

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

TECHNICAL STUDIES ON NORTH AMERICAN PLANTS

M. L. FERNALD

(Plates 993–1020)¹I. SOME SPECIES IN RAFINESQUE'S "HERBARIUM
RAFINESQUIANUM"

(PLATES 993 and 994)

Dr. Merrill has asked me about the identities of some of the species published in the rare work of Rafinesque, his *Herbarium Rafinesquianum* (1833). Unlike too many of the publications of that highly variable and temperamental genius, this little book is carefully written, with logical discussions and with diagnoses of genera and species actually in hand, specimens of which were offered for sale. What a pity that we cannot now buy the series! Here are many well described novelties from many parts of North America, many of which have clear priority over the descriptions of others. For the most part their identification can safely be made only by those intimately familiar with the areas concerned: Texas, Oregon, etc.; but in checking on the region I best know it has been found that several of our long-familiar specific names must lapse, while some in other sections of the world are obviously later homonyms. In the following memoranda only those names about which I feel no doubt are noted; others of them must be considered by specialists on other floras.

SPIRANTHES LACERA (Raf.) Raf. Herb. Raf. 44 (1833). *Neottia lacera* Raf. Fl. Ludovic. 171 (1817), *nomen*, and in Am. Month. Mag. Crit. Rev. ii. 206 (1818) with full description. *Neottia gracilis*, var. β . *secunda* Bigel. Fl. Bost. ed. 2: 322 (1824).

S. MONTANA Raf. Herb. Raf. 45 (1833). *S. ovalis* Lindl. Gen. Sp. Orch. Pl. 466 (1840). *S. cernua*, var. *parviflora* Chapm. Fl. So. U. S., ed. 3: 448 (1897). *Gyrostachys parviflora* (Chapm.) Small, Fl. Se. U. S. 318 (1903). *S. parviflora* (Chapm.) Ames, Orchidaceae, fasc. 1: 137 (1905). *Ibidium ovale* (Lindl.) House

¹ The cost of preparing and engraving the plates met in part through grants from the AMERICAN PHILOSOPHICAL SOCIETY and from the DEPARTMENT OF BIOLOGY OF HARVARD UNIVERSITY.

in Muhlenbergia, i. 128 (1906). *I. parviflorum* (Chapm.) Jennings in Ann. Carneg. Mus. iii. 485 (1906). *Triorchis ovalis* (Lindl.) Nieuwland in Am. Midl. Nat. iii. 123 (1913). *S. Smallii* Schlechter in Beih. Bot. Centralbl. xxxvii². 358 (1920).

S. TUBEROSA Raf. Herb. Raf. 45 (1833). *S. Beckii* Lindl. Gen. Sp. Orch. Pl. 472 (1840), at least as to descr. *S. simplex* Gray, Man. ed. 5: 506 (1867), not Griseb. *Gyrostachys simplex* (Gray) Ktze. Rev. Gen. ii. 664 (1891). *S. Grayi* Ames in RHODORA, vi. 44 (1904). *Gyrostachys Grayi* (Ames) Britton, Man. ed. 2: 300 (1905). *Ibidium Beckii* (Lindl.) House in Muhlenbergia, i. 128 (1906). *Gyrostachys Beckii* (Lindl.) W. Stone, Pl. So. N. J. 375 (1912). *Triorchis Grayi* (Ames) Nieuwland in Am. Midl. Nat. iii. 123 (1913). *Triorchis Beckii* (Lindl.) House in Am. Midl. Nat. iv. 206 (1920).

Unfortunately, the original description of *Neottia lacera* Raf. in Am. Month. Mag. Crit. Rev. ii. 206 (1818) did not get into Index Kewensis, although the other species, described in the same column of the identical page and directly preceding it, was there entered; and this first specific name of the pair, *Neottia plantaginea* Raf. l. c., was taken up by Torrey as the basis of *Spiranthes plantaginea* (Raf.) Torr. (1843) and, since Torrey had taken it up and it, therefore, got into reputable literature, it has been the nomenclatural basis of binomials by Britton, House and Nieuwland. But *Neottia lacera*, described with it and again in Herbarium Rafinesquianum, has been quite ignored, as have the other eight names under *Spiranthes* in the latter work. Nevertheless *Spiranthes lacera*, based on *Neottia lacera* (1818), was several years earlier than *Neottia gracilis* Bigelow, Fl. Bost. ed. 2: 322 (1824), the nomenclatural basis of *S. gracilis* (Bigelow) Beck, Bot. 333 (1833). Bigelow's original account was as follows:

*NEOTTIA GRACILIS.

