B. G. Schubert*

Betula papyrifera, var. commutata: fig. 1, portion of *Lyall's* specimen, × 1; fig. 2, characteristic close bark, × 1; fig. 3, exfoliating bark from base of old trunk, × 1; figs. 4, 5 and 7, fruiting bracts, × 4; figs. 6 and 8, samaras, × 4.


*Photo. B. G. Schubert*

BETULA OCCIDENTALIS, var. FECUNDA: FIG. 1, portion of TYPE, × 1; FIG. 2, flowering branchlet, × 1; FIG. 3, staminate aments, × 1.


*Photo. B. G. Schubert*

BETULA PAPYRIFERA, var. PENSILIS: FIG. 1, portion of TYPE, × 1; FIG. 2, fruiting bract, × 4; FIG. 3, samara, × 4; FIG. 4, branch with younger aments, × 1.


*Photo. B. G. Schubert*

BETULA PAPYRIFERA, var. MACROSTACHYA: FIG. 1, portion of TYPE, × 1; FIG. 2, fruiting bract, × 4; FIG. 3, samara, × 4.
Var. MACROSTACHYA, forma LONGIPES: FIG. 4, portion of TYPE, × 1.


*Photo. B. G. Schubert*

Betula papyrifera, var. elobata: fig. 1, portion of type, × 1; fig. 2, immature samara embraced by bract, × 4; fig. 3, immature bracts, × 4.

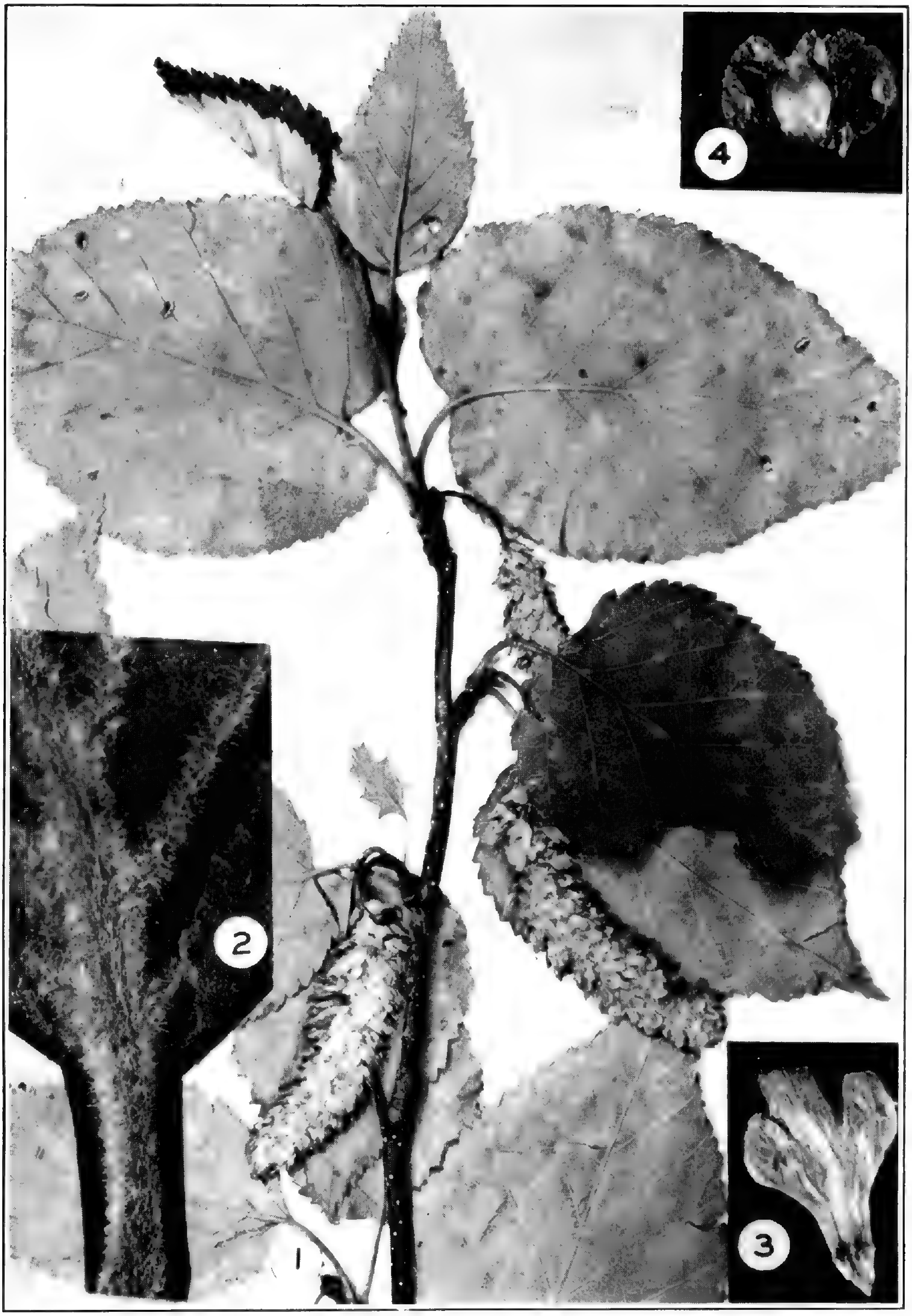


*Photo. B. G. Schubert*

Betula papyrifera, var. cordifolia: fig. 1, portion of fruiting branch, × 1; fig. 2, tip of vigorous sprout, × 5; fig. 3, fruiting bract, × 4; fig. 4, samara, × 4.


*Photo. B. G. Schubert*

BETULA PAPYRIFERA, var. HUMILIS: FIG. 1, portion of branch and Regel's label, from TYPE, × 1; FIG. 2, lower surface of leaf, × 10; FIG. 3, fruiting bract, × 4; FIG. 4, samara, × 4; FIG. 5, fruiting tip, × 1.

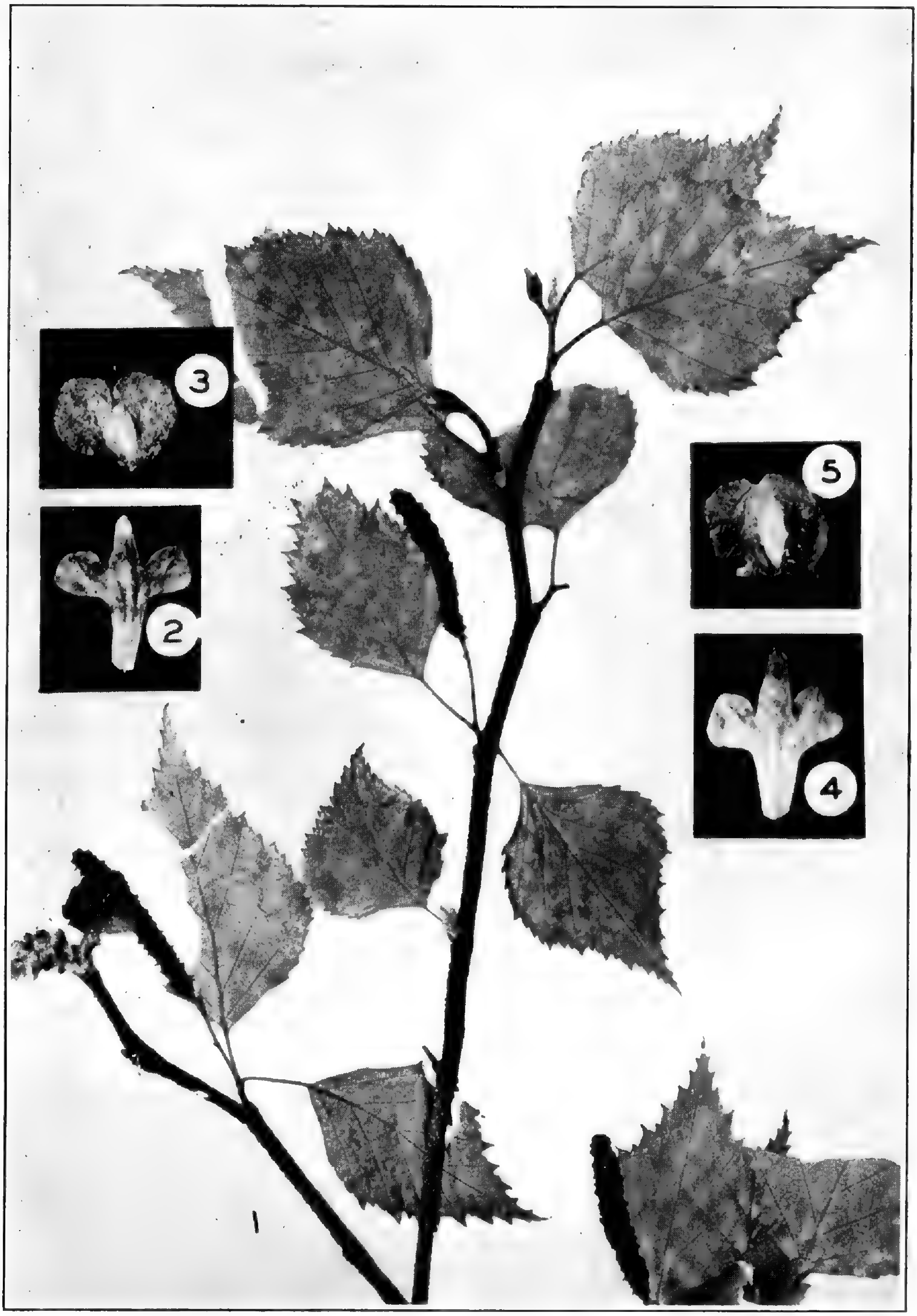


*Photo. B. G. Schubert*

BETULA PAPYRIFERA, var. HUMILIS: FIG. 1, specimen, × 1, cited by Sargent as his *B. alaskana;* FIGS. 2 and 4, fruiting bracts, × 4; FIGS. 3 and 5, samaras, × 4.

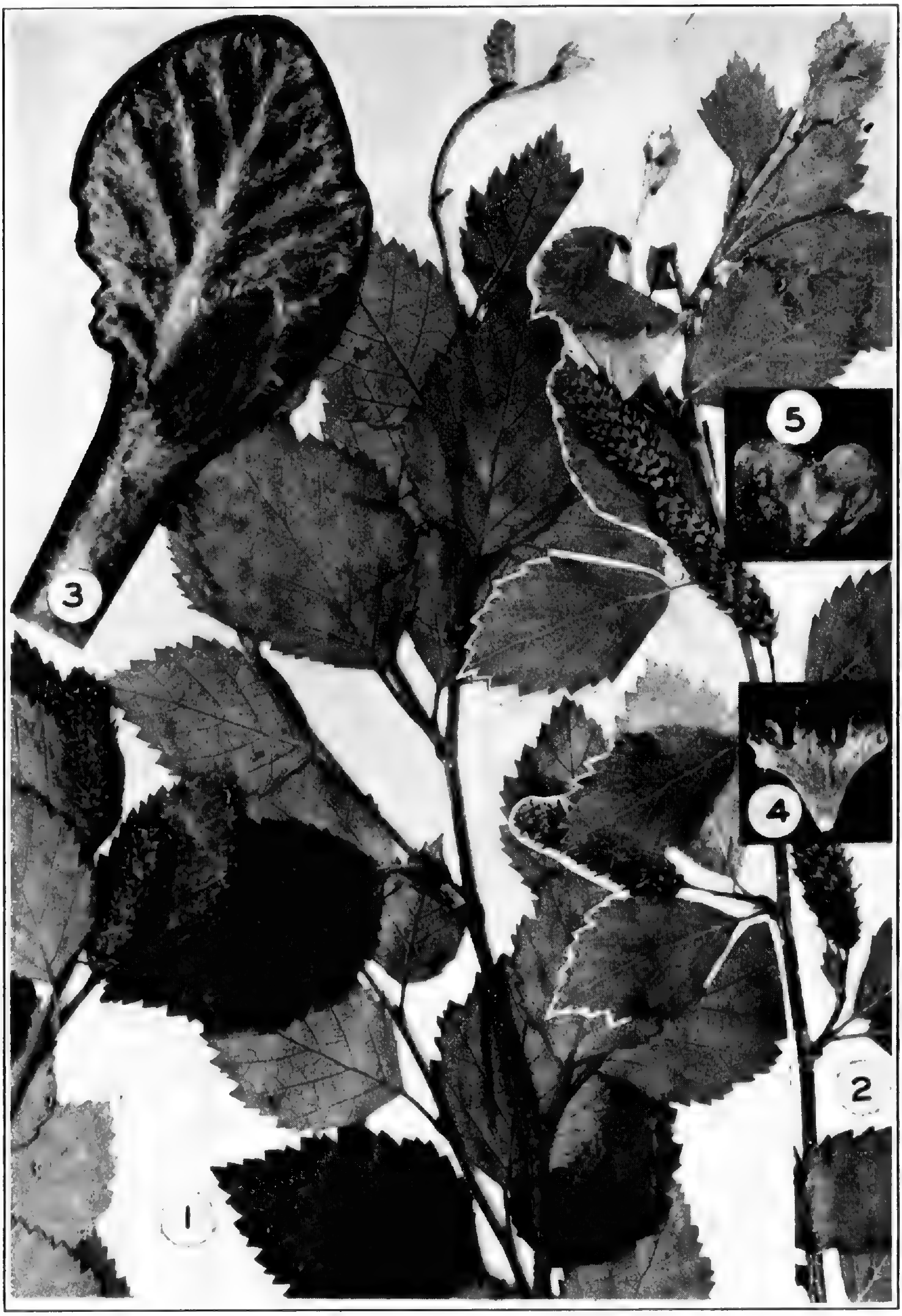


*Photo. B. G. Schubert*

Betula borealis: fig. 1, mature branchlets, × 1; fig. 2, immature fruiting branch, × 1; fig. 3, tip of young branch, × 5; fig. 4, fruiting bract, × 4; fig. 5, samara, × 4.

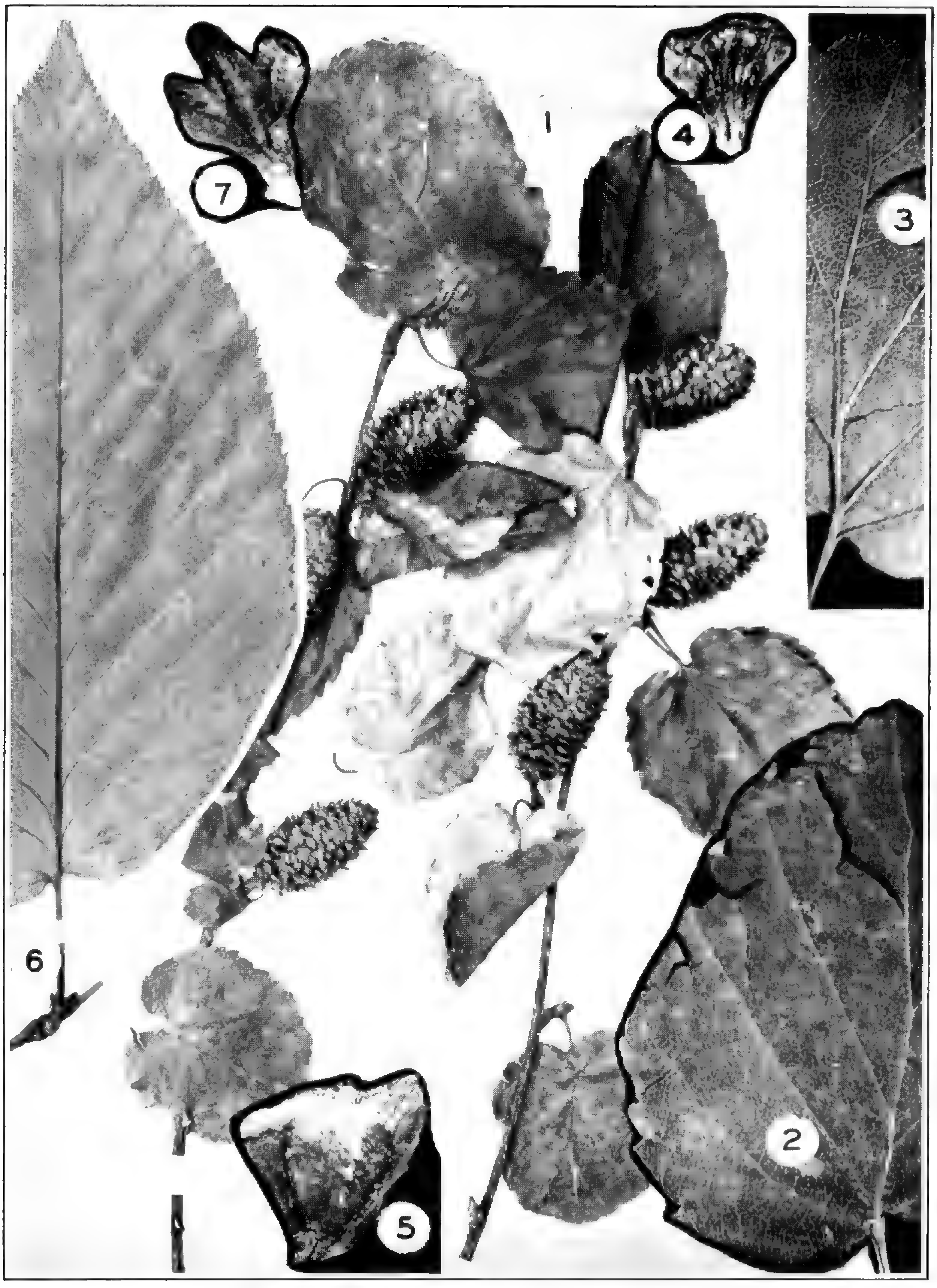


*Photo. B. G. Schubert*

Betula uber: fig. 1, fruiting branchlets from isotype, × 1; fig. 2, upper surface of half a leaf, × 2, showing venation and toothing; fig. 3, portion of lower surface of leaf, × 2; fig. 4, fruiting bract, × 4; fig. 5, samara, × 4.

B. lenta: fig. 6, lower surface of half a leaf, × 1, to show venation and toothing; fig. 7, fruiting bract, × 4.


*Photo. B. G. Schubert*

BETULA TERRAE-NOVAE: FIG. 1, portion of TYPE, × 1; FIG. 2, tip of fruiting branchlet, × 5; FIG. 3, two fruiting bracts, × 10; FIG. 4, nutlet, × 10.
B. NANA: FIG. 5, tip of branchlet, × 5; FIG. 6, fruiting bract, × 4; FIG. 7, samara, × 10.

# CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY—No. CLIX

# SOME NORTH AMERICAN CORYLACEAE (BETULACEAE)

M. L. Fernald

(Plates 963–989)[1]

## I. Notes on Betula in eastern North America

(Plates 963–975)

It has long been evident that the ultraconservative treatment of *Betula*, published by me in 1902, as *Relationships of some American and Old World Birches*[2], can not be accepted, in view of the many characters of aments, their bracts and samaras then not understood. That sophomoric study, based on complete lack of understanding, well illustrates how an over-conservative treatment may be as far afield as are those which split beyond the normal divergencies in Nature. In a recent attempt to set in order the White Birches and the Dwarf Birches as they occur in the Gray's Manual range the names applied to our species and varieties have necessarily changed in several cases. The entire treatment can hardly be given here, but, in order to clarify the situation, the key to our members of Series *Albae* is here given.

*a*. Bark opaque, chalky- or ashy-white, close, the layers not readily exfoliating; staminate ament usually 1 and, before expanding, pointing stiffly forward; leaves glabrous or merely glutinous on both sides, abruptly ending in prolonged tail-like tips (caudate); fruiting aments 1–2.5 cm. long; their mature bracts nearly horizontally divergent, crowded, 3–4.5 mm. long, uniformly ashy-puberulent on back........................................1. *B. populifolia.*

*a*. Bark lustrous, creamy- or pinkish-white to warm-brown, in maturity often exfoliating or separating into layers; staminate aments 1–few; leaves not prominently caudate-tipped; fruiting aments (except in the dwarf shrubby no. 4) mostly larger; their bracts (except in the introduced no. 2) ascending, glabrous or pilose on back, the lobes ciliate....*b*.

*b*. Samaras 3.5–6.5 mm. broad, the wings broader than the achene; trees or coarse shrubs.

[1] The cost of preparing and engraving the plates met in part through a grant from the American Philosophical Society.

[2] Contrib. Gray Herb. n. s. xxiii., Am. Journ. Sci., ser. 4, xiv. 167–194, plates v and vi (1902).

*c.* Leaves glabrous on both sides; young shoots glabrous or merely with resinous warts....*d.*

*d.* Trees with whitish bark; leaves deltoid-ovate, acuminate from broad base, those of fertile branches 3–10 cm. long; staminate aments 4–10 cm. long; lateral lobes of pistillate bracts divergent, larger than terminal lobe; species of low or intermediate altitudes.

Leaves of fertile branches 3–7 cm. long, their cuneate to truncate bases entire; fruiting aments 2–4 cm. long, their bracts divergent; introduced species...2. *B. pendula.*

Leaves of fertile branches 5–10 cm. long, their rounded bases toothed except near petiole; fruiting aments 2.5–5 cm. long, their bracts ascending; indigenous..........................3. *B. caerulea-grandis.*

*d.* Shrub with dark close bark; leaves ovate, merely acute to blunt, those of fruiting branches 1.5–4.5 cm. long; staminate aments 1.5–3.5 cm. long; lateral lobes of pistillate bracts ascending, scarcely broader than terminal lobe; subarctic-alpine species..............4. *B. minor.*

*c.* Leaves pubescent beneath, at least when young, or on veins or in their axils; young vegetative shoots pubescent or puberulent.

Buds lustrous with resin; leaves merely acute, those of fertile branches 3–5 cm. long; mature fertile aments 1.5–3 cm. long; introduced species..................5. *B. alba.*

Buds scarcely resinous; leaves mostly acuminate, those of fertile branches 2.5–10.5 cm. long; mature fertile aments 1.5–6.5 cm. long; indigenous.....6. *B. papyrifera.*

*b.* Samaras 2–3.5 mm. broad, the wings scarcely to barely as broad as the achene; new sprouts pubescent; leaves elliptic, rhombic-oval or ovate; shrub with close dark bark.......................................7. *B. borealis.*

1. B. POPULIFOLIA Marsh. Arb. Am. 19 (1785). *B. alba* L., var. *populifolia* (Marsh.) Spach, Ann. Sci. Nat. sér. 2, xv. 187 (1841).—Sterile dry to wet acid soils, Prince Edward Island to Laurentide region of Quebec, west to southern Ontario, south to Delaware, Pennsylvania, upland to Virginia, northern Ohio and northern Indiana.

B. POPULIFOLIA Marsh., forma **incisifolia,** f. nov., foliis lacerato-incisis, laciniis attenuatis plus minusve incisis.—MASSACHUSETTS: old field at border of woods, Auburndale, July 23, 1941, *D. S. Correll* (TYPE in Herb. N. E. Bot. Club). PENNSYLVANIA: along trail just north of highway, below the Pagoda, Mt. Penn, Berks Co., Aug. 14, 1943, a single young individual, *Wherry.* Illustrated as var. *laciniata* Loud. by Correll in RHODORA, xliv. plate 708 opp. p. 236 (1942).

Unfortunately the name *Betula populifolia,* var. *laciniata* (Lodd.) Loud., currently used for this "cut-leaved" form, is not a safe one to take up. The identity is too doubtful since Loudon based it on a *nomen nudum* which had been published by Conrad Loddiges and Sons, Nurserymen, in their 16th Catalogue of Plants, 44 (1836). Loddiges and Sons merely had the name *Betula laciniata* in a list of hardy trees and shrubs cultivated by them. There was no description; consequently when Loudon, Arb. and Frut. Brit. iii. 1707 (1838), published *B. populifolia*, var. *laciniata*, "*B.* laciniata *Lodd.* Cat. ed. 1836, has large, smooth, shining, deeply cut leaves, and appears to us to belong to *B.* (*a.*) populifolia, rather than to *B.* alba", he based his combination on a *nomen nudum.* If he had omitted the citation of Loddiges' identical *nomen* which was further invalidated by the well described *B. laciniata* Ehrh. (1788), the case would be different. At least, if it be maintained that Loudon gave a sufficient diagnosis and thus validated the name, it is not at all certain what he had. It is safer to establish our indigenous form on surer ground.

2. B. PENDULA Roth, Tent. Fl. Germ. i. 405 (1788). *B. alba* L. Sp. Pl. 982 (1753), in part; Koch, Syn. 662 (1837). *B. alba*, β. *pendula* Ait. Hort. Kew. iii. 336 (1789). *B. verrucosa* Ehrh. Beitr. vi. 98 (1791–1793).—Introduced from Europe; spread to roadsides, thickets, open woods, etc., Nova Scotia to Ontario, south to Pennsylvania, Michigan, Wisconsin and Iowa.

Forma DALECARLICA (L. f.) Schneid. Handb. Laubholzk. i. 112 (1904). *B. alba*, β. *dalecarlica* L. f. Suppl. 416 (1781).—Similarly spreading from cultivation.

Those who treat this half of the mixed *Betula alba* L. as typical *B. alba* (for instance Beck von Mannagetta and Wilmott) go back only to Koch (1837) for their cue. Evidently they have overlooked the fact that Roth in 1788 had removed *B. pendula*, thus leaving the other species (*B. pubescens* Ehrh., 1791) to stand as true *B. alba*. See comments under our no. 5.

3. B. CAERULEA-GRANDIS Blanchard, Betula, i. no. 1 (May 7, 1904); Fernald in RHODORA, xxiv. 171 (1922). *B. caerulea* Blanchard, var. *grandis* Blanchard in Vermont Phoenix for May 13, 1904 and Betula, i. no. 2 (May 13, 1904). *B. caerulea*, var. *Blanchardi* Sargent, Man. Trees. N. A. 202, fig. 168A (1905).—Dry woods, Gaspé Peninsula to Montmorency Co., Quebec, south to Nova Scotia, northern New England and eastern New York.

× B. CAERULEA Blanchard, Betula, i. no. 1 (May 7, 1904); Sargent, Man. 201, fig. 168 (1903); Fernald in RHODORA, l. c. 172 (1922)—A hybrid of no. 3 with no. 1, occasional where they are together.

4. B. **minor** (Tuckerm.), stat. nov. *B. papyracea*, var. *minor* Tuckerman in Am. Journ. Sci. xlv. 31 (1843). *B. dahurica*, β. *americana* Regel in DC. Prodr. xvi². 175 (1868). *B. alba*, subsp. *papyrifera*, β. *humilis* Regel, l. c. 166 (1868), in small part only (i. e. *B. papyracea*, var. *minor* Tuckerm., the TYPE of which is also the type of Regel's *B. dahurica*, var. *americana!*) *B. papyrifera*, var. *minor* (Tuckerm.) Wats. & Coult. in Gray, Man. ed. 6, 472 (1889), at least in part. *B. odorata*, var. *tortuosa* sensu[1] Fernald in RHODORA, iii. 173 (1901), not (Ledeb.) Lange. *B. alba*, var. *minor* (Tuckerm.) Fernald in Am. Journ. Sci. ser. 4. xiv. 179 (1902).—Acidic rocky barrens, peats and alpine summits, Labrador Peninsula, south to Newfoundland, Shickshock Mts., Gaspé Peninsula, and Laurentide Mts., Quebec, highest mountains of northern New England and northeastern New York, and shores of James Bay, Ontario. The following are characteristic. LABRADOR: head of pond, 30 miles west of Nain, Anatolak Bay, *Potter & Brierly*, no. 2614; Anatolak, *C. S. Sewall*, no. 449; Hopedale, Aug., 1935, *Agnes Ayre;* granite hills, Salmon Bight, 53° 27′ N., 55° 47′ W., *A. E. Porsild*, no. 37, as *B. papyrifera*, var. *cordifolia;* Square Island, lat. 52° 49′, Aug. 16, 1882, *J. A. Allen;* large shrubs on upper crests and on gneiss plain, Blanc Sablon, *Fernald & Wiegand*, nos. 3248 and 3249. NEWFOUNDLAND: shrub 0.5–0.8 m. high, turfy and rocky slopes of Cape Dégrat, Quirpon Island, *Fernald & Long*, no. 28,071, erroneously distributed as *B. microphylla* Bunge; thickets, brooksides and ravines, western side of Quirpon I., *Wiegand, Gilbert & Hotchkiss*, no. 28,076 (as *B. microphylla*); quartzite one half mile south of Deer Pond, Highlands of St. John, *Wiegand, Gilbert & Hotchkiss*, no. 28,078 (as *B. microphylla*); erect, 1 m. or less high, peaty or turfy upper quartzite slopes, alt. 600–650 m., Killdevil, Bonne Bay, *Fernald, Long & Fogg*, no. 1635 (as *B. microphylla*); diorite tableland, alt. about 550 m., northern region of the Blomidon ("Blow-me-down") Mts., Bay of Islands, *Fernald & Wiegand*, no. 4263; diorite tableland, near Franchman's Cove, Bay of Islands, *Griscom*, no. 10,242; about 4 feet high, Riverview Camp, Grand Codroy R., *Pease & Edgerton*, no. 27,113; damp thickets on hill southwest of Tilt Cove, Notre Dame Bay, *Fernald & Wiegand*, no. 5307. QUEBEC: rocky hillsides, Vieux-Fort, Pontchartrain, Saguenay Co., *St. John*, no. 90,831 (as *B. glandulosa*); tundra, Ile Herbée, Archipel de Vieux-Fort, *St. John*, no. 90,832 (as *B. glandulosa*); sur les gneiss près des chutes, Natashquan, Côte-Nord, *Victorin & Rolland*, no. 28,101 (as *B. microphylla*); Seven Islands, Saguenay Co., *C. B. Robinson*, nos. 864 and 867; plateau dénudé, Botanists' Dome, Montagne de la Table, *Rousseau & Fortier*, no. 31,429; abondant près du sommet, Mt. Lyall, Gaspé Co., *Victorin, Rolland &*

[1] For these more erroneous identifications one is tempted to write "*nonsensu.*"

*Jacques*, no. 33,516 (as *B. microphylla*); parties sèches près des sommets, Mont Sterling, Gaspé Co., *Victorin, Germain & Jacques*, no. 33,481 (as *B. microphylla*); rocky slopes and barrens, alt. 650–1100 m., Mt. Albert, Gaspé Co., *Collins & Fernald*, no. 67; on hornblende schist, alt. 900–1060 m., north slope, Mt. Albert, *Fernald & Collins*, nos. 214 and 529 (as *B. microphylla*); sur les schistes hornblendiques et les paragneiss, Mt. Albert, *Victorin, Brunel, Rolland & Rousseau*, no. 17,598 (as *B. pumila* ?); bare hornblende schist near summit, about 1100 m. alt., Mt. Fortin, Matane Co., *Fernald & Pease*, nos. 25,023 and 25,024 (as *B. microphylla*); Port à Pueis, below Cap à l'Aigle, *J. Macoun*, no. 68,776. MAINE: summit of Mt. Katahdin, Aug., 1847, *Aaron Young*, Bot. Surv. Me., Aug. 25, 1847, *George Thurber*, Aug. 12, 1873, *Scribner*, Aug. 1874, *Scribner* (as *B. glandulosa*), Sept. 1898, *E. D. Merrill* (as *B. glandulosa*); small shrubs, summit of 1st North Peak, Mt. Katahdin, July 14, 1900, *Fernald*. NEW HAMPSHIRE: "In alpinis Mont. Alborum", *Tuckerman* (ISOTYPE); White Mts., 1842, *A. Gray*, this and the preceding the types of *B. dahurica*, var. *americana* Regel; Alpine Garden, Mt. Washington, July 10, 1893, *E. & C. E. Faxon*, June 26, 1898, *E. F. Williams* (as *B. glandulosa*), Aug. 5, 1901, *Robinson*, August 13, 1902, *Pease*, no. 445, July 31, 1926, *Pease*, no. 19,828; Oakes Gulf, Mt. Washington, July 4, 1878, *Faxon* (as *B. glandulosa*), July 8, 1895, *Kennedy, Williams;* Oakes Gulf, *Eggleston*, no. 2376 (as *B. odorata*, var. *tortuosa*); 5-mile post on Carriage Road, Mt. Washington, July 27, 1886, *Faxon* (as *B. glandulosa*), *Greenman*, no. 1088 (as *B. glandulosa*), *Pease*, no. 10,532; "Cape Horn", Mt. Washington, June 24, 1898, *Williams, Robinson*, no. 955; Lake of the Clouds, Mt. Washington, July 4, 1878, *Faxon* (as *B. glandulosa*), *Pease*, no. 446; near Duck Fall, Low & Burbank Grant, *Pease*, no. 14,160; Nowell's Ridge, Low & Burbank Grant, *Pease*, no. 12,316; Ice Gulch, Randolph, *Pease*, nos. 10,750 ("trees 2 ft. high"), 16,707; upper rocky slopes of Mt. Lafayette, *St. John*, no. 439. NEW YORK: summit of Mt. McIntyre, alt. 4800–5000 ft., *House*, no. 9488. ONTARIO: Hasey Island, Moose River, James Bay, *D. Potter*, no. 804. PLATE 963, FIGS. 1–7.

*Betula minor* closely simulates the Arctic Eurasian and Greenland shrub, there passing as *B. alba*, var. *tortuosa* (Ledeb.) Schneider or *B. odorata* Bechst., var. *tortuosa* (Ledeb.) Lange or *B. tortuosa* Ledeb. (PLATE 963, FIG. 11). That shrub, however, apparently an arctic extreme of *B. alba*, has the samaras elliptic to obovate (as long as or longer than broad) with wings about equaling the narrow achene. *B. minor*, on the other hand, has the broadly subreniform samaras definitely broader than long, the wings as broad as or broader than the broadly elliptic achene. A great number of specimens (through my original sin) have been misidentified as the Siberian *B. microphylla* Bunge, but that poorly understood species seems to be unlike anything American (see discussion under *B. borealis*). As for its relationship to *B. papyrifera*, *B. minor* has, somewhat naturally, been inferred to be merely a dwarfed alpine or subarctic extreme of the tree of lower altitudes and more favorable climatic conditions. Examination of the two, however, brings out several important characters. In *B. papyrifera* (PLATES 964, 965 and 967–972) the vigorous young shoots are pubescent; in *B. minor* glabrous but often so gummy as to be mistaken for those of *B. glandulosa*. In *B. papyrifera* the expanding leaves are pubescent beneath, the mature ones with traces of pubescence beneath, at least in the axils of the veins. In *B. papyrifera* the bracts of the pistillate aments (except in vars. *macrostachya* and *cordifolia*) have broad and widely divergent lateral lobes; in *B. minor* the lateral and terminal lobes are of about the same breadth and porrect. Although the lateral lobes of *B. papyrifera*, vars. *macrostachya* (PLATE 968) and *cordifolia* (PLATE 970) are porrect, the bracts are much longer than in *B. minor* and the other characters sufficiently different: both with pubescent new shoots and young foliage, var. *macrostachya* with mature fruiting aments 1.3–2 cm. thick, the samaras 5–6 mm. broad; var. *cordifolia* similar but with definitely cordate leaves; *B. minor* glabrous from the first, often gummy, with very short staminate and fruiting aments, the latter at most 9 mm. thick, and samaras averaging 4.6 mm. wide.

5. B. ALBA L. Sp. Pl. 982 (1753), in part; emend. Roth, Tent. Fl. Germ. i. 404 (1788); Schneid. Handb. Laubholzk. i. 116 (1904); Rendle & Britten in Journ. Bot. xlv. 441 (1907). *B. alba*, α. *vulgaris* Ait. Hort. Kew. iii. 336 (1789). *B. pubescens* Ehrh. Beitr. v. 160 (1790), *nomen only*, vi. 98 (1793—on title page as 1791). *B. tomentosa* Reitter & Abel, Beschr. und Abbild. Deutschl. selt. wild. Holz.-Art. 17, t. 15 (1803).—Introduced from Europe; naturalized on roadsides, in thickets and at borders of woods, Newfoundland to Pennsylvania, west to Michigan.

Although this characteristic European species is passing in this country as *B. pubescens* Ehrh. (1793) it is clear, I think, that we should retain for it the name *B. alba* L. (1753), as emended by Roth (1788) and as taken up by Aiton (his var. *vulgaris*, as opposed to his var. β. *pendula*). Roth properly split the bipartite *B. alba* of Linnaeus in 1788 into what he considered true *B. alba* and the newly segregated *B. pendula*. Except to those who, following the very simple but also very doubtful Germanic practice of rejecting all Linnean names of European species if they included what are now considered two or more species, the case seems quite clear. *B. alba* in the sense of Roth, who first made the split, and of Aiton, who, the next year, split the species into its two primary elements (as varieties) was thus retained by those very keen students of nomenclature, Schneider in Vienna and Rendle & Britten in London.

If we should apply to North American species of Linnaeus the Germanic idea of rejecting all of his names, which were used for two or more specific elements but which Linnaeus supposed to be conspecific and to both of which the original Linnaean name has been frequently applied, the havoc would be amazing and futile. An embarrassingly large number of the American species of Linnaeus, to say nothing of Old World species from the Orient, were hopeless confusions. Nevertheless, we try to typify them by singling out the element most definitely seeming to be what he primarily intended; or we accept the first clear breaking of the mixture into its primary elements. In case of *Betula alba* the bipartite species was clearly separated into its two primary elements by Roth in 1788. Unless someone earlier segregated them under different names, Roth's typification of *B. alba* should stand.

The name *Betula tomentosa* and that of one of its authors, Reitter (or Reiter) have made endless trouble for those who merely compile from others rather than check the original sources. Thus, from the statement in Dippel, Handb. Laubholzk. ii. 174 (1892), a work in which the illustrations (and apparently the bibliography), right or wrong, were copied from others, we find under *B. alba*, subsp. *pubescens* the following bibliography: "Bet. pubescens Ehrh. Beitr. z. Naturk. VI. S. 98. 1793. . . . Bet. tomentosa Reitter u. Abel Abbild. d. 100 wild. deutsch. Holzart. I. 17. 1790." If Dippel's bibliography were correct, the name *B. tomentosa* ("1790") would obviously antedate *B.*

*pubescens* (1793). This, however, is not the case. It is simply one of the many errors which the incorrect citations of Reitter & Abel have started.

In the first place, the name of the first of the two authors has been so misinterpreted that one wonders if later authors have ever taken the trouble to look up the books. Thus, in Index Kewensis he appears as Retz[ius]. Von Hayek, Fl. Steyerm. i. 105 (1908), swallowed without evident choking the predigested date, 1790, and displaced *B. pubescens* (1793) by *B. tomentosa* "Reith et Abel"; and Schneider, Ill. Handb. Laubholzk. ii. 886 (1912) also said "Reith et Abel". Ascherson & Graebner, Syn. iv. 398, got nearer the facts as to the first author but by omitting a period made the authors and the place of publication erroneously appear as "Reitt u. Abel Abb. 100 wild. Holzart. I. 17 (1790)." Even the very careful Bradley Bibliography called them Reiter & Abel in vol. i. 370, but one looks in vain for them under Reiter in the Index, for there (vol. iv. 716) they are entered only under Reitter.

The author himself (or his editors, collaborators or publishers) was doubtful as to his own name. There were two quite different books by the pair of authors. In the citations by later authors these have been hopelessly confused. These books were

1. Abbildung der Hundert deutschen wilden Holz-Arten, etc. Stuttgart. 1790. With colored plates. The authors given as Reitter und Abel and the first author's name spelled in the dedication very definitely "Reitter". The somewhat altered second edition, with the dedication and much of the introductory matter omitted, the plates uncolored, came out in 1805. Here he appears as "Reiter".
2. Beschreibung und Abbildung der in Deutschland seltener wildwachsenden und einiger bereits naturalisirten Holz-Arten, etc. Stuttgart. 1803. The authors given as Reiter und Abel.

No. 1 alone was caught by Pritzel's Thesaurus. Since no. 2 was evidently unknown to Pritzel it must be very rare. I have, fortunately, been able to consult them both, as well as the 2nd edition of no. 1, at the Arnold Arboretum; and the Librarian, Mrs. Schwarten, kindly refers me to the biography of Johann Daniel Reitter in Hess, Lebensbilder, 287 (1885), the biographer there listing book no. 1, Abbild. Hundert deutsch. wild. Holz-Art., but not no. 2, Beschreib. und Abbild. Deutschl. Holz-Art. Now, when both these works are examined it will be found that in no. 1, Abbild. Hundert deutsch. wild. Holz-Art., there is no

*Betula tomentosa*. The only true Birch there is on p. 7 (not 17), "XV. *Kupfertafel*. Die *Birke*. Wonnerbaum. Betula alba"; while plate 15 has merely the text "*Betula alba. Die Birke*". Dippel, von Hayek and others who have started *B. tomentosa* there have obviously been mistaken.

In work no. 2, Beschr. und Abbild. 17 (1803) there is a detailed account of *Betula tomentosa*, the "wohlriechende Birke" and t. 15 shows it in color, also as *B. tomentosa*. That, however, was in 1803, not in 1790, so that for those who maintain *B. pubescens* as a species the name *B. tomentosa* offers no competition. The rarity of Reitter & Abel's Beschr. und Abbild. (1803) is further indicated by the absence of a reference to its plate 15 in Index Londinensis. Plate 15 of the Abbildung (1790) is there correctly cited under *B. alba*.

