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TECHNICAL STUDIES ON NORTH AMERICAN PLANTS

M. L. FERNALD

(Continued from page 40)

In fact, *Salix* § *Reticulatae* has strongly diverged in Newfoundland and the adjacent Labrador Peninsula from orthodox characters of the section, Schneider in Bot. Gaz. lxvii. 44 (1919) finding "the characters of the RETICULATAE . . . further changed by the inclusion of *S. leiolepis* [endemic in western Newfoundland] with glabrous ovaries". *S. leiolepis* (PLATE 1005), with habit of very coarse-stemmed *S. reticulata* but with strictly glabrous bracts and ovaries, is endemic, so far as known, on Table Mt., Port-au-Port Bay, 150 miles south of the southern known limit of *S. reticulata* var. *semicalva*. In the same general area with the embarrassing *S. leiolepis* the coarse and usually upright *S. vestita* is highly complex. Furthermore, this very definite coarse species of the *Reticulatae*, with very short petioles, the coriaceous leaf-blades usually heavily clothed beneath with dense and lustrous silky white hairs, and with staminate aments 1–1.5 cm. long, has diverged on Eskimo Island, west of the Straits of Belle Isle, and locally on walls of the Shickshock Mts. of the Gaspé Peninsula, as *S. vestita*, var. *psilophylla* Fernald & St. John in Vict. Mem. Mus. Mem. 126: 44 (1922), with the membranaceous leaves glabrescent beneath, the staminate aments 1.7–2.5 cm. long. Again, along the Straits of Belle Isle the *Reticulatae* have thrown off another endemic, *S. jejuna* Fernald in RHODORA,

xxviii. 177 (1926), this tiny shrub (PLATE 1006) differing from *S. reticulata* in its very short (instead of long) petioles and short- (instead of long-) peduncled fruiting aments, and in the very long ascending villi of the papillate capsule, and from the Newfoundland *S. reticulata*, var. *semicalva* still further in its fuscous or dark purple very pubescent bracts. Furthermore, this unique little species of northernmost Newfoundland may flower twice in the same summer. In June or early July the fruits are ripe but one of the original collections, of July 16, had already fruited, while the new, vigorous shoots were already producing new flowering aments, without waiting for the next summer. Since neither of the endemic Newfoundland species of § *Reticulatae* have been illustrated, I am showing them in PLATES 1005 and 1006.

S. VESTITA Pursh, forma ***mensalis***, f. nov., trunco prostrato; foliis 1–1.6 cm. longis; amentis fructiferis 5–6 mm. longis.—NEWFOUNDLAND: mossy knolls on the limestone tableland, alt. 200–300 m., Table Mountain, Port-au-Port Bay, June 16 and 17, 1914, *Fernald & St. John*, no. 10,824, specimens distributed under an identical but unpublished varietal name.

Forming dense prostrate mats 1.5 dm. broad, with tiny leaves only 1–1.6 cm. long, and fruiting aments 5–6 mm. long; in strong contrast with the erect or ascending typical *Salix vestita* (up to 1 m. high) which has leaves 1.5–7 cm. long, the fruiting aments 0.6–1.5 cm. long.

The section *Reticulatae* Fries is unique among the diandrous *Salices*. In the tremendously extensive series of sections of diandrous willows with persistent bracts the aments or their supporting branchlets are axillary, terminal or subterminal, and the flowers are subtended by 1 or 2 slender to stout simple glands or nectaries. In the round-, roundish- or obovate- and reticulate-leaved § *Reticulatae* the peduncled aments are falsely terminal, borne just below the tip of the branchlet and on the side of the stem opposite the terminal leaf; and the glands of both staminate and pistillate flowers often form a false disk (as in *Populus*) with the margin lobed. Thus making a transition in its gland and in several other characters to *Populus*, the section was set up by A. Kerner in 1860 as a genus, *Chamitea*. Of this differentiation the late Professor C. E. Moss wrote in his Cambridge British Flora, ii. 25 (1914).

"*S. reticulata* possesses so many remarkable characters, showing it to be, in spite of the great difference in habit, intermediate in several respects between *Populus* and species of *Salix* in general, that there is little wonder that Kerner . . . suggested it should be placed in a new genus. However, the remarkable characters possessed by *S. reticulata* are so distributed among the other more primitive species of *Salix* that its generic separation from them cannot be maintained; and indeed Kerner himself at a later date accepted this view. The characters by which *S. reticulata* recalls *Populus* are the suckering habit, the long petioles, the broad laminae, and the perianthoid nature of the nectary. In its androecium, however, it has become a thorough *Salix*, more so even than *S. pentandra*, which has rather broad laminae, a double nectary, and, as a rule, 5 stamens at least. It seems to us that *S. pentandra* and *S. reticulata* diverged long ago from a primitive Salicalian stock, that each has retained a few of the *Populus*-like characters which this ancestral hypothetical group possessed, and that each of these species or their ancient allies have given rise to the other species of *Salix*, some of which . . . exhibit interesting features of convergent development."

The very primitive § *Reticulatae* consists of only a few localized species: (1) *S. reticulata* of arctic-alpine range on calcareous soils, extending south to the higher mountains of Eurasia and in America in very local areas to northwestern Newfoundland (as var. *semicalva*), shores of Hudson Bay and southern Alaska and the Aleutian Islands; (2) *S. vestita* Pursh, with localized varieties, of the Labrador Peninsula, Newfoundland, Anticosti and Gaspé, west side of Hudson Bay, Cordilleran region of southern Alberta and British Columbia to northern Montana and eastern Oregon; (3) *S. leiolepis* and (4) *S. jejuna*, Newfoundland endemics; (5) *S. nivalis* Hook. of alpine regions of the Rocky Mts.—evidently a primitive section, consisting only of a few disjoined relicts.

The pentandrous willows, on the other hand, such as those of §§ *Nigrae*, *Pentandrae* and *Bonplandianae*, are relatively southern (some even tropical) and their species, *S. nigra* Marsh., *Humboldtiana* Willd., *lucida* Muhl., *Bonplandiana* Kunth, etc., have broadly continuous ranges. Although presumably, as Moss pointed out, of as great antiquity as § *Reticulatae*, both series showing primitive characters, the pentandrous and chiefly more austral willows show no more evidence of relict-endemism than do the relatively modern diandrous species, such as *S. rigida* Muhl., *S. humilis* Marsh., *S. discolor* Muhl. or *S. Bebbiana* Sargent. § *Reticulatae*, however, has remained somewhat static and relict-endemism is one of its striking peculiarities. In view

of its concentration in northern and western Newfoundland and its association there with hundreds of other relict-species of both plants and animals, those who believe the present distribution of nonaggressive plants and animals of as great or greater significance as the remote occurrence of chance fossils, find themselves unable to subscribe to the insistence of certain geologists and others, that life on Newfoundland and in adjacent areas was wholly obliterated by Wisconsin ice. It would be most difficult to demonstrate that in that area the relatively modern sections of diandrous *Salix* have in a few thousand years given rise to localized shrubs with more primitive floral characters.

SALIX, § **Uva-ursi**, sect. nov., a § *Herbaceae* Borrer differt trunco valde ligneo vix subterraneo, ramulis valde foliosis; foliis firmis nec rotundatis nec valde reticulatis subtus albidis; amentis multifloris; bracteis valde sericeis; stamine plerumque 1. TYPE *S. Uva-ursi* Pursh.