Slender Neottia.

N. foliis radicalibus ovatis; scapo vaginato, floribus spiraliter secundis; labello obovato, crispo.

Leaves radical, ovate; scape sheathing; flowers in a spiral row; lip obovate, curled.

Root fascicled. Leaves radical, on short petioles, ovate, acute, nerved, caducous. Scape erect, slender, eight to twelve inches high with a few sheathing scales or leaflets. Flowers white in a twisted spike. Bractes closely applied to the germ, ovate, acuminate. Germs obovate. Petals linear, crystalline, parallel, the three upper ones cohering. Lip obovate-spatulate, curled, its base swelling with the lateral petals connected before it. Anther parallel to the style.—In dry, hilly woods.—July.—Perennial.

The leaves falling off frequently cause the plant to appear leafless at the time of flowering.

Variety β . *secunda*. Spike unilateral, hardly twisted; flowers more slender. Perhaps a different species.—In Conway, New-Hampshire.—July.

Rafinesque's original description in the American Monthly Magazine and Critical Review was

24. *Neottia lacera* Raf. Smooth radical leaves oblong obtuse flat, scapes vaginated, sheaths acute: spike slender, flowers one sided spiral nodding, bracteas longer than the ovary, labellum canaliculated reflexed obtuse laciniated.—Obs. Detected in 1816, in the swampy woods, near Glen's Fall's, Lake George, and the Luzerne mountains, blossoming in July and August, flowers white, scape slender about one foot high, root palmated.

Rafinesque's second account, in his Herbarium Rafinesquianum (1833), was briefer but contained the synonym "N [*i. e.* *S.*] *gracilis*, Beck, 1833", which nomenclaturally rested on *Neottia gracilis* Bigel. and, incidentally, indicated the priority in 1833 of Beck over Herbarium Rafinesquianum. From this it would be natural to infer that *Spiranthes gracilis* must give way to *S. lacera*; but in this case Rafinesque "builded better than he knew", just as Jacob Bigelow did when he separated as "Perhaps a different species" the more slender-flowered plant of the White Mountains.

Spiranthes gracilis, as generally interpreted, consists of two quite different species: one relatively southern, the true *S. gracilis*, *i. e.* *Neottia gracilis* Bigelow; the other relatively northern, the *Neottia lacera* Raf. (1818), or *N. gracilis*, var. β . *secunda* Bigelow (1824), the *S. lacera* (Raf.) Raf. (1833). Study of all the material in the Gray Herbarium, the Ames Herbarium, the herbarium of the New England Botanical Club and that of the New York State Museum, which has been kindly placed at my disposal by Dr. House, brings out several striking differences. Some of these are shown in PLATES 993 and 994. They may be briefly stated as follows¹:

¹ *SPIRANTHES LACERA* (as *S. gracilis*) is beautifully illustrated in that remarkably accurate study of orchids, by Albert M. Fuller, with photographs by George L. Waite, Studies on the Flora of Wisconsin Part 1: The Orchids; Orchidaceae—Bull. Pub. Mus. Milwaukee, xiv. no. 1, pl. 36 (1933). This plate well displays *S. lacera*. Although Mr. Fuller conservatively followed long-established usage, he obviously saw two elements in his *S. gracilis*, saying (p. 113): "While the flowers usually occur in spirals on the raceme, plants with distinctly 1-sided (secund) racemes appear to be plentiful in northern Wisconsin". If the Milwaukee Museum has more such careful "Studies" we shall all welcome them.

SPIRANTHES LACERA (PLATE 993): basal leaves usually present at flowering time, though often wilted, submembranaceous, semi-translucent, the veins and veinlets clearly evident, the veinlets simple or subsimple, forming an obvious loose mesh; spike secund or with 1-few spirals, the flowers distant in few elongate series; sepals and petals narrowly lanceolate to lance-linear, forming a slender tube 1-1.75 (rarely -2.25), averaging 1.4 mm., in diameter, much longer than thick and not strongly ringent; dilated summit of lip drooping, with a broad white border.—Very dry to moist acid open (rarely shaded) soil, Magdalen Islands to Manitoba, south to Nova Scotia, New England, Long Island, more rarely to southeastern Virginia, upland to North Carolina (up to 3300 ft.) and Tennessee, southern Ontario, Michigan, northern Illinois, Wisconsin and Minnesota. Flowering from June 15 to September 11 (AVERAGE of 135 collections AUGUST 5).