6. B. PAPYRIFERA Marsh. Arb. Am. 19 (1775). *B. papyracea* Ait. Hort. Kew. iii. 337 (1789). *B. alba*, δ. *papyrifera* Spach in Ann. Sci. Nat. Bot. sér. 2, xv. 188 (1841); Regel in Nouv. Mém. Soc. Sci. Nat. Mosc. xiii. 81—repr. Mon. Bet. 23—t. v. fig. 5–16 (1861). *B. alba* sensu Fernald in Am. Journ. Sci. ser. 4, xiv. 169 and 190, in small part (1902).—Highly variable; represented in eastern North America by the following varieties and forms,

*a*. Leaves merely rounded to tapering at base....*b*.
  *b*. Bracts of pistillate aments 3-lobed; peduncle usually shorter than fruiting ament; the latter 2.5–6.5 cm. long....*c*.
    *c*. Mature fertile bracts 3.5–7 mm. long, with divergent lateral lobes; samaras 3.5–5 mm. broad....*d*.
      *d*. Branchlets spreading or ascending, not strongly drooping; leaves of fertile branches broadly ovate, mostly rounded at base; pistillate aments mostly solitary on the spurs....*e*.
        *e*. Bark of trunks of fruiting trees (or shrubs) creamy- to pinkish-white, very soon exfoliating.
          Leaves membranaceous to firm, hardly lustrous ..... *B. papyrifera* (typical).
          Leaves thick and leathery, lustrous above.....Forma *coriacea*.
        *e*. Bark of fruiting trunks warm-brown, only on oldest bases with smooth outer brown layer exfoliating ..... Var. *commutata*.
      *d*. Branchlets pendulous; leaves of fertile branches narrowly ovate to ovate-lanceolate, only slightly rounded to gradually tapering to petiole; pistillate aments often in fascicles of 2–4 on the spurs........Var. *pensilis*.
    *c*. Mature fertile bracts 7–10 mm. long, with ascending lateral lobes; samaras 6–8 mm. broad; leaves ovate, with rounded bases; fruiting aments solitary or paired.
      Peduncles of fruiting aments 0.5–1.5 cm. long, many times shorter than ament...................Var. *macrostachya*.
      Peduncles 2–3 cm. long, one half to essentially as long as pendulous ament..........................Forma *longipes*.

*b.* Bracts unlobed or with merely rudimentary lateral lobes, elliptic-oblong; pistillate aments 1.5–2 cm. long, about equaled by arched-recurving peduncle; leaves rhombic-oval, dentate .......................................... Var. *elobata.*

*a.* Leaves definitely cordate at base; bracts of mature pistillate aments 5–10 mm. long, mostly with ascending lobes; bark of mature trunks warm-brown to creamy- or pinkish-white Var. *cordifolia.*

B. papyrifera, typical.—Woods, especially on slopes, Labrador to Alaska, south to Newfoundland, Nova Scotia, New England, New York, upland of Pennsylvania and West Virginia, northern Ohio, northern Indiana, northern Illinois, northern Iowa, South Dakota, etc. Plate 964.

Forma coriacea Fernald & Wiegand in Rhodora, xxv. 209 (1923)—Dunes of Lake Ontario, New York.

Var. **commutata** (Regel), comb. nov. *B. occidentalis* Hook. Fl. Bor.-Am. ii. 155 (1839) as to specimen from *Scouler* only, not as to other specimens and detailed description; sensu Lyall in Journ. Linn. Soc. vii. 134 (1864); sensu Sargent in Bot. Gaz. xxxi. 237 (1901); not Hook. l. c. as to detailed descr. (1839), nor Nutt. N. A. Syl. i. 23, pl. 7 (1853), nor S. Watson in Bot. King Report—U. S. Geol. Expl. 40th Parallel, v. 323, pl. xxxv (1871), nor Sargent, Sylva, ix. 65, pl. cccclv (1896), nor S. Wats. Bot. Calif. ii. 79 (1880). *B. alba*, subsp. *occidentalis* (Hook.) Regel, β. *commutata* Regel in Bull. Soc. Nat. Mosc. xxxviii. 401 (1865)—repr. as Bemerk. Gatt. Bet. Aln. 14, pl. 7, figs. 6–10 (1866) and in DC. Prodr. xvi². 166 (1868), as to type from Sumass Prairie, *Lyall. B. papyracea*, var. *occidentalis* sensu Dippel, Handb. Laubholzk. 177 (1892). *B. Lyalliana* Koehne in Mitt. Deutsch. Dendr. Gesellsch. 1899: 53 (1899), *nomen only. B. alba*, forma *occidentalis* sensu Fernald in Am. Journ. Sci. ser. 4, xiv. 173 and 190 (1902), not *B. occidentalis* Hook. basonym. *B. papyracea Lyalliana* Koehne ex Schelle in Beisner, Schelle & Zabel, Handb. Laubh.-Ben. 55 (1903). *B. papyrifera*, var. *Lyalliana* (Koehne) Schneid. Ill. Handb. Laubhk. i. 115 (1904), based on "*B. occidentalis* Lyall, in Jour. Lin. Soc. VII. 134. *1864*, ex parte, non Hook." *B. papyrifera*, var. *occidentalis* sensu Sargent in Journ. Arn. Arb. i. 63 (1919), not *B. occidentalis* Hook. basonym.—Woodlands near the coast, Labrador to northeastern Massachusetts; western North America south to Oregon. Plate 965.

In 1902 I pointed out that the character of permanently close and dark bark, which Sargent (1901) took as the single *specific* character of the tall tree of the Pacific slope, "perhaps the largest of all birch-trees" (Sargent, l. c. 238), breaks down in the West and that in the East trees, otherwise inseparable from *B. papyrifera*, may have the bark permanently quite as dark as in the tree of Puget Sound and the lower Fraser River. Subsequently I have seen forests in Newfoundland and at the tip of the Gaspé Peninsula where the large trunks (up to 9 dm. in diameter) were covered with smooth deep-brown bark. In the oldest trees, however, the dark bark of the base of the trunk (up to 2 or 3 m.) will sometimes exfoliate and there leave perfectly characteristic exfoliating pale bark (PLATE 965, FIGS. 2 and 3) of typical *B. papyrifera*. One of the southernmost stations in the East seems to be on Cape Ann, large brown-barked shrubs loaded with fruit, near granite-quarries back of Bayview, Gloucester, where it was collected in August, 1944, by Miss Elizabeth Johnston. It might be thought that it was long ago recorded from Essex County, for the three specimens cited by Regel of his *B. alba*, subsp. *occidentalis*, β. *commutata* were from "Sumass Prairie (Lyall), Topsfield, Massachusetts (Asa Gray), Oregon (Lyall). The Topsfield specimen, labelled by Regel as above, was distributed by William Oakes as *B. papyracea;* Asa Gray merely sent it on loan to Regel. There is no note regarding the bark of the trunk; apparently Oakes did not see anything unusual in it. The Lyall specimen from Sumass Prairie is the TYPE of var. *commutata*.

Hooker, Nuttall, Torrey, Sereno Watson and many other careful students of the past correctly understood Hooker's rather vivid description of *Betula occidentalis*. Unfortunately, however, Hooker originally complicated matters by first citing a specimen from "Straits of De Fuca. *Dr. Scouler*", although his description was, it seems to me and to several field-botanists who know both trees, based almost entirely on the characteristic shrub or small tree of the Rocky Mountain region, west to the drier slopes of British Columbia, Washington, Oregon and California, the species which Sargent, l. c. 239 (1901) renamed *B. fontinalis*. These two trees are abundantly distinct but I am unable to follow Sargent's reasoning, except that in 1901 he was following the now abundantly discredited principle of neglecting, if it happened to disagree, the description and taking as type the first cited specimen, in this case the Scouler specimen from the Straits of Juan de Fuca. In doing so, however, he saw in Hooker's description more elements of that species than I can find and consequently set off the cordilleran *B. fontinalis*. He stated that the specimens cited by Hooker came from three different trees:

First, *Betula papyrifera* Marsh . . .

Second, the large tree which grows on the lower Fraser river, on the shores and islands of Puget sound, and on Vancouver island (PLATE 965, FIGS. 1 and 4–6). This tree has . . . pubescent branchlets, . . . leaves pubescent on the lower surface, . . . Specimens of this tree, which is perhaps the largest of all birch-trees, were first gathered on the shores of the straits of Fuca by Dr. John Scouler . . . The tree from the straits of Fuca appeared first in the description of *Betula occidentalis which was evidently drawn principally from the specimen of that tree* [italics mine], and must be considered the type of Hooker's species . . .

Third, the half-shrubby dark-barked species . . . which ranges as far south as Colorado, Utah, and northern California. This plant was collected by Nuttall on the Sweetwater . . . and was first described and figured by him as *Betula occidentalis* (*Sylva* **I**: 23. *pl. 7*). Torrey in the Botany of Fremont's Expedition repeats this error. This same species was also described and figured in *King's Rep.* (**5**: 323. *pl. 35*) as *Betula occidentalis* by Watson who repeated his error in the *Botany of California*, and it . . . is described and figured as *Betula occidentalis* in my ninth volume of *The Sylva of North America* . . . our tree, for which I now propose the name of **Betula fontinalis.**

Along with many others I have fallen into the trap and have followed Sargent in calling the cordilleran low tree or coarse shrub *Betula fontinalis*. This course, as already stated, ignores the very definite description given by Hooker:

3. *B. occidentalis;* ramis rufo-fuscis copiose resinoso-verrucosis, foliis late rhombeo-ovatis sublobatis grosse inciso-serratis sub lente appresso-hirsutulis v. nudis subtus pallidioribus epunctatis, nervis paucis remotis, amentis foem. lato-cylindraceis, squamis lobis ovato-oblongis lateralibus decurvo-falcatis intermedio longiore.

HAB. Straits of De Fuca. *Dr. Scouler.* Near springs on the west side of the Rocky Mountains. *Douglas;* and on the east side, from the mountains to Edmonton House. *Drummond.* One specimen is in the collection from the Arctic coast* (?) *Dr. Richardson*—This Birch does not agree with any described species, and it is probably confined to the west coast, and to the immediate vicinity of the Rocky Mountains, forming a low, small brush-wood, 6–10 feet high, and never exceeding a few inches in the diameter of its trunk. Mr. Drummond considered it to be the *B. nigra*, but its bark and leaves are quite different; [Then a statement of characters of *B. nigra*]. The main branches are erect, and somewhat virgate, clothed with a red-brown bark, a little inclining to purple, copiously sprinkled with resinous warts in all the specimens. Petioles ½ to ¾ of an inch long, adult leaves 2–2½ inches, broadly ovato-rhomboid, rather acute than acuminate, of a harsh and dry but not thick texture, slightly lobed at the margin, and inciso-serrate, the serratures coarse and sharp, paler beneath, but never, either in the old or younger state, dotted. Male catkins resembling those of the preceding [*B. papyrifera*], 1–2 inches long.

"* There has probably been some mistake in the station of this."

In the two following paragraphs I have quoted the characters as described by Sargent, Man. 204, 205 and 207 (1905) and by Rydberg, Fl. Rky. Mts. 202–204 (1918) of *B. occidentalis* sensu Sargent (i. e. *B. papyrifera*, var. *commutata*) and *B. fontinalis* Sargent (i. e. *B. occidentalis* Hook.); and after each item Hooker's own description in italics. As Bateson used to say, a judicious advocate leaves the conclusion to flow quietly from the evidence.

B. OCCIDENTALIS sensu Sargent (i. e. B. PAPYRIFERA, var. COMMUTATA). "A tree, 100°–120° high, with a trunk 3°–4° in diameter" (*Sargent*); "tree sometimes 30–40 m. high" (*Rydb.*) HOOKER: "*small brush-wood*, 6–10 *feet high, and never exceeding a few inches in the diameter of its trunk*". The "branches often pendulous on old trees, . . . branchlets more or less glandular and coated with long pale hairs when they first appear, . . . marked by numerous minute pale lenticels and pubescent or puberulous during their first winter and nearly destitute of glands" (*Sargent*); "at first pubescent or puberulent" (*Rydb.*) *Hooker: "ramis . . . copiose resinoso-verrucosis", "The main branches erect, and somewhat virgate, . . . copiously sprinkled with resinous warts on all the specimens"*. Leaves "ovate, acute, . . . covered with dark reddish resinous viscid glands, and villous along the midribs and veins, with long white hairs often also in large persistent tufts in the axils of the primary veins, and at maturity thin and firm in texture, marked by the scars of the fallen glands, . . . 3′–4′ long, . . . their petioles stout, glandular, at first tomentose, ultimately pubescent or puberulous, about ¾′ long" (*Sargent*). HOOKER: "*foliis late rhombeo-ovatis . . . sub lente appresso-hirsutulis v. nudis subtus . . . epunctatis*" . . . "*Petioles ½ to ¾ of an inch long, adult leaves 2–2½ inches, broadly ovato-rhomboid, rather acute than acuminate, of a harsh and dry but not thick texture, . . . paler beneath, but never, either in the old cr younger state, dotted*". The "staminate aments . . . becoming 3′–4′ long" (*Sargent*). HOOKER: "*Male catkins . . . 1–2 inches long.*"

B. OCCIDENTALIS sensu Nuttall, Torrey, Sereno Watson and Sargent's Sylva (i. e. B. FONTINALIS Sargent): "more commonly shrubby, with many thin spreading stems forming open clusters, 15°-20° high; often much lower, and frequently crowded in almost impenetrable thickets" or more rarely "A tree, occasionally 30°-40° high, with a trunk 12′-18′ in diameter" (*Sargent*); "tree occasionally 10–12 m. high, often growing in clumps and shrub-like" (*Rydb.*). HOOKER: "*forming a low, small brush-wood*, 6–10 *feet high, and never exceeding a few inches in the diameter of its trunk.*" Branchlets "much roughened at first by large lustrous resinous glands persistent until the second season" (*Sargent*); "twigs densely glandular-resiniferous", "not hairy" (Rydb.). HOOKER: "*ramis copiose resinoso-verrucosis*", "*branches . . . copiously sprinkled with resinous warts in all the specimens*". Leaves "broadly ovate, acute" with "abruptly wedge-shaped . . . base, and sometimes slightly laciniately lobed, . . . pilose above, and covered by conspicuous resinous glands when they unfold, at maturity thin and firm, . . . 1′–2′ long, . . . petioles . . . ⅓′–½′ long" (*Sargent*); "leaves broadly ovate, usually less than 4 cm. long" (*Rydb.*). HOOKER: "*foliis late rhombeo-ovatis sublobatis grosse inciso-serratis sub lente appresso-hirsutulis v. nudis subtus . . . epunc atis*", "*petioles ½ to ¾ of an inch long, adult leaves 2–2½ inches, broadly ovato-rhomboid, rather acute than acuminate, of a harsh and dry but not not thick texture, slightly lobed at the margin, . . . never, either in the old or younger state, dotted*". Staminate "aments . . . becoming 2′–2½′ long" (*Sargent*); "staminate aments 5–7 cm. long" (Rydb.). HOOKER: "*Male catkins . . . 1–2 inches long*".

When we take into account the facts that plenty of mature branches of *Betula occidentalis* (*fontinalis*) have leaves down to ¾ inch long and petioles down to less than ¼ inch in length, while others (*Koehne*, Herb. Dendrol. no. 105; *L. E. Smith*, no. 759; *Muenscher & Maguire*, no. 15,690; *M. E. Peck*, no. 9468; *F. A. Walpole*, no. 323; *Eggleston*, no. 21,998; *St. John*, no. 7655; show blades 2–2½ inches long, while in an extreme variety they may be up to 7 cm. long, it becomes quite clear that in most of his stated characters Hooker was accurately describing the relatively low and often shrubby species which Nuttall, Torrey, Watson and others understood as *B. occidentalis* and which Sargent, without any concrete diagnosis and without designation of type, called *B. fontinalis*.

Returning to *Betula papyrifera*, var. *commutata*, that name started as *B. alba*, subsp. *occidentalis*, var. β. *commutata* Regel in 1865, Regel defining his subsp. *occidentalis*, var. α. *typica* "trunco humili, foliis inciso-sublobatis dentatisque" (i. e., following Hooker's original description), while his var. *commutata* was defined as follows:

> β *commutata* (tab. 7, fig. 6–10); trunco elato; foliis duplicato-dentatis.—Als B. papyracea und papyrifera im Herbarium Asa Grays und Boissiers.—Wächst in Nord-amerika, Sumass Praierie (Lyall), Topsfield, Massachusets (Asa Gray), Oregon (Lyall).
>
> Von der folgenden Unterart [papyrifera] nur durch die gespreizten oder zurück gekrümmten Seitenlappen der Schuppen des Fruchtzäpfchens verschieden.

All three sheets, including the TYPE from Sumass Prairie are before me. In all evident characters they are quite like the tree of the Pacific slope which Sargent took as *B. occidentalis* and they are all easily matched in details by much eastern *B. papyrifera*. The tree of the Fraser River region, including Sumass Prairie, is with reasonable certainty the dark-barked variety, but the Topsfield specimen of William Oakes (not Asa Gray) is, as already explained (p. 313) evidently from the pale-barked and generally commoner eastern *B. papyrifera*. In Lyall's account of "The Lower Fraser River district, which includes the Sumass and Chilukweyuk prairies and other low grounds to the westward of the Cascade Mountains—a moist region", Lyall, in Journn. Linn. Soc. Lond. vii. 131–135 (1864), enumerated from "The banks of the Lower Fraser River . . . *Abies Douglasii*, . . .

*Abies Menziesii*, . . . *Abies Mertensiana*, . . . *Thuja gigantea*, . . . *Acer macrophyllum*", etc. and then "*Betula occidentalis*, Hook. (a tree growing to the height of 60 or 70 feet [compare Sargent's "100°–120°", also J. K. Henry's "A small or large tree"] and most common about the borders of the forest)". That material was the basis of var. *commutata*. When Schneider published his *B. papyrifera*, var. *Lyalliana*, citing the Lyall account above quoted and the synonym *B. occidentalis* sensu Sargent, not Hooker, he evidently overlooked the earlier name which had been based on the Lyall collections.[1]

[1] The reinstatement of *Betula occidentalis* Hook. necessitates the following new varietal name.

B. OCCIDENTALIS Hook., var. **fecunda**, nom. nov. *Betula*, 3d. described tree in Piper & Beattie, Fl. Palouse Reg. 55 (1901). *B. Piperi* Britton in Bull. Torr. Bot. Cl. xxxi. 165 (1904), as to description, not as to single collection cited. *B. fontinalis*, var. *Piperi* (Britton) Sargent in Journ. Arn. Arb. i. 65 (1919), in part only. PLATE 966.

In their Flora of the Palouse Region Piper & Beattie, with well-understood hesitation, refrained from assigning guesswork names to the three birches of the area. Instead, they described the three in detail but without names. Their third tree was

"B. Graceful tree, 8–15 m. tall, with drooping branches: bark dark bronze . . . branchlets . . . very glandular; leaves ovate, obtuse or acute at the base, . . . shining green above, glandular on both surfaces, 2–4 cm. long . . . : pistillate aments cylindrical: 5 cm. long, .5 cm. thick, often flexuous, mostly in twos, . . . Springy hillsides near Almota."

This description was but slightly, though somewhat, changed by Britton, whose *B. Piperi* was the "tree . . . described by Professor Piper as attaining a height of 15 m. and being slender and graceful, with drooping branches" &c., largely a rewriting of the Piper & Beattie description above quoted. But, most unfortunately, the locality of the "Graceful tree, 8–15 m. tall, with drooping branches", "Springy hillsides near Almota", was not given. Instead, Britton cited only a single station: "Type collected by Professor C. V. Piper, July 9, 1901, nine miles south of Pullman, Washington", with the sad result that Piper himself, accepting for the tree which I am calling *B. papyrifera*, var. *commutata* Sargent's misidentification of it as *B. occidentalis* Hook., was forced to reduce *B. Piperi* to its synonymy. Piper's statement follows: "The name *Betula piperi* was meant by its author to apply to the third unnamed species in the Flora of the Palouse Region, but the specimen actually cited is the eastern Washington form of *B. occidentalis* Hook."—Piper, Fl. Wash., Contrib. U. S. Nat. Herb. xi. 218 (1906).

Var. *fecunda* (PLATE 966) is a remarkably definite variety of the western *Betula occidentalis* (*fontinalis*). In its pendulous branches with the tendency to fascicled and slender aments it is strikingly unlike the shrubby and virgate-branched *B. occidentalis* of Hooker's original description, in which the shorter aments are mostly solitary on the spurs. The latter has been so often illustrated that I am here showing only var. *fecunda*. Piper, puzzled by this beautiful tree, sent, unnamed, 14 sheets (under several numbers) to the Gray Herbarium. These were mostly misidentified by me as the Asiatic *B. microphylla*. Under this misidentification of mine Piper in his Flora of Washington, p. 219, wrote: "The Almota specimens form the basis for the third unnamed species in the Flora of the Palouse Region. This is a tall graceful tree with drooping branches, appearing very different from the ordinary form of *B. microphylla*, and probably distinct from it." As TYPE of var. *fecunda* I am designating *Piper*, no. 1642 in the Gray Herbarium.

Although the leaves of var. *fecunda* were described by Piper as 2–4 cm. long, his material was all rather young. Material from slightly to the southwest, Columbia Co., *St. John, Davison & Scheibe*, no. 6939, has leaves 5–7 cm. long.

Var. **pensilis,** var. nov. (TAB. 967), ramulis pendulis; foliis angusto-ovatis vel ovato-lanceolatis basin versus plerumque angustatis vel vix rotundatis; amentis foemineis solitariis vel 2–4-fasciculatis; bracteis 5.5–7 mm. longis, lobis lateralibus rhomboideis vel late oblongis divergentibus. *B. alba* var. *glutinosa* sensu Fernald in Am. Journ. Sci. ser. 4, xiv. 176 (1902), not Trautv.—Locally abundant, Newfoundland to western Quebec, south to Nova Scotia, Maine, Massachusetts and northern New York. NEWFOUNDLAND: high tableland, Holyrood, Aug. 1, 1931, *Agnes M. Ayre;* Buchan Junction, July 19, 1930, *K. P. Jansson.* QUEBEC: Rivière du Brick, Anticosti, *Victorin & Rolland,* no. 27,773; thickets and borders of woods near mouth of Marsouin River, Gaspé Co., *Fernald & Pease,* no. 25,017; head of l'Anse aux Bouleaux, Bic, Rimouski Co., July 6–10, 1905, *Williams, Collins & Fernald;* Bic, July 17, 1905, *J. R. Churchill;* east side of Lac Tremblant, Terrebonne Co., July 21, 1922, *Churchill;* near Georgeville, Lake Memphremagog, Aug. 12, 1914, *Churchill.* NOVA SCOTIA: "small tree 10 ft. high, branches drooping", banks of Lahave R., Bridgewater, *J. G. Jack,* no. 3510. MAINE: tree by road to Leighton Pond, Pembroke, July 10, 1909, *Fernald* (TYPE in Herb. Gray.); by Wassataquoik River between Roebar's and Dacy Dam, Piscatquis Co., July 17, 1900, *Fernald.* MASSACHUSETTS: large tree by Charles River, Newton Lower Falls, July 23, 1912, *Wiegand.* NEW YORK: banks of Cascade Lakes, Essex Co., *House,* no. 7640; mountain-side, alt. 1800 ft., near Minerva, Essex Co., *House,* no. 14,887; Stony Island 2, west end of Black Lake, St. Lawrence Co., *Muenscher & Maguire,* no. 2168.

Var. *pensilis* is very striking, not only as a "weeping" birch but on account of the mostly acute-based leaves and the very abundant fruiting aments. In 8 of the sheets before me they are often clustered on the spurs in fascicles of 2–4.

Var. **macrostachya,** var. nov. (TAB. 968, FIG. 1–3), ramulis divergentibus vix pendulis; foliis ovatis basi rotundatis; amentis foemineis solitariis vel binis, maturis 3.5–5.5 cm. longis 1–2 cm. crassis pedunculatis; pedunculis arcuato-recurvatis 0.5–1.5 cm. longis; bracteis 7–10 mm. longis, lobis lateralibus rhomboideis porrectis vel adscendentibus; samaris 6–8 mm. latis.—Local, northern Newfoundland to Rimouski County, Quebec, south to Nova Scotia and northern Maine. NEWFOUNDLAND: rich thickets on lower slopes of Ha-Ha Mt., Ha-Ha Bay, *Fernald, Wiegand, Long, Gilbert & Hotchkiss,* no. 28,065; thickets and glades, slopes of Cape Dégrat, Quirpon Island, Straits of Belle Isle, *Fernald & Long,* no. 28,067. QUEBEC: cold northerly calcareous walls of Grande Coupe, Percé, Gaspé Co., *Fernald & Collins,* no. 1000; bois près de la mer, Bic, Rimouski Co., *Victorin & Rolland,* no. 49,461. NOVA SCOTIA: dry mixed woods, Hectanooga, Digby Co., July 31, 1920, *Long & Linder*, no. 21,007 (TYPE in Herb. Gray.; ISOTYPE in Herb. Phil. Acad.). MAINE: in disintegrated volcanic rock, Haystack Mt., Aroostook Co., July 11, 1902, *Williams, Collins & Fernald.*

In its very large aments, bracts and samaras var. *macrostachya* stands midway between typical *Betula papyrifera* and var. *cordifolia.* It is also intermediate in the tendency of its pistillate bracts to have the porrect lateral lobes of the latter, but sometimes nearly or quite horizontal as in the former. Its leaves are like those of typical *B. papyrifera,* without the cordate base so characteristic of var. *cordifolia.* Were it not for this transitional var. *macrostachya,* it would be reasonable to look upon var. *cordifolia* as a fairly distinct species, the status originally given it by Regel.

Var. MACROSTACHYA, forma **longipes,** f. nov. (TAB. 968, FIG. 4), pedunculis 2–3 cm. longis, amentis fructiferis pendulis.—Gaspé Peninsula, QUEBEC: woods, Malbaie, Gaspé Co., *Pease,* no. 6025A, as var. *cordifolia;* mossy meadows and woods at 455 m. (1500 ft.)—915 m. (3000 ft.) in the great basin [Fernald Basin] under the north slope of Mt. Logan, Matane Co., July 22, 1922, *Fernald & Pease,* no. 25,019 (TYPE in Herb. Gray.).

Very striking in its long drooping peduncles often essentially as long as the pendulous aments.

Var. ELOBATA (Fernald) Sargent in Journ. Arn. Arb. i. 63 (1919). *B. alba,* var. *elobata* Fernald in RHODORA, xv. 169 (1913).—Known only from the type-locality in QUEBEC: crevices and talus of serpentine along Ruisseau à la Neige, Mt. Albert, Gaspé Co., *Fernald & Collins,* no. 531. PLATE 969.

It is not improbable that var. *elobata,* when mature fruiting material is secured, may prove to be an endemic species. In its subrhombic and dentate leaves, suggestive of those of *B. nigra* L., and in its very short pendulous pistillate aments with unlobed or only obsoletely lobed bracts, it is very distinct. Unfortunately, the material, collected in an alpine area and only slightly past anthesis in July, does not show mature samaras. The type-colony is near the head of one of the northwestern tributaries of Ruisseau à la Neige, as it abruptly descends the cañon-wall, not far below the serpentine tableland (alt. about 3500 ft.). Under it grow *Polystichum mohrioides,* var. *scopulorum* (D. C. Eaton) Fernald, in its only known area east of local stations in Idaho, while close-at-hand are the type-areas of the endemic or near-endemic *Salix chlorolepis* Fernald, *S. hebecarpa* Fernald, *Arenaria marcescens* Fernald and *Solidago chlorolepis* Fernald, and endemic or disjunct varieties in *Salix*, *Statice* and *Cnicus*. It is important to secure the fruit of *Betula papyrifera*, var. *elobata*.

Var. CORDIFOLIA (Regel) Fernald in RHODORA, iii. 173 (1901), by inference only; Rehder, Man. Cult. Trees and Shrubs, 141 (1927). *B. cordifolia* Regel in Nouv. Mém. Soc. Nat. Mosc. xiii. 86—repr. as Mon. Bet. 28, t. 12, figs. 29–36 (1861). *B. alba*, subsp. *papyrifera*, β. *cordifolia* (Regel) Regel in Bull. Soc. Nat. Mosc. xxxiii. 401 (1865)—repr. as Bemerk. Gatt. Bet. Aln. 14 (1866) and in DC. Prodr. xvi². 166 (1868). *B. papyracea*, a *cordifolia* (Regel) Dippel, Handb. Laubholzk. ii. 177 (1892). *B. alba*, var. *cordifolia* (Regel) Fernald in Am. Journ. Sci. ser. 4, xiv. 177 and 190 (1902). *B. papyracea cordifolia* (Regel) Scheele in Beisn., Scheele & Zabel, Handb. Laubh. Benen. 55 (1903). *B. papyrifera*, var. *communis*, f. *cordifolia* (Regel) Schneid. Handb. Laubholzk. i. 115 (1904).—Labrador to Algoma District, Ontario, south to Newfoundland, Nova Scotia, New England (rare southward), northern New York, Michigan, Wisconsin and northern Iowa; high altitudes on Blue Ridge, North Carolina. PLATE 970.

In its firm and definitely cordate leaves, its long bracts with mostly porrect lobes and its large samaras *Betula papyrifera*, var. *cordifolia* might merit the specific rank originally given it by Regel; but, as already noted, var. *macrostachya*, with leaves merely rounded and not cordate at base, exactly bridges the gap between it and typical *B. papyrifera*. With its very long bracts with mostly porrect (instead of horizontally divergent) lobes it is certainly a well marked geographic variety, which in the western half of the continent is replaced by var. *subcordata* (Rydb.) Sargent. Rare in southern New England and not known south of the Adirondack region in New York, this is the only variety of *B. papyrifera* known on the high mountains of North Carolina. In discussing its discovery and abundance at 5500–6200 ft. altitude, "in the spruce and balsam forest", "about 550 miles" south of its supposed southern limit (in Massachusetts and Connecticut), Ashe in RHODORA, xx. 63, 64 (1918) quoted various northern botanists, some of whom (Britton and Blanchard) regarded it a good species, others (Sargent and Burns, besides the present writer) recognizing intergradient trees; and be concluded: "The fact that the cordate [-leaved] form alone occurs in North Carolina, and that there its leaf-form is strongly marked and without indication of variation—foliage was examined from more than 100 trees—would at least seem to give it excellent varietal if not specific characterization."

In his original publication of *Betula cordifolia* Regel cited it as in "Novaja Semlaja von Hr. de la Tylaie im Jahre 1826 gesammelte" and compared it with the Asiatic *B. Ermani* Chamisso, arguing for its specific separation since "dass B. Ermani bis jetzt aus Novaja Semlaja noch nicht bekannt ist". Bearing in mind that Novaja Semlaja is the Russian equivalent of Terre-neuve, where Bachelot de la Pylaie (not "Tylaie") spent so many years in botanizing, the intent is obvious. In fact, Regel got the type-locality straightened in his later treatments, where he correctly gave it as "Terra nova (de la Pylaie . . . )."

A small-leaved northwestern variety of *Betula papyrifera*, which may be expected to cross the plains into Minnesota, has leaves in outline resembling those of *B. pendula*. This is

B. PAPYRIFERA Marsh., var. **humilis** (Regel) Fernald & Raup, comb. nov. *B. alba*, subsp. *papyrifera*, var. γ *humilis* Regel in DC. Prodr. xvi. 166 (1868), in part (descr. and Bourgeau specimen from Saskatchewan). *B. alaskana* Sargent in Bot. Gaz. xxxi. 236 (1901), not Lesq. (1883). *B. neoalaskana* Sarg. in Journ. Arn. Arb. iii. 206 (1921). *B. papyrifera*, var. *neoalaskana* (Sarg.) Raup, Contrib. Arn. Arb. vi. 152 (1934). PLATES 971 and 972.

*Betula alba*, subsp. *papyrifera*, γ. *humilis* was based primarily on a sheet in the Gray Herbarium, collected by Bourgeau in 1857–8 in Saskatchewan ("Bords de la rivière Castor"). This sheet (our PLATE 971, FIGS. 1–4) bears Regel's annotation. Although Regel followed this with citation of Parry and Hall & Harbour specimens, which are of *B. occidentalis* Hook. (*B. fontinalis* Sarg.) and the type of Tuckerman's *B. papyracea*, var. *minor* (*B. minor*) from the White Mts., his description, "folia . . . juniora petiolique saepe pubescentia, . . . subtus ad nervos tantum pilosula. Samararum alae nucula usque triplo latiores", definitely applies to the *Bourgeau* sheet. It can not apply to *B. minor*, for the branchlets and leaves of that more eastern shrub are strictly glabrous and the wings of its samaras are never "nucula usque triplo latiores". Nor could the glabrate branches of Regel's "Ramuli . . . glanduliferi v. juniores pubescentes, dein glabrati" apply to either *B. minor* or *B. occi-*

*dentalis*, both of which have glabrous branchlets; the "juniores pubescentes, dein glabrati" belongs also to the Bourgeau element. Since this Saskatchewan specimen, clearly labelled by Regel as his *B. alba*, subsp. *papyrifera*, var. *humilis*, agrees with his description in the more diagnostic characters, whereas the Rocky Mountain specimens (*Parry* and *Hall & Harbour*) as well as the White Mountain one (*Tuckerman*) already had legitimate names, we see no way but to take up the name var. *humilis* for the Saskatchewan element primarily described.

There is a second sheet of Bourgeau's Saskatchewan material (1858) in the Gray Herbarium. This one (PLATE 972, FIG. 1) has had a checkered career. In his Bemerkungen über die Gattungen Betula und Alnus, Bull. Soc. Nat. Mosc. xxxviii. 398 (1865)—repr. 11 (1866)—Regel published under the strictly Eurasian *Betula alba*, subsp. *verrucosa*, a var. *resinifera*, based exclusively on a Middendorf specimen from eastern Siberia. In DeCandolle's Prodromus, xvi². 164 (1868), however, although otherwise holding his *B. alba*, subsp. *verrucosa* strictly to Eurasia, he cited under var. *resinifera* a single North American specimen: "in America boreali-occidentali ad Saskatchevan (Palliser)". This specimen, *Bourgeau*, 1858, on the Palliser Expedition (Gray Herb.), was originally distributed as *B. papyracea* but it bears Regel's annotation as above. A portion of it is shown in PLATE 972, FIG. 1. The significant point in connection with this second *Bourgeau* (*Palliser*) sheet is that Sargent, describing his *B. alaskana*, selected it as the first specimen to be cited under his new specific name: "Saskatchewan, *E. Bourgeau*, 1858 (in Herb. Gray); near Prince Albert in latitude 53, July 1876, *John Macoun* [our PLATE 971, FIG. 5 and 972, FIGS. 2 and 3]; northwestward, reaching the Alaskan coast", etc. Of this *Bourgeau* specimen Sargent wrote: "The specimen in Herb. Gray collected by Bourgeau in flower on the Saskatchewan was referred by Regel (*Bull. Mosc.* **18:** 398; *DC. Prodr.* **16²:** 164) to his *Betula alba*, subspecies *verrucosa* δ *resinifera*". The fact that, in spite of Sargent's statement, Regel did not mention the Bourgeau specimen in his first publication (Bull. Mosc.) but only in the second (DC. Prodr.) is significant; otherwise it might be involved in the typification of his *B. alba*, subsp. *verrucosa*, var. *resinifera* which, fortunately, was based solely on the Middendorf material.

The name *B. alba,* subsp. *papyrifera,* var. *humilis* has the right-of-way.

7. B. BOREALIS Spach in Ann. Sci. Nat. sér. 2, xv. 196 (1841). *B. pumila,* γ. *borealis* (Spach) Regel in Nouv. Mém. Soc. Nat. Mosc. xiii. 113—repr. Mon. Bet. 55, t. 13, figs. 38 and 39 (1861) and in DC. Prodr. xvi². 173 (1868). *B. alba,* var. *carpatica* sensu Fernald in Am. Journ. Sci. ser. 4, xiv. 179 and 190 (1902) in part only, not *B. carpatica* Wald. & Kit. *B. microphylla* sensu Eames and sensu Fernald, as quoted by Eames, in RHODORA, xi. 93 (1909), not Bunge.—Southern Labrador to James Bay, Ungava, south, chiefly on calcareous or magnesian soils to Newfoundland, Anticosti Island and Gaspé Peninsula, Quebec, and very rarely to Cape Breton and to northern Vermont.—Since this characteristic and very definite northeastern species has not been understood during the full century since Spach very clearly described it as "Legit cl. de Lapylaie, in insulâ Terrae-Novae" (this later rendered by Regel "von Herrn de la Tylaie in Novaja Semlaja gesammelt"), it is important to cite and illustrate good material (all, unless noted, distributed erroneously as *B. microphylla* Bunge). LABRADOR: common on many barrens and hillsides, Backway, off Lake Melville, *R. H. Wetmore,* no. 102,930. NEWFOUNDLAND: 1 m. high, peaty limestone barrens, southern half of Burnt Cape, Pistolet Bay, *Fernald & Long,* no. 28,070; cool springy glade, Burnt Cape, *F. & L.,* no. 28,075; limestone barrens on the Highlands northeast of Big Brook, Straits of Belle Isle, *Fernald, Wiegand & Hotchkiss,* no. 28,072; shrubs 1–2 m. high, spruce woods and thickets bordering limestone barrens, Brig Bay, *Fernald, Long & Dunbar,* no. 26,596; spruce woods and thickets, St. Barbe, *F. L. & D.,* no. 26,595; 1–2 m. high, thickets along East Brook, St. Barbe Bay, *Wiegand & Hotchkiss,* no. 28,080; slaty gorge of brook below serpentine barrens above Woody Point, Bonne Bay, *R. H. Kimball,* no. 117; 1–2 ft. high, quartzite gravel and talus, Killdevil, *Fernald, Long & Fogg,* no. 1636; gravelly beach, Middle Birchy Pond, Eastern Drainage of Humber R., *Fernald & Wiegand,* no. 3247 (as *B. alba,* var. *carpatica*); coarse shrub, southerly slopes of dry serpentine ridge, North Arm, Bay of Islands, *Long & Fogg,* nos. 217 and 219; dry thicket on exposed slope at about 1650 ft., Blow-me-down Mt., *Eames & Godfrey,* no. 6033; serpentine and magnesian limestone barrens, northeastern base and slopes of Blomidon ("Blow-me-down") Mts., *Fernald & Wiegand,* nos. 3245 (as *B. alba,* var. *carpatica*) and 3246; large shrubs, dry limestone barrens, upper slopes and tablelands, alt. 200–300 m., Table Mt., Port-à-Port Bay, *Fernald & Wiegand,* no. 3250 (as *B. alba,* var. *carpatica*), also *Fernald & St. John,* no. 10,827; coarse shrub, thickets on gneiss ledges along Grandy Brook, Distr. of Burgeo and La Poile,

*Fernald, Long & Fogg*, no. 218; springy and boggy places in river-gravel, Gander R., Glenwood, *Fernald & Wiegand*, no. 5308 (as *B. alba*, var. *carpatica*); gravelly river-bank, Glenwood, *F. & W.*, no. 5309 (as *B. alba*, var. *carpatica*). Quebec: 4 ft. high, rocky crest, Pointe au Maurier, Charnay, Saguenay Co., *St. John*, no. 90,385; granite hills, Mingan, *St. John*, no. 90,384; limestone sea-cliffs, Ile Ste. Généviève, Mingan Ids., *St. John*, no. 90,830; sur les rivages calcaires près du Lac Salé, Ile St.-Charles, Archipel de Mingan, *Victorin & Rolland*, no. 18,881; bordant le sommet de l'escarpement, Ile Nue, Mingan, *V. & R.*, no. 24,728; rivages, Ile à la Chasse, Mingan, *V. & R.*, no. 24,740 (as *B. glandulosa*); wet places, Becscie R., Anticosti, Sept. 7, 1883, *J. Macoun;* le long des platières calcaires, Rivière à la Patate, Anticosti, *Victorin, Rolland & Louis-Marie*, no. 21,726; à une douzaine de milles de l'embouchure, R. Jupiter, Anticosti, *Victorin & Rolland*, no. 24,729; arborescent, sur le bord de la falaise boisée, le long du portage de la ligne, Sand-top, Anticosti, *V. & R.*, no. 27,775; crevices and talus of serpentine, Ruisseau à la Neige, Mt. Albert, Gaspé Co., *Fernald & Collins*, no. 532; large shrub, steep clay banks of Matane R., Matane, *Fernald & Pease*, no. 25,022; Rupert House, James Bay, *D. Potter*, no. 805. Nova Scotia: low thicket in bog on plateau north of Bay St. Lawrence, Victoria Co., *Roland*, no. 41,354 (as *B. pumila*). Vermont: rock-outcrop, shore of Fairfield Pond, alt. 550 ft., Fairfield, Franklin Co., *S. F. Blake*, no. 3105 (as *B. alba*, var. *minor*); summit of Mt. Mansfield, July 2, 1897, *Kennedy, Williams* (as *B. papyrifera*, var. *minor*), July 23, 1901, *T. O. Fuller* (as *B. papyrifera*, var. *minor*). Plate 973.