It is most difficult to see any close relationship of the eastern boreal American *Salix Uva-ursi* and the circumpolar *S. herbacea* L. The latter has its trunks and main branches subterranean, stoloniferous and rooting at the nodes, only the short ascending filiform branchlets above ground, these bearing 2-4 reticulate rounded slender-petioled leaves which are green on both sides, and subterminal 2-8-flowered tiny aments, with nearly glabrous bracts, and the staminate flowers with 2 stamens. *S. Uva-ursi* is a strongly ligneous prostrate shrub, forming extensive superficial and very leafy carpets; the firm leaves not rounded, whitened beneath and not conspicuously reticulate, also short-petioled; the many-flowered aments with long-silky bracts; the stamen solitary (rarely 2).

S. ARCTICA Pallas, var. **antiplasta** (Schneider), comb. nov. *S. anglorum* Cham., var. *antiplasta* Schneider in Bot. Gaz. lxvi. 134 (1918).

SALIX, § **Argyrocarpae**, sect. nov. Frutex 0.2-1.7 m. altus; foliis subtus micaceo-sericeis; stipulis minutis fugaceis; amentis fructiferis laxis; capsulis micaceo-sericeis; pedicellis elongatis glandulas duas 3-4-plo superantibus; staminibus 2. TYPE *S. argyrocarpa* Anders.

The boreal and alpine *Salix argyrocarpa* of northeastern America, like its associate, *S. Uva-ursi*, stands so far apart from other willows that it deserves a place in the system of Sections.

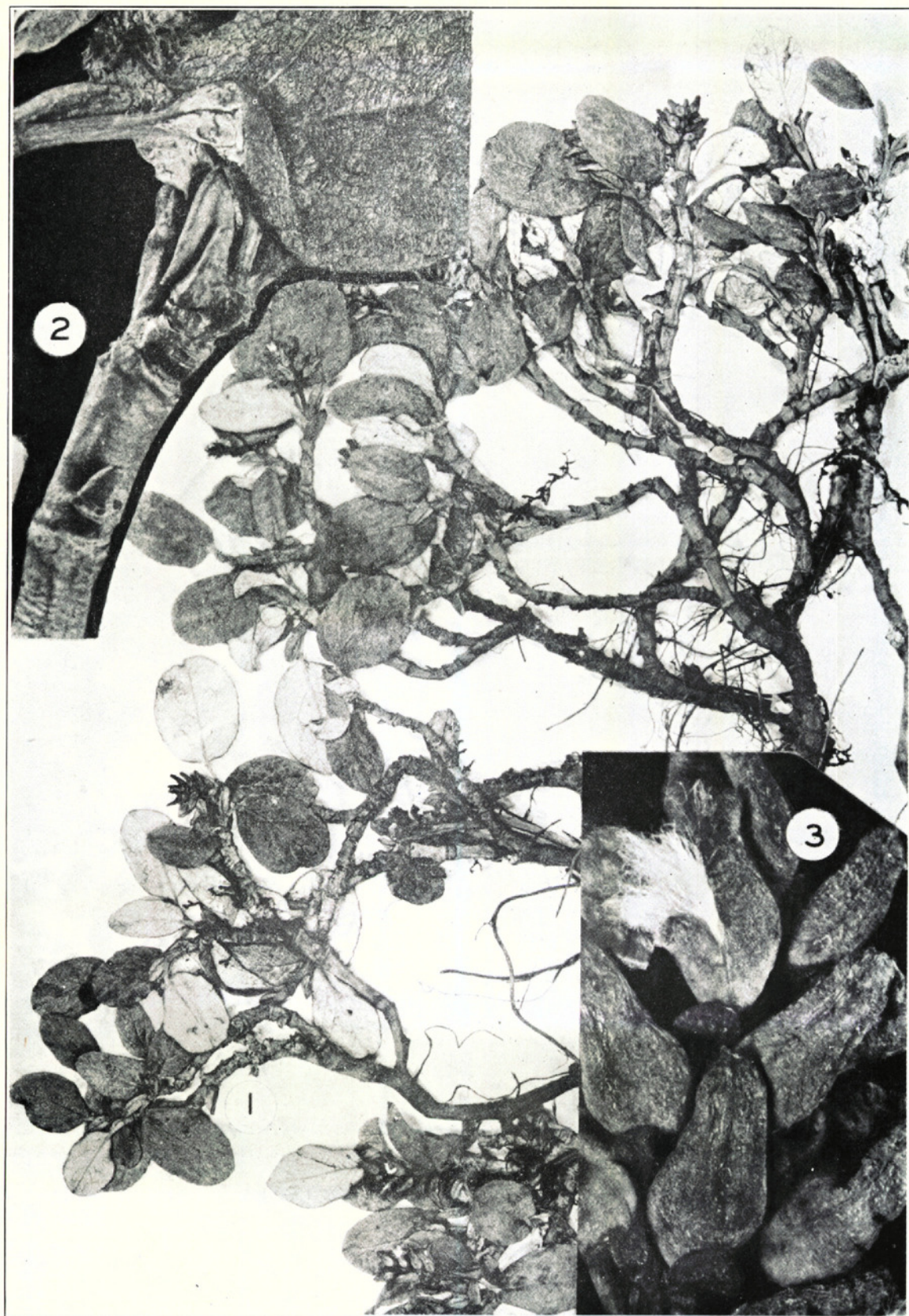


Photo. B. G. Schubert

SALIX LEIOLEPIS, all figs. from TYPE: FIG. 1, portion of shrub, $\times 1$; FIG. 2, branchlet and portions of leaves, $\times 5$; FIG. 3, portion of fruiting ament, showing glabrous bracts and capsules, $\times 10$.



Photo. B. G. Schubert

SALIX JEJUNA: FIG. 1, two portions of TYPE, $\times 1$; FIG. 2, a small dense shrub, $\times 1$; FIG. 3, branch, $\times 1$, showing 2nd flowering in midsummer; FIG. 4, expanding bud and stipule (left), $\times 10$; FIG. 5, fruiting ament and leaf, $\times 5$; FIG. 6, portion of fruiting ament, showing villous bracts and capsules, $\times 10$.

Andersson, Bebb and Schneider have tried to place it in some section and the latter close student of the genus finally left it unanchored.

S. GLAUCOPHYLLOIDES Fernald, forma **lasioclada**, f. nov., ramulis persistenter griseo-velutinis. TYPE from Robinson's Brook, southwestern Newfoundland, August 10, 1930, *Rachel B. Kennedy*, no. 470, in Herb. Gray; flowering material from the same shrub, coll. June 7, 1930, no. 254.

Differing from the glabrous- and lustrous-branched typical *S. glaucophylloides* in its densely gray-velvety branchlets. Found through much of the range of typical *S. glaucophylloides*.

S. GLAUCOPHYLLOIDES Fernald, var. **albovestita** (C. R. Ball), comb. nov. *S. glaucophylla* Bebb, var. *albovestita* C. R. Ball in Journ. Wash. Acad. Sci. xxix. 492 (1939).