S. GRACILIS (PLATE 994): basal leaves rarely present at flowering time (though occasionally on non-flowering younger plants), thick, opaque, the veinlets barely visible by strong transmitted light, more branched and forming an obscure but relatively fine mesh; spike strongly spiraling, the approximate flowers in many short secund series; tube of perianth more ringent, the bases of the broader sepals and petals forming a tube 1.5-2.5, averaging 2 mm., thick; white border of summit of lip narrower.—Dry to moist open soil, or in open woods and thickets, Florida to Texas, north to southwestern Maine, southeastern New Hampshire, central Vermont, southeastern, central and western New York, Ohio, Indiana, Illinois, Missouri and Oklahoma. Flowering late July to October (AVERAGE of 110 collections SEPTEMBER 2).

All material seen from Quebec, New Brunswick, Nova Scotia, northern and central Maine and New Hampshire, northern Vermont, northeastern New York, Ontario, Michigan, Wisconsin, Minnesota and Manitoba belongs to *S. lacera*. In eastern New York that plant abounds northward, being the only one of the two species found in the Adirondack region and near Lake George, from Clinton and St. Lawrence Counties to Saratoga, Fulton and Oneida Counties, while in Cattaraugus County to the west it occurs at an altitude of 2000 feet. It is the plant of shores and slopes near Lake George (our FIG. 2) and is clearly the plant described by Rafinesque from there.

Spiranthes gracilis, of wide southern range, spreads northward at low altitudes to Cumberland County, Maine, Strafford and Hillsboro Counties, New Hampshire, southeastern Addison County, Vermont, and in eastern New York from Long Island northward to Albany County. In southern New England and southern and central New York both species occur. It is, therefore, specially illuminating to note the collector's data when they have placed them both on one sheet or under the same label. Thus, the late Charles W. Jenks, getting them both in Bedford, Massachusetts, and calling them both *S. gracilis*, noted them on his label and sheet as *a*, *b* and *c*; *a* being flowering *S. lacera* collected July 26, *b* fruiting material of the same collected August 24,