*Betula borealis* was very fully and clearly described by Spach, whose description is worth repeating:

B. borealis Nob.—Legit cl. de Lapylaie, in insulâ Terrae-Novae; forsàn varietas *Betulae excelsae* v. *Betulae albae.*

Arbor? vel frutex? Rami haud resinoso punctati: novelli tomentosi. Folia floralia 6–15 lineas longa, ovato-v. obovato-v. lanceolato-v. oblongo-rhombea, acuta, subaequaliter serrato-dentata, basin versùs integerrima, brevè petiolata: juniora pubescentia; adulta subtùs glaucescentia, sparsè punctulata, reticulata, praeter nervos glabra. Stroboli subpollicares, erecti (?), brevè pedunculati, cylindracei, graciles; rachi gracili, ferè filiformi; squamis tricarpis cuneiformibus, subciliolatis, samaras obtegentibus, trilobis: lobis obtusis, aut subaequalibus, oblongis, nunc parallelis, nunc divergentibus, aut dissimilibus: lateralibus subfalcatis, deflexis, terminali abbreviato, subovato. Samarae ovatae v. suborbiculares, vix lineam latae, angustè alatae, squamis duplò brevioribus. (V. s. sp. in Herb. Mus. Par.)

The densely tomentulose pubescence of vigorous new shoots, usually without glandular atoms, the elliptic to somewhat rhombic or ovate merely acute or acutish leaves more or less pubescent beneath, and the small samaras with the wings scarcely broader than the achene, clearly distinguish it from the other dwarf species of the *Albae* in the Northeast: *B. minor*. There is little to induce one who knows *B. pumila* to place it with that, as was finally done by Regel. The identification with the Siberian *B. microphylla* Bunge was a very crude mistake, quite as unclarifying as my reduction to the latter of the cordilleran North American *B. occidentalis* Hook. (*B. fontinalis* Sargent).[1] *B. microphylla*, as originally described and as represented by Altai material sent by Regel to Gray and perhaps isotypic (PLATE 963, FIGS. 8–10), as well as by more modern specimens, has the small obovate leaves with entire cuneate bases, the summit only coarsely dentate; its branchlets are covered with resinous warts and the wings of its samaras (PLATE 963, FIG. 10) are as originally described by Bunge "semen longitudine et latitudine superantibus." In *B. borealis* the acute or acutish leaves are toothed to base, the branchlets rarely glutinous and the wings of the samara narrow. *B. occidentalis* (*B. fontinalis*), although having broadly winged samaras and very gummy but glabrous branchlets and leaves, has the latter of firmer and heavier texture, more regularly serrulate or doubly serrate margins and usually an ovate outline and lingering pubescence on the upper surface. It does not well match true *B. microphylla* and is quite distinct from the eastern *B. borealis* and *B. minor*, the former with new branchlets heavily pubescent, and the samaras with very narrow wings, the latter glabrous from the first, with more slender fruiting aments and narrower samaras (2.5–5, av. 3.5, mm. broad), whereas the western *B. occidentalis* has the aments thick and the samaras 4–6, av. 5.2, mm. broad.

In *Betula*, ser. *Humiles*, two species need special discussion. The first is only doubtfully a member of this series, a tree of the mountains of western Virginia:

B. **uber** (Ashe), stat. nov. *B. lenta*, var. *uber* Ashe in RHODORA, xx. 64 (1918). PLATE 974, FIGS. 1–5.

It is most difficult to feel that the low tree ("20–25 ft. high", according to Ashe's label) described by Ashe as a small-leaved

[1] See discussion, pp. 313–317.

variety of *Betula lenta* has much, except aromatic bark, to do with that species. *B. lenta* (figs. 6 and 7) has cordate-ovate and long-acuminate leaves with fine and sharp serrulation and 10–20 pairs of veins impressed into the upper surface (a typical member of series *Costatae*). *B. uber*, on the other hand, as shown by isotypes at the Gray Herbarium and the Arnold Arboretum, has very short and broadly rounded, often nearly orbicular leaves with few coarse dentations and with only 3–6 pairs of veins not impressed above (characteristics of series *Humiles*). Furthermore, the pistillate aments are more slender than in *B. lenta* and the bracts end in low and broad lobes, those of *B. lenta* more elongate, with the middle lobe prolonged.

In describing his *B. lenta*, var. *uber* Ashe made no note of its size and he stated that the material, in young fruit and foliage, was collected on "Banks of Dickey Creek, Smyth County, Virginia, south of Rye Valley Station, January 14, 1914". The isotype deposited in the Gray Herbarium has Ashe's label, stating that the tree is "20–25 feet high" and that it was collected "At 2800 ft., June [not January], 1914". It is very important to learn much more about *B. uber*,—whether it is shrubby, the range of variation of foliage, the characters of the staminate aments, and its abundance and range.

B. **terrae-novae,** sp. nov. (tab. 975, fig. 1–4), planta habitu *B. nanae;* ramis novellis tomentosis; foliis late cuneato-flabelliformibus coriaceis glabris valde reticulatis inciso-dentatis basin versus integerrimis; strobilis sessilibus 0.5–1 cm. longis; strobili squamis integerrimis vel subintegerrimis oblongis vel oblongo-lanceolatis vel oblongo-ovatis arcte adpressis apice subsquarrosis; nuculis ovoideis vel subrotundatis apteris margine incrassato.—*B. Michauxii* Spach in Ann. Sci. Nat. sér. 2, xv. 195 (1841), as to description, not as to Michaux plant, basis of the name. *Apterocaryon Michauxii* (Spach) Opiz in Lotos, v. 258 (1855), in part, not *B. nana* sensu Michx., basis of name. *B. nana*, ε *Michauxii* (Spach) Regel in Nouv. Mém. Soc. Nat. Mosc. xiii. 103—repr. Mon. Bet. 45 (1861), excluding Michaux plant, source of name.—Bogs, tundra and peaty, acidic barrens, Newfoundland and adjacent southeastern Labrador Peninsula. Type from diorite tableland, altitude about 550 m., northern region of the Blomidon ("Blow-me-down") Mts., Newfoundland, Aug. 22, 1910, *Fernald & Wiegand*, no. 3271, as *B. nana*, var. *Michauxii* (in Herb. Gray.).

It is unfortunate that the name *Betula Michauxii* had so confused a start. The tiny shrub of Newfoundland, southeastern Labrador and the extreme eastern end of the Côte Nord of Quebec is very distinct from the arctic *B. nana* (FIGS. 5–7) in its tomentose (instead of cinereous-puberulent) branchlets, its more flabelliform, more incised and more strongly reticulate leaves, and above all in simple instead of prominently 3-lobed pistillate bracts and its thick-margined, instead of definitely winged samaras. Spach gave a good description of it in general, but his "Strobili 4–8 pollices [inches] longi" was most unfortunate for any American birch and emphatically for a dwarf with strobiles only 5–10 mm. long! For his *B. Michauxii* Spach set up the new section *Apterocaryon*, which was clearly based on Newfoundland material: "Nuculae apterae, margine incrassato, intus suberoso, cinctae.—Squamae strobilae semper 1-carpae, integerrimae, nuculis duplo angustiores", and this was taken up as the genus *Apterocaryon* (Spach) Opiz. Further to confuse matters Spach started his description of the Newfoundland shrub: "B. MICHAUXII Nob.—*Betula nana* Michx.! Flor. Bor. Amer. (excl. syn.)" and gave the range "America borealis [derived from Michaux] et insula Terrae Novae [La Pylaie material at Paris, presumably]". The name *B. Michauxii* automatically belongs with the Michaux element which came from at least 650 miles farther west ("in sphagnosis, a sinu *Hudsonis* ad lacus *Mistassins*") than the western known limit of *B. terrae-novae*. Furthermore, the description of *B. nana* sensu Michx. Fl. Bor.-Am. 180 (1803), nomenclatural type of *B. Michauxii*, was of something quite different: the shrub "glaberrima" (instead of with tomentose branchlets); "amenti squamis profunde 3-partitis, laciniis oblongis" (instead of entire or merely with obscurely undulate margin); "capsulis orbiculatis, subapteris" (instead of quite apteris). Just what Michaux got we cannot learn at the moment. His description suggests one of the dwarf and glabrous or glabrescent extremes of *B. pumila* L., such as var. *renifolia* Fernald, which abounds on much of the Labrador Peninsula and in Newfoundland and which, in exposed situations, may become a tiny depressed mat with round-obovate to reniform leaves down to 8 mm. long and either pubescent or glabrous. Michaux's plant was, obviously, not at all the characteristic little shrub of the Newfoundland barrens.

The fact that Regel confused *Betula Michauxii*, as a variety, with *B. nana* carries little weight. At the same time he also reduced *B. glandulosa* Michx. to his all-inclusive *B. nana*, as he likewise included the utterly different *B. borealis* Spach (our PLATE 973).

## Explanation of Plates

PLATE 963, FIGS. 1–7, BETULA MINOR (Tuckerm.) Fernald: FIG. 1, portion of TYPE, × 1; FIG. 2, fruiting branch, × 1, from Oakes Gulf, Mt. Washington, New Hampshire, *Eggleston*, no. 2676; FIG. 3, staminate aments, × 1, from Mt. Washington, New Hampshire, *Greenman*, no. 1087; FIG. 4, lower surface of leaf, × 5, from no. 2676; FIG. 5, branchlet, × 10, from no. 2676; FIG. 6, fruiting bract, × 4, and FIG. 7, samara, × 4, from no. 2676. FIGS. 8–10, B. MICROPHYLLA Bunge: FIG. 8, fruiting branch, × 1, from the Altai of Siberia, probably an ISOTYPE; FIG. 9, fruiting bract, × 4, and FIG. 10, samara, × 4, from same specimen. FIG. 11, B. ALBA L., var. TORTUOSA (Ledeb.) Schneider: samara, × 4, from Kingua Tunugdliarfik, Greenland, Aug. 17, 1888, *Kolderup Rosenvinge*.

PLATE 964, B. PAPYRIFERA Marsh. (typical): FIG. 1, fruiting branch, × 1, from Middlebury, Vermont, July 8, 1908, *E. F. Williams;* FIG. 2, staminate aments, × 1, from Winchester, Massachusetts, May 9, 1897, *E. F. Williams;* FIG. 3, tip of young shoot, × 5, from Lac Ste.-Anne, Gaspé Co., Quebec, *Victorin, Rolland & Jacques*, no. 33,476; FIG. 4, fruiting bract, × 4, and FIG. 5, samara × 4, from Southport, Maine, Aug. 8, 1894, *Fernald*.

PLATE 965, B. PAPYRIFERA, var. COMMUTATA (Regel) Fernald: FIG. 1, portion, × 1, of the *Lyall* specimen from "Cascade Mountains, 49 N. Lat."; FIG. 2, characteristic close bark, × 1, from Percé, Quebec, July, 1905, *Williams, Collins & Fernald;* FIG. 3, outer bark exfoliating, exposing whitish inner bark, × 1, from base of same tree as in fig. 2; FIGS. 4 and 5, fruiting bracts, × 4, from the *Lyall* specimen; FIG. 6, samara, × 4, from the *Lyall* specimen; FIG. 7, fruiting bract, × 4, from Bayview, Gloucester, Massachusetts, Aug., 1944, *Elizabeth Johnston;* FIG. 8, samara, × 4, from the same specimen as fig. 7.

PLATE 966, B. OCCIDENTALIS Hook., var. FECUNDA Fernald: FIG. 1, portion of TYPE, × 1; FIG. 2, younger (flowering) branchlet, × 1, from type-locality, May 11, 1901, *Piper;* FIG. 3, staminate aments, × 1, from type-locality, April 27, 1925, *Constance et al.*, no. 1043.

PLATE 967, B. PAPYRIFERA, var. PENSILIS Fernald: FIG. 1, portion, × 1, of TYPE; FIG. 2, fruiting bract, × 4, and FIG. 3, samara, × 4, from TYPE; FIG. 4, younger branch, × 1, from Bic, Quebec, July, 1905, *Williams, Collins & Fernald*.

PLATE 968, FIGS. 1–3, B. PAPYRIFERA, var. MACROSTACHYA Fernald: FIG. 1, portion, × 1, of TYPE; FIG. 2, fruiting bract, × 4, and FIG. 3, samara, × 4, from TYPE. FIG. 4, forma LONGIPES Fernald: portion, × 1, of TYPE.

PLATE 969, B. PAPYRIFERA, var. ELOBATA (Fernald) Sargent: FIG. 1, portion, × 1, of TYPE; FIG. 2, immature samara embraced by bract, × 4, from TYPE; FIG. 3, young bracts, × 1, from TYPE.

PLATE 970, B. PAPYRIFERA, var. CORDIFOLIA (Regel) Fernald: FIG. 1, portion, × 1, of fruiting branch from Malbaie, Gaspé Co., Quebec, August 20, 1904, *Collins, Fernald & Pease;* FIG. 2, tip of vigorous sprout, × 5, from Roberval, Quebec, July 28, 1892, *G. G. Kennedy;* FIG. 3, fruiting bract, × 4, and FIG. 4, samara, × 4, from same specimen as fig. 1.

PLATES 971 and 972, B. PAPYRIFERA, var. HUMILIS (Regel) Fernald & Raup. PLATE 971: FIG. 1, portion, × 1, of TYPE of *B. alba* L., subsp. *papyrifera* (Marsh.) Regel, var. *humilis* Regel, with Regel's identification; FIG. 2, lower surface of leaf (with scattered trichomes), × 10, from TYPE; FIG. 3, fruiting bract, × 4, and FIG. 4, samara, × 4, from TYPE; FIG. 5, fruiting tip, × 1, of specimen from Prince Albert, Saskatchewan (*Macoun*, no. 12,952[a]), one of the 2 specimens cited by Sargent as his *B. alaskana*. PLATE 972, FIG. 1, portions,

× 1, of the Saskatchewan plant (*Bourgeau*, 1858), the first specimen cited by its author for *B. alaskana* Sargent: FIG. 2, fruiting bract, × 4, and FIG. 3, samara, × 4, of the Prince Albert material, *Macoun*, no. 12,952[a]; FIG. 4, fruiting bract, × 4, and FIG. 5, samara, × 4, from near Fairbanks, Alaska, *Ynez Mexia*, no. 2291.

PLATE 973, B. BOREALIS Spach: FIG. 1, branches, × 1, from Glenwood, Newfoundland, *Fernald & Wiegand*, no. 5308; FIG. 2, fruiting branch, × 1, from Glenwood, *Fernald & Wiegand*, no. 5309; FIG. 3, tip of young branch, × 5, from no. 5309; FIG. 4, fruiting bract, × 4, and FIG. 5, samara, × 4, from base of Blomidon, Bay of Islands, Newfoundland, *Fernald & Wiegand*, no. 3246.

PLATE 974, FIGS. 1–5, B. UBER (Ashe) Fernald: FIG. 1, portion, × 1, of ISOTYPE in Herb. Arnold Arboretum; FIG. 2, upper surface of leaf, × 2, to show venation and toothing, from ISOTYPE; FIG. 3, portion of lower surface of leaf, × 2, from ISOTYPE; FIG. 4, fruiting bract, × 4, and FIG. 5, samara, × 4, from ISOTYPE. FIGS. 6 and 7, B. LENTA L.: FIG. 6, portion of lower surface of leaf, × 1, to show venation and toothing, from Jamaica Plain, Massachusetts, August 25, 1885, *C. E. Faxon;* FIG. 7, fruiting bract, × 4, from same specimen.

PLATE 975, FIGS. 1–4, B. TERRAE-NOVAE Fernald: FIG. 1, portion of TYPE, × 1: FIG. 2, tip of branchlet, × 5, from Goose Pond, upper Humber River, Newfoundland, *Fernald & Wiegand*, no. 3272; FIG. 3, fruiting bracts, × 10, and FIG. 4, nutlet, × 10, from TYPE. FIGS. 5–7, B. NANA L.: FIG. 5, tip of branchlet, × 5, from Velmunden, Norway, July 23, 1909, *Fr. Lange;* FIG. 6, fruiting bract, × 4, and FIG. 7, samara, × 10, from the *Lange* specimen.

(*To be continued*)

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# A NEW SPECIES OF ANULOCAULIS FROM SOUTHWESTERN TEXAS AND ADJACENT NEW MEXICO

U. T. WATERFALL

SEVERAL collections of *Anulocaulis* were made by the author while botanizing in the Transpecos Region of southwestern Texas and adjacent New Mexico during the summers of 1942 and 1943, and October, 1944. The majority of these were of a plant having large, pallid, eglandular leaves, and long flowers. One collection, my no. 5026 from near the Finlay gypsum quarry in Hudspeth County, was characterized by smaller, greener, papillate-glandular leaves, and by smaller flowers. The latter plant agrees with Torrey's description of *Boerhaavia leiosolena*,[1] the type of which was taken along the Rio Grande about 50 miles southeast of Finlay. The other specimens do not agree with it in several respects.

Most authors have treated the plants as one species, their descriptions merging the characteristics of Torrey's plant with those of later collections which have been almost entirely of the

[1] Torrey, John. *Botany of the Mexican Boundary*, 172. 1859.

proposed new species. The only collections of true *A. leiosolenus* I have seen in the material borrowed from the Gray Herbarium are my no. 5026, mentioned above, and Bigelow's specimen from "the Great Canon of the Rio Grande", presumably near the present location of Indian Hot Springs in southern Hudspeth County. Dr. I. M. Johnston recognized this situation in his account of the *Plants of Coahuila, Eastern Chihuahua, and Adjoining Zacatecas and Durango*[1], citing under *Anulocaulis leiosolenus* only the specimens listed above.

This, the typical variety, *Anulocaulis leiosolenus* (Torr.) Standl., var. **typicus,** nom. nov. (*Boerhaavia leiosolena* Torr., Bot. Mex. Bound. 172. 1859), appears to be a localized plant restricted to gypsum habitats in the southern part of Hudspeth County, while its var. *lasianthus* Jtn. is isolated in the Big Bend[2]. The proposed new species is much wider-ranging, being found on the great Permian gypsum beds of Culberson and Reeves Counties, Texas, in adjacent Eddy County, New Mexico, and as far north as the gypsum deposits of the Comanchean Bluffs east of Roswell, Chaves County, New Mexico. It is an obligate gypsophile, as apparently are other members of the genus.

Anulocaulis **gypsogenus,** n. sp. *Anulocaulis leiosolenus* (Torr.) Standl., Contr. U. S. Nat. Herb. **12.** 375. 1909, *in part.* Not *Boerhaavia leiosolena* Torr. in Bot. Mex. Bound. 172. 1859. —Plant perennial, erect, 8–12 dm. high from a woody root; stems glabrous, usually with an irregular glutinous band on each of the internodes; leaves opposite, mostly from the crowded lower nodes, thus appearing basal; leaf-blades ovate-cordate to reniform-cordate, 7–19 cm. long, 6–23 cm. wide, coriaceous, pallid, glabrous, never glandular-tuberculate as in *A. leiosolenus;* panicle-branches about ⅔ the height of the plant, the ends of the several opposite branches tending to be somewhat closely several-flowered, floral bracts ovate to ovate-lanceolate with acuminate tips; perianths large, about 3–3.5 cm. long, greenish-white suffused with pink toward the limb; lower part of perianth tubular, upper ⅓ funnel-form, 5-lobed, the lobes about 4 mm. long, each lobe deeply bifid and having a prominent midvein extending through the tube to the triangular sinus where it is minutely excurrent; stamens 3, unequal, exserted, 4–6.5 cm. long; bases of filaments unequally united into a short hypogynous tube which is about as long as the ovary; style filiform, extending

[1] Johnston, I. M., *Journ. Arn. Arb.* XXV, 174–175. 1944.
[2] Op. cit. 175.

about 1 cm. beyond the stamens; stigma minutely capitate; anthocarp turbinate, 5–7 mm. long, 4–5 mm. wide, surrounded just below the middle with a reflexed wing about 1 mm. wide, lower part of fruit narrowly conical, upper part hemispherical, prominently 10-ridged.

ANULOCAULIS **gypsogenus,** sp. nov. Planta perennis, e caudice lignoso erecta 8–12 dm. alta; caulibus glabris, internodiis annulo glutinoso irregulari cinctis; foliis oppositis, maxima parte e nodis inferioribus congestis, sicut basalibus: laminis ovato-cordatis vel reniformi-cordatis, 7–19 cm. longis, 6–23 cm. latis, coriaceis, pallidis, glabris, haud glandulari-tuberculatis ut apud *A. leiosolenum;* ramis paniculae pluribus oppositis, apicem versus plus minusve dense plurifloris; bracteis ovatis vel ovato-lanceolatis acuminatis; perianthio magno, ca. 3–3.5 cm. longo, tubo viridi-albido, limbo rosaceo-albido, ca. 1.5 cm. diametro, 5-lobato, lobis ca. 4 mm. longis, bifidis, vena mediana ad imum sinum triangulare inter lobos ca. 3 mm. altum brevissime excurrente; staminibus 3, inaequalibus, exsertis, 4–6 cm. longis, basibus filamentorum in tubum hypogynum ovario subaequilongum inaequaliter adnatis; stylis filiformibus, 5–7.5 cm. longis; stigmatibus minute capitatis; anthocarpiis turbinatis, 5–7 mm. longis, 4–5 mm. diametro, ala angusta reflexa ca. 1 mm. lata infra mediam circumcinctis; parte inferiore fructus anguste conica, parte superiore hemisphaerica, 10-costata.

The TYPE is the author's no. 5701 deposited in the Gray Herbarium. Isotypes are in the Herbarium of the Missouri Botanical Garden, the Herbarium of the New York Botanical Garden, and the author's private herbarium. This collection was taken from gypsum strata on the Comanchean Bluffs on the east side of the Pecos River, 7 miles east of Roswell, Chaves County, New Mexico. Here it grew in association with other gypsophiles characteristic of similar habitats farther south in Transpecos Texas. These include: *Bouteloua breviseta, Sporobolus Nealleyi, Selinocarpus lanceolatus, Mentzelia humilis, Coldenia hispidissima, Gaillardia multiceps, Sartwellia Flaveriae* and *Dicranocarpus parviflorus.*

SPECIMENS EXAMINED: TEXAS, CULBERSON COUNTY: *Cory* 1535, Millers Brothers Ranch (central Culberson Co.), June 17, 1928. REEVES COUNTY: *Waterfall* 4258 from Screw Bean Arroyo near Texas-New Mexico Boundary. COUNTY UNDETERMINED, *Havard* 87 from bluffs of Deleware Creek, West Texas (northern Reeves or Culberson Co.). NEW MEXICO: CHAVES COUNTY: *Waterfall* 4294 from gypsum of Comanchean Bluffs, 7 miles east of Roswell, Aug. 23, 1942; *Waterfall* 5701, TYPE, same site, Oct. 9,

1944. Eddy County: *Strandtman* 6, New Mexico, near Texas State line, Aug. 21, 1941; *Waterfall* 5721 from gypsum hills extending north from the Culberson Plateau, 3 miles north of state line near U. S. Highway 62, Oct. 9, 1944.

The author is indebted to Dr. Milton Hopkins of the University of Oklahoma for borrowing material from the Gray Herbarium, to Dr. C. A. Weatherby and Dr. Milton Hopkins for aid in the preparation of the latin translation, and to the Arnold Arboretum of Harvard University and the Carnegie Institution of Washington for grants of funds to aid these investigations.

Wynnewood, Oklahoma

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Convolvulus Wallichiana at Swarthmore, Pennsylvania.—Among the plantings around Swarthmore College, Swarthmore, Pa., there grows a species of *Convolvulus* which is rapidly becoming a weed. This plant was first observed about three years ago but little attention was paid to it.

Examination of all keys available failed to establish the identity of this species. It resembles *C. sepium* very closely but is much smaller and the leaf-characters are somewhat different. The specimen was forwarded to the Gray Herbarium where it was identified as *Convolvulus Wallichianus* Spreng., a native of India, China, and adjacent parts of Asia. According to report this is the first specimen collected in America.

The source of this plant at Swarthmore can not be determined with any certainty. It was found growing among some narcissus and near an ilex. The narcissus bulbs came from Germantown, Pa., and much of the shrubbery came from Long Island, N. Y. In addition a great deal of mushroom soil has been added from time to time from New York.

The plant is very difficult to exterminate and is likely to become a nuisance. At present it is found in about five separate areas in and around the buildings.—Samuel C. Palmer, Swarthmore College.

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# Rhodora

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## CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY—No. CLIX

M. L. Fernald

### II. Eastern North American Representatives of Alnus incana

(Plates 976–989)

In 1906, while he was a student with me, Dr. Harley H. Bartlett joined me in collecting at different stages of development through the season material of the Swamp Alders of northeastern Massachusetts, for it was quite apparent that the variations within this group were not satisfactorily disposed of merely by calling them all simply *Alnus incana* and *A. serrulata* or *rugosa*. With the cooperation of the late Professor J. Franklin Collins in Rhode Island, we assembled many collections but their final identification was interrupted by Bartlett's finishing his studies at Cambridge and the mass of material was stored, with the hope that one of those eclectic students, who specialize on our trees and shrubs, to the exclusion of herbs, would be interested to clarify the situation. More than quarter of a century later, when he was studying with me, Dr. Ernst C. Abbe, working primarily on morphological problems in the *Corylaceae* (*Betulaceae*), made a fresh start on the problem and, although he was obliged to cut short this special work, he had, before he finished, assembled striking evidence that the shrub or small tree, which in North America passes as the Eurasian *A. incana*, really differs from that species in very many important characters. Following up Abbe's unfinished studies, I undertook to conclude the quest and a decade or more ago wrote the introduction to the present paper.

Interrupted by more immediately pressing matters, I likewise failed to bring the study to completion. Now, after these repeated interruptions, I am again endeavoring to set the group in such order as I can establish in it. Fortunately but somewhat unhappily, I am faced by vastly more numerous, though more satisfactorily made, collections to deal with than Bartlett and I had before us 39 years ago, for wherever I have been, in Newfoundland, eastern Canada, New England, New York, Michigan or Virginia, my companions and I have had our eyes open for variations of the Alders. The present paper cannot, therefore, be called a hasty and off-hand study.

The name *Alnus incana* for the common Swamp Alder of the Labrador Peninsula, Newfoundland, eastern Canada and the more northeastern United States (PLATES 977–982) has been so thoroughly established, especially since Edward Tuckerman in 1843 so identified the northern shrub or small tree with leaves glaucous beneath, that to those who are more influenced by long-established usages than by precision its abandonment might seem mere iconoclasm. At the beginning, however, the name belonged strictly to a Eurasian tree and, of course, it must be retained for that variable but morphologically definite species. True *Alnus incana* (L.) Moench (PLATE 976) was so named because of the hoary (incanous) pubescence which so generally characterizes it; ordinarily its leaves are permanently quite gray with soft and velvety pilosity, as are the young branchlets and the axes of the inflorescences. The terminal lobes (FIGS. 5 and 6) of the bracts of the pistillate and fruiting aments (FIGS. 4 and 5) are depressed and slightly recurving or sometimes almost suppressed. This species is found in North America only in cultivation or where introduced from Europe, as formerly on the sand-hills near Provincetown, at the tip of Cape Cod, where it was originally planted and was abundant as late as 1919 (*Fernald & Long*, nos. 18,354, 18,355 and 18,360) but where, by 1944, none of it seems to have persisted.[1]

[1] The introduction of European plants for the reclamation of the sand-dunes back of Race Point Life Saving Station near Provincetown is typical of much of the practice in holding or reclaiming loose soils. The natural dunes of Cape Cod are very effectively and automatically reclaimed by the indigenous eastern North American *Ammophila breviligulata* Fernald and *Pinus rigida* (Pitch Pine), while the Alders of the dunes and hollows are endemic Americans. Nevertheless, the reclamation of the dunes of the old province-lands was largely attempted through the planting of imported

The eastern North American shrub or (rarely) small bushy so-called tree (PLATES 977–982) which erroneously passes as *Alnus incana* is not truly incanous. Its new branchlets and the axes of its inflorescences, are, with rare exceptions, glabrous or only very sparsely pilose and very gummy, having, when dry, a crackled or subverrucose surface. The oval or ovate to round-elliptical and usually coarsely undulate or doubly toothed leaves are less pubescent or glabrous beneath or, if strongly pilose, with usually rufescent pubescence. The pale cross-veins (between the strong parallel ribs) are, in mature foliage, coarse and prominent beneath (PLATES 977, FIG. 2, 978, FIG. 2, and 979, FIG. 4), freely confluent and forming a conspicuously scalariform and rugose pattern, the veins in European *A. incana* (PLATE 976, FIG. 2) being very slender and comparatively delicate. In the American species the pistillate aments are usually more numerous than in the European species; and the outer lobes of the summit of each bract of the pistillate cone are suberect or arching and prolonged (PLATES 977, FIG. 3, and 978, FIGS. 3 and 5). That the so-called *A. incana* of North America is really very different from true Eurasian *A. incana* is quite obvious; but for clarity of discussion this American shrub, which for more than a century has erroneously passed with us as Old World *A. incana,* may be temporarily designated SPECIES NO. 1.

All the characters above noted are such as can be seen in a good herbarium. Others of equal significance are not often there displayed. Eurasian *Alnus incana* is a large shrub or, more often, a considerable tree, up to 35 or even to 85 feet high and with single erect trunks up to 3 feet in diameter, the cortex lustrous and whitish-gray. "In . . . Europe . . . in the south . . . sometimes attaining a height of seventy feet; it is the common Alder of Siberia and southeastern Asia [this

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European White Alder, Scotch Pine and Scotch Broom; but the Broom is there now relatively unimportant, the Scotch Pine is secondary to the native Pitch Pine, and the European Alder has not survived. That is as it should be: the climate of the dunes of western Eurasia, with prevailingly western winds off the Atlantic, is so unlike the dry and hot summer conditions at the eastern border of North America, that western European shrubs are too much handicapped. Some years ago I received a call from an American soil-conservator who stated that he was going on a federal government mission to India, to find some Asiatic species which would control erosion in our "dust-bowl". A few days later I had a brief visit from a prominent botanist of India, who had been sent to America by his government to see if in our "dust-bowl" he could secure some plant to control wind-erosion in India. Tra-la-la!

sometimes separated], . . . a stately tree fifty or sixty feet in height, with a trunk often two or three feet in diameter"—Sargent, Silva, ix. 69, in footnote (1896). "Strauch oder bis 10 (25) m hoher Baum. . . . Rinde glatt, glänzend weissgrau"—Hegi, Ill. Fl. Mitt.-Eu. iii. 89, with illustration of the arborescent habit as fig. 483. "Arbre à écorce lisse, d'un gris blanc"—Rouy, Fl. France, xii. 261 (1910); "meist 6 bis etwa 23 m hoch, in der Tracht der *A. glutinosa* ähnlich, aber meist niedriger, mit ziemlich dichter Krone. Stamm glatt mit hellgrauer Rinde"—Ascherson & Graebner, Synop. Mitteleur. Fl. iv. 423 (1911). Certainly the North American shrub or bushy "tree", which for a century or more has passed as *A. incana* (our SPECIES NO. 1), does not have sufficiently erect or solitary trunks to rank as a real tree; otherwise it would have been included among the trees in such compendious works as Sargent's *Silva* and his *Manual of the Trees of North America* and in Britton's *North American Trees*, in none of which is it included. If a tree, it should also be in Sudworth's *Check List of the Forest Trees of the United States*. Rightly enough, however, *A. incana* is mentioned by Sudworth only in a footnote as "a shrub", "as it occurs in northeastern North America and United States" (Sudworth, p. 80). In a footnote Sargent, Silva, l. c., refers to it (as *A. incana*) in the following terms: "In North America, where it is the common Alder of swamps and river-banks in the northeastern parts of the continent, forming dense shrubby thickets rarely more than ten or twelve feet high"; while F. A. Michaux, describing it as his *A. glauca* and comparing it with *A. serrulata*, said "c'est-à-dire qu'on en trouve souvent des individus qui ont de 18 à 20 pieds . . . de hauteur, sur environ 3 pouces (12 centim.) de diamètre". And surely the cortex of our northern shrub is never *whitish gray*, the color so consistently stated by Eurasian botanists for their *A. incana*. The thin cortex of ours is a warm purple-black, purple-brown or gray-brown, with conspicuous elongate white lenticels (PLATE 980, FIG. 2). "L'écorce qui couvre le tronc, ainsi que les branches secondaires, est d'une teinte brune très-foncée" (Michx. f. in describing his *A. glauca*); "bark gray brown with lighter horizontal markings" (Mathews, Field Book Am. Trees and Shrubs, 126). "A shrub 8–20 feet high; the stem sometimes 3–4 inches in diameter, with a smooth brown bark"—

Torrey, Fl. N. Y. ii. 202 (1843). In fact, so dark is the bark that, when the younger Michaux published his *Alnus glauca*, with "*foliis subrotundò-ellipticis, duplicatò-serratis, subtùs glaucis*", he gave our shrub of "les États du New-Hampshire, Massachusetts et de Vermont" which has the foliage so "vert pâle et comme bleuâtre, ce qui les fait reconnoître au premier abord", the English name "*BLACK ALDER*"; whereas in Europe *A. incana* is frequently called "White" or "Gray Alder". Furthermore, in Europe witches' brooms (*Hexenbesen*) are frequent on *A. incana*, sometimes as many as 100 on a single tree; our dark-barked northeastern shrub, Professor Faull informs me, has never been known to produce them; and Professor Arthur Stanley Pease tells me that his students in Latin, familiar with the shrubbiness of alders in eastern North America, always have a great laugh as they read passages (at least 11 of them) by the Latin poets, telling of ships built of alder! Surely no argument beyond the mere facts and the plates is needed to show that we have been far astray in calling our northern Swamp Alder the same as the Eurasian *A. incana!*

The only other indigenous Swamp Alder of temperate North America, excluding the quite definite autumn-flowering *Alnus maritima* (Marsh.) Muhl., is the generally more southern shrub (plate 983–989) with the white lenticels of the bark much smaller than in Species no. 1 or often very obscure (plate 985, fig. 5); the leaves of a generalized obovate type, mostly subcuneately narrowed (but sometimes more rounded) to base, usually with regularly or subuniformly fine-serrulate margins, with cross-veins beneath (plates 984, fig. 4, 985, fig. 4, 987, fig. 4 and 988, fig. 3) more delicate and less conspicuous, the lower leaf-surfaces fulvous-green to reddish, glabrous, glabrate or reddish-pubescent; the axis of the pistillate inflorescence (plates 983, figs. 3 and 4, 985, fig. 3, 986, fig. 3, 988, fig. 4, and 989, fig. 4) commonly with right angles or strongly geniculate bends. The outer terminal lobes of the cone-bract (plate 986, fig. 4) are low and broadly rounded. This shrub, the northern limits of which interlock with the southern outposts of Species no. 1, long passed correctly as *A. serrulata* (Ait.) Willd.; but, especially since Karl Koch in 1872, Coulter in 1894 and Sargent's Silva (1896), it has recently been incorrectly passing as *A. rugosa* (Du Roi) Sprengel. Since the latter name must be considered in connection with Species no. 1, it will make for clarity, until the application of the various names is investigated, to designate the more southern shrub as Species no. 2.

Almost from the start, at least beginning with Willdenow in 1796, the names *rugosa* and *serrulata,* whether under *Betula* or *Alnus,* were hopelessly confused. Regel at last got them clearly separated but, depending chiefly on variable leaf-outline and -pubescence, without noting the striking differences of bark and inflorescences, he maintained them both as variations of one species. With the two eastern American species defined as Species nos. 1 and 2 and clearly shown in the plates, we may proceed to examine the specific names published for them, somewhat in chronological order, that we may settle their correct application. In so doing I am omitting the several *nomina nuda* of Steudel and others, undefined names which by various authors have been placed in the vague synonymy of one or another of the properly defined ones.

The first of these two American species defined was *Betula Alnus* (*rugosa*) Du Roi, Obs. Bot. p. xxxii (1771). The original diagnosis and discussion of the shrub growing in the botanic garden of Harbke near Brunswick was as follows:

> 5. BETULA ALNUS (*rugosa*) foliis mucronatis acute serratis, subtus venoso-rugosis.
> *Germ.* Nordamerikanische Eller.
> Habitat in America septentrionali.
> Species horti Harbeccensis *foliis* ovatis mucronatis, acutius serratis et angustioribus, quam in B. Alno incana, viridibus glabris, subtus venis albidis rugosis. *Rami* tenues, cortice nigricante. E semine misso culta arbor in horto nondum adhuc floruit.

This was followed by the fuller account in Du Roi's detailed Die Harbkesche wilde Baumzucht, i. 112 (1771):

> 3. BETULA Alnus (rugosa) foliis mucronatis acute serratis, subtus venoso-rugosis.
> The American Alder.
> Aune d'Amerique septentrionale.
> Die Nordamerikanische Eller.
> Sie unterscheidet sich deutlich von den beiden vorigen, und ist hier aus Saamen gezogen, welcher aus Nordamerika geschickt worden ist.

> Die **Blätter** erscheinen schmaler als bei den vorhergehenden, und in den mehresten an vier Zoll Länge und zwei Zoll Breite. Sie sind oval zugespizt, am Rande scharf und fein gezahnt, auf der oberen Fläche hell grün und glatt, und auf der unteren ebenfals hellgrün. Auf der lezteren lauft der Länge nach eine weissgrüne erhabene Ader hin, welche in schrägen Linien nach dem Rande aus etwas feinere Nebenäste Paarweise gegen einander über ausschicket, und aus diesen lezteren kleinen Adern gehet ein Gewebe noch kleinerer Adern heraus, die das Blatt etwas runzlicht bilden.
>
> Die äussere Rinde ist dunkelgrau an alten Zweigen, an iungen aber grün.

Ehrhart, improving on the trinomial nomenclature of Du Roi, redescribed the shrub growing in the Harbke Garden as *Betula rugosa* (Du Roi) Ehrh. Beitr. iii. 21 (1788).

> 6. *Die Haseleller.*
> *Betula rugosa.*
> Betula gemmis elevatis, obtusis; foliis ovatis, acutis, repando-angulatis, serratis, nudis, superne glabris, subtus venoso-rugosis; racemis subtristrobilis, aphyllis.
> Ihr Vaterland ist Nordamerika.
> Die Plantage zu Herrnhausen, die Gärten zu Harbke, Destedt und mehrere haben sie.
> Betula Alnus rugosa. Duroi baumz, v. i, p. 112.

Sprengel, too, in transferring the species to *Alnus*, in Syst. iii. 848 (1826), was equally clear:

> *rugosa** 8. A[lnus] foliis basi rotundata ovato-oblongis acutis duplicato-denticulatis subtus rugulosis, axillis venarum villosis. *Amer. bor.*

but Sprengel made the serious mistake of suggesting identity with the Peruvian *A. acuminata* HBK.

From the original accounts of Du Roi, Ehrhart and Sprengel, then, it is clear that *Alnus rugosa* rests upon material cultivated in Germany and having dark or blackish bark, leaves ovate or oval, acutish, rounded at base, doubly toothed, green and glabrous or glabrescent beneath, a leaf which so resembles that of *Corylus* as to suggest to Ehrhart the name "*Haseleller*" (Hazel-Alder). These descriptions are so vivid for the common extreme of the shrub of northeastern America which has erroneously passed as the European *A. incana*, var. *hypochlora* Call.[1], that it is doubly reassuring to see a photograph (our PLATE 979, FIG. 1) of a speci-

[1] As by Fernald in RHODORA, xxiii. 257 (Feb. 27, 1922).

men distributed by Ehrhart as his *Betula rugosa* and coming from the Harbke Garden. The photograph, for the use of which I am indebted to Professor Alfred Rehder and the Arnold Arboretum, was taken by Professor Rehder at the Botanical Museum at Berlin-Dahlem; and, since the destruction of that invaluable herbarium, it is a most fortunate photograph to have. The foliage shown is young first-year leaves and is closely matched by the leaves on young and vigorous sprouts of our greener-leaved so-called "*A. incana*, var. *hypochlora*". Surely no one, familiar with the obovate and usually cuneate-based leaf of *A. serrulata*, would think of matching the latter with the authentic foliage from the Harbke Garden. Neither would they call our *A. serrulata* "Hazel-Alder". That name is wholly appropriate for our shrub (Species no. 1) which has been passing as *A. incana.* A characteristic leaf was shown by Regel in his *Monographia Betulacearum* in Nouv. Mém. Soc. Nat. Mosc. xiii. 165, t. xi. fig. 8—repr. as Mon. Bet. 107 (1861)—of the shrub "in den Gärten Europas" and which Regel, with remarkable conservatism, called *A. glutinosa*, lusus *rugosa!* Regel in 1861 stated that the shrub was widely grown in the botanical gardens of Europe and he identified with it the *A. hybrida* of Alexander Braun in Reichenb. Ic. Fl. Germ. xii. 3, t. 630, fig. 1292 (1850), which had been found wild in various parts of Germany and in Bohemia. Such a shrub, from a wild habitat in Wittenberg, was distributed in *Baenitz. Herb. Dendrol.* no. 1214, as *A. rugosa.* This material, unlike the Ehrhart specimen, shows mature fruiting branches with the characteristic cones and the typical foliage of fruiting branches of our greener-leaved "*A. incana*". It is shown in our plate 977. Native American specimens, almost like it in every respect, are shown in plate 978.