Unfortunately the name *Salix glaucophylla* Bebb (1881) is antedated by the same name for quite different species by Besser (1822) and by Andersson (1851). Typical *S. glaucophylloides*, occurring on gravelly shores in calcareous areas from Newfoundland to northern Ontario, south to the Gaspé Peninsula, northern New Brunswick and northern Maine, is a coarse shrub or small tree up to 5 m. high, its oblong to lanceolate or ovate leaves glaucous beneath and lustrous above, these about half-grown at anthesis, the aments subtended by 3–5 leaves. Its pistillate aments are dense, in maturity 2–6 cm. long, the capsules on pedicels only 1–1.5 mm. long. Var. *glaucophylla* (Bebb) Schneider, localized about the Great Lakes, is a low shrub (1–2.5 m. high) its aments expanding before the leaves are well grown, the pistillate aments lax and subremotely flowered, becoming 6–10 cm. long, with fruiting pedicels 2–4 mm. long. Var. *albovestita* is similar to the latter and found on dunes of the Great Lakes from New York and southern Ontario to Michigan. Its branchlets are densely pubescent and the young (sometimes the old) leaves are clothed with dense white pubescence.

S. HUMILIS Marsh., var. **hyporhysa**, var. nov. Frutex 1–3 m. altus; ramulis fertilibus 2–5 mm. crassis; foliis glabratis vel subtus sparse puberulis, subtus valde rugoso-reticulatis, lamina matura 0.7–2 (–3) cm. lata; amentis masculis 1–3 cm. longis 1–2.3 cm. crassis; amentis fructiferis 2–8 cm. longis.—*S. humilis*, var. *rigidiuscula* sensu Rob. & Fern. in Gray, Man. ed. 7: 362 (1908) not the basic *S. humilis*, var. *longifolia*, f. *rigidiuscula* Anders. (1897).—The commoner variety southward, from Florida

to eastern Texas, north on or near the coastal plain to eastern Connecticut, Long Island, New Jersey and eastern Pennsylvania, and inland to West Virginia, Ohio, southern Michigan, southern Wisconsin, Iowa and Oklahoma. TYPE from NEW JERSEY: open thickets bordering brackish marshes, Manahawkin, Ocean Co., July 23, 1923, *Bayard Long*, no. 28,011 (in Herb. Gray.).

S. HUMILIS, var. **microphylla** (Anders.), comb. nov. *S. tristis* Ait. Hort. Kew. iii. 393 (1789). *S. tristis microphylla* Anders. in Öfv. Svensk. Vet.-Akad. Frösh. xv. 126 (1858). *S. humilis*, var. *tristis* (Ait.) Griggs in Proc. Ohio Acad. Sci. iv. 301, t. x (1905).

S. HUMILIS, var. *MICROPHYLLA*, forma **tortifolia**, f. nov., foliis valde spiraliter tortis.—MASSACHUSETTS: Plymouth, *Wm. Oakes*, with manuscript label bearing an unpublished varietal name (TYPE in Herb. Gray.); dry hill, Plymouth, Sept. 22, 1853, *Wm. Boott*; another sheet, with copied (not original) label, "Ipswich, Masachusetts ex herb. William Oakes", with typical flat-leaved and twisted-leaved branches mixed.

Oakes's material was evidently collected prior to 1848. The type-sheet has above his label the stamped memorandum "Manual, 1847". Gray's Manual 425 (1848) has under *S. tristis* the note "A variety occurs with very small and rigid contorted leaves."

S. HUMILIS, var. *MICROPHYLLA*, forma **curtifolia** (Fernald), comb. nov. *S. tristis*, forma *curtifolia* Fernald in RHODORA, xxxvi. 195 (1934).

S. HUMILIS, var. *MICROPHYLLA*, forma **festiva** (Fernald), comb. nov. *S. tristis*, forma *festiva* Fernald in RHODORA, l. c. (1934).

S. GRACILIS Anders., var. **textoris**, var. nov., capsulis ad 9 mm. longis; foliis maturis glabratiss 4-10 cm. longis ad 2 cm. latis evidenter serrato-dentatis, dentibus apice glanduliferis. (*S. petiolaris* sensu Pursh and later American authors, not J. E. Smith)—Southern Quebec to Manitoba, south to New Brunswick, New England, northern New Jersey, northeastern and central Pennsylvania, Ohio, Indiana, Illinois, northern Iowa and Nebraska. TYPE: MASSACHUSETTS: border of boggy meadow near Concord River, Bedford, May 11 and June 30, 1930, *Fernald, Weatherby & Anderson* in Pl. Exsicc. Gray. no. 447 (in Herb. Gray.; ISOTYPES in many herbaria).

Typical *Salix gracilis* is smaller and generally more northern, occurring from Quebec to Alberta, south to northern Massachusetts, western Connecticut (local), northern New York, northern Michigan, northern Wisconsin and Minnesota. It is *S. petiolaris*, vars. *rosmarinoides* (Anders.) Schneid., and *angustifolia*

Anders., characterized by capsules only 5–7 mm. long, and leaves entire or only obscurely denticulate, the mature ones 2.5–7 cm. long and 3–11 mm. broad.

Var. *textoris* (of the basket-maker) is so named because of the memoranda by Joseph Barratt (Salic. Amer.) and others, Barratt (1840) stating that “Mr. Hopkins, an experienced basket-maker . . . assures me that the green osier . . . furnishes the best twigs of any Willow he knows . . . The twigs are hard, tough, and elastic, and twist well for handles . . . It furnishes long, smooth twigs with small buds; the twigs are less tapering than is usual, which enhances their value to the basket-maker.”

It seems extraordinary that the identity of our low shrub, *Salix gracilis*, should, for more than a century and a quarter, have been confused by all students of *Salix* with the British tree, *S. petiolaris* J. E. Smith, Trans. Linn. Soc. vi. 122 (1802), Engl. Bot. xvi. t. 1147 (1803) and Fl. Brit. iii. 1048 (1804), etc. Our *S. gracilis* is a slender shrub with erect green to olive-brown tenuous and flexible branches 1–3 m. high; aments with narrow (linear-lanceolate to narrowly oblanceolate or spatulate) yellowish or pale brown bracts, leaves linear or narrowly lanceolate, entire to short-serrate-dentate, and 2.5–10 cm. (1–4 inches) long by 3–20 mm. ($\frac{1}{8}$ – $\frac{3}{4}$ inch) wide, with stipules usually quite wanting, very rarely present on the sprouts but then minute and caducous. *S. petiolaris*, at first known from meagre material sent by Dickson from Scotland, was soon better known and the treatment by Forbes, Salict. Woburn. 45 t. 23 (1829), gave a good account of it: “A bushy tree, with slender, spreading [not strongly ascending] purplish, or dark-brown [not green or olivaceous] branches. Leaves about 4 inches long, and nearly 1 broad [in *S. gracilis* 1–4 inches long, $\frac{1}{8}$ – $\frac{3}{4}$ inch broad]. Stipules lanceolate, serrated [in *S. gracilis* wanting] . . . Scales rounded, notched [in *S. gracilis* elongate, entire, and yellowish; Smith’s original diagnosis said “black, hairy, obovate, often notched”]. . . . Stalk of the germen as long as the adjoining scale”, though in the plate shown as shorter [in *S. gracilis* much longer]. Forbes’s beautiful plate would scarcely be taken as made from our slender and upright shrub; and European specimens, distributed as *S. petiolaris*, show a dense, curling, soft pubescence on the leaves and young branchlets, whereas the pubescence of young leaves

(rarely if ever occurring on the branchlets) of *S. gracilis* is minute, silky and closely appressed. Although Schneider talked all around the subject in Journ. Arn. Arb. ii. 16-24 (1920), there is no indication in his discussion that he actually compared our species with true *S. petiolaris*. The latter name seems to have been wholly misapplied to our material.