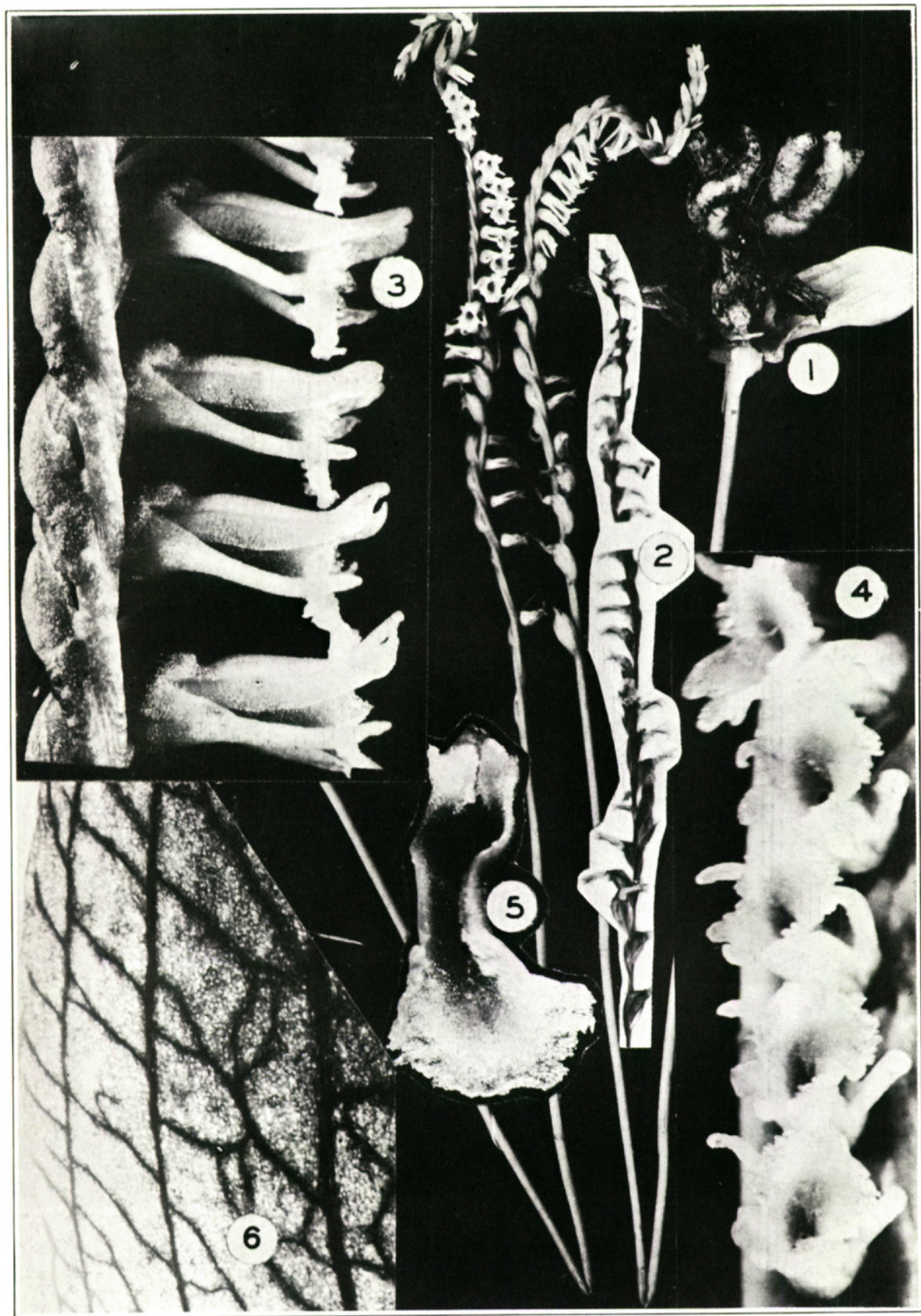


Photo. B. G. Schubert

SPIRANTHES LACERA: FIG. 1, two plants, $\times 1$, from type-region of *S. gracilis*, var. *secunda*; FIG. 2, two spikes, $\times 1$, from type-region of species; FIG. 3, profile, $\times 6$, of portion of spike; FIG. 4, face-view, $\times 6$, of same flowers; FIG. 5, lip, $\times 10$; FIG. 6, venation of basal leaf, $\times 10$, by transmitted light.