Confusing as it may temporarily prove, there seems to be no escape from taking up for the North American shrub which passes as *Alnus incana,* our Species no. 1, its earliest name, A. rugosa (DuRoi) Spreng.

Chronologically, the names of Humphrey Marshall, Arb. Am. 20 (1785), have to be noted. The first, "Betula-Alnus glauca. *Silver-leaved Alder*" of "low marshy ground", had no diagnosis whatever but from its names may be inferred as being the common northern variety of *A. rugosa,* which reaches northeastern

Pennsylvania, a species which had already been described by DuRoi (1771) and which in 1813 F. A. Michaux properly described and illustrated, with no reference to Marshall, as *A. glauca.* Marshall's second species, "BETULA-ALNUS maritima, *Sea-side-Alder*", was sufficiently defined as to give an unquestioned basis for *A. maritima* (Marsh.) Nutt., a clear-cut autumn-flowering species which we are not here discussing. His third had no good description, merely very brief and inconclusive comments. though geographically it was obviously intended for *A. serrulata* (Ait.) Willd., our SPECIES NO. 2. This was

> BETULA-ALNUS rubra. *Common Alder.*
> This grows very common in most parts of Pennsylvania.
> The leaves are broader than the other kinds and rough or wrinkled.
> This flowers in the spring, and perfects its seeds in the fall.

From its abundance in Pennsylvania Marshall's species, as said, should be some form of *Alnus serrulata.* The leaves "broader than the other kinds and rough or wrinkled" is inconclusive but there are plenty of broad-leaved variations of *A. serrulata.* Tuckerman interpreted it as unmistakable *A. serrulata* and described *A. rubra* (Marsh.) Tuckerm. in Am. Journ. Sci. xlv. 32 (1843), with leaves obovate and with *Betula serrulata* Ait. and *A. serrulata* (Ait.) Willd. as synonyms, Tuckerman giving the naïvely nationalistic explanation:

> The name of our own botanist should have the priority: his description, though short [he might have said inconclusive], notices the most striking features of the species, and cannot be mistaken. The A. rubra of Bongard [1833], is many years later [than *Betula-Alnus rubra*]. Add to this, that Marshall's name is far more expressive and apt than that of Aiton [1789].

Nevertheless, *Alnus rubra* Bongard (1833), the Pacific North American species, has right of way and under present-day rules no other species can validly bear the same name, even though its name-bringing typonym was earlier. *A. rubra* (Marsh.) Tuckerm. (1843) is fortunately, in view of its vague origin, a later homonym.

The next name, chronologically, was *Betula serrulata* Aiton, Hort. Kew. iii. 338 (1789). Aiton's diagnosis was brief but its characterization of the leaf definite:

*serrulata.* 11. B. pedunculis ramosis, foliis obovatis acutis; venis et axillis venarum subtus villosis, stipulis ovalibus obtusis.
Notch'd-leaved Alder Tree.
*Nat.* of Pensylvania.
*Cult.* 1769, by Peter Collinson, Esq.

That *Betula serrulata* was our SPECIES NO. 2 (especially as shown in PLATE 983) is clear from the *obovate, acute* leaves; but, with wholly vague conceptions of our two species, European authors promptly produced confusion of names, like most botanists who study names to the exclusion of the plants! Thus, Willdenow, in his Berlinische Baumzucht, 45 (1796), took up *Betula serrulata* with Aiton's original diagnosis of 1789 and placed unquestioningly in its synonymy *B. rugosa* Ehrh. (1788), which went back to Du Roi's original publication of 1771. And later, when he made the combination *Alnus serrulata* (Ait.) Willd. Sp. Pl. iv[1]. 336 (1805), Willdenow merged with this species, correctly described "foliis obovatis", the above discussed *Betula rugosa* "foliis ovatis . . . repando angulatis". Further augmented by the failure of André Michaux (1803) definitely to distinguish our two species, the mixing of the two, started by Willdenow in 1796, became general and, consequently, has resulted in the recent erroneous and highly uncritical application of the name *A. rugosa* to the abundantly different and usually more southern *A. serrulata.* Michaux's confusion of the two may be stated as follows: in his Flora Boreali-Americana, ii. 181 (1803) he described *Betula rugosa* (American "*incana*") as *B. serrulata* "foliis lato-ovalibus" and then added the

> *Obs.* Folia saepe obovalia, interdum subglanduloso-repanda, basi semper acuta,

the observation referring to the relatively southern *A. serrulata.* Michaux gave the range from "Pensylvania ad Carolinam", the specimen in his Herbarium at Paris, which I examined in 1903, being of the southern species. Somewhat surprisingly, André Michaux, who had explored eastern Canada as far north as Rupert River and west to Lake Ontario and who knew northern New England, gave no intimation in his Flora that there is any Alder of this group north of his "Pensylvania ad Carolinam". Having collected *A. serrulata* in that area, he possibly did not further feel any special interest in the group; at any rate, the only Alder he noted from Canada in his Flora was *Betula crispa* Ait. More probably, however, northern material was lost before the writing of the Flora Boreali-Americana. It is fairly clear that Michaux recognized the northern species as distinct from the southern, for in his Journal—*Journal of André Michaux. 1787–1796. with an Introduction and Notes,* by Charles Sprague Sargent, Proc. Am. Phil. Soc. xxvi. no. 129 (1888)—he noted, among the plants seen on his trip up the Saguenay and across to Lake Mistassini, "Alnus glauca stipulis lanceolatis" (Sargent, l. c. 75, under "Le 15" of August). To be sure, Sargent (l. c.) identified Michaux's *Alnus glauca* as *Betula pumila,* but Michaux knew the difference, for on the 19th of August on "la riv. ditte Mistassin", he specially noted *Betula pumila.*[1]

F. A. Michaux, the son, carried the confusion still further, describing *A. serrulata* "foliis duplicatò-serratis, ovalibus, acutis"[2], stating that it is found in the Northern, Central and Southern States ("on la trouve aussi bien dans les États du Nord que dans ceux de Centre, du Sud et de l'Ouest"), and illustrating the round-based doubly serrate leaf of typical *A. rugosa,* already discussed. With such inauspicious beginnings, it is little to be wondered at that the correct applications of the names *A. rugosa* and *A. serrulata* have been hopelessly confused by those who have relied more upon "the books" than upon the morphological characters of the plants.

The next specific name to consider is *Alnus glauca.* Although the undefined name "Betula-Alnus glauca" had been used by Marshall in 1785, that publication was not cited by F. A. Michaux when he described and illustrated his own *Alnus glauca,* Michx. f. Hist. Arb. Forest. Am. Sept. iii. 322, t. 4, fig. 2 (1813). The diagnosis and figure are unequivocal, the former being

[1] Unfortunately, most others of Sargent's identifications of Michaux's plants need correction. For instance, "Sparganium natans", collected on the same trip, was identified by Sargent (p. 75) as *S. minimum.* Michaux's collection, labeled "Hab. in Amnibus à Québec ad Lacus Mistassins", was the type of *S. angustifolium* Michx. Fl. Bor.-Am. ii. 189 (1803), the only species of the genus in the *Flora.* Similarly Michaux's Journal recorded as growing with the *Sparganium* and near the *Alnus* "Alisma subulata", which Sargent identified as "*Alisma Plantago,* L. var. *Americanum,* Gray". But Michaux knew the broad-leaved plant and in his Flora, i. 218, had it as *A. Plantago.* He there included *A. subulata* L. from Florida only, the plant now known as *Sagittaria subulata* (L.) Buchenau. The plant of Canada, which Michaux mistook in the field for *Alisma subulata* L., is the type of *Sagittaria graminea* Michx. Fl. Bor.-Am. ii. 190 (1803).

[2] Michx. f., Hist. Arb. Forest. Am. Sept. iii. 320, fig. 1 (1813).

ALNUS *glauca, foliis subrotundò-ellipticis, duplicatò-serratis, subtus glaucis,*

the species said to be unknown in the South, very rare in the Middle States but abundant in New Hampshire, Vermont and Massachusetts ("Cette espèce d'Aulne qui ne se trouve pas dans les États du Sud, qui est assez rare dans ceux du Milieu, est, au contraire, plus multipliée dans les États du New-Hampshire, Massachusetts et de Vermont"). The description, figure and abundance in northern New England clearly indicate the common shrub of the North with gray or glaucous lower leaf-surfaces (PLATES 980 and 981), which erroneously and almost universally passes as the Old World *A. incana,* the only possible excuse for such an interpretation being the glaucous lower surface of the leaves. This familiar shrub is, of course, one of the extreme and usually most northern variations of *A. rugosa.*

In 1894, the late Dr. Britton collected on Staten Island fruiting material from a "large alder in swampy woods, . . . ; these were at the time referred to *Alnus incana,* though with doubt, inasmuch as the height of the tree seemed much too great for that species, and the large, strongly pointed leaves seemed also to be different from those of any specimens of *incana* that I had seen. The woods in which this tree grew were cut away soon after my collection was made, and, though a search was made in the vicinity for other plants, I was never able to find another specimen".—Britton in Torreya, iv. 124 (1904). Since, however, the late Eugene P. Bicknell subsequently found somewhat similar shrubs on Long Island, the Staten Island specimen was made the type of *Alnus noveboracensis* Britton in Torreya, l. c. (1904) our PLATE 995. It was more fully described and illustrated in Britton, N. Am. Trees, 264, fig. 224 (1908), but in Britton & Brown, Ill. Fl. ed. 2, i. 613 (1913) it was noted after "*A. rugosa*", i. e. *A. serrulata,* with the justifiable comment: "It may be a race of this species". The latter disposition of it seems about right; it is an occasional and rather marked extreme in the broad range of *A. serrulata,* from Maine to Georgia, Tennessee and Louisiana. Unfortunately the type from Staten Island, which I have before me through the courtesy of Dr. Gleason, had been badly pressed, poorly mounted and seriously broken. It is, therefore, not a very good subject for illustration, but in PLATE 985 Dr. Schubert has cannily covered the most broken parts.

Numerous varietal names must be considered but, since they do not disturb the specific epithets which we must apply to our two native species, their discussion will be deferred until the varieties of the two species are defined.

As I understand our spring-flowering native Alders of this group they fall into the two species following.

Cortex of trunks and older branches bearing abundant linear transverse whitish lenticels up to 7 mm. or more long; axis of young or flowering inflorescence arching, without right angles, the pistillate branch or branches (in monoecious inflorescences) then drooping and appearing to be below the staminate ones; leaves ovate, oval, subelliptic or rounded, broadest below or near the middle, with rounded to subcordate bases, oftenest double-serrate or -dentate, often repand-undulate, not at all or only slightly glutinous, the mature blades with the cross-veins beneath prominent and forming ladder-like reticulation between the main lateral veins . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 1. *A. rugosa.*

Cortex with fewer and shorter orange to gray lenticels or these obsolescent; axis of young inflorescence with 1 or more abruptly geniculate or right-angled bends, the pistillate branches erect or strongly divergent and thus appearing to be above the drooping staminate ones; leaves obovate or obovate-elliptic, broadest above middle, cuneate to but slightly rounded at base, simply serrulate, only exceptionally strongly undulate, the expanding ones glutinous, often aromatic, the mature blades with the lower surface delicately or finely reticulate or with only weak cross-veins . . . . . . . . 2. *A. serrulata.*

1. A. RUGOSA (Du Roi) Spreng. Syst. iii. 848 (1826).—The following varieties and forms are recognized.

*a.* Leaves green or fulvous, not glaucous, beneath.
 Lower surfaces of leaves glabrous or promptly glabrate, only the principal veins or their axils sometimes permanently pilose . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Var. *typica.*
 Lower surfaces of leaves permanently soft-pilose or subvelutinous (to touch) . . . . . . . . . . . . . . . . . . . . . . . Forma *Emersoniana.*
*a.* Leaves glaucous or whitened beneath . . . . *b.*
 *b.* Lower surfaces of leaves glabrous or promptly glabrate.
  Leaves ovate or oval to rounded-elliptic, with low toothing . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Var. *americana.*.
  Leaves narrowly elliptic to ovate-lanceolate, lacerate or jagged-toothed . . . . . . . . . . . . . . . . . . . . . . . . . . . . Forma *tomophylla.*
 *b.* Lower surfaces of leaves densely soft-pilose or subvelutinous (to touch) . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Forma *hypomalaca.*

A. RUGOSA, var. TYPICA H. Winkl. in Engler, Pflanzenr. iv[61]. 119 (1904), as to name of the type. *Betula Alnus* (*rugosa*) Du Roi, Obs. Bot. 31 (1771) and Harkb. Wilde Baumz. i. 112 (1771). *Betula rugosa* (Du Roi) Ehrh. Beitr. iii. 21 (1788). *A. serrulata* sensu Michx. f. Hist. Arb. Forest. Am. Sept. iii. 320, fig. 1 (1813), not Willd. (1805). *A. rugosa* (Du Roi) Spreng. Syst.

iii. 848 (1826); Callier in Mitteil. Deutsche Dendr. Gesellsch. 1918: 114 (1918), in small part only (a bad mixture). *A. latifolia* Desf. Cat. Pl. Hort. Par. ed. 3: 352 (1829), *nomen nudum*, cited in synonymy of the next by Spach (1841). *A. hybrida* A. Br. ex Reichenb. Ic. Fl. Germ. xii. 3, t. 630, fig. 1292 (1850). *A. serrulata*, β. *macrophylla* Spach in Ann. Sci. Nat. sér. 2, xv. 206 (1841). *A. macrophylla* Desf. ex Spach, l. c. in synonymy (1841). *A. autumnalis* Hartig. Naturgesch. Forste, Kulturpfl. 337 (1850). *A. glutinosa*, δ. *serrulata*, lusus c. *rugosa* (Du Roi) Regel in Nouv. Mém. Soc. Nat. Mosc. xiii. 165, t. xi. figs. 8–10—repr. as Mon. Bet. 107 (1861). *A. serrulata* β. *rugosa* (Du Roi) Regel in DC. Prodr. xvi². 188 (1868). *A. glutinosa*, var. *autumnalis* (Hartig) Ktze. Rev. Gen. ii. 638 (1891). *A. incana*, var. *hypochlora* sensu Fernald in RHODORA, xxiii. 257 (Feb. 27, 1922), not Callier (1918).—Low grounds, western Nova Scotia to northern Michigan, south to southern New England, locally to northern and eastern Pennsylvania and northern Indiana. The following, mostly distributed as *A. incana* and selected from more than 300 specimens before me, are characteristic. NOVA SCOTIA: Cedar L., Digby Co., *Fernald & Long*, no. 23,781 (as *A. incana*, var. *hypochlora*); Eel L., Yarmouth Co., *F. & L.*, no. 23,782 (as *A. incana*, var. *hypochlora*). MAINE: Milford, Penobscot Co., *Fernald & Long*, no. 13,474 (as *A. incana*, var. *hypochlora*); Rowe P., Pleasant Ridge, Somerset Co., Sept. 10, 1909, *J. F. Collins;* New Sharon, Franklin Co., July 23, 1904, *Knowlton* (as *A. serrulata*); Whitney P., Oxford, Oxford Co., July 12, 1914, *Weatherby;* Mud P., Greenwood, Oxf. Co., June 12, 1931, *Bill, Eaton, Fernald, Griscom & Hunnewell;* Washington, Knox Co., *J. G. Jack*, no. 3398 (as *A. incana*, var. *hypochlora*); Isle au Haut, Knox Co., Aug. 11, 1918, *Kidder* (as *A. incana*, var. *hypochlora*), *A. F. Hill*, no. 1652; Waterville, Kennebec Co., July 5, 1904, *Knowlton;* Livermore, Androscoggin Co., 1879, *Kate Furbish;* Baldwin, Cumberland Co., *Fernald & Long*, no. 13,476; Limington, York Co., *F. & L.*, no. 13,475; Cape Neddick, York Co., *J. G. Jack*, nos. 3388 and 3392. NEW HAMPSHIRE: Lebanon, Grafton Co., June 12, 1920, *Fernald, Hunnewell and R. W. Blanchard;* Hookset, Merrimac Co., Aug. 2, 1925, *C. F. Batchelder;* Durham, Strafford Co., Sept. 7, 1918, *Knowlton:* Derry, Rockingham Co., Aug. 25, 1917, *C. F. Batchelder;* Nashua, Hillsborough Co., *Robinson*, no. 800; Jaffrey, Cheshire Co., *Robinson*, no. 156. VERMONT: Essex Junction, Chittenden Co., *S. F. Blake*, no. 2218; Middlebury, Addison Co., Sept. 25, 1880, *Brainerd* (as *A. serrulata*); West Rutland, Rutland Co., *Eggleston*, no. 3211; Townshend, Windham Co., June 2, 1912, *L. A. Wheeler;* Manchester, Bennington Co., *M. A. Day*, no. 163. MASSACHUSETTS: Emerson Point, Rockport, Essex Co., *L. B. Smith & R. G. Gates*, no. 1009; West Manchester, Essex Co., June 7, 1913, *F. T.*

*Hubbard;* Plum Island, Essex Co., *White & St. John*, nos. 528 and 543; Winchester, Middlesex Co., *Fernald & Bartlett*, no. 7; West Cambridge, Mid. Co., *F. & B.*, no. 2; Concord, Mid. Co., July, 1857, *E. S. Hoar;* Boxboro, Mid. Co., *Hubbard & Torrey*, no. 477; West Roxbury, Suffolk Co., April 9 and September 11, 1906, *F. F. Forbes* (as hybrid of *A. incana* and *A. rugosa*); Dorchester, Suf. Co., Sept. 23, 1919, *Kidder*, Brookline, Norfolk Co., March 19, Sept. 9 and Nov. 24, 1902, *F. F. Forbes;* Dedham, Norfolk Co., Sept. 8, 1895, *E. F. Williams;* Hanson, Plymouth Co., *Knobloch, Smith & Stebbins*, no. 2562; North Tisbury, Martha's Vineyard, Dukes Co., Oct. 3, 1912, *Bicknell;* Copaum P., Nantucket, Nant. Co., June 8, 1908, *Bicknell;* Hardwick, Worcester Co., Aug. 9, 1935, *C. F. Batchelder;* Sutton, Worc. Co., *Anderson, Smith & Weatherby*, no. 2446; Montague, Franklin Co., May 11, 1912, *Wheeler & Wiegand;* Chicopee, Hampden Co., *Murdoch & Torrey*, no. T 435; Smith's Ferry, Northampton, Hampden Co., Aug. 10, 1912, *F. F. Forbes;* Proven Mt., Agawam, Hampden Co., May 18, 1913, *Knowlton & White;* North Adams, Berkshire Co., May 14, 1915, *Knowlton;* Lenox, Berks. Co., Aug. 24, 1902, *Hoffmann;* Centre P., Becket, Berks. Co., Sept. 22, 1904, *Hoffmann;* Mount Washington, Berks. Co., Sept. 10, 1915, *Floyd*. RHODE ISLAND: Cumberland, Providence Co., May 30, 1911, *Knowlton;* East Providence, Prov. Co., *J. F. Collins*, no. 15,010. CONNECTICUT: Middlebury, New Haven Co., April 25 and July 16, 1897, *Shepardson;* Oxford, N. H. Co., April 12, 1888 and Sept. 17, 1897, *Harger*. NEW YORK: Black Lake, St. Lawrence Co., *Fernald, Wiegand & Eames*, no. 14,251; Canton, St. L. Co., *Phelps*, no. 373; Sandy Creek Township, Oswego Co., *Fernald, Wiegand & Eames*, nos. 14,249 and 14,250; Spruce P., Black Lake Forest, Orange Co., *Raup*, no. 7589; Taughannock Ravine, Ulysses, Tompkins Co., *Eames & Wiegand*, no. 11,930. PENNSYLVANIA: Kenney's P., e. of West Auburn, Susquehanna Co., *Wahl*, no. 489; 7 miles s. of Moscow, Lackawanna Co., *Randolph & Randolph*, no. 57; Martic Forge, Lancaster Co., Aug. 16, 1914, *J. F. Collins;* Crawford Co., *Dickey*, no. 23. MICHIGAN: Isle Royale, Keweenaw Co., *Cooper*, no. 7; Keweenaw Co. (without stated localities), Oct., 1904, *Farwell* (some as *A. incana*, var. *americana*, some as var. *glauca*); north of St. Ignace, Mackinac Co., *Benner*, no. 6715. INDIANA: south of Tamarack, Porter Co., *Deam*, no. 8064.—Spread from cultivation in Europe. PLATES 977–979.

Var. TYPICA, forma **Emersoniana,** f. nov. (TAB. 979, FIG. 4), foliis subtus piloso-tomentulosis, pilis plus minusve rufescentibus. —*A. incana* sensu Emerson, Trees and Shrubs in Mass. i. 251, with plate (1875), not (L.) Moench.—Differing from typical *A. rugosa* in having a permanently and usually densely pilose-tomentulose lower surface, the pubescence mostly ferruginous.

Of essentially the same range but forming individual and constant large colonies. The following, selected from thrice as many sheets, are characteristic. Nova Scotia (all distrib. as *A. incana*, var. *hypochlora*): Lahave R., Bridgewater, Lunenburg Co., *Fernald & Long*, no. 23,779; Wallace Lake, Italy Cross, Lun. Co., *F. & L.*, no. 23,780; Sloane L., Pleasant Valley, Yarmouth Co., *Fernald, Bissell, Graves, Long & Linder*, no. 21,015. Maine: Fairfield, Somerset Co., *Fernald & Long*, no. 13,472; Pembroke, Washington Co., *Fernald*, no. 1700; Burnham, Waldo Co., July 24, 1940, *Knowlton;* Nequasset L., Woolwich, Sagadahoc Co., *Fernald & Long*, no. 13,477; Cape Elizabeth, Cumberland Co., *Chamberlain*, no. 682; Limington, York Co., *Fernald & Long*, nos. 13,475, 13,479 and 13,480; Alfred, York Co., *F. & L.*, no. 13,478; Wells, York Co., *F. & L.*, no. 13,467; York Harbor, York Co., Aug., 1892, *Bicknell* (with unpublished new specific name). New Hampshire: Haverhill, Grafton Co., *Fernald*, no. 15,525; Mason, Hillsborough Co., Aug. 20, 1917, *C. F. Batchelder;* Dover, Strafford Co., *Hodgdon*, no. 2567; Hampton Falls, Rockingham Co., Sept. 10, 1916, *C. F. Batchelder;* Derry, Rock. Co., Aug. 15, 1926, *Batchelder;* Hinsdale, Cheshire Co., Aug. 23, 1919, *Batchelder.* Vermont: Milton, Chittenden Co., July 25, 1927, *Knowlton;* Hartford, Windsor Co., June 12, 1920, *Eaton & St. John;* Wallingford, Rutland Co., May 30, 1907, *Kennedy.* Massachusetts: Lynnfield, Essex Co., *Fernald & Bartlett*, no. 786; Round Pond, Tewksbury, Middlesex Co., April 14 and Oct. 14, 1906, *M. L. Fernald & H. H. Bartlett*, nos. 14 (type in Herb. Gray.) and 18; Fresh Pond, Cambridge, Mid. Co., 1842 or 43, *Asa Gray* (sheet sent to and identified by Regel as "*Alnus serrulata* Willd., β. *rugosa*"); West Cambridge, *Fernald & Bartlett*, no. 4; West Roxbury, Suffolk Co., March 25, April 5 and May 28, 1904, *F. F. Forbes;* Brookline, Norfolk Co., Oct. 11, 1914, *F. F. Forbes;* Milton, Norf. Co., March 26 and May 26, 1921, *Kidder;* Hanson, Plymouth Co., Aug. 30, 1941, *Knowlton;* Gunning P., Falmouth, Barnstable Co., *Fernald*, no. 578; Dennis P., Yarmouth, Sept. 19, 1913, *Fernald & Long*, as *A. noveboracensis;* Lambert Cove, Martha's Vineyard, Dukes Co., *Bicknell*, no. 3432; Great P., Martha's Vineyard, *Bicknell*, no. 3143 (as *A. noveboracensis*); Nantucket, *Bicknell*, no. 3438; Leominster, Worcester Co., *Fernald & Bean*, no. 14,017; Princeton, Wor. Co., July 22, 1913, *Weatherby;* Barre, Wor. Co., May 14, 1915, *Hunnewell, Macbride & Torrey;* Northfield, Franklin Co., May 11, 1912, *Fernald & Floyd;* Longmeadow, Hampden Co., May 18, 1913, *Hill & St. John;* Chester, Hampd. Co., May 17, 1913, *Weatherby & Bean;* Worthington, Hampshire Co., *B. L. Robinson*, no. 812; Adams, Berkshire Co., *Knowlton & Bean*, no. 15,107. Rhode Island: Newport, N. Co., *Mearns*, no. 603. Connecticut: Woodstock, Windham Co., July 31, 1919, *Weatherby;*

Pomfret, Wind. Co., July 4, 1901, *Driggs;* Franklin, New London Co., Aug. 27 and Nov. 21, 1912, *Woodward;* Sprague, N. L. Co., Sept. 3, 1913, *Woodward;* Tyler P., Goshen, Litchfield Co., *Weatherby,* no. 3350. New York: Bear P., French Mt., Warren Co., June 9, 1920, *Burnham;* Long L., Hamilton Co., *House,* no. 10,172; Mud Pond, Oswego, O. Co., *Fernald, Wiegand & Eames,* no. 14,246. Michigan: Douglas L., Cheboygan Co., *Ehlers,* no. 534. Indiana: Tremont, Porter Co., Sept. 9, 1920, *D. C. Peattie.*

The extreme with soft-pubescent lower leaf-surfaces, *Alnus rugosa,* forma *Emersoniana,* is named for that remarkably accurate and unexcelled student of Massachusetts trees and shrubs, George Barrell Emerson (1797–1881), author of the scholarly Report on the Trees and Shrubs in Massachusetts (2 vols., 1875), a famous and greatly honored educator, an intimate of Jacob Bigelow, adviser of Horace Mann, and one of the three trustees of the Arnold bequest which, as a result of his guidance, became the initial fund of the Arnold Arboretum. Emerson clearly understood and first discriminatingly stated the strong specific differences which separate the northern *Alnus rugosa* and the southern *A. serrulata.* These he accurately illustrated but, like every one of his period and up to the present, he did not get away from the conviction that our dark-barked shrub is identical with the whitish-barked tree of Europe. Although in Trees and Shrubs in Mass. i. 248 he definitely wrote "White Alder of Europe is a very beautiful tree, sometimes rising to the height of seventy feet", on p. 251 he began his very accurate account of "The Speckled Alder. *A. incana,* Willdenow", "easily distinguished by the brilliant, polished, reddish green color of its stem-bark", "speckled with conspicuous light gray dots", "The stem is usually eight or ten feet high and from one to three inches in diameter".

Emerson distinguished three variations of the Speckled Alder: (1) what he considered typical, with "leaves . . . broad oval, rounded or somewhat cordate at base . . . , doubly serrate or denticulate-serrate . . . smooth and conspicuously impressed at the veins and veinlets above; of a soft coriaceous texture; covered with abundant, soft, often ferruginous pubescence beneath, with the veins and veinlets strikingly prominent" (*A. rugosa,* forma *Emersoniana*); (2) *A. glauca* Michx.:

"A striking and very beautiful variety of the speckled alder, called the glaucous alder by the younger Michaux, is distinguished by the pale blue or glaucous color of the lower surface of the leaves. The pubescence is less abundant, but the veins and foot-stalk are often, as in the common form [i. e. *A. rugosa*, forma *Emersoniana*] of the tree, of a rusty color"; and (3) a series which Emerson considered "intermediate between the common [*A. serrulata*] and the glaucous alder . . . It differs from the common alder in its leaves being always acute and never obovate, and from the speckled, in having its leaves shining and free from down . . . The general aspect of this alder is similar to that of the speckled alder, differing in the greenness of the under surface of the leaves". Emerson's third variety was, apparently, a mixture of typical *A. rugosa* and the extreme of *A. serrulata* with subelliptic and round-based leaves.

Var. **americana** (Regel), comb. nov. *A. incana, β. americana* Regel in Nouv. Mém. Soc. Nat. Mosc. xiii. 155—repr. as Mon. Bet. 97 (1861); H. Winkl. in Engler, Pflanzenr. iv$^{61}$. 123 (1904). *A. glauca* Michx. f. Hist. Arb. Forest. Am. Sept. iii. 320, t. 4, fig. 2 (1813). *A. incana*, var. *glauca* (Michx. f.) Loudon, Arbor. Brit. iii. 1688 (1838) pro parte, excl. citation of Ait.; Gray, Man. ed. 2: 412 (1856); Callier in Mitteil. Deutsche Dendr. Gesellsch. 1918: 143 (1918)[1], not Ait. Hort. Kew. ed. 2, v. 259 (1813). *A. incana, α. vulgaris* Spach in Ann. Sci. Nat. sér. 2, xi. 206 (1841) in small part only (*A. glauca* Michx. fil), excluding the synonyms "*Alnus incana* auctor", "*Alnus undulata* Pursh" (Pursh correctly giving *A. undulata* Willd. as a synonym of *A. crispa* Ait.) and "Foliis . . obovatis". *A. incana* sensu Tuckerm. in Am. Journ. Sci. xlv. 32 (1843) and most later Am. auth., not (L.) Moench. *A. americana* (Regel) Hort. ex K. Koch, Dendrol. ii$^{1}$. 636 (1872).—Generally more northern in range, Labrador to Hudson Bay region and Saskatchewan, south to Newfoundland, Nova Scotia, Maine, New Hampshire, Massachusetts, uplands of Pennsylvania, Maryland and West Virginia, northern Ohio, northern Indiana, Wisconsin and northeastern Iowa. The following, selected from nearly 200 sheets before me, are characteristic. LABRADOR: Paradise R., Sandwich Bay (lat. 53° 30′, long. 57° 15′), *Harlow Bishop*, no. 275. NEWFOUNDLAND: Clarenville, July 30, 1938, *Agnes M. Ayre;* Quarry, *Fernald &*

[1] Callier showed the usual Germanic lack of understanding of American geography, citing one specimen from "D a k o t a: New Anglia leg. Blake" and Mrs. Chase's no. 2105 from Dune Park, Indiana, as from "M i c h i g a n: Lake Michigan, Done Park". On a preceding page the strictly northeastern *A. rugosa* was cited from anywhere, including California.

*Wiegand*, no. 5302; Grand Falls, *F. & W.*, no. 5301; near mouth of Badger Brook, *Robinson & Schrenk*, no. 35; Little Red Indian Lake, *F. & W.*, no. 5300; Goose P., *F. & W.*, no. 3276; Winterhouse Brook, Bonne Bay, *Fernald, Long & Fogg*, no. 1647; Summerside, Bay of Islands, *F. & W.*, no. 3277; Table Mt., Port-à-Port Bay, *Fernald & St. John*, no. 10,828. QUEBEC: Natashquan R., Saguenay Co., July, Aug., 1912, *C. W. Townsend;* Piashtibaie, Sag. Co., *St. John*, no. 90,395; Seven Islands, Sag. Co., *C. B. Robinson*, no. 900; Douglastown, Gaspé Co., Aug. 22, 1904, *Collins, Fernald & Pease;* R. Ste. Anne des Monts, Gaspé Co., *Fernald & Collins*, no. 217; Bonaventure R., Bonav. Co., Aug. 4–8, 1904, *C. F. & P.;* Matane, M. Co., Aug. 5, 1904, *F. F. Forbes;* Bic, Rimouski Co., *Rousseau*, no. 21,457; Cap-à-l'Aigle, Charlevoix Co., *J. Macoun*, no. 68,768; Lac Tremblant, Terrebonne Co., July 23, 1922, *Churchill;* Black Lake, Megantic Co., *Fernald & Jackson*, no. 12,076; Georgeville, Stanstead Co., Aug. 22, 1914, *Churchill;* East Main, E. Coast of James Bay, *D. Potter*, no. 265; Rupert House, E. Coast, *Potter*, no. 260. MAGDALEN ISLANDS: Brion Island, *St. John*, no. 1847; Ile de l'Étang-du-Nord, *Victorin & Rolland*, no. 9418; Grindstone I., *Fernald, Bartram, Long & St. John*, no. 7310. NEW BRUNSWICK: Kent Co., 1870, *Fowler*. NOVA SCOTIA: Pottle's L., North Sydney, Cape Breton Co., *Bissell & Linder*, no. 21,020; Glenbard, near James River Sta., Antigonish Co., *Perry, Wetmore, Hicks & Prince*, no. 10,256; Musquodoboit Harbor, Halifax Co., *Rousseau*, no. 35,263; Deception L., Shelburne Co., *Fernald & Long*, no. 23,777; Clyde River, Shelb. Co., *J. G. Jack*, no. 3454; Butler's L., Gavelton, Yarmouth Co., *Fernald, Long & Linder*, no. 21,021; Lake Annis, Yarm. Co., *Bissell, Pease & Linder*, no. 21,017; Journeay L., Weymouth, Digby Co., *Fernald & Long*, no. 23,778. MAINE: Fort Kent, Aroostook Co., *Fernald*, no. 2446; Masardis, Aroost. Co., *Fernald*, no. 2447; Orono, Penobscot Co., May 30, 1904, *Fernald;* Foxcroft, Piscataquis Co., Aug. 31, 1897, *Fernald;* St. John P., Township iv, Range 17, Somerset Co., *St. John & Nichols*, no. 2272; Dead River, Som. Co., *Fernald & Strong*, no. 409, in part; Chesterville, Franklin Co., Aug. 28, 1904, *E. B. Chamberlain;* Calais, Washington Co., Aug. 24, 1928, *Knowlton;* Roque Bluff, Wash. Co., July 31, 1918, *Knowlton;* Northfield, Wash. Co., Aug. 2, 1941, *Knowlton;* Nicatous L., Twp. 3, Hancock Co., *Fassett*, no. 2378; Seal Harbor, Hanc. Co., July 8, 1889, *Redfield;* Brooklin, Hanc. Co., *A. F. Hill*, no. 1051; Isle au Haut, Knox Co., Aug. 26, 1927, *Kidder;* Monhegan I., Lincoln Co., Aug., 1911, *Kate Furbish;* Brunswick, Cumberland Co., Aug. 26, 1910, *Kate Furbish;* Baldwin, Cumb. Co., *Fernald & Long*, no. 13,470; North Berwick, York Co., Aug. 31, 1894, *Parlin*. NEW HAMPSHIRE: White Mountains, Tuckerman, labeled, "*Alnus incana*, Willd. *A. glauca*, Michx. f. species unica", with reference to Tuckerman's treatment in Am. Jour. Sci. xlv. 32 (1845), this sheet marked by Regel *A. incana* β. *glauca;* Lake Umbagog, Cambridge, Coös Co., *Pease,* no. 18,150; Pittsburg, Coos Co., *Pease,* no. 10,297; summit of Cape Horn, Northumberland Co., Coös Co., *Pease,* no. 16,451; Jackson, Carroll Co., Aug. 1895, *E. W. Hervey;* Bow, Merrimack Co., Sept. 21, 1930, *G. M. Bryant;* Hillsborough, H. Co., Sept. 2, 1921, *C. F. Batchelder;* New Hampton, Belknap Co., Sept. 5, 1904, *F. F. Forbes;* Richmond, Cheshire Co., Aug. 21, 1919, *C. F. Batchelder;* Cheshire Co., *Robinson,* no. 156. Vermont: Brunswick Springs, Essex Co., *S. N. F. Sanford,* no. 1083; Willoughby, Orleans Co., July, 1898, *Kennedy:* Worcester, Washington Co., Aug. 25, 1875, *Blanchard;* Charlotte, Chittenden Co., April 15 and Sept. 29, 1879, *Pringle;* Hartland, Windsor Co., *J. G. Underwood,* no. 3116. Massachusetts: Lexington, Middlesex Co., March 23 and May 20, 1931, *L. B. Smith;* Buckland, Franklin Co., April 11 and Aug. 19, 1904, *F. F. Forbes;* Worthington, Hampshire Co., *B. L. Robinson,* no. 507; Pittsfield, Berkshire Co., Aug. 5, 1915, *Churchill.* New York: Norfolk, St. Lawrence Co., *Phelps,* nos. 1139–1141; Selkirk, Oswego Co., *Fernald, Wiegand & Eames,* no. 14,245; Canadice, Ontario Co., *C. C. Thomas,* no. 3926; Penn Yan, Gates Co., *Sartwell* (Sartwell Herb., Hamilton College, presumable duplicate of the type of *A. incana* β. *americana* Regel); western New York, *Asa Gray,* identified by Regel as *A. incana,* var. *glauca.* Pennsylvania: Little Mud P., e. of Porter's L., Pike Co., *Fogg,* no. 10,767; Pocono Plateau, Monroe Co., July, Aug., 1904, *Harshberger.* Maryland: s. of Finzel, Garrett Co., Aug. 15, 1936, *Wherry.* West Virginia: at 2500 ft. alt., e. of Gormannia, Grant Co., *Svenson,* no. 4439. Ontario: Lake Rosseau, Muskoka Co., *W. F. Wright,* no. 140; Moose River, James Bay, Nipissing Distr., *David Potter,* nos. 262–264; Sand Point, Algoma Distr., *Taylor et al.* no. 842; Batchawana R., Alg. Distr., *Taylor et al.* no. 839; Nipigon, Thunder Bay Distr., *Jennings & Daily,* no. 481. Michigan: Baraga, B. Co., *Fernald & Pease,* no. 3081. Ohio: Hiram, Portage Co., *R. J. Webb,* no. 1377. Indiana: Chesterton, Porter Co., Aug. 12, 1925, *Churchill.* Wisconsin: Kewaunee, K. Co., Aug. 2, 1902, *Schuette;* Brodhead, Green Co., *Fassett,* no. 12,931; Dayton, Green Co., *Fassett,* no. 13,990; Brown Co., 1880, *Schuette.* Minnesota: Sect. Nw.-Sw. 35, T. 144, R. 36, Clearwater Co., *M. L. Grant,* no. 3368; Cass L., Cass Co., *Pammel,* no. 5; Centre City, Chisago Co., July, 1892, *B. C. Taylor;* Bembridge, *Pammel,* no. 892. Iowa: Postville, Allamakee Co., June, 1914, *Schultz, Pammel & Orr;* Bluffton, Winneshiek Co., March 28 and Sept. 16, 1903, *Shimek;* New Hampton, Chickasaw Co., *Pammel,* no. 475. Plates 980 and 981.

Var. AMERICANA, forma **tomophylla** (Fernald), comb. nov. *A. incana*, var. *glauca*, f. *tomophylla* Fernald in RHODORA, xvi. 56 (1914). *A. incana*, var. *tomophylla* (erroneously attributed to Fernald) by Rehder, Man. Cult. Trees and Shrubs, 147 (1927).—Local. NEWFOUNDLAND: Norris Arm, *Fernald & Wiegand*, no. 5303 (TYPE). MAINE: Hartford, Oxford Co., Aug., 1892, *Parlin*. PLATE 982, FIG. 4.

Var. AMERICANA, forma **hypomalaca,** f. nov. (TAB. 982, FIG. 1–3), foliis subtus molliter persistenterque piloso-tomentulosis, pilis cinereis.—Local, often abundant, through much of the area of var. *americana*. QUEBEC: Pointe du Lac, St. Maurice Co., Aug. 2, 1923, *Chamberlain & Knowlton*. NEW BRUNSWICK: Shediac Cape, Westmoreland Co., July 3, 1914, *F. T. Hubbard;* Seal Cove Brook, Grand Manan, Charlotte Co., July 24, 1941, *C. A. & Una F. Weatherby*, no. 7015 (TYPE in Herb. Gray.). PRINCE EDWARD ISLAND: St. Charles, Kings Co., *Fernald & St. John*, no. 11,030. NOVA SCOTIA: Central Port Mouton, *Fernald, Bissell, Graves, Long & Linder*, no. 21,019; Meteghan, Digby Co., *Fernald & Long*, no. 21,016; Middleton, Annapolis Co., *Fernald, Pease & Long*, no. 21,018. MAINE: Houlton, Aroostook Co., Aug. 26, 1897, *Fernald;* Patten, Penobscot Co., Aug. 23, 1897, *Fernald;* Milford, *Fernald & Long*, nos. 13,468 and 13,469; Fryeburg, Oxford Co., *C. E. Faxon;* Cutler, Washington Co., July 1, 1902, *Kennedy et al.;* Pembroke, Wash. Co., *Fernald*, no. 1699; Dedham, Hancock Co., *Fernald & Long*, no. 13,465; Deer Isle, Hanc. Co., *A. F. Hill*, no. 2096; Atlantic, Swans Island, Hanc. Co., *Hill*, no. 2281; Rockport, Knox Co., *Rossbach*, no. 1207; Nequasset L., Woolwich, Sagadahoc Co., *Fernald & Long*, no. 13,477; Leeds, Androscoggin Co., July 23, 1913, *Knowlton;* Falmouth, Cumberland Co., *Chamberlain & Bissell*, no. 389; Limington, York Co., *Fernald & Long*, nos. 13,479 and 13,480; Alfred, York Co., *F. & L.*, no. 13,466; Kennebunkport, York Co., Aug. 1929, *C. A. Cheever*. NEW HAMPSHIRE: Mt. Washington, Coös Co., July 16, 1891, *Kennedy:* Randolph, Coös Co., *Pease*, no. 11,179; Shelburne, Coös Co., *Pease*, no. 11,133; Jackson, Carroll Co., July 12, 1883, *C. W. Jenks;* Warren, Grafton Co., July 24, 1908, *E. F. Williams;* Merrimack, Hillsborough Co., Aug. 11, 1917, *C. F. Batchelder;* Rindge, Cheshire Co., May 30, 1912, *F. F. Forbes*. VERMONT: Stowe, Lamoille Co., July 27, 1884, *C. W. Swan*. MASSACHUSETTS: Round Pond, Tewksbury, Middlesex Co., *Fernald & Bartlett*, no. 15; Beaver Brook Reservation, Mid. Co., May 26, 1894, *G. L. Chandler;* Brookline, Norfolk Co., Sept. 25, 1905, *F. F. Forbes;* Needham, Norf. Co., *T. O. Fuller;* Springfield, Hampden Co., June 17, 1913, *Luman Andrews;* Cheshire, Berkshire Co., July, 1912, *E. J. Winslow;* Sheffield, Berks. Co., July 24, 1912, *Hoffmann*. NEW YORK: Axton, Franklin Co., July 10, 1899, *Rowlee, Wiegand & Hastings;* Conklingville, Saratoga Co., *Fogg*, no. 15,161. Ontario: Kokoko Bay, Timagami Region, *Edgar & Dorothy M. Anderson*, no. 26,045B; Stokes Bay, Bruce Peninsula, *Krotkov*, no. 8948. Indiana: Dune Park, Porter Co., *Greenman*, no. 2683.