EXPLANATION OF PLATES 995-1006

PLATES 995 and 996, *SALIX RIGIDA* Muhl. (*S. cordata* Muhl.). PLATE 995: FIG. 1, leaf of TYPE of *S. rigida*, $\times 1$, after Muhlenberg; FIG. 2, fruiting branch, $\times 1$, from Hinsdale, New Hampshire, May 15, 1919, C. F. Batchelder; FIG. 3, portion of young pistillate ament, showing characteristically divergent flowers, $\times 5$, from Lebanon, New Hampshire, May 4, 1884, G. G. Kennedy; FIG. 4, fruiting ament, to show small basal bracts, $\times \frac{4}{5}$, from Buckland, Massachusetts, May 21, 1906, F. F. Forbes; FIG. 5, portion of latter ament, to show elongate pedicels, $\times 5$. PLATE 996: FIG. 1, leaf of *S. cordata* Muhl., $\times 1$, after Muhlenberg; FIG. 2, staminate flowering branch, $\times 1$, from Shelburne, New Hampshire, May 21, 1920, Walter Deane; FIG. 3, pistillate flowering branch, $\times 1$, from Lebanon, New Hampshire, May 4, 1889, Kennedy; FIG. 4, portion of half-mature pistillate ament, showing long pedicels, $\times 5$, from Hinsdale, New Hampshire, May 15, 1919, C. F. Batchelder.

PLATES 997-1000, *S. CORDATA* Michaux (*S. adenophylla* Hook.). PLATE 997: FIG. 1, type of *S. adenophylla*, \times ca. $\frac{1}{2}$; FIG. 2, margin of leaf of TYPE of *S. adenophylla*, showing porrect gland-tipped teeth, $\times 10$; FIG. 3, tip of leafy branch, $\times \frac{4}{5}$, from Natashquan River, Saguenay County ("Labrador"), Quebec, July, Aug., 1912, C. W. Townsend; FIG. 4, fruiting ament, with foliaceous bracts, $\times \frac{4}{5}$, from Townsend specimen. PLATE 998, FIGS. 1, 2, 3 and 6, from specimens from Michaux's TYPE-REGION, Lake St. John, Quebec: FIG. 1, leafy tip, $\times \frac{4}{5}$, from Vauvert, Lake St. John, Victorin, no. 16,362, as *S. adenophylla*; FIG. 2, tip of leafy shoot, $\times \frac{4}{5}$, from Roberval, Lake St. John, July 23, 1895, as *S. adenophylla*, J. G. Jack; FIG. 3, stipules and leaf-bases, $\times 5$, from no. 16,362; FIG. 4, stipule and leaf-base, $\times 5$, from Rivière Petite Cascapédia, Gaspé Pen., Quebec, Victorin, Rolland & Jacques, no. 33,846; FIG. 5, leaf-margin, $\times 10$, from Fort Fairfield, Maine, Sept. 19, 1900, Fernald, as *S. adenophylla*; FIG. 6, leaf-margin, $\times 10$, from no. 16, 362; FIG. 7, staminate ament, $\times \frac{4}{5}$, from Moosonee, mouth of Moose River, James Bay, Ontario, Dutilly & Lepage, no. 14,002. PLATE 999: FIG. 1, staminate flowering branch, $\times \frac{4}{5}$, from Moosonee, mouth of Moose River, James Bay, Ontario, Dutilly & Lepage, no. 14,002; FIG. 2, pistillate flowering tip, $\times \frac{4}{5}$, from Rupert House, Ungava, Dutilly & Lepage, no. 14,032; FIG. 3, fruiting ament, $\times \frac{4}{5}$, from no. 14,032; FIG. 4, portion of unexpanded staminate ament, showing blackish bracts, $\times 10$, from no. 14,002; FIG. 5, portion of expanded staminate ament, $\times 10$, from no. 14,002. PLATE 1000: FIG. 1, fruiting branch, $\times 1$, from Wellington, Ontario, June 3, 1902, James Fowler, as *S. adenophylla*; FIG. 2, lower surface of mature glabrate leaf, showing delicate venation, $\times 10$, from Michaux's TYPE-REGION, Ile-aux-Couleuvres, Lake St. John, Quebec, Victorin, no. 16,371; FIG. 3, portion of immature pistillate ament, to show short pedicels, $\times 10$, from Rupert House, Dutilly & Lepage, no. 14,032.

PLATES 1001 and 1002, *S. SYRTICOLA* Fernald. PLATE 1001, both figs., from TYPE, Lake Michigan, near Chicago, Bebb, Herb. Sal. no. 2, as *S. adenophylla*: FIG. 1, pistillate, and FIG. 2, staminate branch, $\times \frac{4}{5}$. PLATE 1002: FIG. 1, portion of stipule, petiole and leaf-base, $\times 5$, from Saugutuk, Michigan, August 15, 1896, C. F. Wheeler; FIG. 2, petiole and leaf-base, $\times 5$, from Dune Park, Indiana, Umbach, no. 95; FIG. 3, portion of stipule, $\times 5$, from no. 95; FIG. 4, lower surface of mature leaf, showing venation, $\times 10$, from New

Buffalo, Michigan, *Lansing*, no. 3265; FIG. 5, portion of flowering pistillate ament, $\times 5$, from TYPE; FIG. 6, portion of staminate ament, $\times 5$, from TYPE.

PLATES 1003 and 1004, *S. RETICULATA* L. and var. *SEMICALVA* Fernald. PLATE 1003: FIG. 1, portion of staminate ament, showing villous-based and blackish bracts, $\times 10$, of typical *S. RETICULATA* from Dovre, Norway, *W. Boeik* (?). FIGS. 2-4, var. *SEMICALVA*: FIG. 2, portion of TYPE, $\times \frac{4}{5}$; FIG. 3, staminate ament and lower surface of leaf, $\times 3$, from TYPE; FIG. 4, portion of staminate ament, showing pale and glabrous bracts, $\times 10$, from TYPE. PLATE 1004, FIG. 1, portion, $\times 10$, of fruiting ament of the typical *S. RETICULATA* from Torne Lappmark, July 19, 1927, *Samuelsson & Zander*. FIGS. 2-4, var. *SEMICALVA*, all from Gargamelle Cove, Ingornachio Bay, Newfoundland, *Fernald, Long & Fogg*, no. 1580: FIG. 2, fruiting plant, $\times \frac{4}{5}$; FIG. 3, fruiting ament, $\times 5$; FIG. 4, portion of latter, to show pale glabrous bracts and sparsely pubescent capsules, $\times 10$.