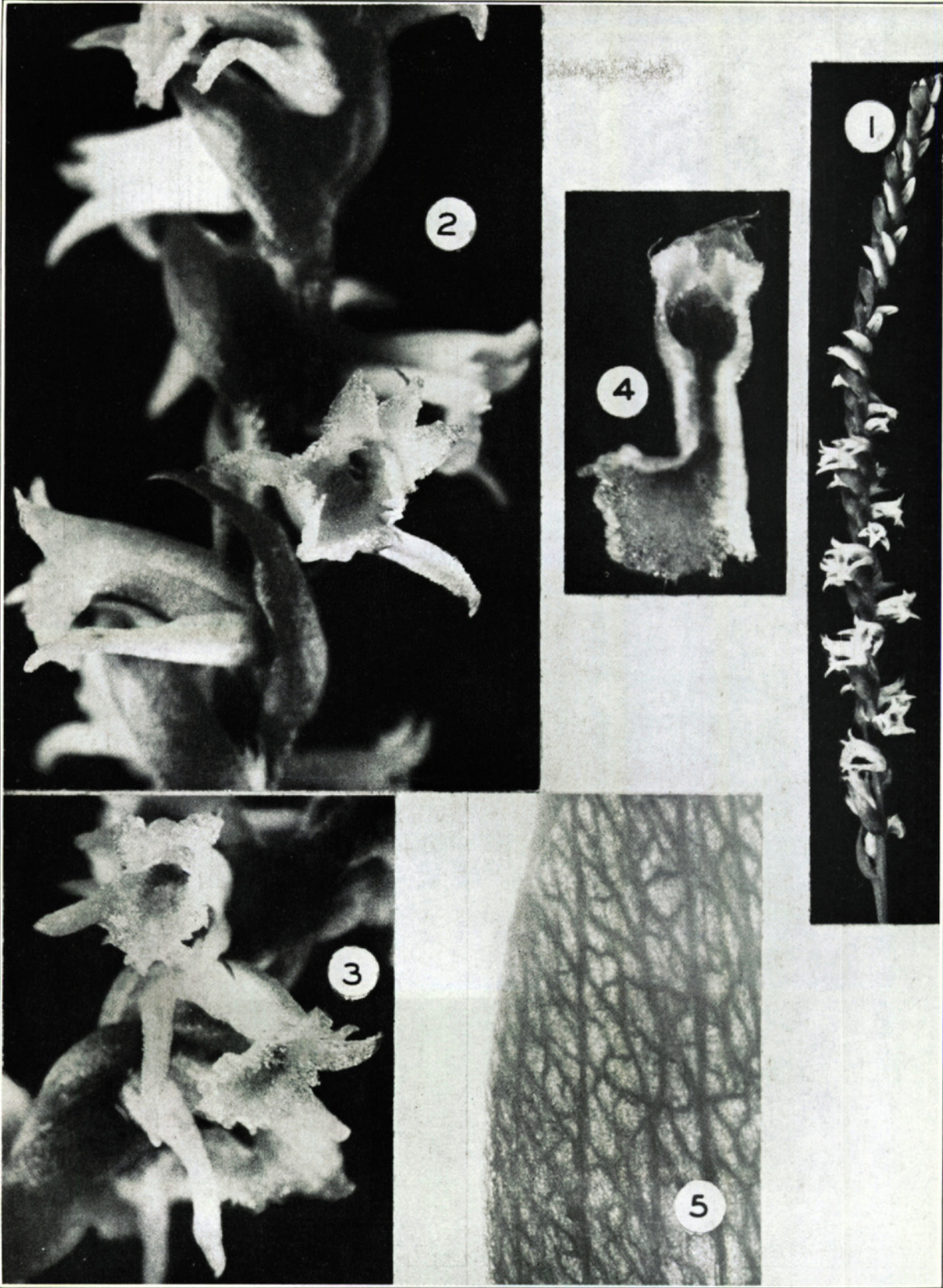


Photo. B. G. Schubert

SPIRANTHES GRACILIS: FIG. 1, spike, $\times 1$, from type-region; FIG. 2, profile, $\times 6$, of flowers, and FIG. 3, face-view, $\times 6$, of flowers; FIG. 4, lip, $\times 10$; FIG. 5, venation of basal leaf, $\times 10$, by transmitted light.

and *c* young flowering material (the upper half of the spike in bud) of *S. gracilis* collected August 25. Another sheet from Massachusetts, from the herbarium of H. M. Ballou, has the two under one label, the slender-flowered *S. lacera* dated July 18, the flowering *S. gracilis* marked "Aug.". One other mixed sheet brings out the difference in flowering period. This is one of the late R. W. Woodward's beautiful sheets from Franklin, Connecticut, the label bearing the notes: "plants with basal leaves July 14", these being *S. lacera* in anthesis; "plants without basal leaves Aug. 11", these being *S. gracilis*, so young that the recurving budded tips have not straightened up.

Not only did Jacob Bigelow think that *Spiranthes lacera* (his *Neottia gracilis*, var. β . *secunda*) was "perhaps a different species"; Asa Gray, having material of it, probably from northern New York, was puzzled by it. His specimen resided for nearly a century in the Gray Herbarium, unnoticed in a pocket, pasted on a sheet of typical *S. gracilis*, but with a folded manuscript discussing its details and a significant "(?)" after the unsatisfactory name. Furthermore, I find that in both the Gray Herbarium and that of the New England Botanical Club a specialist on the *Orchidaceae* has recently separated out strikingly characteristic sheets of *S. lacera* and has annotated them as the very different *S. Beckii*; at least they did not seem to him to be *S. gracilis*!

There can be hardly a doubt of the identity of *Spiranthes montana* Raf. with the beautifully distinct *S. ovalis* Lindl. Rafinesque's description was brief but clear:

8. Sp. *montana*, Raf. Caule basi folioso, fol. radic. obl. cuneatis-obtusis, caulinis lanc obt. spicis obl. dense spir. bract. obt. acum. fl. mediocris, labellum obl. obt. erosum.—Cumberland mts. pedal. disc. 1823.