*Alnus rugosa*, vars. *typica* and *americana* are not mere forms, the former with green to rufescent lower leaf-surfaces, the latter with them glaucous, gray or cinereous. The latter is decidedly more northern in range. I am indebted to Professor Rehder and Dr. A. C. Smith for the use of a Sartwell sheet from Penn-Yan, New York, lent by the Herbarium of Hamilton College. This is presumably part of the original collection upon which Regel founded his *A. incana*, β. *americana*. The approximately 400 sheets showing foliage in the Gray Herbarium and the herbarium of the New England Botanical Club, when tabulated, give the following proportions (in percentages).

Labrador Peninsula, var. *typica* 0, var. *amer.* 100%; Newfoundland, var. *typica* 0, var. *amer.* 100; Quebec (south of Lab. Pen.), var. *typica* 0, var. *amer.* 100; New Brunswick, var. *typica* 0, var. *amer.* 100; Nova Scotia, var. *typica* 43, var. *amer.* 57; Northern Maine (northern tier of counties), var. *typica* 59, var. *amer.* 41; Southern Maine, var. *typica* 80, var. *amer.* 20; Coös Co., New Hampshire, var. *typica* 5, var. *amer.* 95; rest of New Hampshire, var. *typica* 65, var. *amer.* 35; Vermont, var. *typica*, 62, var. *amer.* 38; Massachusetts, var. *typica* 89, var. *amer.* 11; Rhode Island, var. *typica* 100, var. *amer.* 0; Connecticut, var. *typica* 100, var. *amer.* 0.

The variations which I treat as forms show no such geographic concentrations; they are scattered throughout the range of the variety under which they are placed.

2. A. serrulata (Ait.) Willd. Sp. Pl. iv[1]. 336 (1805).—The following varieties and forms are recognized.

*a.* Principal leaves definitely obovate, cuneate, or subcuneate to subacute at base; those of vigorous 1st. year's shoots obtuse or acute; those of fertile branches of 2nd. year one third to two thirds as broad as long.
Lower surfaces of mature leaves glabrous or strongly glabrescent. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Var. *vulgaris*.
Lower surfaces of mature leaves permanently and densely pilose-tomentulose, plush-like to touch. . . . . . Forma *noveboracensis*.
*a.* Principal leaves broadly elliptic-obovate to broadly oblong-elliptic or subrotund (though broadest at or above the middle), gradually rounded at base; those of fertile branches of 2nd. year mostly three fifths to nine tenths as broad as long. . . . *b*.
*b.* Lower surfaces of mature leaves glabrous or strongly glabrescent.

Leaves gradually rounded to subacute (or more rarely acute) at apex, mostly 6–15 cm. long; staminate aments 3–7 cm. long. . . . . . . . . . . . . . . . . . . . . . . . . . Var. *subelliptica.*
Leaves broadly retuse or emarginate at apex, mostly 2–5 cm. long; staminate aments 2 cm. long. . . . . . . . . Forma *emarginata.*

*b.* Lower surfaces of mature leaves permanently and densely pilose-tomentulose, plush-like to touch.
Large shrub or small tree; principal leaves 6–12 cm. long; mature cones 1–2 cm. long; staminate aments 3–7 cm. long. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Forma *mollescens.*
Dwarf shrub 0.5–1 m. high; principal leaves 2–5 cm. long; mature cones 6–12 mm. long; staminate aments 1.3–1.8 cm. long. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Forma *nanella.*

A. SERRULATA, var. VULGARIS Spach in Ann. Sci. Nat. sér. 2, Bot. xv. 206 (1841), in part ("Foliis . . . lanceolato-obovatis, v. obovatis, v. oblongo-obovatis, saepius obtusis v. vix acuminatis, basi cuneatis"). *Betula-Alnus rubra* Marsh. Arb. Am. 20 (1785), presumably. *Betula serrulata* Ait. Hort. Kew. iii. 338 (1789); Willd. Berlin. Baumzucht, 45 (1796), at least as to citation of Ait. *A. serrulata* (Ait.) Willd. Sp. Pl. iv[1]. 336 (1805). *A. rubra* (Marsh.) Tuckerm. in Am. Journ. Sci. xlv. 32 (1843), not Bong. (1833). *A. glutinosa, δ. serrulata* (Ait.) Regel in Nouv. Mém. Soc. Nat. Mosc. xiii. 164, t. xi. fig. 7—repr. as Mon. Bet. 106, t. xi. fig. 7 (1861), in part, incl. basonym. *A. glutinosa, δ. serrulata*, lusus a. *genuina* Regel, l. c. fig. 6 (1861). *A. glutinosa, δ. serrulata*, lusus b. *obtusifolia* Regel, l. c. fig. 7 (1861). *A. serrulata, α. genuina* Regel in DC. Prodr. xvi[2]. 188 (1868), in part. *A. serrulata, δ. obtusifolia* Regel, l. c. (1868). *A. rugosa* sensu K. Koch, Dendrol. ii. 635 (1872); sensu Coulter in Mem. Torr. Bot. Cl. v. 131 (1894); sensu Sargent, Silva, ix. 69 (1896) and subseq. auth.; not Spreng. (1825). *A. rugosa*, var. *serrulata* (Ait.) H. Winkler in Engler, Pflanzenr. iv[61]. 120 (1904). *A. rugosa*, var. *obtusifolia* (Regel) H. Winkler, l. c. (1904). *A. serrulata pumila* Dameker in Mitt. Deutsch. Dendr. Ges. 1909: 326 (1909).—Northern Florida to Louisiana, north to southwestern Nova Scotia, central and southern Maine, southern New Hampshire, central Vermont, New York, West Virginia, Ohio, Indiana, Illinois, Missouri and southeastern Oklahoma. The following, selected from many hundreds of sheets, are characteristic. NOVA SCOTIA: Ponhook L., Queen's Co., *Weatherby*, no. 6955: Cameron L., South Brookfield, Queen's Co., *C. A. & Una F. Weatherby*, no. 7059. MAINE: North P., Norway, Oxford Co., *Pease*, no. 24,100; near Jordan P., Mt. Desert I., Hancock Co., *Stebbins*, no. 235; Bristol, Lincoln Co., *E. B. Chamberlain*, no. 716; South Poland, Androscoggin Co., 1893, *Kate Furbish;* Wilson's Mill, Cumberland, C. Co., *Chamberlain, Morris & Ricker*, no. 852; Limington, York Co., *Fernald & Long*, no. 13,481; Cape Neddick, York Co., *J. G. Jack*, no. 3394. NEW HAMPSHIRE: Wild Goose P., Strafford, S. Co., *Hodgdon & Cham-*

*berlain,* no. 2886; Nottingham, Rockingham Co., *A. A. Eaton,* no. 435; Danville, Rock. Co., *Pease,* no. 28,210; Manchester, Hillsborough Co., Oct. 2, 1896, *F. W. Batchelder;* Walpole, Cheshire Co., *Fernald,* no. 505; Sandy P., Richmond, Chesh. Co., Sept. 3, 1916, *C. F. Batchelder.* Vermont: L. St. Catherine, Wells, Rutland Co., *Dodge & Fassett,* no. 822. Massachusetts: Andover, Essex Co., *Pease,* no. 3432; Ashby, Middlesex Co., May 30, 1914, *Knowlton;* Concord, Mid. Co., April 4 and July 20, 1858, *E. S. Hoar;* Wilmington, Mid. Co., *Fernald & Bartlett,* no. 9; West Roxbury, Suffolk Co., Aug. 9 and Sept. 9, 1904, *F. F. Forbes;* Blue Hills Reserv., Aug. 11, 1895, *E. F. Williams;* Lakeville, Plymouth Co., *Fernald & Long,* no. 9345; Prospect Hill P., Taunton, Bristol Co., *F. C. Seymour,* no. 4460; Brewster, Barnstable Co., *Fernald,* no. 16,684; Provincetown, Barns. Co., *Fernald & Long,* no. 18,356; Chilmark, Martha's Vineyard, Dukes Co., *F. C. Seymour,* no. 1671; Harvard, Worcester Co., Aug. 6, 1916 and April 22, 1917, *F. F. Forbes;* Gill, Franklin Co., May 11, 1912, *St. John & Weatherby;* Ware, Hamshire Co., *Goodale, Potsubay & St. John,* no. 64,660; Stockbridge, Berkshire Co., Aug. 6, 1917, *Hoffmann.* Rhode Island: Lincoln, Providence Co., *St. John,* no. 894: Barrington, Bristol Co., May 20, 1911, *E. J. Winslow;* Warren, Bristol Co., July 25, 1919, *Sanford;* Prudence I., Newport Co., *Sanford,* no. 10,377; Richmond, Washington Co., Aug. 30, 1919, *Fernald & Collins;* Hopkinton, Wash. Co., Sept. 1, 1919, *Fernald, Woodward & Collins.* Connecticut: Woodstock, Windham Co., *Weatherby,* no. 4519; Franklin, New London Co., Oct. 4, 1913, *Woodward;* Tolland, T. Co., *Weatherby,* no. 5330; Tariffville, Hartford Co., May 17, 1913, *Winslow & Hill;* North Guilford, New Haven Co., July 11, 1904, *W. R. Dudley.* New York: West Fort Ann, Washington Co., Aug. 17, 1913, *Dobbin & Burnham;* Ballston L., Saratoga Co., Aug. 11, 1906, *Burnham;* Sutherland P., Black Lake Forest, Orange Co., *Raup,* no. 7746; Fishers Island, Suffolk Co., *St. John,* no. 2683; Sandy Creek Township, Oswego Co., *Fernald, Wiegand & Eames,* no. 14,248; Ithaca, Tompkins Co., *MacDaniels,* no. 3928. New Jersey: Oradell, Bergen Co., April 16 and Oct. 8, 1905, *Mackenzie;* Denville, Morris Co., Aug. 13, 1905, *Mackenzie;* Vincetown, Burlington Co., *Long,* no. 11,091; Pleasantville, Atlantic Co., *Tidestrom,* no. 11,377; Friendship, Salem Co., *Long,* no. 51,606. Pennsylvania: Scotrun, Monroe Co., Aug., 1906, *B. Long;* Chester Co., *Sharpless,* no. 276; Smithfield Swamp, Lancaster Co., Aug. 30, 1889, *Heller;* Mifflinville, Columbia Co., *Fogg,* no. 14,537; Farrandsville, Clinton Co., *Fogg,* no. 11,516; Fayette Co., *Dickey,* nos. 21 and 205. Delaware: Cool Spring, Sussex Co., *Larsen,* no. 459. Maryland: Chesapeake City, Cecil Co., *Tidestrom,* no. 11,679; St. Mary's Co., *Tidestrom,* no. 5062. District of Columbia: Brookland, Oct. 15, 1898, *Holm;* Terra Cotta, Aug. 18, 1915, *Holm.* WEST VIRGINIA: Huttonsville, Randolph Co., *Greenman,* no. 330; Tygart Junction, Barbour Co., *Greenman,* no. 329; between Gilmer and Read, Gilmer Co., *Greenman,* no. 331. VIRGINIA: se. of Alexandria, Fairfax Co., *Wiegand & Manning,* no. 958; ne. of Mechanicsville, Louisa Co., *Adams & Wherry,* no. 2228; Capital Landing Creek, York Co., *Mentzel,* no. 145; Oceana, Princess Anne Co., *Fernald & Long,* nos. 3896 and 3897; eastern shore, Lake Drummond, Norfolk Co., *J. Arthur Harris,* no. C 18,233; Zuni, Isle of Wight Co., *Fernald, Griscom & Long,* no. 6582; south of South Quay, Nansemond Co., *F. & L.,* no. 11,559; south of Franklin, Southampton Co., *F. & L.,* no. 8235; e. of Dan River, Halifax Co., *Fosburg,* no. 15,383; Hollins School, Roanoke Co., *C. E. Wood, Jr.,* no. 5483; "Mts., Virg. 1843", *Asa Gray* (type of var. *obtusifolia* Regel, in Gray Herb.); Bane, Giles Co., *Fogg,* no. 14,714, as *A. crispa;* Peak Creek, Pulaski Co., at 2200 ft. alt., July 16, 1892, *Small.* NORTH CAROLINA: Snow Hill, Greene Co., *L. F. & F. R. Randolph,* no. 776; Clinton, Sampson Co., *Godfrey,* no. 5895; Biltmore, Buncombe Co., *Bilt. Herb.* no. $1240^b$; at 4000 ft. alt., Pisgah Forest, Transylvania Co., *House,* no. 4041; at 1700 ft. alt., Great Smoky Mts., Swain Co., July, 1891, *Beardslee & Kofoid.* SOUTH CAROLINA: s. of Myrtle Beach, Horry Co., *Weatherby & Griscom,* no. 16,511; Georgetown, G. Co., *Godfrey & Tryon,* no. 988; Santee Canal, *Ravenel* (identified by Regel as his var. *genuina*); Summerville, Dorchester Co., *B. L. Robinson,* no. 114; se. of Elloree, Orangeburg Co., *Godfrey & Tryon,* no. 1503. GEORGIA: se. of Ludowici, Long Co., *Wiegand & Manning,* no. 962; s. of Cuthbert, Randolph Co., *Harper,* no. 1782. FLORIDA: River Junction, Gadsden Co., *Nash,* no. 2590; Peters Creek, Clay Co., *Small & DeWinkeler,* no. 9706. INDIANA: s. of Chestnut Ridge, Jackson Co., *Deam,* no. 13,740. KENTUCKY: Keyser Creek, Boyd Co., Sept. 25, 1937, *T. N. McCoy;* Tygart's Creek, Carter Co., Oct. 16, 1937, *E. L. Braun;* "Fernbank—ad ripas fluminis Ohio, prope 'North Bend'", *Short.* TENNESSEE: Rugby, Morgan Co., *Svenson,* no. 4048; Sunbright, alt. 2200 ft., Morgan Co., *Svenson,* no. 4117; n. of Manchester, Coffee Co., *Svenson,* no. 9256; Hollow Rock Jc., Carroll Co., *Svenson,* no. 374. ALABAMA: n. of Headland, Henry Co., *Wiegand & Manning,* no. 964; Perdido, Baldwin Co., *Blanton,* no. 7087. ILLINOIS: Pope Co., July 31, 1898, *G. P. Clinton.* MISSOURI: Jefferson Co., July, 1887, *Eggert;* Bismark, St. Francois Co., *E. J. Palmer,* no. 18,065; Monteer, Shannon Co., *Bush,* nos. 204 and 7852. ARKANSAS: Kensett, White Co., *Demaree,* no. 8658; Siloam Springs, Benton Co., *Demaree,* no. 4626; Washington Co., Aug. 17, 1895, *Blankinship;* Howard Co., *Demaree,* no. 9734; Murfreesboro, Pike Co., *Demaree,* no. 9377; Locksburg, Sevier Co., *Demaree,* no. 9890. LOUISIANA: New Orleans, 1832, *Drummond;* n. of Kisatchie, Natchitoches Parish, *D. S. & H. B. Correll*, no. 9765. OKLAHOMA: Page, LeFlore Co., *Stevens*, no. 2619; Valliant, McCurtain Co., *Demaree*, no. 12,022 (appr. var. *subelliptica*). PLATES 983 and 984.

Var. VULGARIS, forma **noveboracensis** (Britton), stat. nov. *A. noveboracensis* Britton in Torreya, iv. 124 (1904) and N. Am. Trees, 264, fig. 224 (1908). *A. rugosa*, race? Britton in Britt. & Brown, Ill. Fl. ed. 2, i. 613 (1913).—Differing from typical var. *vulgaris* only in the persistent plush-like pubescence of the lower leaf-surfaces.—Scattered through the range, often abundant. MAINE: Orono, Penobscot Co., *Fernald & Long*, no. 13,473, as *A. incana*, var. *hypochlora*. MASSACHUSETTS: West Roxbury, April 5 and May 18, 1904, *F. F. Forbes*. RHODE ISLAND: Washington P., Kent Co., May 24, 1914, *Thos. Hope*. NEW YORK: Grant City, Staten I., Aug. 5, 1894, *Britton* (TYPE of *A. noveboracensis*); Selkirk, Oswego Co., *Fernald, Wiegand & Eames*, no. 14,247. NEW JERSEY: South Amboy, Middlesex Co., *Mackenzie*, no. 1465. VIRGINIA: Blackwater R., Princess Anne Co., *Fernald & Long*, no. 3898; w. of Franklin, Southampton Co., *F. & L.*, no. 6583; se. of Branchville, South. Co., *F. & L.*, no. 10,231; n. of Skipper's, Greensville Co., *F. & L.*, no. 8693. SOUTH CAROLINA: *M. A. Curtis*. GEORGIA: s. of Athens, Clarke Co., *Duncan & Roland*, no. 3877; Augusta, Richmond Co., *Olney & Metcalf*, no. 91. KENTUCKY: Harlan Court House, Harlan Co., *Kearney*, no. 7; s. of Albany, Clinton Co., *Smith & Hodgdon*, no. 3992. TENNESSEE: between Lexington and Natchez Trace Forest, Henderson Co., *Svenson*, no. 10,499. LOUISIANA: *Hale* (identified by Regel as his *A. serrulata*, var. *genuina*). PLATE 985.

Var. **subelliptica**, var. nov. (TAB. 986), foliis late elliptico-obovatis vel oblongo-ellipticis vel subrotundo-obovatis basin versus sensim rotundatis, subtus glabris vel glabratis; amentis masculis 3–7 cm. longis; strobilis maturis 1–2 cm. longis.—Georgia, north to southern New Hampshire, Massachusetts and New York. NEW HAMPSHIRE: Wheelwright P., Lee, Strafford Co., *Hodgdon*, no. 2576. MASSACHUSETTS: Rockport, Essex Co., *L. B. Smith & R. C. Gates*, nos. 964 and 965; Round P., Tewksbury, Middlesex Co., *Fernald & Bartlett*, no. 17; sandy swamp, Tewksbury, April 14 and October 14, 1906, *Fernald & Bartlett*, no. 16 (TYPE in Herb. Gray.); Winchester, Mid. Co., *F. & B.*, nos. 8, 11 and 13; West Cambridge, Mid. Co., *F. & B.*, no. 3; Fresh Pond, Cambridge, Sept. 29, 1894, *Robinson*, also *F. & B.*, no. 1; Bedford, Mid. Co., Sept. 12, 1903, *Knowlton;* Needham, Norfolk Co., April 20 and July 3, 1883, *T. O. Fuller;* Bellingham, Norf. Co., Sept. 17, 1935, *Ordway & Sanford;* Silver L., Kingston, Plymouth Co., Aug. 30, 1941, *Knowlton;* Wareham, Plym. Co., Sept. 18, 1925, *Knowlton;* Waquoit, Falmouth, Barnstable Co., *R. A. Ware*, no. 336; East Sandwich, Barn. Co., Sept. 16, 1916, *F. F. Forbes;* Seward's P., West Barnstable, Barn. Co., *St. John & White,* no. 924; Great P., Centerville, Barn. Co., June 16, 1895, *E. F. Williams;* Walker P., Brewster, Barn. Co., *Fernald,* no. 16,681; Sheep P., Brewster, *Fernald,* no. 16,683; Cliff P., Brewster, *Fernald & Long,* no. 16,685; Davis P., Greenwich, Hampshire Co., *Pease,* no. 20,353. RHODE ISLAND: Limerock, Lincoln, Providence Co., Oct. 19, 1906, *J. F. Collins;* East Providence, Prov. Co., Oct. 17, 1906, *Collins;* Wash. P., Block Island, Newport Co., *Fernald, Hunnewell & Long,* no. 9344. CONNECTICUT: Coventry, Tolland Co., Aug., 1916, *Weatherby & Smith;* Ladd Fool Bridge, Franklin, New London Co., Aug. 24 and Sept. 6, 1912, *Woodward;* Rainbow, Windsor, Hartford Co., Sept. 20, 1908, *H. S. Clark;* Southington, Hartford Co., *L. Andrews,* no. 182; Oxford, New Haven Co., April 16, 1888 and July 30, 1899, *Harger.* NEW YORK: Long L., Hamilton Co., *House,* no. 13,513; Ashokan, Ulster Co., *Muenscher,* no. 16,104; Glycerine Hollow, Black Lake Forest, Orange Co., *Raup,* nos. 7789 and 7792; Peconic R., Southampton, Suffolk Co., *St. John,* no. 2682: Renwick Flats, Ithaca, Tompkins Co., *MacDaniels,* no. 3927. PENNSYLVANIA: near Kimbles, Pike Co., *Fogg,* no. 10,780; Allegheny Co., *Dickey,* no. 24. VIRGINIA: n. of Keyesville, Charlotte Co., *Fosberg,* no. 15,531; se. of Whitemarsh School, Nansemond Co., *Fernald & Long,* no. 11,558 (transitional); south of South Quay,Nans. Co., *F. & L.,* no. 10,611. NORTH CAROLINA: Parkville, Perquimans Co., *L. F. & F. R. Randolph,* no. 682; Raleigh, Wake Co., *Godfrey,* no. 4957; Hamlet, Richmond Co., *Wiegand & Manning,* no. 960. SOUTH CAROLINA: Pee Dee R. at Mars Bluff, Florence Co., *Wiegand & Manning,* no. 961. GEORGIA: e. se. of Statesboro, Bulloch Co., July 5, 1936, *Wherry.*

Var. SUBELLIPTICA forma **emarginata,** f. nov. (TAB. 987). Frutex ad 1.5 m. alta; foliis subrotundo-obovatis 2–5 cm. longis 1.5–4 cm. latis basin versus rotundatis apice late emarginatis paginis inferioribus glabratis; amentis masculis 2 cm. longis; strobilis maturis 5–10 mm. longis.—CONNECTICUT: open, rather sphagnous, swamp, Rainbow, Windsor, Hartford Co., Sept. 16, 1906 and April 6, 1907, *C. H. Bissell & C. A. Weatherby* (*Weatherby,* no. 2031), TYPE in Herb. Gray.

Var. SUBELLIPTICA, forma **mollescens,** f. nov. (TAB. 988). Frutex altus vel arbor fastigiata ad 8 m. alta; foliis ut in var. *subelliptica* 6–12 cm. longis apice obtusis vel acutis basin versus rotundatis subtus dense persistenterque subvelutinis; strobilis maturis 1–2 cm. longis.—Scattered through the range of the variety. NEW ENGLAND: old specimen from "Nova Anglia", *Oakes,* identified by Regel as his var. *genuina.* MASSACHUSETTS: Plum Island, Essex Co., *St. John,* no. 837; Winchester, Middlesex Co., July, 1907, *Knowlton;* Sharon, Norfolk Co., *S. F. Poole,* no. 3; Barnstable, B. Co., *Fernald & Woodward,* nos. 15,124 and 15,126; Sheep P., Brewster, Barn. Co., *Fernald,* no. 16,682; Seth's P., West Tisbury, Dukes Co., *Fernald & Fogg,* no. 888; Brookfield, Worcester Co., *Hill, St. John & Torrey,* no. T. 261. CONNECTICUT: Thompson, Windham Co., June 11, 1922, *Eaton, Fassett, Jack, Linder & Peattie.* NEW YORK: wet hollow, Riverhead, Southampton, Suffolk Co., July 25–Aug. 3, 1920, *St. John,* no. 2681 (TYPE in Herb. Gray.). NEW JERSEY: South Amboy, Middlesex Co., *Mackenzie,* no. 1906. VIRGINIA: Little Neck, Princess Anne Co., *Fernald & Long,* no. 3899. NORTH CAROLINA: Raleigh, Wake Co., *Godfrey,* no. 4052; Gilson, Scotland Co., *Godfrey,* no. 5073.

Var. *subelliptica,* at the northern border of its range, has often been taken for a hybrid of *Alnus serrulata* (var. *vulgaris*) and *A. rugosa* (var. *typica*) and in outline of leaf it is suggestive of such an origin. It has, however, the characteristic bark, glutinous or gummy quality, branching of inflorescence and venation and serrulation of leaves of *A. serrulata,* not of *A. rugosa.* In southern New England and New York the two species meet, but farther south, from eastern Maryland to Georgia, no representative of the latter species is known.

Var. SUBELLIPTICA, forma **nanella,** f. nov. (TAB. 989), nana, 0.5–1 m. alta; foliis elliptico-obovatis 2–5 cm. longis, subtus subvelutinis; strobilis maturis 6–12 mm. longis.—VIRGINIA: dwarf shrubs with scattered simple stems only 5–8 mm. thick, springy sphagnous and argillaceous bog, Ram-hole Swamp, Seward Forest, near Triplett, Brunswick Co., June 22 and Sept. 13, 1944, *Fernald (and Lewis),* no. 14,596 (TYPE in Herb. Gray.); with *Lachnocaulon anceps, Sarracenia flava,* etc., bushy sphagnous swamp southeast of Petersburg, at head of Poo Run, Prince George Co., *Fernald & Long,* no. 6167.

EXPLANATION OF PLATES

PLATE 976, ALNUS INCANA (L.) Moench.: FIG. 1, leading shoot, with foliage and young aments, × 1, from Breslau, Sept. 20, 1908, *Ziesché;* FIG. 2, lower surface of leaf, × 10, from Charlottenbrunn, Silesia, *Baenitz,* no. 1373; FIG. 3, inflorescence, × 1, from Möenlycke, April, 1890, *Walter Unlemann,* Fl. Scand.; FIG. 4, mature cones, from *Baenitz,* no. 1373; FIG. 5, half a cone, × 4, from Wurzburg, *Fl. exsicc. Bavar.,* no. 56; FIG. 6, bract, × 10, from Bohemia, July, 1887, *Fopitze;* FIG. 7, nutlet, × 10, from same specimen as fig. 6.

PLATES 977 and 978, A. RUGOSA (Du Roi) Spreng., var. TYPICA H. Winkl. PLATE 977: FIG. 1, fruiting branch, × 1, of shrub spread from cultivation in Europe, from Gehölze an der Lüneburger Eisenbahn nach Motrich, Wittenberge, *Baenitz, Herb. Dendrol.* no. 1214; fig. 2, venation of lower leaf-surface, × 10, from no. 1214; FIG. 3, half a cone, × 4, from no. 1214; FIG. 4, nutlet, × 10, frrom no. 1214. PLATE 978: FIG. 1, fruting branch from Narrows Island, Black Lake, New York, *Fernald, Wiegand & Eames,* no. 14,251; FIG. 2, venation of lower leaf-surface, × 10, from no 14,251; FIG. 3, portion of cone, × 4, from no. 14,251; FIG. 4, achene, and FIG. 5, bract, × 10, from no. 14,251.

PLATE 979, FIGS. 1–3, A. RUGOSA, var. TYPICA: FIG. 1, terminal leaves of vegetative sprout, × ca. ½, from TOPOTYPE, Harbke Garten, *Ehrhart*, no. 88; FIG. 2, branches of strictly pistillate shrub, × 1, from Townshend, Vermont, June 2, 1912, *L. A. Wheeler;* FIG. 3, inflorescence, × 1, from West Roxbury, Massachusetts, April 9, 1906, *F. F. Forbes.* FIG. 4, forma EMERSONIANA Fernald: lower surface of leaf, × 10, from TYPE.

PLATES 980 and 981, A. RUGOSA, var. AMERICANA (Regel) Fernald. PLATE 980: FIG. 1, fruiting branch, × 1, from Douglastown, Gaspé Co., Quebec, Aug. 22, 1904, *Collins, Fernald & Pease;* FIG. 2, bark, × 1, from Rindge, New Hampshire, Sept. 8, 1917, *C. F. Batchelder;* FIG. 3, group of cones, × 4, from same specimen as fig. 1. PLATE 981: FIG. 1, foliage and young aments of larger-leaved specimen, × 1, from Hillsborough, New Hampshire, Sept. 3, 1921, *C. F. Batchelder;* FIG. 2, inflorescence, × 1, from Buckland, Massachusetts, April 11, 1904, *F. F. Forbes.*

PLATE 982, FIGS. 1–3, A. RUGOSA, var. AMERICANA, forma HYPOMALACA Fernald: FIG. 1, foliage, × 1, of TYPE; FIG. 2, foliage of vigorous sprout, × 1, from Tewksbury, Massachusetts, *Fernald & Bartlett*, no. 15; FIG. 3, lower surface of leaf, × 10, from TYPE. FIG. 4, var. AMERICANA, forma TOMOPHYLLA Fernald; leaf, × 1, from TYPE.

PLATES 983 and 984, A. SERRULATA (Ait.) Willd., var. VULGARIS Spach. PLATE 983, extreme with more acute leaves, "Foliis obovatis acutis", *Aiton:* FIG. 1, foliage of vigorous sprout-shoot, × 1, from Newton, Massachusetts, *Wm. Boott;* FIG. 2, foliage and incipient inflorescence of fertile branch, × 1, from Oceana, Virginia, *Fernald & Long*, no. 3896; FIG. 3, inflorescence, × 1, from Centerville, Massachusetts, April 18, 1897, *E. F. Williams;* FIG. 4, old cones, × 1, from Weymouth, New Jersey, *Long*, no. 25,358; FIG. 5, half a cone, × 4, from Stoneham, Massachusetts, April 16, 1896, *W. P. Rich;* FIG. 6, nutlet, × 10, from *Long*, no. 25,358. PLATE 984, extreme with obtuse leaves; FIG. 1, TYPE, × 1, of var. *obtusifolia* Regel; FIG. 2, narrower leaf (approaching forma *nanella*), × 1, from Richmond, Rhode Island, Aug. 20, 1919, *Fernald & Collins;* FIG. 3, broadest-leaved extreme, approaching var. *subelliptica*, × 1, from Wareham, Massachusetts, Sept. 18, 1928, *C. H. Knowlton;* FIG. 4, venation of lower leaf-surface, × 10, from same leaf as in fig. 2; FIG. 5, young inflorescences of staminate shrub, × 1, from south of South Quay, Virginia, *Fernald & Long*, no. 11,559.

PLATE 985, A. SERRULATA, var. VULGARIS, forma NOVEBORACENSIS (Britton) Fernald: FIG. 1, TYPE, × ½, of *A. noveboracensis* Britton; FIG. 2, tip with incipient inflorescence, × ½, from Selkirk, Oswego Co., New York, *Fernald, Wiegand & Eames*, no. 14,247; FIG. 3, fruiting cones, × 1, from no. 14,247; FIG. 4, lower surface of leaf, × 10, from no. 14,247; FIG. 5, bark, × 1, from Orono, Maine, *Fernald & Long*, no. 13,473.

PLATE 986, A. SERRULATA, var. SUBELLIPTICA Fernald, all figs. from TYPE: FIG. 1, foliage and incipient inflorescence, × 1; FIG. 2, inflorescence, × 1; FIG. 3, fruit, × 1; FIG. 4, bract, × 10; FIG. 5, nutlet, × 10.

PLATE 987, A. SERRULATA, var. SUBELLIPTICA, forma EMARGINATA Fernald, all figs. from TYPE: FIG. 1, fruiting branch, × 1; FIG. 2, largest leaves, × 1; FIG. 3, flowering tip, × 1; FIG. 4, lower surface of leaf, × 10.

PLATE 988, A. SERRULATA, var. SUBELLIPTICA, forma MOLLESCENS Fernald: FIG. 1, leaf and incipient inflorescence, × 1, from TYPE; FIG. 2, old cones, × 1, of TYPE; FIG. 3, lower surface of leaf, × 10, from TYPE; FIG. 4, branch with unusually long cones, × 1, from Little Neck, Virginia, *Fernald & Long*, no. 3899.

PLATE 989, A. SERRULATA, var. SUBELLIPTICA, forma NANELLA Fernald, all figs. from TYPE: FIGS. 1 and 2, fruiting branches, × 1; FIG. 3, lower surface of leaf, × 10; FIG. 4, nutlet, × 10.

A necessary Transfer in Populus § Turanga.—During the compilation of bibliography preliminary to monographic studies in the genus *Populus*, it has become evident that there is an earlier name for the British East African Poplar known as *Populus Denhardtiorum* (Engler) Dode, the said combination made in 1909.

Dode's basonym was *Populus euphratica* Olivier, subsp. *Denhardtiorum* Engler (1898). But Engler himself, in 1905 (Bot. Jahrb. **36:** 252. 1905), had clearly indicated that he had given a full description of the same tree under the name *Celtis ilicifolia* in his Pflanzenwelt Ost-Afrikas, Theil C, p. 160. 1895. It is, then, clear that this species should bear the following name:

Populus **ilicifolia** (Engler) comb. nov. *Celtis ilicifolia* Engler in Pflanzenwelt Ost-Afrikas, Theil B, p. 290 et Theil C, p. 160. 1895. *Populus euphratica* Olivier, subsp. *Denhardtiorum* Engler in Notizbl. Kön. Bot. Gart. Mus. Berlin, **2:** 217–218. 1898, in Sitzungsber. Preuss. Akad. Wiss. 369. 1904, in Engl. Bot. Jahrb. **36:** 252. 1905; Aschers. in Ber. Deutsch. Bot. Gesellsch. **36a:** 360. 1908. *Populus euphratica* Olivier, var. *Denhardtiorum* Gombocz in Math. Természet. Közlem. **30:** 72. 1908 (Populus-nem Monogr.). *Populus Denhardtiorum* Dode, in Bull. Soc. Dendr. France, **1909:** 152. 1909; Stapf in Hooker, Icon. Pl. **31:** t. 3050. 1916; Skan in Prain, Flora of Tropical Africa, **6,** sect. 2, part 2, pp. 325–326. 1917; Battiscombe, in Descr. Cat. Common Tr. & Woody Pl. Kenya Colony, pp. 66–67. 1926. *Turanga ilicifolia* Kimura in Sc. Rep. Tôhoku Imp. Univ., ser. IV, Biol., **13:** 387. 1938. *Balsamiflua ilicifolia* Kimura, Sc. Rep. Tôhoku Imp. Univ., ser. IV, **14:** 192. 1939.

Ernest Rouleau, Institut Botanique, Université de Montréal

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Linum catharticum in Ontario.—A note in Rhodora for March, 1945, called attention to occurrence of *Linum catharticum* L. in New Brunswick and Quebec, the provinces next westward from Nova Scotia, in the eastern parts of which it is well known. An Ottawa, Ontario, collection made by John Macoun on June 15, 1903, "on the left side of the road near the entrance of Beechwood Cemetery", was reported in the Ottawa Naturalist **20:** 164. 1906, by J. M. Macoun; and specimens are preserved in the National Herbarium and in the Herbarium of the Division of Botany, Department of Agriculture, Ottawa, from which a spare plant was recently contributed to the Gray Herbarium. Search for


*Photo. B. G. Schubert*

ALNUS INCANA: FIG. 1, shoot with foliage and young aments, × 1; FIG. 2, lower surface of leaf, × 10; FIG. 3, inflorescence, × 1; FIG. 4, mature cones, × 1; FIG. 5, half a cone, × 4; FIG. 6, bract, × 10; FIG. 7, nutlet, × 10.


*Photo. B. G. Schubert*

ALNUS RUGOSA, var. TYPICA: FIG. 1, fruiting branch of the shrub cultivated and naturalized in Germany, derived, presumably, from the original specimen; FIG. 2, venation of lower leaf-surface from same collection, × 10; FIG. 3, half a cone from same collection, × 4; FIG. 4, nutlet, × 10.

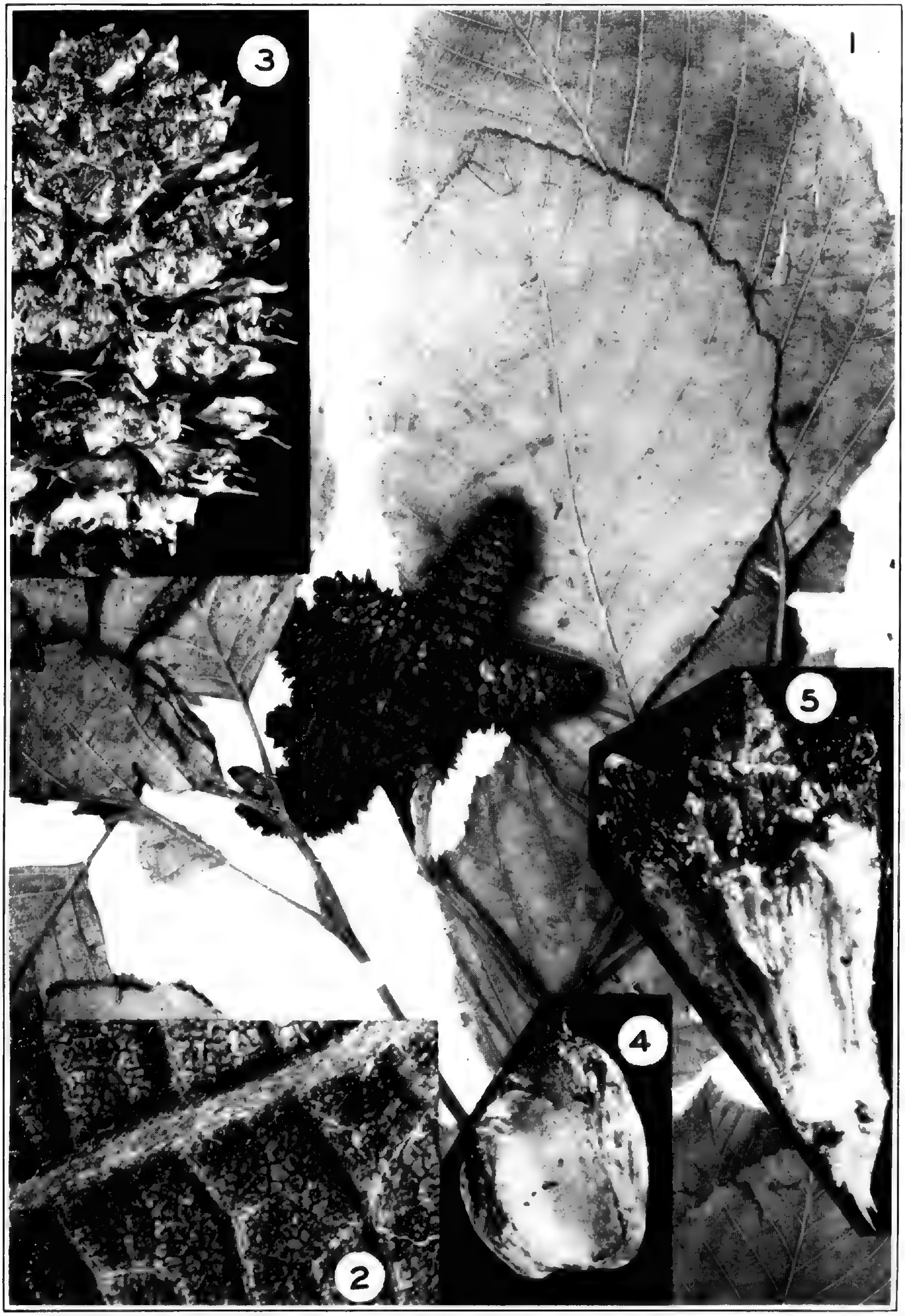



*Photo. B. G. Schubert*

ALNUS RUGOSA, var. TYPICA, native American shrub: FIG. 1, fruiting branch, × 1; FIG. 2, venation of lower leaf-surface, × 10; FIG. 3, portion of cone, × 4; FIG. 4, achene, × 10; FIG. 5, bract, × 10.