PLATE 1005, *S. LEIOLEPIS* Fernald, all figs., from TYPE: FIG. 1, portion of plant, $\times 1$; FIG. 2, branchlet and portions of leaves, $\times 5$; FIG. 3, portion of ament, to show glabrous bracts and capsules, $\times 10$.

PLATE 1006, *S. JEJUNA* Fernald: FIG. 1, two portions of type, $\times 1$; FIG. 2, a denser plant, $\times 1$, from Four-Mile Cove, Straits of Belle Isle, Newfoundland, *Fernald, Wiegand & Long*, no. 27,949; FIG. 3, branch, $\times 1$, showing 2nd flowering in midsummer, from east of Big Brook, Straits of Belle Isle, Newfoundland, July 16, 1925, *Fernald, Wiegand & Hotchkiss*, no. 27,986; FIG. 4, expanding bud and stipule, $\times 10$, from no. 27,986; FIG. 5, fruiting ament and leaf, $\times 5$, from no. 27,949; FIG. 6, portion of same ament, showing villous bracts and capsules, $\times 10$.

III. NOMENCLATURAL TRANSFERS IN *POLYGONUM*

POLYGONUM AMPHIBIUM L., var. *STIPULACEUM* Coleman, forma **hirtuosum** (Farwell), comb. nov. *P. amphibium*, var. *marginatum*, forma *hirtuosum* Farwell in Papers Mich. Acad. Sci. i. 93 (1923).

P. AMPHIBIUM, var. *STIPULACEUM*, forma **simile**, f. nov., terrestre vel subterrestre, ramis adscendentibus glabris vel minute pubescentibus; ochreis cylindricis; foliis lanceolatis, breviter petiolatis. TYPE from moist open meadow, Lisbon, New York, June 25, 1916, *O. P. Phelps*, no. 1551 (in Herb. Gray).

P. AMPHIBIUM, var. *STIPULACEUM*, forma **fluitans** (Eaton), stat. nov. *P. amphibium*, var. α . *natans* Michx. Fl. Bor.-Am. i. 240 (1803), not Moench, Enum. Pl. Hass. 189 (1777). *P. natans* (Michx.) Eaton, Man. ed. 3: 400 (1822). *P. amphibium*, var. *aquaticum* Torr. Fl. No. Mid. U. S. i. 404 (1824), not Leysser, Fl. Hals. ed. alt. 95 (1783). *P. fluitans* Eaton, Man. ed. 6: 274 (1833). *Persicaria fluitans* (Eaton) Greene, Lfts. i. 26 (1904).

In *RHODORA*, xxvii. 125-130, 146-152 and 156-166 (1925) Stanford discussed very clearly the heteromorphic series which at various times and by various authors has been treated as *Polygonum amphibium* L., his conclusions including, among other points, the segregation of the aquatic plant with thick and relatively short spikes and glabrous peduncles as a strictly North

American species, *P. natans* (Michx.) Eaton, with terrestrial phases. His main arguments for separating these from the Eurasian *P. amphibium* were the facts that in America the terrestrial form often has the summit of the ochrea flaring into a horizontally divergent foliaceous and bristly-ciliate flange, which does not occur in the Old World; that the terrestrial forms of the American plant have a less harsh leaf-margin; that the floating leaves of the American plant are more elliptic or elliptic-oval than in that of the Old World; that in true *P. amphibium* "the lateral veins of mature leaves [are] nearly straight and meeting the mid-vein nearly at right angles", whereas in the American *P. natans* they are more curved and meet "the midvein at an angle of about 60°" (Stanford, pp. 157, 158); and the ochreolae of *P. natans* are narrower and more tapering than in true *P. amphibium*. Other differences, measurements of achenes, calyx, etc., break down in the two series and the angle by which the veins join the midrib proves to vary too much in both series. So far as I can make out the really significant differences are the more lance-oblong or narrowly trowel-shaped leaf in *P. amphibium*, the harsher and shorter pubescence of the terrestrial foliage, the broader ochreolae and the more slender and often more elongated spike of the Eurasian series, with a tendency to longer peduncles. These are all relative characters, whereas the flowers and achenes are so similar that I am forced back to the long-established uniting of the two series as a single circumboreal species, *P. amphibium* L.

The North American variety cannot take the first varietal name given it, *P. amphibium*, var. *α. natans* Michx. (1803), nomenclatural basis of *P. natans* (Michx.) Eaton (1822), for there was already a var. *natans* Moench (1777) for the floating-leaved European plant. The next varietal name for our plant, *P. amphibium*, var. *aquaticum* Torr. (1824) likewise duplicated an identical name given the aquatic European plant in 1783. Singularly enough, the first available varietal name for the American series seems to be one applied to the most distinctively American phase of the species, var. *stipulaceum* Coleman, Cat. Fl. Pl. S. Pen. Mich. 32 (1874). Since Coleman's work is a relatively scarce one I here give his account: Under *P. amphibium* he had the conventional var. *aquaticum*, ascribed to

Linnaeus, with *P. fluitans* Eaton as a synonym, and var. *terrestre* Willd. Then came

Var. *stipulaceum*, with leaves and flowers like *P. amphibium*; the leaves, possibly a little narrower, and with salver form stipules, like *P. orientale*, found growing in sandy soil near Gd. Rapids.

That was a clear description of the distinctively North American terrestrial plant which had been described as *P. Hartwrightii* Gray in Proc. Am. Acad. viii. 294 (1870), the plant subsequently called *P. amphibium*, var. *Hartwrightii* (Gray) Bissell in RHODORA, iv. 104 (1902) and *P. natans* (Michx.) Eaton, forma *Hartwrightii* (Gray) Stanford in RHODORA, xxvii. 160 (1925). As the first valid varietal name, var. *stipulaceum* has to be taken up to include the many vegetative American forms. This might seem to those who think of the American plant as the aquatic phase with oblong long-petioled floating leaves, which, becoming stranded, will change rapidly to the terrestrial phases, like putting the cart before the horse. The floating transmutation, however, is the exceptional one. Over much of the area, where lakes and ponds are scattered, the terrestrial var. *stipulaceum* occupies thousands and thousands of square miles of swamp, meadow and swale, where it makes vast carpets and never gets the opportunity to stretch into permanently standing water. To those who know such extensive areas var. *stipulaceum* seems the normal development of the species.

As to var. *stipulaceum*, forma *simile*, that plant of swale, meadow and shore, although simulating the Old World *P. amphibium*, forma *terrestre* (Leers) Blake in RHODORA, xv. 164 (1913) and Moss, Camb. Brit. Fl. ii. 115 (1914), which was based nomenclaturally on *P. amphibium*, var. *terrestre* Leers (1775), is really a parallel form of var. *stipulaceum* without the foliaceous flanges.

It is in some ways fortunate that the name *P. fluitans* Eaton is available as a nomenclatural basis for the formal name of the common lacustrine extreme of the species in America, the *P. natans* (Michx.) Eaton, forma *genuinum* Stanford in RHODORA, xxvii. 158 (1925), for, since the varietal names given this extreme by earlier authors were later homonyms, we should be faced by a large handful of Greene's so-called species and might have to transfer to the formal category for the common aquatic plant

growing from Labrador to Alaska and south into the Northeastern, Central and Western States one of several inappropriate binomials, such as *Persicaria purpurata* Greene, *P. mesochora* Greene or *P. oregana* Greene.