This species (as *S. ovalis*) has been collected by my companions and me several times in Virginia. Its cuneate-oblong or oblanceate, obtuse or acutish lower leaves, its well developed cauline leaf or leaves and the thick and short spike, tapering when young but rounded at summit at maturity, are characteristic, as is the lip. Although local, the species is scattered in rich, preferably calcareous woods from Virginia across the Cumberland Mts. and Plateau of Kentucky to bluffs of southern Indiana and to Mis-

souri, south to northern Florida, Alabama, Mississippi, Louisiana and eastern Texas. Dr. E. Lucy Braun records it from three counties of Kentucky in the Cumberland area and specimens from the Cumberland Mts. of Tennessee are well known.

As to the identity of *Spiranthes tuberosa* Raf. and the white-lipped *S. Beckii* Lindl. there is certainly no doubt. Here is the original diagnosis:

10. *Sp. tuberosa*, Raf. rad. *tuberosa monorchis*, caule filif. aphylo, vaginis setaceis, spic. *gracilis vix spiralis secunda*, bract. *brevis acutis*, fl. *parvis*, labellum *cuneato acuto*.—Disc. by M. Durand in New Jersey, pedal.

This, with “*rad. tuberosa monorchis*”, etc., is surely the characteristic species with a single tuberoid, described by Gray as *S. simplex*: “Root a *solitary oblong or spindle-shaped tuber*; no leaves at flowering time; scape 5'–9' high, bearing a small narrow (rarely 1-sided) spike of *very short flowers* (perianth 1"–1½" long) . . . —E. Mass. (Nantucket, Dr. Robbins), New Jersey (C. F. Austin, &c.) and Delaware, Wm. M. Canby”.

HABENARIA MARITIMA Raf., Herb. Raf. 74 (1833) antedates by nearly 60 years the Californian *H. maritima* Greene, Pittonia, ii. 298 (1892), basis of *Piperia maritima* (Greene) Rydb. in Bull. Torr. Bot. Cl. xxviii. 641 (1901).

With only limited understanding of the Californian endemics I refrain from renaming the latter. By Ames it is treated as *H. elegans* (Lindl.) Bolander, var. *maritima* (Greene) Ames, Orchidaceae, iv. 113 (1910). It is noteworthy, however, that both Jepson and Abrams, with intimate field-acquaintance of both, maintain them as distinct.

Rafinesque's *Habenaria maritima* was obviously one of the numerous fluctuations of *H. clavellata* (Michx.) Spreng. (1826), which was based on *Orchis clavellata* Michx. Fl. Bor.-Am. ii. 155 (1803) from Carolina and which, in spite of the slightly 3-lobed tip of the lip was described by Michaux “*cornu longitudine ovarii, clavato; labello ovali, integro*”. Rafinesque's description was quite as definite:

4 *Habenaria maritima*, Raf. Caule angulato, folia unica longa cuneata lanc. ceteris subulatis, Spica brevis paucifl. 5–8 fl. bract. lanc. ovar. eq. calcar recurvo clavato labello oblongo truncato.—On the Sea Islands of New Jersey in swamps, semipedal, flowers small greenish white.

Those who consider *Habenaria maritima* Greene a good species need a name for it.

CALIPOGON PARVIFLORUM Raf. Atl. Journ. i. 148 (1832).

Several years earlier than *Calopogon parviflorus* Lindl. Gen. Sp. Orch. Pl. 424 (1840), that species considered identical with *Ophrys barbata* Walt. Fl. Carol. 221 (1788), the basis of CALOPOGON BARBATUS (Walt.) Ames, Orchidaceae, ii. 227 (1908). Rafinesque's plant was evidently of this species, as indicated by his "stem one leaved 3-5 flore", for *C. barbatus* has 1-7 flowers, its var. *multiflorus* (Lindl.) Correll in Bot. Mus. Lfts. vii. 71 (1940), based on *C. multiflorus* Lindl. l. c. 425 (1840), having more. The only other species to consider for Rafinesque's species of "Fl. and Louis", with "3-5 . . . flowers spicate, minute, bracts subulate, labellum undulate", is *C. pallidus* Chapm. (1860). Originally described "Scape 10-20-flowered", that species, at the northern limit of its range, in southeastern Virginia and North Carolina, may, in the smaller specimens, have as few as 3-6 flowers. Until authentic material of Rafinesque's species is found, it is wisest to let *C. pallidus* stand; his specific epithet, however, clearly antedates that of Lindley.