*Photo. B. G. Schubert*

ALNUS RUGOSA, var. TYPICA: FIG. 1, terminal leaves of vegetative sprout of TOPOTYPE, $\times$ ?½, after photo. by Professor *Alfred Rehder;* FIG. 2, branches of strictly pistillate shrub, $\times$ 1; FIG. 3, typical inflorescence, $\times$ 1.
A. RUGOSA, forma EMERSONIANA: lower surface of leaf of TYPE, $\times$ 10.

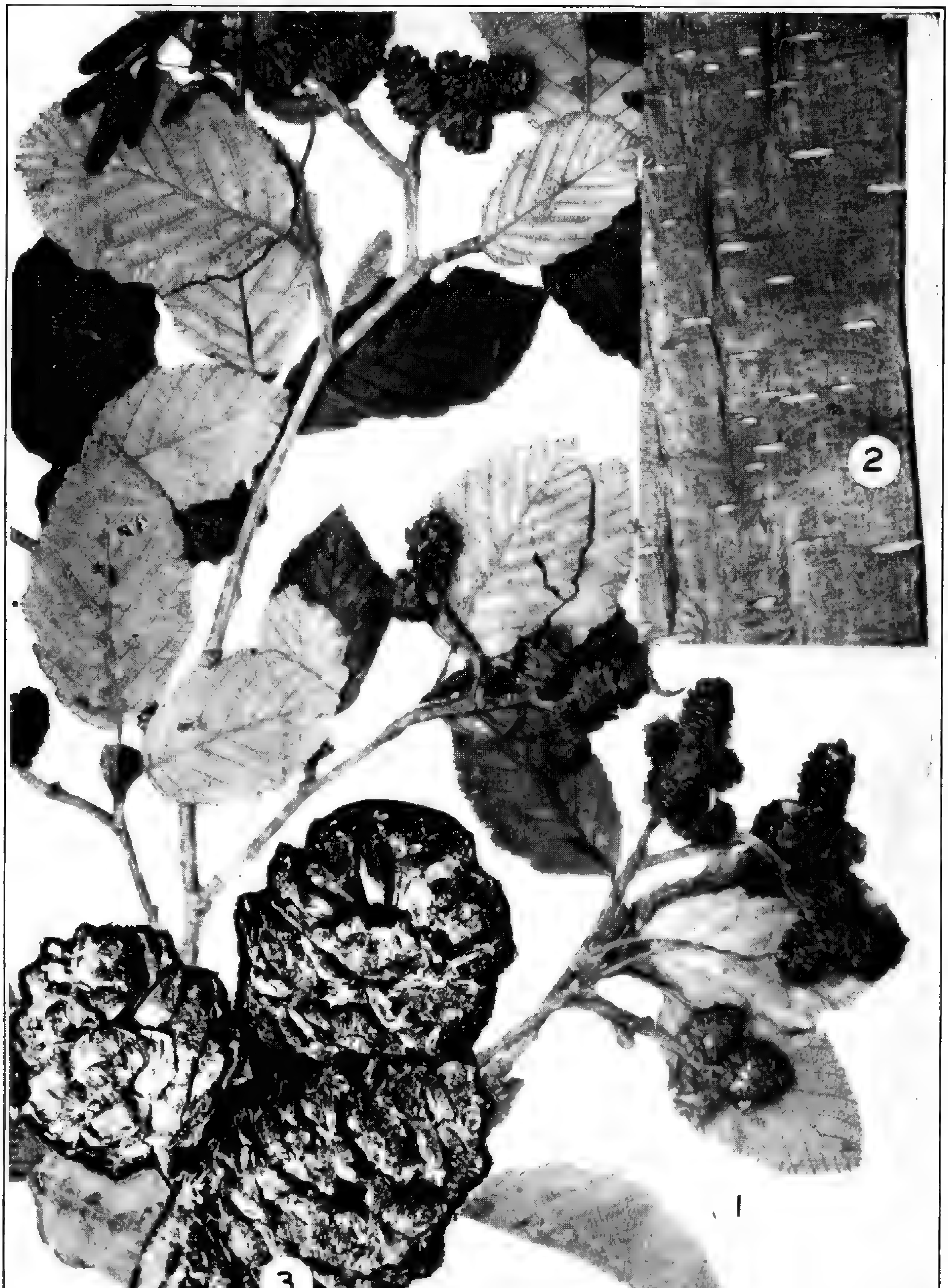



*Photo. B. G. Schubert*

ALNUS RUGOSA, var. AMERICANA: FIG. 1, fruiting branch, × 1; FIG. 2, bark, × 1; FIG. 3, cones, × 4.

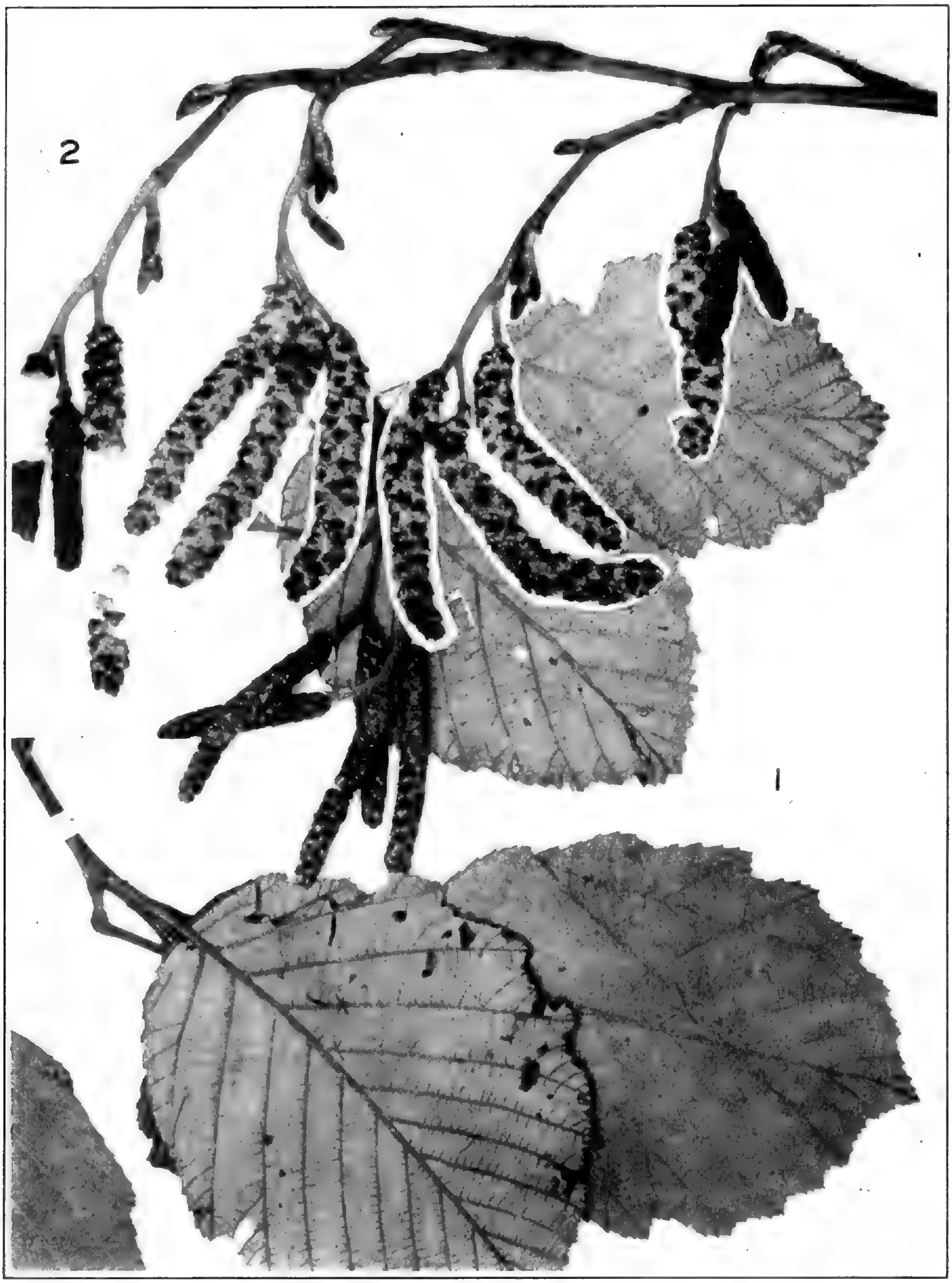



*Photo. B. G. Schubert*

ALNUS RUGOSA, var. AMERICANA: FIG. 1, foliage and young aments of large-leaved shrub, × 1; FIG. 2, inflorescence, × 1.


*Photo. B. G. Schubert*

Alnus rugosa, var. americana, forma hypomalaca: fig. 1, foliage of type, × 1; fig. 2, leaf of vigorous sprout, × 1; fig. 3, lower surface of leaf, × 10.
Var. americana, forma tomophylla: fig. 4, leaf of type, × 1.


*Photo. B. G. Schubert*

Alnus serrulata, var. vulgaris, extreme with more acute leaves as in Aiton's type, "foliis obovatis acutis": fig. 1, foliage of vigorous sprout, × 1; fig. 2, fertile branch, × 1; fig. 3, inflorescence, × 1; fig. 4, old cones, × 1; fig. 5, half a cone, × 4; fig. 6, nutlet, × 10.


*Photo. B. G. Schubert*

ALNUS SERRULATA, var. VULGARIS, extreme with obtuse leaves: FIG. 1, type, × 1, of var. *obtusifolia* Regel; FIG. 2, narrow leaf, × 1; FIG. 3, broad leaf, × 1; FIG. 4, venation of lower leaf-surface, × 10; FIG. 5, inflorescence of staminate shrub, × 1.

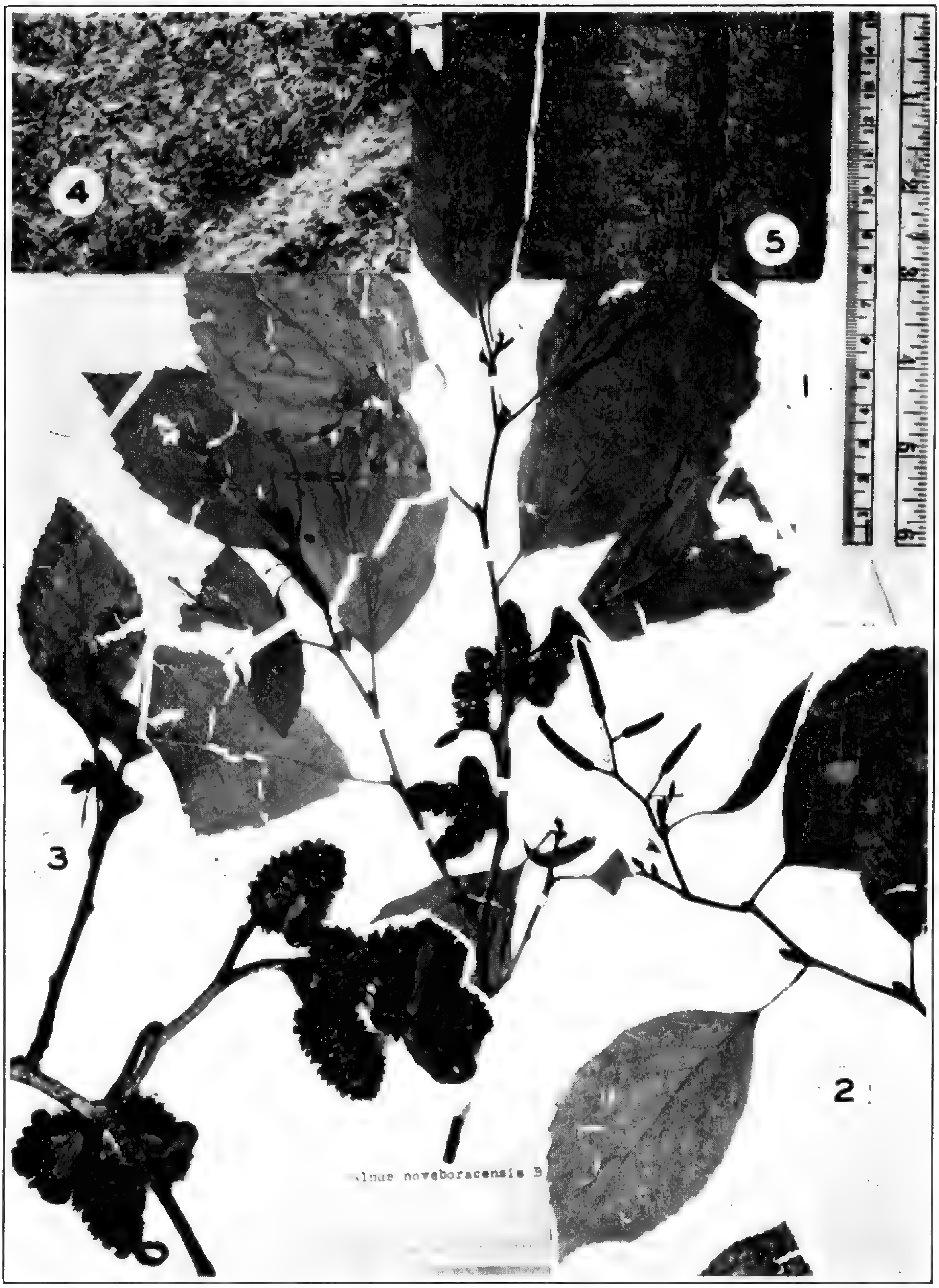



*Photo. B. G. Schubert*

ALNUS SERRULATA, var. VULGARIS, forma NOVEBORACENSIS: FIG. 1, TYPE, × ½; FIG .2, tip of branchlet with incipient inflorescence, × ½; FIG. 3, fruiting cones, × 1; FIG. 4, lower surface of leaf, × 10; FIG. 5, bark, × 1.


*Photo. B. G. Schubert*

ALNUS SERRULATA, var. SUBELLIPTICA, all figs. from TYPE: FIG. 1, foliage and incipient inflorescence, × 1; FIG. 2, inflorescence, × 1; FIG. 3, cones, × 1; FIG. 4, fruiting bract, × 10; FIG. 5, nutlet, × 10.

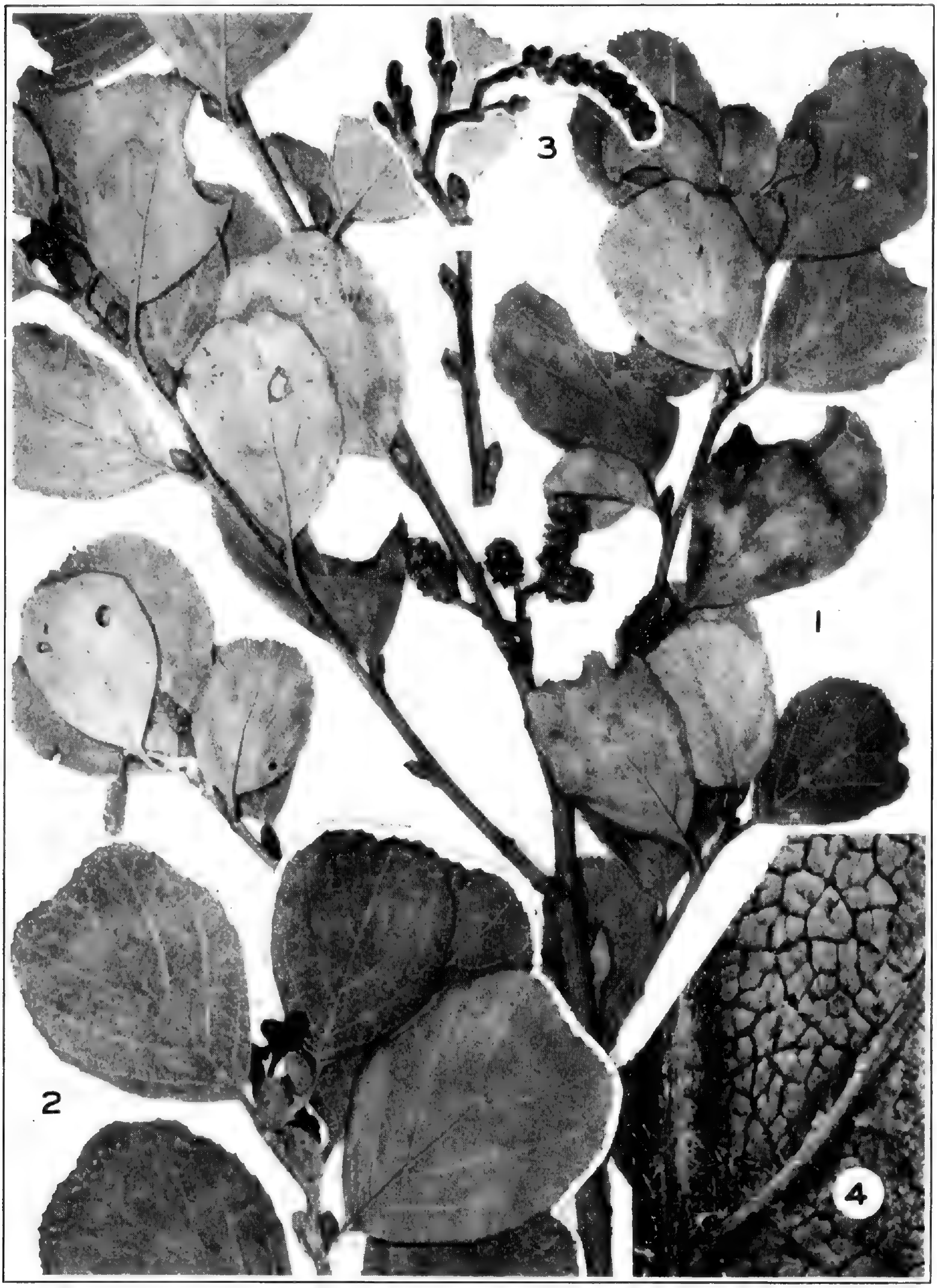



*Photo. B. G. Schubert*

ALNUS SERRULATA, var. SUBELLIPTICA, forma EMARGINATA, all figs. from TYPE: FIG. 1, fruiting branch, × 1; FIG. 2, largest leaves, × 1; FIG. 3, flowering tip, × 1; FIG. 4, lower surface of leaf, × 10.

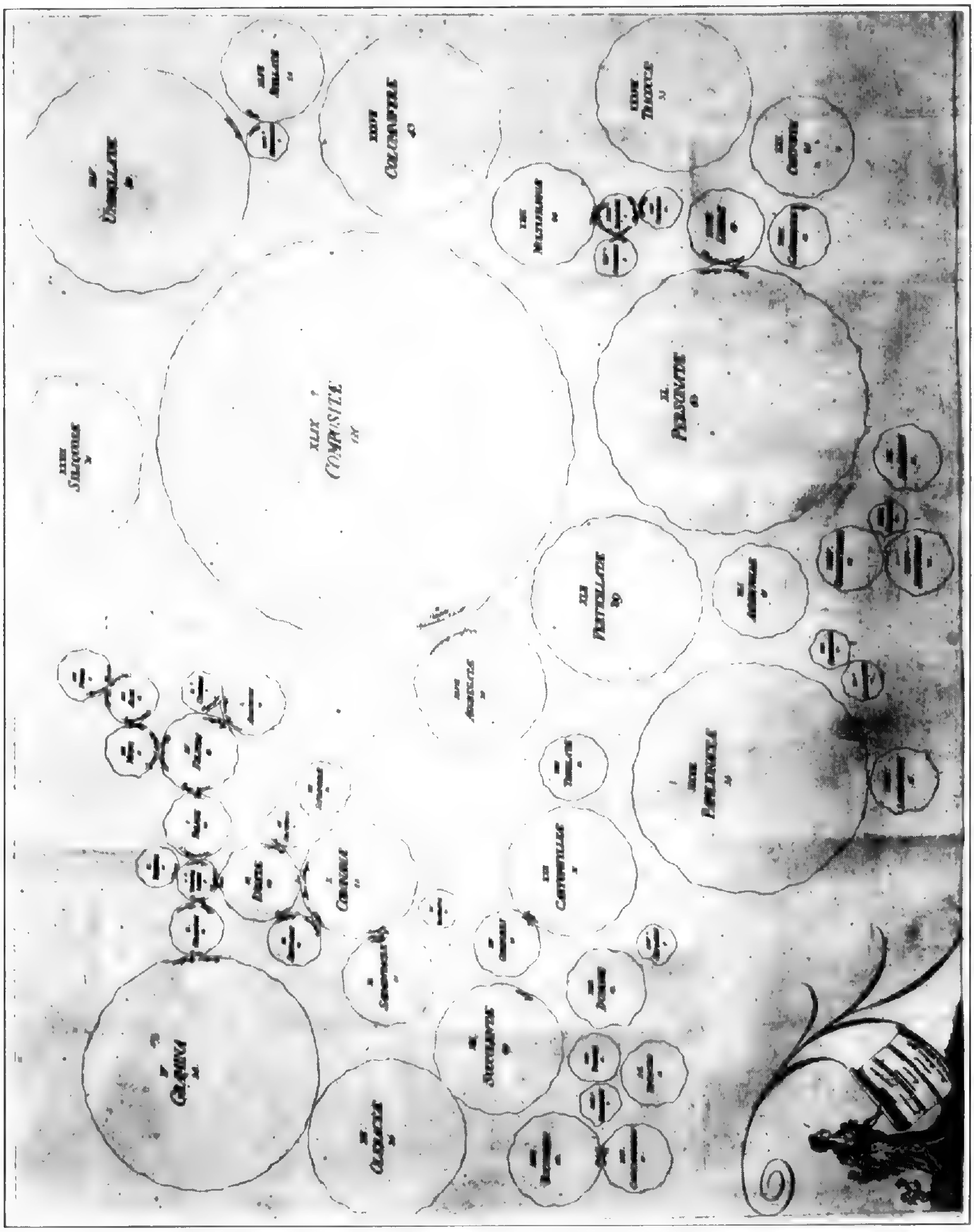

*Photo. B. G. Schubert*

ALNUS SERRULATA, var. SUBELLIPTICA, forma MOLLESCENS, FIGS. 1–3 from TYPE: FIG. 1, leaf and incipient inflorescence, × 1; FIG. 2, old cones, × 1; FIG. 3, lower surface of leaf, × 10; FIG. 4, unusually long cones, × 1.


*Photo. B. G. Schubert*

ALNUS SERRULATA, var. SUBELLIPTICA, forma NANELLA, all figs. from TYPE: FIGS. 1 and 2, fruiting branches, × 1; FIG. 3, fruiting cones, × 1; FIG. 4, lower surface of leaf, × 10; FIG. 4, nutlet, × 10.

Euphorbia maculata: left, *Smith & Zimmerman*, Winchester, Massachusetts; right, Plukenet, Alm. t. 65, f. 8.



Tabula genealogico-geographica
Affinitatum Plantarum. Secundum Ordines
Naturales Linnaei delineavit Paulus
Dietericus Giseki
1789

any subsequent reference to a continuing colony, and search in 1945 for such a colony, have failed to locate anything more.

The collection reported for St. Andrews, New Brunswick, July, 1944, by Mr. Weatherby, was not the first from this station. Specimens secured by J. Adams, September 1, 1936, and by H. Groh, July 31, 1936, are in the Divisional Herbarium, but have not been reported.—HERBERT GROH, Central Experimental Farm, Ottawa.

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## ON THE DESCRIPTIVE METHOD OF LINNAEUS

H. K. SVENSON

(*Continued from page 302*)

How well Clayton's English notes were translated into Latin by Gronovius, I cannot say. But the English common names did not always fare well, as may be seen by his treatment of the skunk cabbage (p. 186): "CALLA aquatilis odore alii vehementer praedita, radice repente, vulgo **Pole Cadweed**. *Clayt. n.* 17." Clayton undoubtedly had written, at least approximately, "Calla, with creeping root, growing in wet places, with a strong odor of onions, commonly called Polecat Weed." A description was given by Gronovius, but no specific name. The latter was supplied by Colden, and was copied by Linnaeus in *Species Plantarum* (p. 967) as: "DRACONTIUM foliis subrotundis. *Cold. noveb.* 214." On the other hand, the jack-in-the-pulpit received a specific name from Gronovius (p. 186): ARUM *caulescens foliis ternatis,* and his italics show that it was a new name. This was based on Clayton's no. 539, which bore the descriptive note: "Arisarum triphyllum altissimum, spatha & spadice omnino albovirescentibus". Gronovius' specific name was taken up, practically intact, by Linnaeus in *Species Plantarum*, p. 965.[43]

Of the Clayton specimens, Linnaeus saw only the first installment except for duplicates which Gronovius later sent him, or of specimens in the collections of other persons.[44] The assistance of

[43] The Brazilian collection to which Linnaeus refers under *Arisaema triphyllum* came from Canada, and was part of the Burser Herbarium (cf. Juel, H. O. Symbolae Bot. Upsal. II, pt. 1: 5. 1936).

[44] Linnaeus to Bergius (Hulth no. 519), July 2, 1753: "At Beck's I saw a *Ribes* from America, recently received from Gronovius, *pediculis dichotomis*." Clayton also sent some living plants, for Beck (Hulth Letter no. 626) saw *Hamamelis* in London, which Clayton had sent to Catesby.

Linnaeus was chiefly in helping Gronovius arrange the new flora according to the Linnaean method, and in describing some new genera. The situation has in general been so misunderstood that I am quoting (in translation) from the preface of *Flora Virginica* (1739), which was addressed to Clayton:

"I have therefore not hesitated to undertake this work, leaning upon the assistance of our friend, and to examine your gift of specimens (as many as had been up to that time received) with keen-eyed Linnaeus, and to search out the characters of the rare plants which had not been assigned to their genera.[45] I wish that I could recall that learned man [Linnaeus] to examine the remainder of the specimens which you sent me in this and the previous year. After his departure I carried on alone, to the best of my ability, the work of writing up the characters of rare plants; and I earnestly ask you to examine these characters anew in the living plants and to correct any errors which I may have committed.

For certain plants I have given the specific names which are in Hortus Cliffortianus and Flora Lapponica; for the remainder, which had no obvious names, I have myself adapted specific names according to the method prescribed by Linnaeus. For some plants I have omitted names, not sufficiently trusting my own observations; therefore I propose that you examine them for insertion in the second edition of the Flora Virginica which I am preparing.

For each plant I have added as a rule only a single synonym, from which others may be easily found; except for a few plants where synonyms are scattered among various authors and have not hitherto been assembled. Furthermore it will be well to place an asterisk before the names of plants listed in the catalogue of which specimens have not reached me."[46]

As I have pointed out (Rhodora **41**: 521–524. 1939), *Quercus rubra* of Linnaeus included all the American species with lobed and bristle-tipped leaves, and of these the northern red oak was first clearly differentiated by Du Roi in 1772. Much the same is true of *Quercus Prinus* L. This species first appears with a spe-

[45] Melothria, Xyris, Houstonia, Cephalanthus, Claytonia, Pontederia, Prinos, Medeola, Rhexia, Clethra, Hydrangea, Penthorum, Trichostema, Schwalbea, Diodia, Obularia, Chrysogonum, Nyssa.

[46] Cf. also Amoenitates Academicae. Vol. III. n. 31. p. 5. 1751 (L. J. Chenon, sub Praesidii Doct. Caroli Linnaei): "Gronovius, in Flora Virginica (1739 & 1743), enumerated more plants of North America than all others before him; all of which John Clayton, who lived in Virginia, had collected. The illustrious Gronovius examined them, added synonyms, referred them to genera, and distinguished them by specific differentiae." And Jacob Biuur, Amoen. Acad. **3**: 388, 389. 1753. "Species Plantarum, which comprises all the species which he (Linnaeus) has treated in his previous works, or later examined, or any that have been collected or described by his associates: as well as those which have been sent to him from all parts of the world, by *Gmelin* from Siberia, by *Sauvage* from Mt. Pessulano, by *Loefling* from Spain, by *Kalm* from Canada, etc. Gronovius has written *Flora Virginica* (1739) in which he enumerates many plants, which Clayton had diligently collected and sent; these he examined, referred them to genera, determined them with differentiae and added synonyms; and in this work no botanist has gone further."

cific name according to the Linnaean method in *Hortus Cliffortianus* p. 448 (1737):

> Quercus foliis obverse ovatis utrinque acuminatis serratis; denticulis rotundatis uniformibus.
> Quercus castaneae foliis, procera arbor virginiana. Pluk. alm. 309, t. 54, f. 3. Raj. hist. 1916. Catesb. ornith. 18. t. 18.
> *Crescit* in Virginia & Carolina.

This specific name remained unchanged in Gronovius' *Flora Virginica,* and to it was assigned Clayton's specimen. The trees grown in Cliffort's garden presumably came from England, the source of most of the American plants then grown on the Continent. Cliffort's tree had leaves with "denticulis rotundatis uniformibus" as did the Plukenet figure, and through Du Roi (1772) and Marshall (1775) this northern tree has come down to us as "Quercus Prinus" even in Sargent's Silva of North America (1895). Here in a note (vol. 8, p. 53) was the first inkling of the change that was to be made later: "The early description of the Chestnut Oak might apply as well to the Swamp Chestnut Oak (*Quercus Michauxii*) as to this species which does not grow near the coast of Virginia, where, however, the Swamp Chestnut Oak is common, and may have been the first of the Chestnut Oaks noticed by the Europeans". To this may be replied that Banister, who collected much of the early material described by Plukenet, did not lose his life by falling off a mountain on the coastal plain. Many other plants were collected by Banister in the Virginia mountains[47], where *Quercus Prinus* (*Q. montana* Willd.) is abundant. Michaux (Chênes Am. 1801) made *Q. Prinus* into five subdivisions in a peculiar trinomial manner. Of these *Q. Prinus palustris* was based on Clayton no. 77, and *Q. Prinus monticola* on Marshall's species no. 16. This was renamed *Q. montana* by Willdenow in 1805.

In the Linnaean Herbarium in London, which I examined in 1937, there are three specimens of *Quercus Prinus,* all of the

[47] Cf. Ray, Historia Plantarum, Vol. III lib. xxv, p. 6. 1704, "Nux Juglans *Virginiana* fructu minore oblongo. Ex superioribus montosis fluvii inundationibus aliquando defertur, & in rupibus ad praecipitia aut catarractas invenitur." Professor Fernald has written "There is every reason in the world why Linnaeus could have had *Quercus Prinus* (*montana*) and *Q. rubra* (*borealis,* var. *maxima*) from Clayton. They both abound on the lower James River (See Rhodora, xl. 182 & 412). Several later stations were found farther down the James." Changes in application of the names were undoubtedly due to Ashe.

northern tree now frequently called *Q. montana* Willd. Two of these specimens are from Kalm, one of them with staminate flowers; both are labeled "Prinus" by Linnaeus under the number "7", according to the enumeration of species in *Species Plantarum*, and the sheets also bear the number "15". A third sheet (no. 34) bears the label in Linnaeus' hand: "Quercus foliis obverse ovatis, utrinque acuminatis serratis, denticulis rotundatis uniformibus. Hort. Cliff. 448". This specimen, with staminate flowers, has the characteristic shallow crenate toothing of the northern tree, leaves densely stellate-pubescent below, and the winter buds silky tomentose. Nothing is further indicated as to its source. A fourth sheet (no. 20) from Kalm is merely marked "7" by Linnaeus, and was placed under "8" (*Q. nigra*) by J. E. Smith; it is *Q. heterophylla.*

It is advantageous here to discuss other American oaks in the Linnaean herbarium, since they tend to show that the Linnaean species was not based on type specimens, but was rather the subdivision of a genus comprising all specimens, illustrations and descriptions, falling within the differential limits of the specific phrase name.

*Q. nigra:* sheet 18, "8 nigra K" and sheet 19 "8K" (i. e., both from Kalm). On the latter the number "9" has been written above, and there is the notation "triloba n. 47 det. Smith".

*Q. rubra:* sheet 21, "K" (*discolor* det. Smith). The lower surface is densely stellate-pubescent. This is *Q. falcata* Michx., or a deeply incised form of *Q. velutina.* Sheet 22: "9" ("discolor H. Kew" det. Smith). The lower surface is densely tomentose-stellate and the upper surface a bit scurfy-stellate. It bears on the reverse side in Linnaeus' hand: "Quercus foliorum sinubus obtusis, angulis lanceolatis seta terminatis integerrimis (vix divisis deleatus et legatus subtus tomentosis)"; i. e., from the Gronovian specific name of *Quercus rubra* the phrase "vix divisis" [somewhat divided] was to be deleted and "subtus tomentosis" inserted. It is probable that this was a modification of the specific name intended for future publication. Sheet 23: "rubra K", a young specimen with staminate flowers from Kalm, determined as *Q. palustris* by Smith, and is that. Sheet 24: "9 K" a mixture of the northern red oak and *Q. palustris* (det. "rubra & palustris" by Smith). Sheet 25: "K" ("*ilicifolia* Willd. no. 59" det. Smith).

*Q. alba:* sheet 26 "10 K alba". A specimen from Kalm with elongate mature leaves glabrous below, and with very narrow lobes. Sheet 27: "476 Quercus alba". A very young specimen of *Q. stellata* from Gronovius with staminate flowers, lower leaf-surface hairy matted, and the upper with stellate hairs on the veins toward the margin of the leaf. Sheets 26 and 27 are pinned together. Sheet 35: "K"; a single leaf (15 x 12 cm.) of *Q. stellata.*

From the foregoing account of literature and herbarium material, it should be obvious that most Linnaean species consist of two or more species of general present-day usage. Only occasionally, as in *Viburnum dentatum*[48], is it based unequivocally upon a single collection. If the Linnaean *Quercus rubra* is to be rejected because it is based on two or more species of our present interpretation, then the names *Quercus alba, Q. nigra,* and *Q. Prinus* should also be discarded, along with most other Linnaean binomials.

With these preliminary remarks we come to the crucial point in the interpretation of Linnaean species: the relative value of specimens, figures, descriptions and synonyms. It is quite evident that Linnaeus considered the species as an entity which included all these elements. All entities were part of the species and "by knowing any synonym one would know the species". This is true also of herbarium specimens, whether or not they represent the species as we now understand it. *Species Plantarum* was written from a practical point of view, and the fact that Linnaean species were more inclusive, in general, than species of today, does not modify the original status of the Linnaean species.

Thus the statement of Wheeler (Contrib. Gray Herb. n. s. no. 127: 76. 1939), in discussing the identification of *Euphorbia maculata*, that "the identity of the plate is of secondary importance since the specimen in Linnaeus' herbarium takes precedence over cited figures" controverts all Linnaean philosophy, and it is only natural that Wheeler should therefore have found the Linnaean method only chaos. The Plukenet plate has come down through botanical usage and history as the recognized representation of *Euphorbia maculata.* It was based on plants

[48] Cf. RHODORA 42: 1. 1940.

growing in Walker's garden at London as early as 1660 (Plukenet t. 65, fig. 8. 1691). *E. maculata*, in the sense of Asa Gray, has been well known as a European weed (cf. Hegi, Ill. Fl. Mittel-Eur. f. 1757 (1911). Although no scale was given in Plukenet's plate, I believe it to be the generally recognized *E. maculata* (*E. supina* Raf.) because of the following characteristics: 1) it has the reduced axillary shoots very characteristic of *E. maculata*, but rarely seen in *E. nutans;* 2) the leaves are slightly, but definitely, petioled, which is a characteristic of *E. maculata* and not *E. nutans;* 3) the leaves of *E. maculata* are as frequently 3-veined as not, as a casual inspection of herbarium specimens will show. See pl. 990.

There seems to be no reason for Wheeler's change of the traditional usage of the Linnaean *Euphorbia maculata.*

There is nothing in the description, in my estimation, which would discriminate between *E. maculata* and *E. nutans.* It applies equally well to either one. Linnaeus, in the Second Mantissa 382. 1771, merely said: "*Euphorbia maculata* similis *E. hypericifolia*", and nothing more. The treatment in *Species Plantarum* (p. 455) is as follows:

> 21. EUPHORBIA dichotoma, foliis serratis oblongis pilosis, floribus axillaribus solitariis, ramis patulis.
> Tithymalus s. Chamaesyce altera virginiana, foliis crenatis & macula fusca eleganter notatis. *Pluk. alm.* 372. *t.* 65. *f.* 8.
> *Habitat in* America *septentrionali.*
> Caules *dichotomi: Ramis alternis, patentibus, supra purpurascentibus.* Folia *ovali-oblonga, trinervia, subpilosa, serrata, altero latere maxima parte integerrima, tenera adhuc planta notata macula fusca.* Flores *axillares, solitarii, parvi, calyce rufo.*

It will be noted that this Linnaean treatment consists of 1) a new specific name; 2) a synonym; 3) habitat; and 4) a description. Most of the other species of *Euphorbia* treated in the first edition of *Species Plantarum* had been described in the *Amoenitates*—*Euphorbia maculata* is evidently one of those plants, mentioned in the preface of *Species Plantarum,* for which a description "sine ambagibus" was added.

Since *Species Plantarum* was a compendium based partly on illustrations, there are many instances where pictured material of great similarity in appearance, but representing as we now understand it, distinct species, was included under the same specific name. Such, for example, were the American *Asclepias syriaca*, based partly on illustrations by Cornut and Clusius[49]; and *Trillium erectum*, based partly on the purple-flowered plant of Cornut's plate (which was said by Cornut to have a white variation), and partly on the once white-flowered specimen of *Trillium grandiflorum* in Burser's herbarium.

Progress of the art of illustration is taken up amusingly, and at the same time regretfully, by Linnaeus in his message to the Royal Academy (Jan. 3, 1765; Fries, Letter no. 367):

"In order that I may further follow the progress of my natural sciences, I observe how the first workers after the *Palingesia literarum* tried to understand the objects of creation, and to illustrate them by descriptions and figures.

"Descriptions were then wrapped up in long and lofty orations; now they have just so many words as are necessary, and without a whipped-cream covering—that is, they are characteristic descriptions which exclude common structures. One no longer says of animals that the head is placed in front of the body, or the eyes in the head, or that a bird has two wings and two feet; or that, in the case of a plant, that the root is dark, the leaves green, the flower beautiful, and that the fruit comes after the flower—one states only the characteristic things.

"Figures provide a similar situation. If I compare the first figures, for example those of Cuba in *Hortus Sanitatis* with Ehret's in *Hortus Cliffortianus*, they appear like ghosts among angels. Figures of the 15th century needed a superscript in order to be understood; they painted a rabbit and said it was a bear. They made figures according to the stories of others, without having seen the object.

"In the beginning of the 16th century the figures were poor, but toward the end of the century they become tolerable, especially after the good masters began carving in boxwood.

"With the beginning of the 17th century, when it was seen that subtle lines could not be cut well in wood, some began to employ copper; at first it went rather slowly and the plates became smudges. But before the century's close appeared Dodart's beautiful figures from the French Academy of Science, not to mention others.

"Even at the beginning of this century, in spite of the fact that the figures had become reasonable enough, one had to get together a whole lot

[49] This plant, the widespread *Calotropis procera* Ait., was brought to Vienna from Jericho by Weixius, and illustrated by Clusius in 1601. This illustration was not unlike Cornut's plant from Canada, and Linnaeus took Cornut's word for their identity. Cornut, Pl. Canad. 1635, p. 89 says: "I here offer a double differentia for *Apocynum:* maius & minus. [These were respectively *Apocynum maius Syriacum* and *A. minus Canadense*, known now as *Asclepias syriaca* and *A. incarnata*]. *Maius* I believe to be the same as Clusius has described under the name *Apocynum Syriaci.* But since a description is lacking and the plant is mutilated (for there is nothing of the root and of its duration, and of the flowers and juice little is known). Furthermore, the learned man states that he has seen the plant only in small dried fragments I have added what seems to be lacking in description."

of synonyms each time a plant or animal was to be determined. One had to get a sufficient library and set up all the citations until naturalists began to paint their objects in lifelike colors, so that one could not possibly be mistaken. I am not speaking of the old illuminated figures which made all leaves the same shade of green, or all yellow flowers the same kind of yellow: but I refer to the Surinam insects of Merian, Seba's paintings, Frischen's birds, Catesby's fishes, Ehret's plants, Roesel's insects, Edward's birds, Regenfus's snails, in which the objects stand as though living, as well as the best portrait painter delineates the human face. Among all these, Roesel is best in the insects, Regenfus in shells, Ehret in plants—all of which are so beautiful that the most stupid Hottentot could stand in admiration and affection for the master's work.

"If I ask, furthermore, what has brought this kind of literature to such a height, I will reply that patronage has been entirely responsible. Wealthy Englishmen supported Catesby's voyage to America, and paid well for his pictures. Roesel was supported by a baron. Ehret's plates brought a guinea apiece, as fast as he could produce them. His Majesty of Denmark's generosity brought us Regenfus's shells. Edward's patron can be read about in his preface. The English boast of Edward, the Germans of their Roesel, the Danes of their Regenfus, and with much reason.

"Our librarians have obtained a new point of view from them; even potentates must stand at the opening of these books, and be drawn into support of the natural sciences. I have tried [unsuccessfully] to get Clerck's figures published . . . This has placed me in wonderment that I, in the 27 years since I returned from my foreign travels, never could command a single good figure. With this help, I, who have had the opportunity of seeing more of our rare plants and animals than anyone else, would surely have brought out some observations quarterly."