Amos Eaton started off his *Polygonum fluitans* (1833) in a somewhat contradictory manner. In 1822 he had published *P. "natans* (floating knotweed)" from "Whiting's pond, 5 miles south of New Lebanon springs", saying definitely "It is the *P. amphibium*. Var. *natans* of Mx". In 1833, however, he changed his mind, renaming the plant of Whiting's Pond *P. "fluitans*, Ea. . . swimming knotweed" and saying "Finding this to be a new one, not var. *natans* of Mx. I give it a new name." There is nothing about the lacustrine plant of western Massachusetts and adjacent eastern New York (TYPE-region) to separate it from Michaux's *P. amphibium*, var. *natans* from Lake St. John, Quebec, as shown by the photograph of it before me. And even Greene, who saw many species where others see only one, admitted the probable identity, saying in his typically sophisticated and plausible style, under his *Persicaria fluitans* (*Polygonum fluitans* Eaton):

"Amos Eaton as early as 1840 [*i. e.* 1833] gave the name *P. fluitans* to what, from the description as well as the locality, we must conclude to have been that here described anew. I do not know where that St. John's Lake is which Michaux cites as the habitat of his var. *natans*; but I suspect it to be some northern lake now known by another name, and lying within the habitat of *P. fluitans*, in which case that may be an older, though a merely varietal designation which would in my view be of no consequence."

Since Michaux's *Polygonum amphibium*, var. *natans* was the nomenclatural basis of *P. natans* (Michaux) Eaton (1822), the plant later (1833) becoming *P. fluitans* Eaton, Greene's dismissal of the name *natans* as "merely a varietal designation" showed woeful lack of knowledge of the literature for a self-styled historian. So did his ignorance of "Where that St. John's Lake is which Michaux cites", for the big Lake St. John, lying at the head of the Saguenay, in the Districts of Lake St. John and Chicoutimi, was on the old route of early explorers from the lower St. Lawrence to Hudson Bay, was much mentioned by

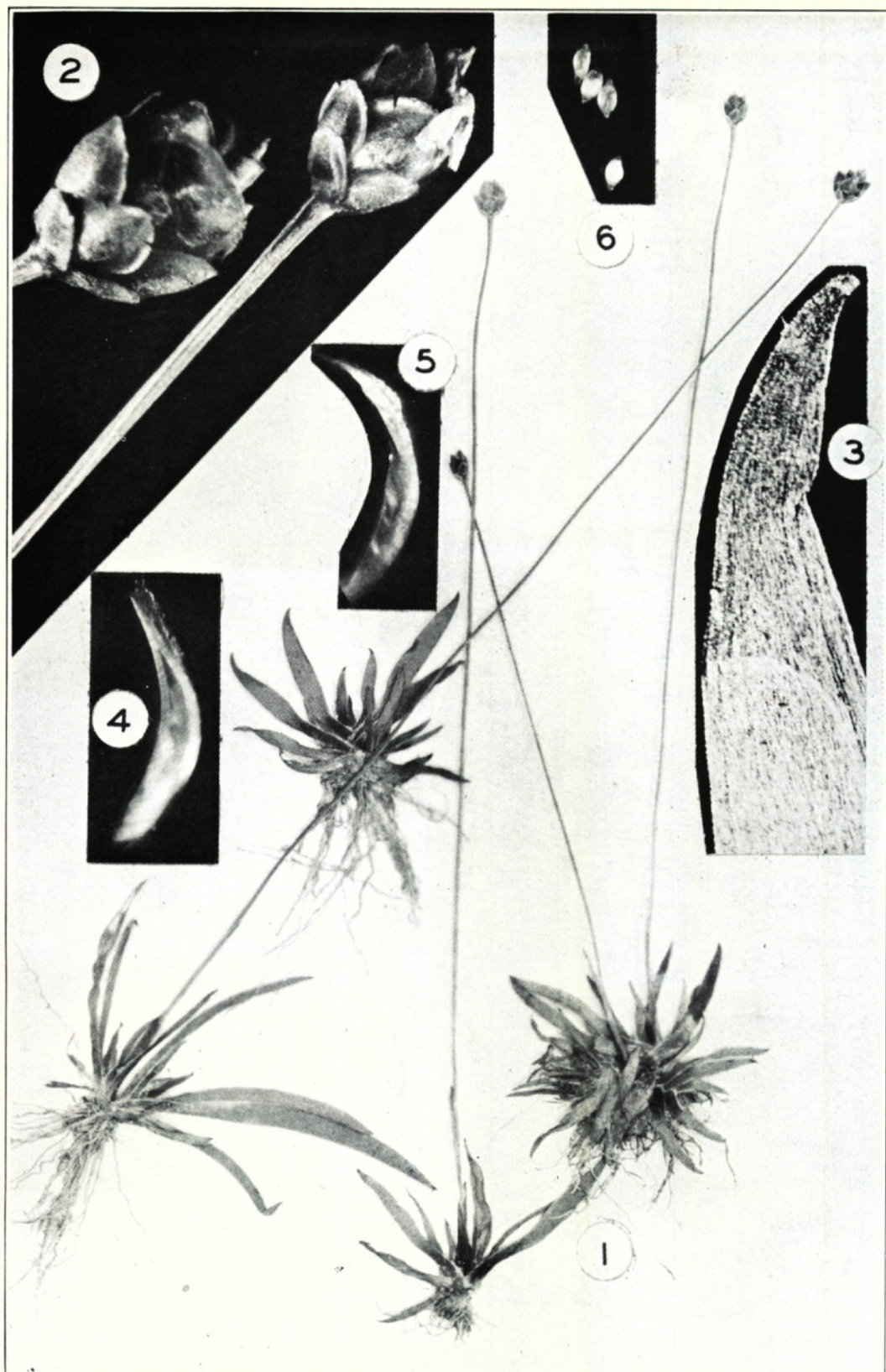


Photo. B. G. Schubert

XYRIS BAYARDI, all figs. from TYPE: FIG. 1, four plants, $\times 1$; FIG. 2, two spikes, $\times 5$; FIG. 3, leaf-tip, $\times 10$; FIGS. 4 and 5, lateral sepals, $\times 10$; FIG. 6, four seeds, $\times 10$.