GOODYERA OBLONGIFOLIA Raf. Herb. Raf. 76 (1833). *Spiranthes decipiens* Hook. Fl. Bor.-Am. ii. 203, t. 204 (1839). *G. Menziesii* Lindl. Gen. Sp. Orch. Pl. 492 (1840). *Orchioides decipiens* and *O. Menziesii* Ktze. Rev. Gen. ii. 675 (1891). *Peramium Menziesii* (Lindl.) Morong in Mem. Torr. Bot. Cl. v. 124 (1894). *Peramium decipiens* (Hook.) Piper in Contrib. U. S. Nat. Herb. xi. 208 (1906). *G. decipiens* (Hook.) F. T. Hubbard in Standardized Pl. Names, 328 (1923).

Rafinesque's description of *Goodyera oblongifolia* from the mountains of Oregon seems unequivocal:

10 *Goodyera seu Tussaca oblongifolia*, Raf. Fol. radic petiol oblongis ovatis acutis 5 nervis non reticulatis, subtus glaucis, caule gracile vaginato, spica laxiflora, fl. remotis hirsutis, bract. lanc. acut. ovar. eq. ovarium tereto.—Oregon mts. subpedal, fl. white small.

Hooker said "Scape 8 inches to a foot high"; Lindley's description of *Goodyera Menziesii*, "Hab. in Americae septentrionalis orâ occidentali, Menzies, Douglas", began:

"G. subacaulis, foliis oblongis venosis unicoloribus petiolis longioribus, spicâ laxâ . . . , bracteis ovario aequalibus".

There is little difference (except in finish) between this account of the habit of *G. Menziesii* and Rafinesque's definition of the earlier *G. oblongifolia*.

CORALLORHIZA MONTANA Raf., Herb. Raf. 75 (1833) should be added to the synonymy of *C. odontorhiza* (Willd.) Nutt. (1818), which was *Cymbidium odontorhizon* Willd. (1805). Rafinesque's species from the "Wasioto mts, and hills, autumnal" had the "labello involuto truncato . . . , capsulis pendulis globosis, . . . flowers small yellowish, with red spots on the lip". The small flowers, pendulous, globose capsule and autumnal flowering seem to settle the identity.

DENTARIA GRANDIFLORA Raf. Herb. Raf. 47 (1833). *D. macrocarpa* Nutt. ex Torr. & Gray, Fl. i. 88 (1838). *Cardamine pulcherrima* Greene in Erythea, i. 148 (1893). *D. macrocarpa*, var. *pulcherrima* (Greene) Robinson in Gray, Syn. Fl. i¹. 154 (1895). *D. tenella* Pursh, var. *pulcherrima* (Greene) Detling in Am. Journ. Bot. xxiii. 273 (1936).

Rafinesque's description was clearly of the largest-flowered extreme which Greene later described as *Cardamine pulcherrima*. Rafinesque's account of his plant from Oregon follows:

2. *Dentaria grandiflora*, Raf, Caule flexuoso apice diphylo, fol. oppos. petiolis alatis, trifoliatis, foliolis sessilib. ovato-lanceol, ineq. serratis, racemo brevis umbellato grandifloro.—Pedal. fl. incarnate one inch long. petals entire equal to stam.

SANGUISORBA STIPULATA Raf., Herb. Raf. 47 (1833). *S. canadensis* L. β. *latifolia* Hook. Fl. Bor.-Am. i. 198 (1834). *S. sitchensis* C. A. Meyer, Fl. Ochot. 34 (1856). *Poterium sitchense* (C. A. Meyer) S. Watson, Bibl. Index, i. 303 (1878). *S. latifolia* (Hook.) Coville in Contrib. U. S. Nat. Herb. iii. 339 (1896).

Unfortunately the long-familiar name *Sanguisorba sitchensis* for the northwestern species must lapse. Rafinesque's description of his plant from Oregon was clear:

3. *Sanguisorba stipulata*, Raf. Caule apice panicul. angul. nudo, fol. amplis, foliolis stipulatis petiolatis alternis, cordatis ovatis grandident. spicis parvis obl. bract. ovatis acum.—Foliolis twice as large as in *S. officinalis*, 3 inches long.

Compare the description by Abrams of *Sanguisorba sitchensis*:

" . . . stipules rounded, coarsely toothed; leaflets oblong-ovate, 2-7 cm. long, rounded at the apex, cordate at the base, coarsely serrate, petiolulate", etc.