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It may now be of some interest to trace the progress, or rather the change, of the Linnaean conceptions as they are enunciated in the introductions to succeeding issues of Linnaean works. Many of these were by authors who had lost contact with the Linnaean method, and whose publications merely retained the Linnaean trade-mark, so to speak.

Linnaeus' *Systema Naturae* appeared as a very small publication in 1735. It ran through twelve editions, the last (in 1766) with notes by Fabricius. A number of these editions represented merely translations into other languages, and the eleventh edition is non-existent. The most important were the fourth (by B. Jussieu in 1744), the ninth by Gronovuis in 1756, and the tenth in 1758.

Beginning with the thirteenth (ed. Murray) in 1774, the botanical part was separated out as the *Systema Vegetabilia*, based upon the twelfth edition (1766–1788) of the *Systema*

*Naturae*. Another edition by Murray appeared in 1784, and this was translated into Italian (as the fourteenth edition) and was also issued with very slight changes by Persoon in 1797. In the meantime Gmelin's edition (which he called the thirteenth) had appeared in 1791, and caught up the names in Walter's *Flora Caroliniana* (1788). The remarkably fine edition (also inscribed as the fifteenth) by Roemer & Schultes required the span of years from 1817 to 1830, and during this interval came the final edition (the sixteenth) by Sprengel in 1825.

In 1817 Roemer & Schultes began their monumental edition of the *Systema Naturae*, and the preface of this work is an extended account of the difficulties which had arisen in the field of systematic botany. It is as fresh and timely today. As they state, Persoon's unsatisfactory edition of the *Systema* had appeared twenty years before (1797). The early death of Willdenow had left his edition (fourth) of *Species Plantarum* unfinished, and the same was true of Vahl and his *Enumeratio Plantarum*. Lamarck's *Encyclopedia*, in process of completion by Poiret, was too large and expensive for ordinary use. The number of species and synonyms since the time of Linnaeus had increased out of all bounds due to the opening up of Australia and America, and the number of herbarium specimens now preserved in various institutions was far beyond the power of any single human being to correlate.

"What (p. vii) was allowed the father of the science is not forever permitted his successors. And for these a new edition either of *Species Plantarum* or of the *Systema Vegetabilia* is necessary for determination of plants: with synonyms not only for species, but for the synonyms scattered about among genera, orders and even classes. From these, new miseries have arisen for even the best botanists of our time. Scarcely half of the plants have been seen that have been collected and described in our time—a burden for many camels—preserved in the museums of London, Paris, Madrid, etc.: so that a man's life would not suffice in comparing and describing either those known or those in herbarium collections . . . For not only are many specimens deceptive, often badly dried or poor in other ways, but even those plants that are living; so that it not rarely happens that excellent botanists have published this or that new species, but later acknowledged it to be only a variety of a species already known. We have omitted genera, since Nature herself has not produced genera; perhaps not even species, you may readily say, if you consider those royal battles of botanists as to what should be considered a species. These arguments could easily be solved, if you would consider as *forms*[50] what they often call *species*—but forms of some importance and

[50] This seems to be the first use of the word "form" in a classification sense, but Roemer & Schultes give no further definition.

easy distinction . . . And what advantage lies in a battle of words, when it is sufficient to know that a plant may have leaves now ovate, or again lanceolate?

"To the diagnoses expressed in an oracular style, as was customarily done in previous editions of Systema Vegetabilia, it seems best for us not to acquiesce. We are persuaded that but few species can be distinguished easily and definitely by these diagnoses alone. We have therefore added short descriptions to the diagnosis, by which the plant can be determined more easily and correctly.

"We (p. ix) have diligently added copious synonyms. The way to enter the sanctuary of truth is to be sceptical in judgment (which we express by the sign '?') . . . If we fail in synonymy there is some excuse in the diverse names published at about the same time by various authors, and the diverse plants published under a single name, and the heteronyms which refer to the same plant under different names. Of synonyms those only are of value by which the plant can be readily and securely known to all botanists. There is nothing in a synonym or a homonym or a heteronym, when a plant—either per se or by fallacious and difficult description or rarity—is dubious, or has been based by its authors on an imperfect figure or description: there you will not rarely find ten or more synonyms. . . If, therefore, you perhaps find the same plant written up under two or even three names in our edition, you should not wonder or be too critical before you have patiently looked through the botanical works of others . . . Who does not detest the enumeration under one name of different plants which have not been seen, or the inclusion of two or three diverse species? By monographs the core of botany will ultimately be reached, so that further doubt may not proceed from the doubtful, and that the abyss will not invoke a greater abyss. We have not dared to change the diagnosis or definition of plants we have not seen.

"All (p. xiii), who may propose new species, are advised to be thoughtful of the future, and to place the new species in its systematic place, indicating its place between species already known, and to which it is most clearly related. We have placed new species at the end of the genus, rather than to interpolate them ourselves."

## The Trivial Name

Binomials had appeared sporadically in the publications of Bauhin, Cornut, and others, but not until their use by Linnaeus did they become adjuncts to specific names. The idea itself was one of almost childish simplicity, and the strength of the trivial names lay in the specific phrase names which they represented. It is probable that Linnaean trivial names had their inception in pharmacological terms such as *Sarsaparilla*, *China*, *Tacamahacca*, *Tragacantha*, etc.; it is at least of interest to note that the ordinary Latin adjectives which are often employed as trivial names are not listed in the index to trivial names in *Species Plantarum*, and we may infer therefore that the substantives were considered as of more importance. As has been pointed out by Sherff (quoting L. H. Bailey; Bull. Torrey Bot. Club **67:** 374. 1940) it would be as logical to have monomials as binomials. This had already been done to some extent by Ehrhart in 1790 (cf. RHODORA **31:** 171. 1929) and such monomials as *Trichophyllum* were taken up by some American botanists and combined as though they were legitimate generic names. Ehrhart was not the only one to advocate the use of monomials, even in limited usage.[51]

Nor was *Species Plantarum* the first place where trivial names were used by Linnaeus. As he says in *Philosophia Botanica* 257: "*Nomina trivialia* may be admitted after a fashion, as I have used them in Pan Suecica; they consist of a single word freely selected from any source.[52] A list of over 800 plants in Pan Suecica bears such names, the method as mentioned by Hasselgren in Amoen. Acad. **2:** 213. 1749 being as follows: "I have arranged the plants of Flora Suecica according to their catalogue numbers; and so that I could study them in brevity, I found it advantageous to add to the generic name a short and insufficient epithet, which is made clear by the Flora itself". An even earlier indication is seen in the italicized second word of the specific name, as in the account of "Radix Senega" issued by Kiernander in the Amoenitates in April, 1749. This paper is perhaps the real genesis of the Linnaean binomial, since in nine

[51] Cf. A. P. DeCandolle, Théorie . . . Bot. 224. 1813: "It is true that the Linnaean method facilitated the study of names; it is also true that it brought to students the possibility of knowing the name of a plant without knowing its character, and thus to place the word for the thing itself. It was without doubt, in accordance with this idea, that Haller rejected specific [i. e., "trivial"] names, but gave great emphasis to descriptive phrases . . . A second inconvenience of the Linnaean nomenclature was to admit the name of the genus as a basis for the name of the species: in effect, genera are very arbitrary, more variable than species; and so, any plant one meets has received four or five names, solely because different botanists have thought that it should be placed in four or five different genera. Therefore, some naturalists, among them Richer de Belleval, Renaulme and Buffon, have thought that it might be more convenient to give each species a single name, so that nomenclature might be independent of classification and not participate in its variations. But this method has been renounced, partly because of the large number of names, partly because there is no aid to memory, and finally because nomenclature itself is a guide to related species."

[52] A. DeCandolle, Lois de la Nomenclature Botanique. 1867. Footnote, p. 7: "What appears to us today to be the most fortunate and the most important of Linnaeus' ideas, seemed to him merely an accessory; for in the editions of his *Philosophia*, all published after 1745, he discourses at length on the phrases (nomina specifica) and merely mentions what we now call the specific names . . . In his dissertation of June 1753, *Incrementa botanices*, in which he considered himself as a reformer in science . . . he did not remark on the employment of binomial nomenclature."

out of ten of the plants (in addition to *Polygala Senega*) which were reputed remedies for rattlesnake bite, the italicized word is taken over directly into *Species Plantarum*. One of these plants was an unidentified plant of Plukenet; the others were *Aristolochia Serpentaria, Actaea racemosa, Prenanthes alba, Veratrum luteum, Osmunda virginiana, Sanicula canadensis, Uvularia perfoliata, Aletris farinosa, Cunila mariana.*

In some other accounts in the Amoenitates, the trivial name, instead of being italicized, was enclosed in parentheses. When it came to writing *Species Plantarum*, Linnaeus placed such names "in the margin", as he says in the introduction to *Species Plantarum*. With an outlook to the future, he continued with the important advice which has been but little heeded, or not at all, "Caveant autem quam sanctissime omnes sani Botanici, umquam proponere nomen triviale sine sufficienti differentia specifica, ne ruat in pristinam barbariem scientia." (All botanists must beware of proposing any trivial name without sufficient differentia specifica, lest the science fall into its original barbarity.) "I have placed the trivial name in the margin so that we may find any plant whatever encompassed by a single name; this I have placed without selection, which however another day may demand."

These trivial names Linnaeus often wrote at the bottom of his herbarium sheets, as has been mentioned in the discussion of *Quercus*. In addition, they were placed by him against some of the polynomials in books in his library, thus [Letter no. 816 (Hulth), Dec. 28, 1753]: "I have written in the trivial names in *Flora anglica* Ray, *helvetica* Haller, *monspeliensis* Magnolii, and a lot of others; and thus the species appear short and clear."

In evaluating the trivial name, Link (Philosophia Novae Prodromus, 1798, p. 190) says,

"Trivial names are now given to all species, a good invention of Linnaeus by which botany is made brief, easy, and secure. It may be a Latin adjective in apposition with the generic name, but as much as possible it should not be a variable character, i. e., color, or even less a country, which is subjected to political changes, and which a species rarely inhabits solely . .. . I would prefer some other substantives added to the generic name, either Greek or barbarous, which could be understood by themselves, and would so explain themselves that their significance would not be a cause of trouble. The *subspecies* should be designated by a third name, preferably by an adjective which denotes in what way it differs from other subspecies; the *variety* not so, but by a brief phrase; and the *monstrosity* not to be indicated by way of name."

With the exception of the work by Roemer & Schultes, the editions beginning with Murray were unimaginative. Johan Andreas Murray, one of Linnaeus' students, set up rules for the formation of the trivial name similar to those used by Linnaeus for the specific phrase-name. To Linnaeus the trivial name was always an accessory. Murray's changes are to be found in the preface of the thirteenth edition of *Systema Vegetabilia* (1774)[53]. They were published with good intentions but undoubtedly led to greater emphasis of the trivial name. Murray notes (p. x) that he has had to change the "character essentialis" of many species, and because of poor descriptions of recent authors was unable to allocate many species within the genus, but was obliged to place them at the end. In changes of the specific phrase-names (p. xvi) he has added the letter "M", not from any feeling of vanity[54], but so that any mistakes that were made might not be attributed to Linnaeus. In the edition of 1784 (and also of 1774?) Murray (p. 8) gives Linnaeus' explanation of the origin of genera and species by hybridization:

"Suppose the Creator, in a progression from the simple to the complex and from few to many, at the beginning of plant life to have created as many diverse plants as there are natural orders. These plants the Creator then allowed to reproduce by crossing so that as many plants arose as there are distinct genera today. From these genera, Nature has through generations without change of flowering structures, mingled and multiplied them into existing species. But to be excluded from this type of generation are hybrid plants which are for the most part sterile. Nature therefore confirms that the Genus is natural."

A *Character*, furthermore, does not constitute a genus, but the character is to be carefully drawn up according to the genus as it occurs in nature . . . The *Diagnosis* of a plant consists in the "affinitate *Generis*" and the "discrimine *Speciei*".[55] The name of a plant, "utramque diagnosis indiget", is to be duplex: a) a *Generic cognomen gentilitium*, and b) a *Specific Praenomen*

[53] Murray states (p. ix) that for two years the younger Linnaeus had promised him the editing of the third mantissa of Species Plantarum, a work which never appeared due to the illness and early death of Linnaeus, the son.

[54] A similar procedure was followed by Reichard and by Willdenow in their editions of Species Plantarum, but no reference was made to vanity.

[55] This statement is somewhat obscure, but certainly different from the Linnaean usage of the term, which applied only to the genus.

*triviale*, and under this the *Synonyma vaga* of authors. And (p. 9):

"The botanist, following the classification, is led by the character of the plant to a named genus; by the differentiae to the name of the species; thence to its synonyms; from these to the authors, and to all the information that has come to us about the object in question through the course of time. Thus the plant tells its name, and its history among a great multitude of species and individuals; this, the first goal of the botanist, has been brought about during our time, and every true botanist should be absorbed in its perfection".

Miller's seventh edition of the Gardener's Dictionary appeared in 1759. The early editions did not use binomial nomenclature, for Miller, as did Haller,[56] realized the difficulties that would arise from an unrestricted use of the binomials without the concurrent specific phrase name. As Martyn, editing the edition of 1807, says (p. ix):

"[Miller], early and practically versed in the methods of Ray and Tournefort, [was] habituated to the use of these [phrase-names], from his younger years, and it was not without reluctance that he was brought to adopt the system of Linn[a]eus; but he was convinced at length by the arguments of the late Sir William Watson and Mr. Hudson, and embraced it . . . (p. v.)

It is quite evident that Link's observations on the trivial name, especially those dealing with color and geographic locality, were influenced by Murray, who in his edition of *Systema Vegetabilia* (1774) included a supplement with rules for the formation of the trivial name. As he says (Sect. 1): "The trivial name does not render superfluous the definition of a species or the specific differentia; it should however be added whenever in any work there is to be exact determination of plants. Such a necessity exists in the systematic enumeration of plants, in extended designation of either exotic or indigenous species, where there should be some character for comparison, as in medical books or those in plant economy, so that there will not be confusion of species due to lapse of memory or hasty writing". These rules tended to focus attention on the trivial name rather than the specific name, and

[56] Stirpium indigenarum Helvetii inchoata historia. 1768. Introd. p. xxii: "More and more I feel that most genera are artificial, nor can any law be given by which you can determine what discrimination is necessary for separating two genera . . . I have not wished to create trivial names, which Linnaeus and Rivinus have given us, since I realize how meagre several words are, and feel that it would be most difficult to express any characteristic in a single word."

in that respect perhaps tended to hasten the downfall of the Linnaean method.

### Varieties

As both Lindman and E. L. Greene have pointed out, Linnaeus was the first to distinguish varieties from species, i. e., at the time of Bauhin there was no distinction between species and varieties, all plants being collected under the genus without further formal designation. Thus the statement of Linnaeus to Cronhjelm "botanists pride themselves on having 20,000 species of plants; but there are not more than 8,000 when varieties have been placed under their proper species". A variant of this statement found its way into the preface of *Species Plantarum:* "Numerum plantarum . . . vix 10,000 attingat". (The number of species in the whole world is much less than is generally credited; I have calculated, sufficiently accurately, that there are about 10,000). The actual number of species in the second edition of *Species Plantarum,* was 7540, and these were distributed in 1260 genera.[57] But it should be emphasized here that the Linnaean species was, in general, much more inclusive than that of the modern consensus.

It is generally accepted that the Greek-letter subdivisions in *Species Plantarum* represent varieties, and this view is corroborated by Linnaean correspondence. For example, in Letter no. 542 (ed. Fries) from Bergius, 1769: "Erica Gnaphalodes n. 27. Your synonym which I placed with this species is probably not the proper one, for I see in the new system that E. Gnaphalodes of Sp. Pl. is placed as a variety under *Erica spumosa.*" It is obvious that the Linnaean "variety" represented the third and lowest stage in the "Genus, Species, Variety" series, and included all the categories below the species, of our modern literature. The low esteem in which Linnaeus held the too liberal designation of varieties may be gained from a letter to Beck (no. 671, ed. Fries, in 1749): "Rosen's flora has 5 or 6 species; the others are all varieties that no one in these times takes the trouble to look for or describe". This statement, and those in *Philosophia Botanica* (section 306)[58], was directed primarily toward the dilet-

[57] Sprengel, K. Geschichte der Botanik. 2: 284. 1818.

[58] "The use of varieties in economics, cooking, and medicine shows the necessity for their recognition in ordinary life; otherwise varieties should not be recognized by botanists unless care is taken that species are not multiplied or confused thereby

tantes or "Anthophili". The idea that the Linnaean variety as employed in *Species Plantarum* applied only to horticultural variations (*varietates levissimae*), or to plants that we would now call "formae", is quite erroneous. Linnaeus tended toward the reduction of varieties (cf. Fl. Suecica, p. ix): "Varieties for the most part I have voluntarily omitted, except for a few which I have placed under their proper species; if, after the manner of some others, I should enumerate varieties in the place of species, I should certainly be able to show more than twice as many plants; I have however judged that the plants themselves and not their mere increase should be considered and I have departed from that custom". That the Greek-letter subdivisions of *Species Plantarum* often have a geographical significance is evident from such examples in *Species Plantarum* as:

*Juncus pilosus* (p. 329). Habitat in Europae sylvis, at varietates β, δ, ε in Europae australioribus; γ in Alpibus.
*Bupleurum angulosum* (p. 236). Habitat in Pyreneis. β in Vallesiae alpibus.
*Asarum canadense* (p. 442). An varietas praecedentis (*A. europaeum*); sic suadet Folia bina, dissuadet alia.

In *Flora Suecica* a similar treatment of varieties based on habitats had been carried out for *Myosotis* (no. 149) and *Gentiana* (no. 203). And in the Amoenitates Academicae **1**: 334. 1743, the paper on *Betula nana* treats the Greek-letter variants as having a significance quite remote from that of cultivated plants. It should be kept in mind, however, that one of the chief functions of *Species Plantarum* was to dispose of the loose-lying varieties of Bauhin's Pinax, and to place them under their proper species; hence the large number of Greek-letter subdivisions under such important cultivated plants as *Prunus Cerasus*, *Prunus domestica*, and various species of *Pyrus*.

The following observations in sections of *Philosophia Botanica* provide a good background for the problem of *varieties:*

158. Varieties are as many as there are different plants produced from the seed of the same species. This is due to accidental causes: climate, soil, temperature, winds, etc. Varieties often revert when the soil is changed.
259. That varieties are distinct species, no sane person admits in the animal kingdom: for there are white cows, black cows, lean and fat cows,

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Obvious varieties, in general use, are inserted at the end of the differentiae when necessary."

smooth and wooly cows, and no one has thought that the most diverse represent species.
317. It is as important to assemble varieties under their species, as it is to place species under their genera. The constancy of the older botanists in treating species as distinct, was superseded by the eagerness of more recent botanists (previous to the end of the last century) in augmenting the number of plants and infecting the science by the introduction of varieties as species. This heresy was first opposed by Vaillant, then by Jussieu, Haller, Royen, Gronovius, and a few others, in order that botanical science might not be ruined.

Many varieties can be easily traced back and explained by comparing their variable characters with those of the natural plant; but there are not a few varieties which demand both genius and experiment. The botanist who chooses to occupy himself with varieties can hardly reach his goal—the bounds of interplay of polymorphic nature.
310. *Varietates levissimas non curat Botanicus.* The horticulturists (Anthophili), unremitting in their industry and observation, see in the corollas of flowers marvellous things which the untrained eye cannot perceive; their object is the most beautiful flowers of Tulips, Hyacinths, Dianthus, Primulas, etc. To obscure varieties of these they give names that arouse wonder! They cultivate the science of flowers, all its own and pertaining only to themselves. Into their camp no sane botanist goes.

The technical aspect of varieties, from the modern point of view, has been so extensively discussed in recent literature[59] that little space is needed here. As I have pointed out in a discussion of *Hypericum cistoides*, many of our present varieties have no geographic background, and represent merely random variations in herbarium collections. Moreover we are not certain that some of the variations that we call "geographic" are not responses to climate and soil. The history of subspecies of the ornithologists is quite different from that of the botanists.

## The Herbarium

The status of some specimens in the Linnaean Herbarium, especially of the genus *Quercus*, has been discussed. The best general statement on the Linnaean Herbarium seems to be that of C. B. Clarke, the eminent specialist on the *Cyperaceae*, in Journ. Linn. Soc. Bot. **30:** 299. 1894:

"The herbarium of Linnaeus appears to have originally contained a perfect, or very nearly perfect, set of examples (one, two, or rarely more, sheets of each species) representing the Sp. Pl. ed. 1. Each sheet of this set was numbered and named in the hand of Linnaeus, in ink, on the paper

[59] Cf. R. T. Clausen in Rhodora **43:** 157–167. 1941; and C. A. Weatherby in Rhodora **44:** 157–167. 1942. The problem of varieties is also discussed in the outstanding paper by Ramsbottom, Proc. Linn. Soc. London, 150th Session: 192–219. 1938.

itself, the numbers corresponding always to the species-numbers in the *first* edition of the Sp. Pl.

"The herbarium of Linnaeus has been, as is well known, disarranged: a quantity of additional material has been mixed into it; some of the original names have been crossed out; some of the original sheets have been moved, and many have disappeared altogether. There still remain, however, in the Cyperaceae enough of these authentically named sheets to verify more than half the species described in his Sp. Pl. From comparing these so many times, I have come to the conclusion that we possess, in them, in every case, a specimen plant that Linnaeus himself referred to the name he wrote on them. Besides these (usually numbered) specimens there are a good many other sheets named in Linnaeus's hand (but without numbers) which refer to species subsequently published under Linnaeus's names in the Sp. Pl. ed. ii, in the Mantissa, and in Linn. f. Suppl."

And Ramsbottom (Linn. Soc. London Proc. 148th session, p. 26. 1936), in discussing Savage's paper on Burser's herbarium:

"When dealing with the Linnaean Herbarium some botanists seem to have lost their sense of proportion. Great as Linnaeus's opinion of his own work was—with abundant reason—it is foolish to imagine that he could ever have anticipated the importance that future botanists would place on his specimens. Consequently his herbarium was likely to contain some specimens which had been placed with less care than had the majority; moreover, it took many years to accumulate.

"It was common knowledge that all the specimens contained in the Linnaean Herbarium were not types and that all his types were not in his own herbarium; some, for example, were in the Department of Botany [British Museum] in the Hortus Cliffortianus and the Sloane Collections."

Linnaeus notes in the introduction to *Species Plantarum* that Clifford gave him all the specimens that he had in duplicate, and that Gronovius gave him many Virginia plants. In the several volumes of Linnaean letters published by Hulth are references here and there to the herbarium, and of these I quote a few:

No. 767 (to Beck) Jan. 28, 1753: "Take out as many duplicates as you are certain of; then there will be room in the herbarium". No. 61, vol. 2 (to Aymen) May 14, 1753: "You say that you have 6000 *plantas exsiccatas;* I have received plants from nearly the whole world, but have obtained only 6000". No. 1172 (to Celsius) Nov. 1736 (written from Hartekamp, Holland): "Sloane's big collection is wholly in disorder. I got a lot of rare species in England, especially of American plants, such as Sassafras, Canella alba, Alpinia, Barleria, Bauhinia [no.] 6, Bellonia, Bocconia, Breynia, Brunsfelsia, Cameraria, Coa, Cornutia, Dioscorea, Dodonea (mea, non Plumieri), Fuchsia, Hermania (formosissima arbuscula), Jan roja (?), Karatas, Magnoliae 2nd. spec., Mancinella (venenatiss.), Maranta, Petivera, Millera Houst., Kaempferia Nobis, Collinsonia nob., Mollugo nob., Dorstenia Plum., Catesbaea Gronov., Ammania Houst., Triopteris nob., Tetracera nob., Lippia Houst., Dalea Nob., Trigonella nob., Guazuma Plum. &c. Nearly all of them I brought back living to Holland

. . . I am now working hard on Hortus Cliffortianus, which is now up to 300 quarto pages; altogether it will go well over a thousand." Fries has provided the following footnote: "In 1736 Linnaeus visited England, returning to Clifford in Holland in 1737, when he assisted Gronovius on the Flora Virginica. In October he left for Sweden and remained there until the end of February, 1738. He then went to Hartekamp in Holland, which he left in May, 1738; next he went to Paris, and then to Sweden, where he was married in June, 1739."

The "herbarium parvum" was obtained by Alstroemer, who supplied the younger Linnaeus with travel funds. It was composed of specimens from the large herbarium, left at Alstroemer's place in Halland, and eventually came to the museum at Stockholm. (cf. Fries: Biographical Sketch of Alstroemer in Letters, Vol. 1, pt. 3. p. 13. 1909).

No. 968 (to Beck) Feb. 22, 1758: "I have sent 600 thalers to London for Browne's herbarium; I hope it comes intact through the pirates. It certainly must have Rolander's plants". No. 976 (to Beck) July 18, 1758: "Finally I have received Dr. Browne's Jamaica herbarium, which I have been waiting for so long; it contains more than 1000 beautiful plants . . . Here I find all the rare plants which I saw hastily at Rolander's and all that Loefling has described".

No. 440 (to Elvius) Dec. 1773: "I have read through Retzius' paper in which he wants to make 4 species of out *Sophora biflora.* Of this large tree, called *coral-tree,* I have several specimens. As I read through the paper much seemed paradoxical. But I did not wish to trust to my memory, until I came to the country to my collection, which in all ways confirmed my previous ideas . . . The peduncles are usually *biflori;* in poor soil they become *uniflori* . . . and I have specimens which have peduncles *unifloris* et *biflores* on the same branch . . . So I see in this paper nothing which is to be gained, but only more harm, and the placing of 4 species *incorrectly* for one which is certain."

An extensive list of papers dealing with the Linnaean Herbarium will be found in Soulsby's "Catalogue of the Works of Linnaeus" published by the British Museum, 1933, pp. 217–222.

## The Natural System

The idea of a natural system interested Linnaeus at an early date.[60] As mentioned in *Philosophia Botanica* (1751, p. 25) a

[60] Spring, p. 5: "The regular arrangement of natural objects under the lowest element of unity [i. e., species] gives us what Linnaeus, for example, called a 'natural system'. But the subjective natural system, as it is set up in the sciences, is quite different from the actual or objective; the latter is an ideal which the former, as much as possible, strives to illustrate."

Spring, p. 6: "The natural system has a double role to fulfill

1) It serves as a register in which each discovered natural object is arranged without constraint, and where each object already named and determined can be placed without difficulty.

natural method had been sought by Royen, by Haller, and by Wachendorff, according to cotyledons, calyces, etc. The "Fragmenta" of a natural system (p. 27–36) were composed of 67 groups, together with an additional group of plants which were of vague or uncertain status. "This is the first and ultimate desideratum in botany. *Natura non facit saltus.*[61] All plants show an affinity on either side, as a territory in a geographic map. The lack of undetected plants has been the cause of deficiency in the natural system, rather than that the knowledge of many plants has perfected it; for *Natura non facit sàltus.*"[62]

Schuster, Nachwort über das Natürliche System. p. civ. 1926, briefly reviews the situation.

"In Classes Plantarum (1738) Linnaeus says that he has worked for a long time on the natural method . . . that he could not complete it within his lifetime . . . and that the key to the system could be given only when all plants had been brought under their natural orders. The natural system must be improved, rebuilt, and completed; those who do so will be the reigning botanists. The principles would be that here no *a priori* rule would suffice, no definite part of the fructification organs, but the integral relationship of all parts". (Schuster notes here that Linnaeus has already seen the principle of the Organism as a Whole). "The relationship of the artificial system Linnaeus explained as follows: the system is for the purpose of determining plants without an instructor. Without a key there is no method for the natural families. But since a key to the natural families is nearly or quite impossible, one can use only the artificial system for identification; the artificial system deals only with the diagnosis of plants, the natural only with the internal character or nature of plants. Who therefore refers to the artificial system resembles a builder who cannot complete the roof of the house. In the last analysis

2) It should provide us a picture of the plan of Nature, of natural objects in their natural relationships.
The first is the function of the so-called artificial system; the second of the natural system. Completion of the natural system is the most important contribution to Natural History. The better it is done, the more unnecessary an artificial system will become in time."

[61] This phrase had also been used by Ray, Hist. Plant. sig. $A_3$ verso. "Nam, cum *Natura* (ut dici solet) *non faciat saltus*, neque ab extremo ad extremum transeat nisi per medium . . . (for, *Nature*, as we say, does not make a leap and does not proceed from one extreme to the other, except through intermediaries) . . .

[62] Cf. A. P. DeCandolle, Théorie Elémént. Bot. 1813, p. 45. "Several objections have been made to the system based on a separation contrary to the natural order; but since Linnaeus is the first to have distinguished the natural from an artificial system, he is far from meriting such a reproach. Also whoever examines the [artificial] system sees how relatively certain it is for discovering the names of plants." And p. 59, "The group of imitators of Linnaeus have poorly understood the master and have attributed opinions to him contrary to those he actually held. It is today truly remarkable that those who call themselves Linnaeans are in direct opposition to all the pages of Linnaeus, while Linnaeus and Jussieu were practically in accord on all the principles of the science. Linnaeus was always in favor of the natural system."

Linnaeus' wisdom is a compromise between the unattainable natural and the completed artificial system".

The manuscripts of Linnaeus' student, Fabricius, were issued and edited in 1926 by Schuster [see introductory paragraph of this paper]. In discussing the "chain of nature", Fabricius says:

"Our illustrious preceptor knew how commonly, though erroneously these words were often used, for he was among the first to contend that the affinities of natural objects are many, according to the various relationships observed. Well known is his statement in Phil. Bot. 77: 'Plantae omnes utrinque monstrant, uti Territorium in Mappa geographica'. Should the word 'catena' be employed, it will not be found to be a simple chain, but multiplex and intertwined, and with many free ends which are not connected with other links. On the other hand, the word 'scala' is quite inept. What use I ask, is a ladder, if certain steps are missing, sometimes so many that you cannot make the jump to the succeeding ones? or if after a few steps there may be a huge hiatus to be ascended? Certainly I would not wish to use such a ladder. More apt is the idea of a reticulum (*retis*) of which the substance is disrupted here and there at random. Or to speak without metaphor: into continuous families many plants are joined, each of which has the lineaments of the family, but is otherwise distinguished from the other, as men of the same family in face, stature and approach. Those which are more similar are placed closer to one another, as tribes are joined from families . . . But there are families, in plants as in humans, in which the connection can be seen only as a probability or not at all. Here the network is broken; there it is continuous. The most apt comparison is with a geographic map, where the families of the first group form provinces in their own right, the middle group (which constitute most of the reticulum) form boundaries with these, and those which do not directly cohere form islands. Upon this idea the table has been constructed". [Cf. the appended chart from Giseke's "Praelectiones"][63]. . . .

"Thus, let it be supposed that the mystery of creation was being investigated, and a method imitating nature could be found. Who then seeks the natural method 1) forms *genera*, and these *natural;* 2) having formed these, he examines their convergences and affinities, and then will come the idea of order. For no one will say that Zea and Poa, for example, are of the same genus, though he sees that they are related. He therefore concludes that they are diverse genera of the same order.

"If this method is really natural, the affinities of genera and orders should appear among themselves; thus the natural method should be set up so that the genus or order should be intermediate to the preceding or following genus or order with which it coheres; in this way the chain arises. But such a method cannot be easily shown; for genera are lacking which

[63] Cf. Sprengel, K., Geschichte der Botanik 2: 242. 1818: "Finally Linnaeus appears to have occupied himself studiously with the Natural Method. At least this is shown by his 'Vorlesungen' on the natural families, which he held at his country place, Hammarby, until 1771. (Praelectiones in Ordines Naturales, ed. Giseke, Hamburg 1792)."
See also Sprengel's editions (1809) of *Philosophia Botanica*, Sect. 77: "Fragmenta, quae Linnaeus proposuit, in Praelectionibus a Gisekio editis, haec sunt".

have not yet been detected, which cause a hiatus and a defect in the natural chain, so that order at times may seem to be lacking. Hence anomalies arise, which have an uncertain place in the natural system. But the natural method, though best, cannot be easily discovered; therefore the artificial is to be sought, so that genera can without difficulty be located and distinguished".

The accompanying chart (pl. 991) of the Linnaean natural orders has an ingenuity equal to the phylogenetic charts of the present day, though it bears the inscription, "Tabula genealogico-geographica Affinitatum Plantarum secundum Ordines Naturales Linnaei delinavit Paulus Dietericus Giseke, 1789". The explanation is given on p. 623 of Giseke's "Praelectiones", of which fragments (in translated form) are included here:

"There are provinces (of circles) of which some are merely neighbors while others are contiguous, which I have tried to indicate as clearly as possible. When circles are closely assembled they usually, but not always, indicate neighboring provinces. Thus the first 13 orders are not only as Monocotyledons more closely related to one another than to others, but furthermore even by genera themselves, which are inscribed at the periphery. One of these, the *Palmae*, is related to the Acotyledons; another, the Filices, through *Equisetum*, is related to the *Amentaceae* and *Coniferae*. Thus they are not only neighboring but contiguous. The *Hesperideae* and *Preciae* [*Primula*, etc.] are closely related, but there is no intermediate genus by which they can really be joined. The *Aggregatae*, with seeds solitary and naked, approach the Compositae. . . From the *Compositae* recedes the order of *Umbellatae*, with two naked seeds, but only in degree does it differ in inflorescence (cf. *Eryngium*) . . . Finally, from the *Compositae* the *Columniferae* are not so greatly removed, in the character of the solitary seeds . . . This is the plan of affinity, or GENEALOGY.

"As to the GEOGRAPHIC nexus, the provinces of the Monocotyledons (I–XIII) are sufficiently close. But others are much more distant than can be expressed in the plate. From the *Personatae* to the *Tricoccae* the distance is greater than the map shows. The former probably touch the *Luridae* from which the *Campanaceae* are removed, for there is similarity in the corolla of certain plants (e. g. *Datura* and *Convolvulus*), the number of stamens and pistils, and the similar fruit. With some others, *Campanula lactescens* might seem to make a transition to the *Contortae*. Though many *Tricoccae* have milky juice, none can be combined [with the *Campanaceae*] by means of the fruit. For Linnaeus did not wish to build orders on qualities. Thus there are islands . . . but none of the islands is more remote from other provinces or other islands than the *Siliquosae*. . .

"Finally, as to the amplitude these provinces of islands attain, I have taken the proportion that the number of genera in any order should be a third of the radius of the circle (at the time the map was drawn in 1789, not as in the exposition of orders, in which many new genera from the recent *Genera Plantarum* Linn., ed. Schreber, were added) . . . Thus in the *Stellatae* there are 25 genera, a third of which is 8; therefore the radius [one-half the diameter] should be four lines long. But if this is carried out in the smaller orders (as those of 10 or 7 genera) the names could not be written in or read, and the radius has been made larger. Such are inscribed with an asterisk. If made on the same scale, the *Compositae* would have taken the whole page, so the proportions are there reduced.

". . . Order XVI is not in the table, because the genera are so few . . . Nor are there any in LIV, of which I did not at all understand the inscription *Miscellanea* until I heard Linnaeus . . . Thus he explained to me: 'Whoever has seen Sarracenia in flower does not question its close affinity with Nymphaea, but at what place can both be put?' I responded that I would associate it with Papaver, on account of the similarity of the stigma of Nymphaea. He replied that he would concede that point, but that plants were lacking which would properly join with the rest of the parts".

The transitional genera between orders are written in fine script on the plate. The orders on the plate, together with the number of genera in each order, the connecting genera and the orders which they connect, are enumerated below:

I. Palmae 10
  Nipa—Filices
  Hydrocharis—Tripetaloideae
II. Piperitae 10
  Acorus—Tripetaloideae
III. Calamariae 12
  Carex—Gramineae
  Scirpus & Schoenus—Tripetaloideae
IV. Graminae 54
  Cenchrus & Cynosurus—Calamariae
V. Tripetaloideae 8
  Butomus—Palmae
  Sagittaria—Ensatae
  Juncus—Calamaria
VI. Ensatae 10
  Ixia—Tripetaloideae
  Crocus—Spathaceae
  Gladiolus—Orchideae
  Iris—Coronariae
VII. Orchideae 11
  Serapis—Ensatae
VIII. Scitamineae 13
IX. Spathaceae 12
  Colchicum—Ensatae
  Erythronium—Coronariae
X. Coronariae 20
  Lilium & Martagon—Ensatae
  Tulipa—Spathaceae
  Amaryllis—Sarmentaceae
XI. Sarmentaceae 21
  Alstroemeria—Coronariae
XII. Oleraceae 36
XIII. Succulentae 29
  Sedum
XIV. Gruinales 14
  Linum—Caryophylleae
XV. Inundatae 10
XVI. Lacking (see note)
XVII. Calycanthaceae 17
  Rhexia—Bicornes
XVIII. Bicornes 23
  Kalmia—Calycanthemae
XIX. Hesperideae 19
XX. Rotaceae 14
XXI. Preceae 12
XXII. Caryophylleae 31
  Lychnis—Gruinales
XXIII. Trihalatae 13
XXIV. Corydales 10
  Fumaria—Rhoeadeae
XXV. Putamineae 8
  Capparis—Rhoeadeae
XXVI. Multisiliquae 24
  Trollius—Rhoeadeae
XXVII. Rhoeadeae 6
  Chelidonium—Corydales
  Sanguinaria—Fumarineae
  Podophyllum—Multisiliquae
XXVIII. Luridae 19
  Pedalium & Datura—Personatae
XXIX. Campanaceae 15
  Lobelia—Contortae
XXX. Contortae 25
XXXI. Asperulae 10
XXXII. Papilionaceae 55
XXXIII. Lomentaceae 10

XXXIV. Cucurbitaceae 12
XXXV. Senticosae 12
XXXVI. Pomaceae 10
XXXVII. Columniferae 43
XXXVIII. Tricoccae 35
XXXIX. Siliquosae 31
XL. Personatae 63
Martynia & Barleria—Luridae
XLI. Asperifoliae 21
XLII. Verticillatae 39
XLIII. Dumosae 19
XLIV. Sepiariae 9
XLV. Umbellatae 50
Sium & Ninsi—Hederaceae
XLVI. Hederaceae 7
Panax—Umbelliferae
XLVII. Stellatae 25
Phyllis—Umbelliferae
XLVIII. Aggregatae 30
Dipsacus & Globularia—Compositae
XLIX. Compositae 120
Capitatae
Sphaeranthus & Echinops—Aggregatae
L. Amentaceae 14
Casuarina—Filices
Betula—Coniferae
LI. Coniferae 7
Cupressus—Amentaceae
LII. Coadunatae 8
LIII. Scabridae 12
LIV. Miscellaneae
LV. Filices 18
Zamia & Cycas—Palmae
Osmunda regalis—Musci
LVI. Musci 10
Lycopodium clavatum—Filices
Hypnum—Algae
LVII. Algae 12
Jungermannia—Muscae
Marchantia & Tremella—Fungi
LVIII. Fungi 11
Agaricus & Peziza—Algae

With this brief account of the Natural Method of Linnaeus, it may be of interest in the nature of a review to insert here what were the last words of Linnaeus on botanical method—the preface to the Second Mantissa, dated September 1, 1771.

"In the twilight of my life I am assembling some scattered accounts and unrecorded observations to add to the First Mantissa. I have emended some *differentia specifica*, where I have seen better or living specimens . . . Dubious synonyms, formerly admitted, I have often excluded here; for not in many synonyms, but in true specific differentiations lies the strength of the art. The new species of many authors I would gladly have inserted, if the essential characters had been included, but with these lacking I was obliged to omit plants which I had not seen myself. Some botanists talk loudly about the *Natural Orders* in place of a method, but so long as there is no essential character of an order, by which the genera can be combined or distinguished from those of different orders, these orders remain as a bell without a clapper. However, their use in other respects may be of the greatest importance.

"If anyone after my time should publish my *Systema*, *Genera*, or *Species*, I beg him to insert in its proper place, each of the plants that I have noted in the Mantissae, Systema, and the various appendices. If he should wish descriptions of species he will find them in *Hortus Cliffortianus* and *Hortus Upsaliensis*, in *Flora Suecica* and *Flora Zeylanica*, in the *Amoenitates* and in my *Travels*".

## Resumé

Not until Redi had disposed of the doctrine of spontaneous generation, and Harvey had shown the continuity of life from the egg, was it possible to place species on a firm basis, i. e., immutability, and to observe that "there are as many species as were created in the beginning". The doctrine of immutability of species from the beginning was to give way later in Linnaeus' life to the idea that existing genera and species had been derived by the crossing or hybridization of a few created forms. As early as 1733, Linnaeus had outlines of his chief botanical works: Bibliographia Botanica, Philosophia Botanica, Genera Plantarum and Species Plantarum. The last-named work (1753), the basis of modern nomenclature, may be looked upon as a revision of Bauhin's "Pinax" in which the unit of classification was to be the *species;* whereas in Bauhin's work the *genus* was the unit of classification. Binomial nomenclature, as used in Species Plantarum, consisted of the *genus* and a *trivial* name, the binomial to be used as a supplement to (but not a replacement of) the polynomial specific name. Treatment of the genus (*Genera Plantarum*) was in three stages of amplification: 1) the *natural character*, essentially a description; 2) the *factitious character*, a few notae sufficient to distinguish genera in an artificial order; and 3) the *essential character*, a single unusual character sufficient for recognition. The goal, as in modern times, was to find the *character essentialis.* At the time of publication of "Species Plantarum", both genera and species were considered by Linnaeus to be "natural"; i. e., they were created units, and it was the duty of man to group together those species which belonged to a genus. According to Linnaeus: "*All genera and species are natural:* unless this principle is assumed there can be no soundness in the art". This point of view was strongly opposed by Lamarck who considered all genera as artificial.