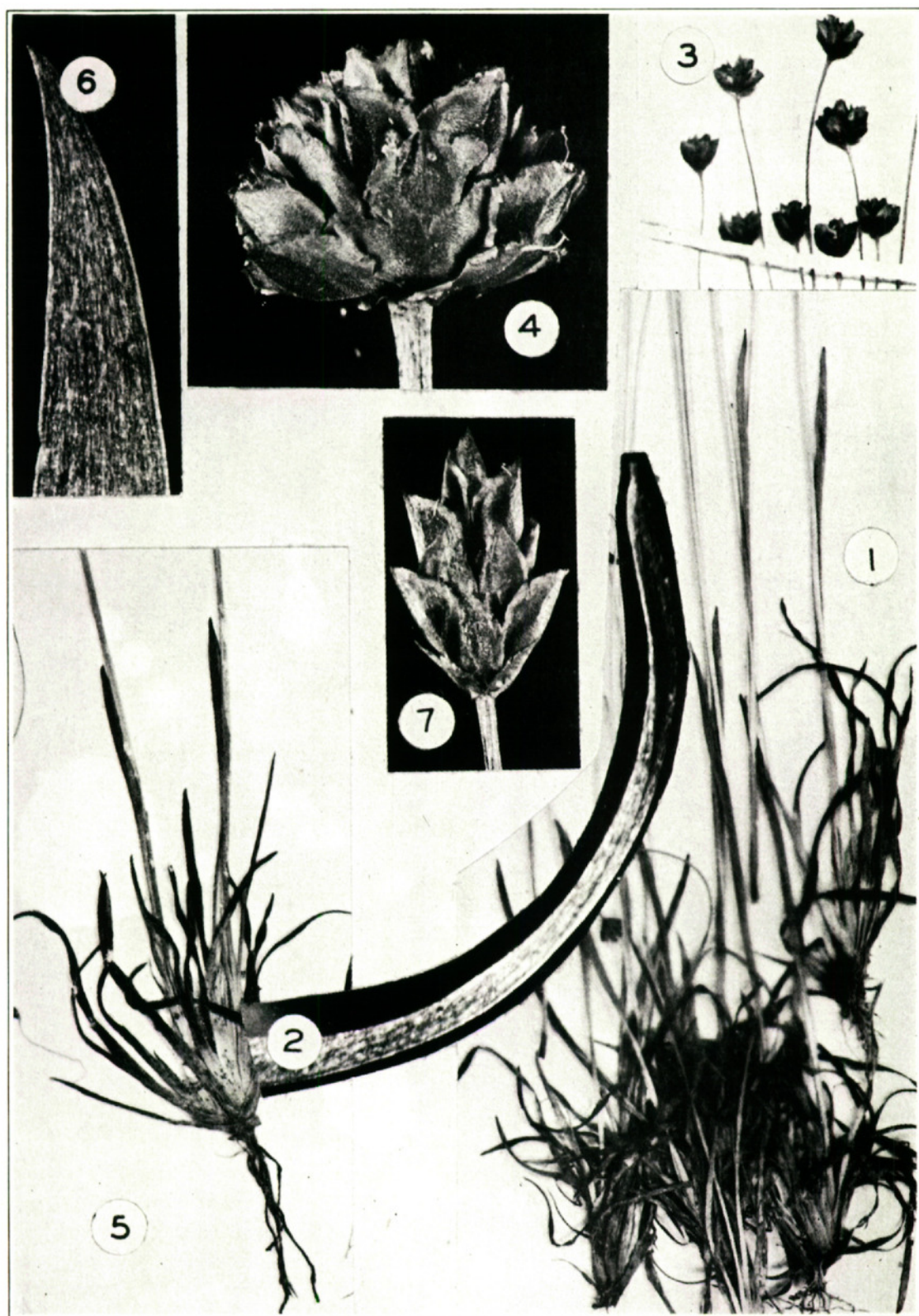


Photo. B. G. Schubert

XYRIS BREVIFOLIA: FIG. 1, bases of plants, $\times 1$, from TYPE-REGION; FIG. 2, basal leaf, $\times 10$; FIG. 3, group of spikes, $\times 1$, from Michaux's TYPE, after photo. by Cintract; FIG. 4, spike, $\times 5$.

X. FLABELLIFORMIS, all figs. from ISOTYPE: FIG. 5, base of plant, $\times 1$; FIG. 6, tip of leaf, $\times 10$; FIG. 7, spike, $\times 5$.

Michaux in his journals of exploration and was repeatedly cited as the type-locality of plants described by him, and it is shown (and named), almost north from the city of Quebec, as a roundish blue spot on all maps of Canada, or even of North America, which I find in recent atlases. Nevertheless some botanists express admiration of Greene and his methods.

P. ARIFOLIUM L., var. **pubescens** (Keller), comb. nov. *P. sagittatum*, var. *pubescens* Keller in Bull. Soc. Roy. Bot. Belg. xxx². 45 (1891). *P. arifolium*, var. *lentiforme* Fernald & Griscom in RHODORA, xxxvii. 167 (1935).

It is too bad to be forced to abandon a diagnostically descriptive name, var. *lentiforme* (from the lenticular achene), for a non-distinctive one, since both typical southeastern *Polygonum arifolium* and the northern var. *pubescens* (or *lentiforme*) are pubescent, the former much more so than the latter.

When Dr. Robert Keller described the northern variety as a pubescent variety of *P. sagittatum*, in a paper entitled *Remarques sur quelques espèces du genre Polygonum de l'Herbier de Jardin Botanique de l'État à Bruxelles*, he unwittingly indicated the weakness of that famous herbarium in representative North American material and, incidentally, unfamiliarity with the standard floras and manuals of eastern North America, in which the Linnean *P. arifolium* (1753) was described with the pubescent, large, long-acuminate leaves and the hispid-glandular axis of the inflorescence which set off Keller's *P. sagittatum*, var. *pubescens* (a single specimen from Troy, New York) as "une variété bien caractérisée" of his true *P. sagittatum*, defined "*foliis sagittato-lanceolatis nudis vel margine setulis ciliolatis subtus nervo inermi vel plus minusve aculeolato*"; var. *pubescens* "*foliis sagittatis late ellipticis, longe acuminatis, . . . subtus in nervo medio nervisque secundariis aculeolatis, foliis infra densius pubescentibus pilis stellatis supra parce pubescentibus pilis simplicibus adpressis pilisque stellatis*".

As early as 1788 Walter described *P. arifolium* "*foliis hastatis pilosis magnis*"; Elliott (1817) knew its stem "towards the summit with capitate hair and a stellated pubescence. *Leaves* on long petioles, hastate, with the auricles acute, pubescent"; Torrey (1824) knew its "*Leaves* on long aculeate petioles . . . acuminate, with short scattered hairs on the upper surface,

minutely papillose beneath" and to these characters he added in Fl. N. Y. (1843) "peduncles glandularly hispid". Even if Keller did not know these and the more detailed American treatments of succeeding years he might have found Meisner in his Monograph (1826) defining *P. arifolium* "foliis hastatis acuminatis, utrinque adpresse pilosis", these characters repeated in Meisner's treatment in DeCandolle's Prodrômus (1856), with the other distinctive character of Keller's *P. sagittatum*, var. *pubescens*, "pedunculis subglanduloso-hispidulis". Had Keller looked further he would doubtless have found that the flowers of the latter have 6 stamens and bifid style (the achene, consequently, biconvex), whereas his true *P. sagittatum* would have shown him 8 stamens and a trifid style (consequently a trigonous achene).

Since the type and only specimen cited by Keller came from Troy, New York, it is obviously of the less pubescent northern plant which Griscom and I described as *P. arifolium*, var. *lenti-forme*, we not imagining anyone in these days referring members of that long and generally understood species to the very different *P. sagittatum*. Even the most inexperienced of our "lumpers" would hardly argue for the specific uniting of *P. sagittatum* and *P. arifolium*, provided, of course, that he knew the plants and their morphological characters.

P. CILINODE Michx., forma **erectum** (Peck), stat. nov. Var. *erectum* Peck, N. Y. State Mus. Rep. xlv. 129—repr. 49 (1893). Var. *breve* Peck, Bull. N. Y. State Mus. vi. 120 (1899).