As Spring and others have pointed out, most of our genera are not natural units; but merely represent a stage of classification above that of the species. Nor did the doctrine of descent with modifications of Lamarck and of Darwin ease the Genus problem, since it introduced the additional element of time into a system which had been preeminently concerned with the nomenclature of plants and animals as they are distributed in space. To this problem of the Genus, Linnaeus seems to have given a good answer: "The limits of a genus cannot be determined until all the species of the genus are known". In the author's opinion, the attempt to make all genera "natural", without some conventional limitations, would be destructive to nomenclature, which is built up primarily on a basis of history and usage.

"The Ariadnean thread of the systematists terminated in Genera, but I have attempted to extend it so far as Species, for which I have made proper differentiae". As in the treatment of the Genus, there was also a threefold aspect of technical delimitation: 1) The *Descriptio*, or *character naturalis;* 2) the *Nomen Specificum*, or polynonial phrase-name, based on differentiae taken from the *Descriptio;* 3) *Nomen specificum essentiale*, in which only a single character (*nota*) was present, and which constituted the goal of differentiation in species; but most Linnaean specific names remained in the *synoptic* stage, where several characters (*notae*) were still required for differentiation. The trivial name was placed "in the margin" in *Species Plantarum.*

The polynomial phrase name (specific name) required changes when it was converted from a synoptic to an essential name; also changes were usually necessary in adjacent specific names when a new species was introduced into the genus, in order to balance the differentiae; new specific names were required when pre-Linnaean and other specific names without differentiae were introduced into the Linnaean system. These older specific names became synonyms.

The Linnaean species appears to have been an aggregate of the synonyms, illustrations, herbarium specimens and living plants noted in the gardens at Upsala and elsewhere. All synonyms seem to have been of equal value, since "by any synonym you can know the species". The Linnaean species, therefore, included all material encompassed by the specific name. Distinctions were not so closely drawn as at the present day, and in general each Linnaean species consisted of several species, as delimited by modern consensus. Illustrations played a large part in Linnaean procedure. Specimens were placed in the herbarium as representative of the species, but were frequently discarded or replaced. Selection of a representative element for each Linnaean species, would seem largely dependent on usage.

The Linnaean natural system as it was conveyed to his student, Gieseke, is shown in graphic form, with explanations.

The writer is greatly indebted to Mr. C. A. Weatherby for a number of suggestions made after reading the manuscript, and to Mr. W. L. Dix for his help in translating the Latin of the preface of Roemer & Schultes' *Systema.*

Brooklyn Botanic Garden

Chrysanthemum uliginosum Pers. adventive in Quebec.—Late in the season of 1939, while botanizing in a once-abandoned cow-field in Lachine, a suburb of Montreal, the author came upon what first struck him as an odd, if not extremely robust, form of the "ox-eye daisy". The short-stalked flowers, which occasionally were severally grouped together, though somewhat larger, closely resembled those of the weed species of the genus *Chrysanthemum.* At the same time, however, it was striking to observe that in the older heads, the yellow ray-flowers had turned dark brown. The erect, shoulder-high stems were well covered with light green foliage, the long-lanceolate, acutely-pointed leaves of which were regularly as well as sharply toothed. Owing to the author's unfamiliarity with the following variety, it was originally determined as *Chrysanthemum Leucanthemum* var. *pinnatifidum* Lecoq & Lamotte. A comparison, last summer, with the various species of *Chrysanthemum* grown here at the Montreal Botanical Garden, revealed that the material on hand was good *C. uliginosum* Pers., which some botanists keep in a genus apart, *Pyrethrum.* Dr. L. H. Bailey's observation (Standard Cyclopedia of Horticulture **1:** 758. 1939) that this native Hungarian species "deserves a greater popularity" increases the interest in this plant as a garden escape.

This may be the first record for Quebec though it is not the first time that the giant daisy has been mentioned as having become established outside of a garden. Last November, Mr. C. A. Weatherby informed the writer by letter that there was but a single American specimen of the species at the Gray Herbarium. It bears the data: "A plant on roadside with *Boltonia asteroides*, probably dumped, Lenox, Berkshire Co., Massachusetts, Sept. 9, 1919, R. Hoffmann". He also mentioned that two localities in Connecticut, New London and Woodbridge, were given in the paper on "Additions to the Connecticut Flora" (Bull. Conn. Nat. Hist. Survey **48:** 90. 1931).

Dr. G. L. Wittrock, Custodian of the Herbarium, states that no specimen of *C. uliginosum* collected in the field is housed at the New York Botanical Garden.

The giant daisy has not spread elsewhere in Lachine but has remained localized in the spot where the author first collected it on October 9, 1939. It now seems firmly well established in a moist depression in this cow-pasture, growing along with *Ranunculus acris* L., *Galium palustre* L., *Scirpus atrovirens* var. *georgianus* f. *viviparus* Vict. together with some other plants less exacting in habitat-requirements, such as *Pastinaca sativa* L., *Lithospermum officinale* L., *Solidago rugosa* Mill. and *S. canadensis* L. It now forms an almost perfectly circular patch, some six feet in diameter, with the number of plants densest about the circumference and gradually thinning out towards the center. The plant, in all likelihood, may merely have been dumped there.

The original collection has been deposited with the Herbier de l'Institut Botanique de l'Université de Montréal. Duplicates of material collected on a subsequent trip to the station on September 28, 1943, have been forwarded to the Gray Herbarium of Harvard University for checking.

The author desires to express his sincere thanks to Messrs. Weatherby and Wittrock for their generous assistance, as well as to Mr. Marcel Raymond, of the Montreal Botanical Garden, for several valuable suggestions.—James Kucyniak, Montreal Botanical Garden.

---

Chamaedaphne calyculata (L.) Moench, var. **latifolia** (Ait.), comb. nov. *Andromeda calyculata,* β *latifolia* Ait. Hort. Kew. ii. 70 (1789).

Typical Eurasian *Chamaedaphne calyculata* has the oblong to oblong-lanceolate leaves mostly 2.5–5 cm. long, about one third as wide, its calyx-segments broadly deltoid-lanceolate to narrowly deltoid-ovate and acuminate or nearly so, these a third to half as long as the urceolate corolla. The common North American shrub, similar to the Eurasian and up to 1 m. or more high, has the leaves one fourth to two fifths as broad as long, the acute calyx-segments about one third as long as the nearly cylindric corolla. This is var. *angustifolia* (Ait.) Rehder.

Var. *latifolia* was described by Aiton:

> β corollis oblongo-cylindricis, foliis oblongo-ovalibus obtusis . . . *Nat.* . . . of Newfoundland.

All the specimens from Labrador and most of the many collections from Newfoundland have the oblong or oblong-elliptical leaves broadly rounded at summit and only 1–3 cm. long, only about twice as long as broad. Furthermore, the calyx-segments are broad- to roundish-ovate and blunt, often quite obtuse. This shrub, often depressed and down to only 1 dm. high (up to 6 dm.), is clearly what Aiton had. It occurs from the Labrador Peninsula south, somewhat locally, to Nova Scotia and northern New England, the commoner shrub of the latter regions being var. *angustifolia*.

It is probable that *Chamaedaphne calyculata*, var. *latifolia* is *C. calyculata*, var. *nana* (Lodd.) Rehder in Bailey, Stand. Cycl. Hort. ii. 732 (1914). However, *Andromeda calyculata* β *latifolia* Ait. (1789) greatly antedates *Andromeda calyculata nana* Lodd. Bot. Cab. ix. no. 862 (1824); and Loddiges, although giving a good plate, had no description which can be taken as diagnostic. Instead he wandered over the subject, including a sermon, without getting down to a concrete description:

> This neat little variety is a native of North America: it is evergreen, and seldom grows above half a foot from the ground. It flowers with us in the month of March, being one of the earliest shrubby plants that we are acquainted with.
>
> It is quite hardy, and may be increased by layers, thriving best planted in a mixture of peat earth and loam in a border. Care should be taken to place such dwarf plants in situations where they may be seen to advantage. It is thus even in matters of far greater importance, and such as are connected with our highest interests, for (to use the words of an excellent writer,) 'Much of the credit and comfort of Christianity is lost in consequence of its professors fixing their aims too low, and not conceiving of their high and holy calling in so elevated and sublime a view as the nature of religion would require, and the word of God would direct.'

M. L. Fernald

---

A new Form of Campanula from Minnesota.—Campanula rotundifolia L. var. intercedens (Witasek) Farw. forma **cleistocodona,** f. nov., flores erecti, steriles; corollae inflatae, clausae.—Minnesota: a colony restricted to a single fissure of diabase, southwest end of Beaver Island in Lake Superior, 2 mi. east of Beaver Bay, Lake Co., Aug. 14, 1944, *Lakela* no. 5777 (type in Univ. Minn. Herb.) Lab. grown spec. no. 6133.

The form herewith described appears to be a natural clone capable of maintaining itself by vegetative propagation. Moreover, it differs from the typical form by erect, sterile flowers, inflated corollas closed at the mouths.

To confirm field observations of its flowering habit by experimental study, the writer collected from the fissure on Beaver Island young plants with basal leaves on May 26, 1945. The potted plants grown under laboratory conditions showed notable vigor. During the period of anthesis, from the latter part of June till the middle of Sept., over fifty flowers were produced by the six plants. Not one of the flowers opened its corolla-lobes.

In about a month the first formed flower-buds were as large as those of the typical form at the time of the opening of the corolla-lobes. In the typical form, also grown under laboratory conditions, the lobes expand while the limb of the corolla is still plaited in at the sinuses, exposing the dehiscing anthers and the elongating style. In the clone, the anthers dehisced within the closed corollas, coating the styles with copious pollen. At this time nectar was notable. Then the corollas gradually inflated into pyriform balloons within which the stigmas matured but the styles failed to elongate. At that time the pollen was post-mature. Without deflation the corollas dried up on infertile withering ovaries.

The laboratory observations are in full accord with those of the field study at the time of the discovery of the colony and three later collecting trips. In the particular crevice, the *Campanula* with erect, air-filled, balloon-form flowers presented a startling contrast with the typical form, growing in abundant clusters in the adjacent crevices of the same rock ledge. The colony was last observed on Sept. 6, 1945. The fissure was well filled with stolons and basal leaves; in post-anthesis the withered but inflated bells were fruitless.

In drying the specimens at least some of the flowers popped open from pressure; on boiling the pressed specimens open.—Olga Lakela, Duluth State Teachers College, Minnesota.

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FIG. 2. N. SINUATA growing at the base of a rocky ledge

FIG. 1. Three fronds, one large, NOTHOLAENA SINUATA; two small, N. SINUATA, var. COCHISENSIS

# Rhodora

JOURNAL OF

## THE NEW ENGLAND BOTANICAL CLUB

**Vol. 47. December, 1945. No. 564.**

## A COMPARISON OF THE TOXICITY OF NOTHOLAENA SINUATA AND N. SINUATA VAR. COCHISENSIS*

Frank P. Mathews

Data on the toxicity of a fern for cattle, sheep, and goats were presented in a previous publication under the title of *Notholaena sinuata*, var. *crenata* (Texas Agricultural Experiment Station Bulletin No. 611, 1942). Quite recently it was called to our attention that the nomenclature employed in that publication was erroneous and that the correct designation for the plant should have been *N. sinuata*, var. *cochisensis*. Therefore, the correct nomenclature is employed in this publication.

Both the species and the variety are common plants in the Trans-Pecos area of Texas, but as a rule they do not occur with equal abundance in the same locality. On the limestone hills and mountains of this area the variety is the more abundant of the two plants, while on the Davis Mountains, which are of igneous rock formation, the opposite condition prevails. Proof of the toxicity of the variety determined the cause of serious sheep losses in many limestone areas but left the status of the species in doubt. Information concerning the toxicity of the species was desired in view of the fact that there has been a gradual extension of the sheep industry into the Davis Mountains, where this plant is often found in considerable abundance.

* Approved for publication as Technical Contribution no. 906 from the Texas Agricultural Experiment Station by C. H. McDowell, Acting Director, and G. B. Winstead, Director of Information and College Publication. Prepared in cooperation with the United States Department of Agriculture, Bureau of Animal Industry, Agricultural Research Administration, Washington, D. C.

For exact information a comparison of the toxicity of the two plants growing in the same soil formation was desired. With this in view a place was selected in the Davis Mountains near Alpine, where both plants could be found in sufficient quantities to feed to experimental animals. This locality consisted of but a few acres with uniform soil conditions throughout, thus eliminating the factor of different soil formations which must be considered in an experiment of this nature. For the past four years both plants have been gathered in this locality and fed to both sheep and goats in both green and dry state. The results of the feeding tests are summarized in the accompanying table.

The Results of Feeding Ferns to Sheep and Goats

| No. | Animal weight lbs. | Total lbs. fed | Per cent body wt. | Days fed | Results |
|---|---|---|---|---|---|
| | | N. sinuata (Lag. ex Sw.) Kaulf. | | | |
| S163 | 70 | 6.3 | 9.0 | 9 | No ill effects |
| S169 | 55 | 4.5 | 8.1 | 6 | No ill effects |
| S170 | 65 | 6.4 | 9.8 | 8 | No ill effects |
| S139 | 70 | 8.4 | 12.0 | 8 | No ill effects |
| S142 | 73 | 4.8 | 6.5 | 8 | No ill effects |
| S169 | 55 | 7.0 | 12.7 | 7 | No ill effects |
| S176 | 83 | 8.3 | 10.0 | 6 | No ill effects |
| G92 | 70 | 5.6 | 8.0 | 8 | No ill effects |
| G2879 | 50 | 6.0 | 12.0 | 6 | No ill effects |
| | | N. sinuata var. cochisensis (Goodding) Weath. | | | |
| S170 | 65 | 1.8 | 2.7 | 3 | Marked toxic effects |
| S142 | 73 | 0.6 | 0.82 | 2 | Marked toxic effects |
| S169 | 55 | 0.9 | 1.63 | 3 | Marked toxic effects |
| S176 | 85 | 1.5 | 1.78 | 3 | Marked toxic effects |
| G2879 | 50 | 1.5 | 3.0 | 3 | Marked toxic effects |

A total of seven sheep and two goats were fed *N. sinuata* for periods of 6 to 9 days. The total amounts of the plant fed during these periods varied from 6.5 to 12.7 per cent of the body-weights of the animals. No evidence of toxic effects were observed. On the other hand the variety *cochisensis* produced marked toxic effects in four of these animals with the largest dose equivalent to 3 per cent and the smallest 0.82 per cent of the body-weight, after a feeding period of but 2 to 3 days. The largest dose was probably in excess of the minimum amount which would have been required to produce toxic effects as numerous feeding tests with the variety have shown that one per cent of the body-weight constitutes a toxic dose for both sheep and goats. The plan adopted was to feed the species to two animals and the variety to a third animal at the same time. The feeding of the latter plant was discontinued as soon as toxic effects appeared but the feeding of the species was continued until comparatively large amounts had been administered. Since no evidence of ill effects could be detected as a result of feeding the species, part of the animals which received this plant were later fed the variety in order to test the susceptibility of these animals, a procedure that was not required from past experience, as we have never found a sheep or goat which is resistant to the toxic principle in var. *cochisensis*. The results of the experimental feeding are in accord with limited field observations which have disclosed no reason for suspecting *N. sinuata* of being poisonous for livestock.

In view of the fact that the two plants occur in the same soil formation, that one is toxic and the other is not, that the two plants can be readily differentiated, the present classification is certainly inadequate. The gulf between these two plants should provide sufficient reason for classifying var. *cochisensis* as a species rather than a variety.

Loco Weed Laboratory, Texas Agricultural Experiment Station, A. and M. College of Texas, Alpine, Texas.

---

A handy Guide to Aquatic and Marsh Vegetation.—A number of sumptuously illustrated and extensive volumes on aquatic and marsh plants have recently been published. These hardly demand comment here. A more modest study, with every indication of care in its preparation and up-to-date understanding of the plants is the pamphlet by Moyle and Hotchkiss on such plants of Minnesota.[1] As said, this study shows every indication that the authors have taken pains to check on the latest studies of the plants they discuss; only in two or three cases have they missed recent revisions. Their keys are clear and interesting, the drawings simple and readily recognizable, the text instructive and authoritative. The state of Minnesota is to be congratulated upon the production of so unpretentious and accurate a bulletin.—M. L. F.

[1] Moyle, John B., and Neil Hotchkiss. Aquatic and Marsh Vegetation of Minnesota and its Value to Waterfowl. Minn. Dept. Conservation, Technical Bull. no. 1. 122 pp., many illustrations, keys, etc. 1945.

# NOTES ON THE COMPOSITAE OF THE NORTH-EASTERN UNITED STATES. II. HELIANTHEAE AND HELENIEAE

Arthur Cronquist

The first paper of this series appeared in Rhodora **47**: 182–184. 1945.

Ambrosia trifida L. var. **trifida,** nom. nov. *A. trifida* L. Sp. Pl. 987. 1753, sens. strict.

Bidens vulgata Greene var. **vulgata,** nom. nov. *B. vulgata* Greene, Pitt. **4**: 72. 1899, sens. strict.

The North American species of *Coreopsis* with yellow rays, greatly reduced upper leaves, and fimbriate or pectinately toothed achaenial wings were treated by Asa Gray as two species, *C. gladiata* Walt., with alternate, elongate, and relatively broad leaves, and *C. angustifolia* Ait., with mostly opposite, shorter, and relatively narrow leaves. Some other names which have been applied to plants of this group are *C. linifolia* Nutt., *C. longifolia* Small, *C. falcata* Boynton, *C. oniscicarpa* Fern., and *C. oniscicarpa* var. *simulans* Fern. In general these plants may be sorted into the groups made out by Gray, but there are so many intermediates that it seems unwise to maintain them as distinct species. There has been some doubt as to the identity of *C. angustifolia,* Sherff (Field Mus. Pub. Bot. **11**: 407. 1936) considering it to have narrow but elongate and alternate leaves. Nuttall's name *C. linifolia* has been taken up by Sherff and others for the plant with small and narrow opposite leaves. The only varietal name thus far used in the group is *C. oniscicarpa* var. *simulans,* applied to a plant with broad opposite leaves, thus squarely between the two main intraspecific groups. Just as a binomial applied to an intraspecific hybrid need not be used for either of the parents, so, I believe, the var. *simulans* need not be taken up for either of the two varieties between which it stands. Plants of this alliance, as I understand them, may be treated as follows:

Coreopsis gladiata Walt. var. **gladiata,** nom. nov. *C. gladiata* Walt. Fl. Carol. 215. 1788, sens. strict. Leaves all or nearly all alternate, the lower ones greatly elongate, mostly 1–3.5 cm. wide; stem mostly terete.

Coreopsis gladiata Walt. var. **linifolia** (Nutt.) comb. nov. *C. linifolia* Nutt. Journ. Acad. Philad. **7**: 75. 1834. Leaves (or at least the middle and upper ones) mostly or all opposite, the lower ones not greatly elongate, mostly 0.3–1 cm. wide; stem tending to be quadrangular.

The rays of var. *gladiata* average a little longer than those of var. *linifolia*, as noted by Gray, but the difference is entirely inconstant and not at all to be depended on. The differences which have been noted by various students in the size and shape of the involucral bracts, and size of the achenes and their wings, seem to me too variable to be of much assistance. No difference in the range of the two varieties can be discerned from our specimens and the previous treatments.

Coreopsis lanceolata L. var. **lanceolata,** nom. nov. *C. lanceolata* L. Sp. Pl. 908. 1753, sens. strict.
Coreopsis major Walt. var. **major,** nom. nov. *C. major* Walt. Fl. Carol. 214. 1788, sens. strict.

*Echinacea laevigata* (Boynton & Beadle) Blake is a rare plant that differs from *E. purpurea* in being glabrous throughout. Its range is almost entirely included within that of *E. purpurea*, but is much more restricted. *E. purpurea* ordinarily has both the stem and the leaves conspicuously hirsute, but individuals with the stem essentially glabrous are not uncommon. A specimen in the herbarium of the New York Botanical Garden (*Murrill s. n.*, Lynchburg, Va.), annotated *E. laevigata* by Sharp, has the upper surface of the leaves short-hirsute, but is otherwise essentially glabrous. In the absence of any other distinguishing feature, *E. laevigata* can scarcely stand as a species.

Echinacea purpurea Moench var. **purpurea,** nom. nov. *E. purpurea* Moench, Meth. Pl. 591. 1794, sens. strict.
Echinacea purpurea Moench var. **laevigata** (Boynton & Beadle), comb. nov. *Brauneria laevigata* Boynton & Beadle in Small, Fl. S. E. U. S. 1261. 1903.

*Echinacea atrorubens* Nutt., described from Arkansas, is represented in the herbarium of the New York Botanical Garden by specimens from Oklahoma and Texas. A tracing of part of the type collection, with detailed drawings of certain parts, is also on deposit. *E. paradoxa* (Norton) Britton & Brown is represented by several specimens from Missouri and a few from Oklahoma and Texas, and specimens from these states only are cited by Sharp (Ann. Mo. Bot. Gard. **22:** 95. 1935). The ranges of the two species, although not identical, are seen to cover much of the same territory. E. J. Palmer pointed out in 1936 (Rhodora **38:** 197–199) that the two species are very much alike except for the color of the ligules, these being purple in *E. atrorubens*, and yellow in *E. paradoxa.* The two other minor differences which he suggested, the sometimes longer ligules of *E. atrorubens*, and the sometimes wider leaves of *E. paradoxa*, nearly vanish when our specimens are examined. In the absence of any other distinguishing feature, it seems unwise to maintain the two species as distinct.

Echinacea atrorubens Nutt. var. **atrorubens,** nom. nov. *E. atrorubens* Nutt. Trans. Am. Phil. Soc. n. ser. **7:** 354. 1840, sens. strict.

Echinacea atrorubens Nutt. var. **paradoxa** (Norton), comb. nov. *Brauneria paradoxa* Norton, Trans. Acad. Sci. St. Louis **12:** 40. 1902.

It may be noted that *E. atrorubens* has nearly from the first been confused with a southeastern species of *Rudbeckia.* A full and apparently correct discussion was published in 1901 by Boynton & Beadle (Bilt. Bot. Stud. **1:** 11–12), but as late as 1935 Sharp excluded it from *Echinacea* with only the following comment: "Small in 'Flora of the Southeastern United States' . . . included six species, four of which are retained in this monograph, one reduced to a variety, and the sixth being excluded." (Ann. Mo. Bot. Gard. **22:** 85. 1935.)

Dr. Fernald, following Exell (Cat. Vasc. Pl. S. Tome 225. 1944), has recently maintained (Rhodora **47:** 196–7. 1945) that the name *Eclipta alba* (L.) Hassk. must be replaced by *Eclipta prostrata* (L.) L. Linnaeus, in the Species Plantarum, proposed among others two species of *Verbesina, V. alba* and *V. prostrata.* Later (Mant. 286. 1771) he transferred both these species to *Eclipta,* but substituted the epithet *erecta* for *alba,* thus coining the illegitimate name *E. erecta,* a nomenclatural synonym of *Verbesina alba.* Later (in 1848) Hasskarl published the combination *Eclipta alba,* based on *Verbesina alba* L., and indicated that *E. prostrata* might or might not be sufficiently distinct to warrant recognition.

Fernald says "Since *Verbesina alba* L. and *V. prostrata* L. are considered conspecific and are of even date, the first of them taken up must stand. This is *E. prostrata* (L.) L. (1771)". The pertinent statement in Article 56 of the Rules is as follows: "If the names or epithets are of the same date, the author who unites the groups has the right of choosing one of them. The author who first adopts one of them, definitely treating another as a synonym or referring it to a subordinate group, must be followed." Note that the two species were not combined by Linnaeus in the Mantissa. The fact that *prostrata* was the first legitimate epithet to be used in *Eclipta* has no bearing on the matter; the Kew Rule has been repudiated by the International Code. The two epithets, *alba* and *prostrata*, are still of the same date; therefore the first author to unite them definitely under one name or the other must be followed. Hasskarl's treatment, in which he indicated that *E. prostrata* might or might not be distinct from *E. alba*, is not sufficiently definite to fulfill the requirement of Article 56 in setting the precedent. The first definite use of one name to cover both species, so far as I am aware, is that of Miquel, in the Fl. Ind. Bat. 2: 65. 1856[1], where *E. alba* is used and *E. prostrata* relegated to varietal status. This usage, with *E. prostrata* as a variety or synonym of *E. alba*, was adopted successively in Oliver's Flora of Tropical Africa, Hooker's Flora of British India, Martius' Flora Brasiliensis, and Gray's Synoptical Flora of North America, and is in general use today. Unless and until it can be shown that, prior to 1856, some author definitely united *E. prostrata* and *E. alba*, accepting the former epithet and relegating the latter to intraspecific status or synonymy, the name *E. alba* must stand as the proper one.

Helianthus atrorubens L. var. **atrorubens,** nom. nov. *H. atrorubens* L. Sp. Pl. 906. 1753, sens. strict.

Helianthus occidentalis Riddell var. **occidentalis,** nom. nov. *H. occidentalis* Riddell, Suppl. Cat. Ohio Pl. 13. 1836, sens. strict.

Helianthus tuberosus L. var. **tuberosus,** nom. nov. *H. tuberosus* L. Sp. Pl. 905, 1753, sens. strict.

Parthenium integrifolium L. var. **integrifolium,** nom. nov. *P. integrifolium* L. Sp. Pl. 988, 1753, sens. strict.

Parthenium integrifolium L. var. **auriculatum** (Britton) Cornelius in herb., comb. nov. *P. auriculatum* Britton, Ill. Fl. **3:** 521. 1898.

Specimens in the herbarium of the New York Botanical Garden bear Miss Cornelius' label with the heretofore unpub-

[1] I have had the assistance of Dr. M. L. Fernald and Mr. C. A. Weatherby in arriving at this conclusion.

lished combination given above. Since her monograph of the genus *Parthenium* was completed more than 10 years ago, it seems unlikely that publication is now contemplated.

*Polymnia Uvedalia* L. var. *floridana* Blake (Rhodora **19:** 48. 1917) and var. *densipilis* Blake (loc. cit.), both differing from var. *genuina* Blake in having the peduncles spreading-hairy, with few or obscure glands, are now known to be confluent in range, and are distinguished only by the most tenuous of characters. It seems proper to treat them both under the name *P. Uvedalia* L. var. *densipilis* Blake.

A considerable number of specific and varietal names has been proposed for the Rudbeckias in our area having the leaves entire or merely toothed, the receptacular bracts glabrous or ciliate, the style-appendages short, and the pappus evident. Among these names are *R. fulgida*, *R. spathulata*, *R. speciosa*, *R. Sullivantii*, *R. palustris*, *R. missouriensis*, *R. umbrosa*, and *R. Deamii*. While plants of this group show a great deal of variation in size and shape of the leaves, amount and orientation of pubescence, and length of rays, the variation seems to be essentially continuous. The oldest name, *R. fulgida* Ait., must therefore stand for the entire group. Four varieties, showing considerable intergradation, may be recognized in our range.

Rudbeckia fulgida Ait. var. **Sullivantii** (Boynton & Beadle), comb. nov. *R. Sullivantii* Boynton & Beadle, Bilt. Bot. Stud. **1:** 15. 1901. *R. speciosa* var. *Sullivantii* Robinson, Rhodora **10:** 68. 1908. *R. speciosa* Wenderoth, Ind. Sem. Hort. Marb. 1828. Rays mostly 2.5–4 cm. long; leaves usually sharply toothed, commonly but not always relatively broad and only sparsely or moderately pubescent; involucral bracts mostly glabrous or strigose. Mostly in moist places; Mich. to Mo. and W. Va., and perhaps southward.

Rudbeckia fulgida Ait. var. **umbrosa** (Boynton & Beadle), comb. nov. *R. umbrosa* Boynton & Beadle, Bilt. Bot. Stud. **1:** 16. 1901. Rays mostly 1–2.5 cm. long; leaves not very sharply toothed, the cauline ones mostly ovate or broader and abruptly contracted to the wingless or narrowly winged petioles; herbage mostly only sparsely hairy; involucre mostly glabrous or strigose. Moist woodlands; Ky. to Tenn. and Ga.

Rudbeckia fulgida Ait. var. **fulgida,** nom. nov. *R. fulgida* Ait. Hort. Kew. **3:** 251. 1789, sens. strict. Rays mostly 1–2.5 cm. long, leaves mostly denticulate or subentire, the cauline mostly narrower than ovate and sessile or merely narrowed to winged petioles or petioliform bases, nearly always at least some of them over 2 cm. wide; herbage usually only sparsely or moderately pubescent; involucral bracts mostly glabrous or strigose. Mostly in woodlands, but sometimes in drier or boggy places; Pa. to Ohio, Ind., Mo., and southward.

Rudbeckia fulgida Ait. var. **missouriensis** (Engelm.), comb. nov. *R. missouriensis* Engelm. ex Boynton & Beadle, Bilt. Bot. Stud. **1:** 17. 1901. Rays mostly 1–2.5 cm. long; leaves denticulate or subentire, narrow, even the basal ones rarely over 2 cm. wide; involucral bracts mostly spreading-hirsute; herbage densely spreading-hirsute. Mostly in dry open places; Mo. to Tex.

Rudbeckia laciniata L. var. **laciniata,** nom. nov. *R. laciniata* L. Sp. Pl. 906. 1753, sens. strict.

Rudbeckia triloba L. var. **triloba,** nom. nov. *R. triloba* L. Sp. Pl. 907. 1753, sens. strict.

*Rudbeckia alismaefolia* T. & G. apparently differs from *R. grandiflora* Gmel. only in being less pubescent and in having usually more obtuse leaves. The two are habitally very much alike, and intermediates may be found. The necessary combinations follow.

Rudbeckia grandiflora Gmel. var. **grandiflora,** nom. nov. *R. grandiflora* Gmel. ex DC. Prodr. **5:** 556. 1836, sens. strict.

Rudbeckia grandiflora Gmel. var. **alismaefolia** (T. & G.), comb. nov. *R. alismaefolia* T. & G. Fl. N. Am. **2:** 310. 1841.

Silphium integrifolium Michx. var. **integrifolium,** nom. nov. *S. integrifolium* Michx. Fl. Bor. Am. **2:** 146. 1803, sens. strict.

Silphium trifoliatum L. var. **trifoliatum,** nom. nov. *S. trifoliatum* L. Sp. Pl. 920. 1753, sens. strict.

The genus *Verbesina* of Linnaeus included plants now referred to several distinct genera, and there has been some question to which of these the name should be applied. According to the list of proposed type species of Linnaean genera, as printed in the currently available edition of the International Rules, *V. alata* should be accepted as the type. This is in accordance with the treatments of Bentham, Hoffman, and Gray, and may well be adhered to. In the Genera Plantarum, Bentham separated *Actinomeris* Nutt., with 9 species, from *Verbesina* on the basis of its neutral rather than pistillate rays, noting that in habit and other features the two groups were very similar. It is now well known that several species of *Verbesina* may either lack or possess the style, however. Hoffman, and most American botanists, have maintained *Actinomeris* (or one of its synonyms, such as *Ridan*) for two species with squarrosely spreading achenes and relatively few and soon deflexed involucral bracts. The type species of *Verbesina*, however, frequently has distinctly squarrose-spreading achenes, and the difference in the involucres is neither very great nor sharply defined. In view of the general habital similarity of the groups, their admittedly close relationship, and the absence of any well-marked differentiating character, it seems pointless to maintain the separation. *Actinomeris* Nutt. should be considered an integral part of *Verbesina* L. No new combinations are required. It may be noted that the combination *V. alternifolia* (L.) Britt., which appeared as a nomen nudum in Bull. Torrey Bot. Club **20:** 485. 1893, was validated by Mohr in Contr. U. S. Nat. Herb. **6:** 804. 1901.

The determination of species of *Xanthium* has become a formidable task, undertaken by many botanists only when it becomes unavoidable, and then with serious misgivings. More than 20 species are reputed to occur in North America. I am convinced that the only proper way out of the difficulty is that suggested by Wiegand in the Flora of the Cayuga Lake Basin. ("Several years ago I undertook a revision of the American Xanthiums, making use of the material in the Gray Herbarium. After a prolonged but unsuccessful effort to prepare a satisfactory treatment, the problem was laid aside. I am now greatly in doubt as to the existence of more than one real species in the group represented by *X. chinense* Mill., *X. pennsylvanicum* Wallr., *X. italicum* Mor., and other related forms. The foliage in these forms is practically identical, and the only differences of any moment are in the burs, which are indeed highly variable. Extreme forms of burs, however, are often found in the same colony, as though sporadically produced. A large suite of specimens is almost sure to show a nearly or quite unbroken series through the various forms. In every attempt to segregate the burs into species, so many transitional specimens have been found as to do unwarranted violence to any species concept. It is probably wise to treat all North American Xanthiums as one species except *X. spinosum* L. and possibly *X. strumarium* L. and *X. echinatum* Murr. *X. strumarium*, however, is scarcely distinct, and with more study may also be included. *X. echinatum* may be a real species, as it has a distinct coastal range, and seems to behave as though genetically distinct . . .") I am completely in agreement with Wiegand's observations, except that *X. strumarium* sens. strict. seems no more than varietally distinct from our plants, and that I am quite unable to see any sort of taxonomic unit in *X. echinatum.* Our plants, as I understand them, may be treated as follows:

Xanthium strumarium L. sens. strict. Fruit straight-beaked, small, less than 2 cm. long, yellow-green, puberulent but not hirsute or markedly glandular. Common in Europe; also in Calif. and reputedly in Mass.

Xanthium strumarium L. var. **glabratum** (DC.), comb. nov. *X. macrocarpum* var. *glabratum* DC. Prodr. **5:** 523. 1836. Fruits with more or less incurved beaks, usually small, seldom over 2 cm. long, usually brownish or yellowish-brown, atomiferous-glandular or slightly glandular-puberulent to subglabrous between the prickles, not hirsute. Sometimes closely resembling the preceding, sometimes passing into the following. Occurs throughout our range, but not so sommon as the next.

Xanthium strumarium L. var. canadense (Mill.) T. & G. Fl. N. Am. **2:** 294. 1841. *X. canadense* Mill. Gard. Dict. ed. 8. 1768. Fruits with evidently incurved beaks, usually large, commonly 2–3.5 cm. long, occasionally larger or smaller, generally brown or yellowish-brown, the lower part of the prickles conspicuously spreading-hirsute with viscid hairs, the surface between the prickles often stipitate-glandular. Occurs throughout our range.

Although both species of *Xanthium* have now become cosmopolitan weeds, and *X. strumarium* was well established in Europe four hundred years ago (according to Hegi), it seems probable that they originated in the new world. Except for a few species of *Ambrosia,* the subtribe *Ambrosinae* is otherwise exclusively American.

I am fully in agreement with Asa Gray that the plant treated in recent manuals as *Actinea herbacea* Greene is no more than varietally distinct from *A. acaulis* (Pursh) Spreng., but the proper varietal combination under *Actinea* has not yet been made.

Actinea acaulis (Pursh) Spreng. var. **glabra** (A. Gray), comb. nov. *Actinella scaposa* var. *glabra* A. Gray, Man. ed. 5. 263. 1867. *Actinella acaulis* var. *glabra* A. Gray, Syn. Fl. **2** (1): 345. 1884.

Helenium autumnale L. var. **autumnale,** nom. nov. *H. autumnale* L. Sp. Pl. 886. 1753, sens. strict.

The New York Botanical Garden

Campanula rapunculoides in Indiana.—The 7th Edition of "Gray's Manual" gives the range of this plant as far west as Ohio. Deam's "Flora of Indiana" records it from Steuben Co., which has Ohio as its eastern boundary, and also from Wells Co. in the eastern part of the state. Deam also records the essentially glabrous variety *ucranica* from Lake Co., remote from the range of the species.

June 30, 1942, I found a small patch of what seems to me the species itself at Hobart, Lake Co., in waste ground along a road. The plants are much roughened, especially on leaves and calyx lobes, with small hairs, in many cases reduced to little more than papillae. June 21, 1945, I again visited this colony, and found it much increased, and the plants larger, due to the copious rainfall during the spring months. Pubescence, however, seemed to be about the same. The flowers are a clear lilac, although they turn blue in drying.

Specimens have been sent to the Gray Herbarium.—Edwin D. Hull, Gary, Indiana.

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"Ia." sometimes stands for Indiana.—In Rhodora, xlvii. 175 (1945) I referred to a sheet of specimens of typical *Scutellaria nervosa* as bearing the annotation "Knobs. Ia. Mohr lg. 1854" and suggested the possibility of some error in the data, since no such plant is known from Iowa, but is what "one expects from the Knobs of Kentucky and Tennessee". Dr. Roland M. Harper, in a letter written June 23, points out that in this case "Ia." unquestionably stands for Indiana. In his very detailed *Biographical Sketch of Dr. Charles Mohr*, Bull. Torr. Bot. Cl. xxviii. 599–604 (1901), Dr. Eugene A. Smith stated that Mohr arrived at Cincinnati in December, 1850, and "The next two years were spent upon a farm in Indiana . . . Finally . . he went to Louisville" until the climate forced him to go farther south. As Dr. Harper says, "Clarke Co., Indiana has plenty of knobs"; he further calls my attention to the publication of *Gerardia Skinneriana* Wood, Class-Bk., ed. 2, 408 (1847), a species described from "Barrens, Ia.!", and named for an Indiana botanist: "I detected this delicate species in July, 1846, in Greene Co., Ia., on land belonging to Dr. A. G. Skinner." Deam, Fl. Ind. 853, speaks of "the type locality in Greene County"; while Pennell, Scroph. E. Temp. N. Am. 468, cites the type as marked by Wood as from "Indiana, legit ipse". The case is clear, then, that "Ia." once stood for Indiana, now generally abbreviated "Ind.", while "Ia." now stands for "Iowa". One is reminded of the policy of the old lady in the autobiographical story of early Indiana, popular during my boyhood, *The Hoosier-Schoolmaster:* "'Git a plenty while you're a gittin' says I". Turning to Lippincott's Gazetteer of 1856 with the hope of finding Indiana abbreviated "Ia.", my eye is caught by "INDIANAPOLIS, a post-village of . . . Iowa, . . . N. E. of Oskaloosa"!—M. L. FERNALD.

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BETULA PAPYRIFERA, var. COMMUTATA IN WESTERN MAINE.—While botanizing along the Sunday River beyond Ketchum in Riley, Oxford County, Maine, on August 16, 1945, I found a birch which, because of the red-brown color of the bark, seemed unusual. When the revision of the white birches by Prof. Fernald appeared in the October RHODORA, I immediately tried to place the birch. The range, "woodlands near the coast", did not seem to fit western Oxford County but Prof. Fernald has kindly confirmed the specimen as *Betula papyrifera* Marsh., var. *commutata* (Regel) Fernald. This seems worth recording as it extends the range of this variety much farther inland.—R. C. BEAN, Wakefield, Mass.

*Volume 47, no. 563, including pages 333–392 and plates 986–989, was issued 15 November, 1945.*

## ERRATA

No. 553, Contents, lines 6 and 7; omit.
Page 3, line 34; *for* have *read* has.
Plate 841, in caption; *for* flowing *read* flowering.
Page 15, line 3; *for* ATHENS *read* AIKEN.
Page 15, line 46; *for* Stephenson *read* Stevenson.
Page 27, last line; for *W. F. A.* read *W. E. A.*
Page 36, line 17; *for* CHARLESTON *read* CHARLTON.
Page 65, line 4; *for* Grant *read* Boone.
Page 82, line 42; for β. *dentatus* read β. * *dentatus.*
Page 101, line 31; for *densipila* read *densipilis.*
Page 135, lines 28 and 43; *for* Reckinger *read* Rechinger.
Page 136, lines 6 and 39; *for* Reckinger *read* Rechinger.
Page 136, line 26; *for* stated *read* started.
Page 139, line 2; *for* vii. *read* xii.
Page 149, line 8; *for* 275 *read* 276.
Page 149, line 11; *for* (Raf.) Chapm. *read* Chapm.
Page 162, last line; for *densipila* read *densipilis.*
Page 196, line 15; for DENSIPILA *read* DENSIPILIS.
Page 253, line 24; *for* Kokoma *read* Kokomo.
Page 259, page-heading; *for* Hardy,—Filago arvensis in North America *read* Fernald,—Injury to Herbarium-Specimens.
No. 562, Contents, line 9; *for* **Hallichiana** *read* **Wallichianus**.
Page 332, line 13, *for* WALLICHIANA read WALLICHIANUS.

# INDEX TO VOLUME 47

**New scientific names are printed in full-face type**