The low and upright plants ending in panicles and without twining tips, comparable with bush-beans, as contrasted with twiners.

IV. NOVELTIES IN OUR FLORA

(Plates 1007-1020)

CAREX CRINITA Lam., var. **brevicrinis**, var. nov., a var. *typica* recedit spicis foemineis 4-10 (plerumque 6-7) cm. longis densifloris omnino foemineis vel ad apicem masculis; squamis imis perigyneis aequantibus ad duplo longioribus, squamis superioribus perigyneis vix aequantibus ad paulum longioribus; perigyneis valde inflatis 3-4 mm. longis 2-3 mm. latis.—North Carolina to eastern Texas, north to southern New England, Kentucky and Missouri. The following are characteristic. MASSACHUSETTS: edge of cedar swamp, southwest of Beachwood,

Cohasset, July 22, 1938, *Griscom & Svenson* (as *C. Mitchelliana*); maple swamp, Spring Hill, Harwich, July 30, 1919, *Fernald & Long*, no. 18,127 (as *C. Mitchelliana*). RHODE ISLAND: Providence, May, 1845, *Thurber*. CONNECTICUT: Bridgeport, June 8, 1910, *H. S. Clark*; New Fairfield, July 19 and 20, 1912, *Blewitt*. DISTRICT OF COLUMBIA: May 30, 1899, *Steele*; May 22, 1890, *Steele* (as var. *gynandra*). VIRGINIA: sphagnum swamp, 1½ miles northwest of Williamsburg, June 12, 1921, *Grimes*, no. 3693; Powhatan Swamp, ½ mile southwest of Five Forks, James City Co., June 20, 1922, *L. F. & F. R. Randolph*; sphagnous boggy margin of spring-fed pond, Century House, northeast of Burgess, Dinwiddie Co., July 23, 1938, *Fernald & Long*, no. 8614; wooded alluvial bottomland of Rowanta Creek, near Rowanta, Dinwiddie Co., June 8, 1938, *Fernald & Long*, no. 8413 (TYPE in Herb. Gray.; ISOTYPE in Herb. Phil. Acad.); inundated swamp along Quarrel Creek, "Chamblis bigwoods", Seward Forest, near Triplett, Brunswick Co., May 10, 1945, *Fernald*, no. 14,795. NORTH CAROLINA: swamp, edge of Newbridge Creek, 2 miles from Currituck Sound, Currituck Co., July 1, 1922, *Randolph & Randolph*; marsh, Lake Raleigh, Wake Co., May 11, 1937, *Godfrey*; low field, 7 miles northwest of Chapel Hill, June 28, 1927, *Wiegand & Manning*, no. 414. KENTUCKY: without stated locality, *Short* (as *C. Pseudo-Cyperus*, this corrected by Dewey). TENNESSEE: low, wet grounds, Wolf Creek, August 15, 1900, *Ruth*, no. 497. MISSOURI: rare in low ground, Courtney, May 25, 1902, *Bush*, no. 1714. LOUISIANA: western section, *Hale*. TEXAS: without stated locality, *Wright*.

Carex crinita, var. *brevicrinis* has puzzled its collectors. Some of the northern collections were placed with the then recently redefined *C. Mitchelliana* M. A. Curtis¹, because they would not go satisfactorily into typical *C. crinita*, in which the pistillate spikes only rarely have staminate tips, the long awns of the lower scales are two to three or four times as long as and the upper awns definitely longer than the relatively small perigynia (2–3–rarely 3.5 mm. long and 1–2 mm. broad). Var. *brevicrinis* most often has the pistillate spikes with a staminate tip (as frequently in var. *gynandra* (Schwein.) Schwein. & Torr.), its lower scales are rarely twice as long and the upper ones shorter than to barely longer than the large and strongly inflated, mostly obovate perigynia, these 3–4 mm. long and 2–3 mm. broad.

Although superficially suggesting var. *gynandra*, the usually more southern or coastwise var. *brevicrinis* differs at once in its

¹ See Weatherby in RHODORA, xxv. 17–20 (1923).

smooth lower leaf-sheaths (those of var. *gynandra* being harsh), in its relatively longer lower foliaceous bract, in its relatively shorter scales and in its more strongly inflated and crumpled perigynia. In the relatively northern and upland var. *gynandra* the lowest foliaceous bract ranges from 1.2–4 (av. 2.5) dm. long, this averaging twice the length of the axis of the inflorescence. In var. *brevicrinis*, on the other hand, the lowest bract is from (2.5–) 3–4 (av. 3.6) dm. long, this averaging three and a third times the length of the axis of the inflorescence.

Although *Carex crinita*, var. *brevicrinis* has been mistaken for *C. Mitchelliana*, it is really very different. *C. Mitchelliana* has the leaves and lower foliaceous bract only 2.5–9 mm. broad (in var. *brevicrinis* thinner and darker, 6–12 mm. broad) the lower bract 0.8–3 (av. 1.8) dm. long; the tight or scarcely inflated and definitely nerved granular-papillate ovate to ovate-lanceolate perigynia 2.5–3.5 mm. long and only 1.4–2 mm. broad.

XYRIS (§ BREVIFOLIAE) Bayardi, sp. nov. (TAB. 1007). Planta annua vel biennis; foliis pallide viridibus lanceolato- vel lineari-ensiformibus 1.5–4 cm. longis ad 4 mm. latis, plus minusve curvatis, membranaceis, margine albido minute denticulato, apice subacuto breviter curvato; scapis filiformibus 1–3 dm. altis glabris; vaginis basilaribus scapi perbrevibus brunneis; spicis paucifloris ellipsoideo-ovoideis acutis vel subacutis 5–6 mm. longis 3–4.2 mm. crassis; bracteis intermediis elliptico-ovalibus brunneis margine albido-hyalinis, area dorsali viridi distincta; sepalis lateralibus liberis curvatis oblique lineari-lanceolatis 3–3.5 mm. longis 0.3–0.5 mm. latis, ala carinali angustissima in parte tertia superiore minute denticulatis; seminibus ellipsoideo-fusiformibus 0.45–0.5 mm. longis 0.2–0.24 mm. latis, pallide stramineis apicibus brunneis.—Sussex County, VIRGINIA: wet sandy and peaty shore of Airfield Millpond, southwest of Wakefield, September 11, 1945, *Fernald & Long*, no. 14,922 (TYPE in Herb. Gray; ISOTYPE in Herb. Phil. Acad.).

Xyris Bayardi (for one of its discoverers, BAYARD LONG) is the northernmost member of *Xyris* § *Brevifoliae*, only three other members of this chiefly tropical section, mostly annuals and biennials, being known in the United States. From all three *X. Bayardi* is abundantly distinct. The basic *X. brevifolia* Michaux, Fl. Bor.-Am. i. 23 (1803), shown in our PL. 1008, FIGS. 1–4, described from the low country of Georgia, is rare except in Florida. Its firm leaves (FIGS. 1 and 2) are very narrowly linear



Fernald, Merritt Lyndon. 1946. "CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY—NO. CLX. TECHNICAL STUDIES ON NORTH AMERICAN PLANTS (Continued)." *Rhodora* 48, 41–60.

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