EXPLANATION OF PLATES 993 AND 994

PLATE 993, *SPIRANTHES LACERA* (Raf.) Raf.: FIG. 1, two plants, $\times 1$, from Randolph, Coös County, New Hampshire, *Pease*, no. 31,500; FIG. 2, spike, $\times 1$, from the type-region, Northwest Bay, Lake George, Warren County, New York, *House*, no. 30,076; FIG. 3, profile of portion of spike, $\times 6$, from no. 31,500; FIG. 4, face-view, $\times 6$, of portion of spike, from no. 31,500; FIG. 5, lip, $\times 10$, from no. 31,500; FIG. 6, venation of basal leaf, $\times 10$, by transmitted light, from Willoughby, Vermont, September 4, 1896, *G. G. Kennedy*.

PLATE 994, *S. GRACILIS* (Bigelow) Beck: FIG. 1, spike, $\times 1$, from Wellesley, Massachusetts, August 17, 1945, *F. W. Hunnewell*; FIG. 2, portion of spike, $\times 6$, from same collection; FIG. 3, face-view of portion of spike, $\times 6$, from Winchester, Massachusetts, August 16, 1945, *Ernest Rouleau*; FIG. 4, lip, $\times 10$, from last specimen; FIG. 5, venation of dried-out old basal leaf, $\times 10$, by transmitted light, from East Hartford, Connecticut, *Weatherby*, no. 1434.

II. DIFFICULTIES IN NORTH AMERICAN *SALIX*

(Plates 995–1006)

1. MUHLENBERG'S NORDAMERIKANISCHEN WEIDEN ANTEDATED BY MICHAUX.—The first decade of the 19th century and the two decades immediately preceding it were of the greatest significance in making known the more generalized flora of eastern North America. Not appreciating the ultimate significance of the exact date of issue (like too many editors of so-called learned societies today), editors brought out scattered or independent papers under a blanketing title-page with one arbitrary date for the whole series. Something has been done to clarify the dates of actual publication of numerous debatable works and much more remains to be done, especially since the over-nice susceptibilities of librarians and book-binders have long led to the discarding of or the shifting of the positions of the original covers (and, of course, the trimming off of all carefully made marginal memoranda). In the intricate genus *Salix* one paper has been outstanding as containing the original descriptions and drawings of leaves of the commoner species of the eastern United States. This is the brief article entitled *Über die Nordamerikanischen Weiden von Hrn. Pred. MÜHLENBERG mit Anmerkungen des Hrn. Prof. WILLDENOW*, which was article no. XIV (pp. 233–242, tab. VI) in *Der Gesellschaft Naturforschender Freunde zu Berlin Neue Schriften*, iv, with the general title-page dated 1803.

Since Michaux, in his *Flora Boreali-Americana*, ii. 225, 226 (1803), also published as new five species of *Salix* from Canada and the eastern United States the exact dates of issue of the two

nearly contemporaneous treatments have to be settled. To be sure, it has long, following Willdenow who had an editorial finger in the Muhlenberg paper, been assumed to need no investigation. In fact, so dominating was the influence of Willdenow and his remarkable and compendious *Species Plantarum* that the dictum emanating from those sources has rarely been challenged. Thus, the Muhlenberg treatment of American willows was reprinted by Konig and Sims in their *Annals of Botany*, ii. 62-69, pl. 5 (1805)¹ with the title: *On North American Willows, by the Rev. Mr. MUHLENBERG, with Notes of Professor WILLDENOW*. Furthermore, although Sims had been regularly citing Michaux, *Flor. Bor.-Am.* in his articles in Curtis's *Botanical Magazine*, beginning on December 1, 1803, so that it appears that he knew that remarkable work, he and Konig in 1805 contrived to overlook the five species of *Salix* published by Michaux, for, as an explanation of their reprinting of the Muhlenberg paper they wrote: "of all the species of these regions, we know but one through Mr. von Wangenheim [*S. conifera*, an abnormal plant] and another through Mr. Aiton [*S. tristis*]." Nevertheless, the five species of Michaux can hardly be waved aside; surely not if the sketchy accounts by Marshall are satisfactory for the establishment of three of our species!

My attention was drawn to this technical matter through noting, while studying Schneider's various papers on American willows, that in *Journ. Arn. Arb.* ii. 189 (1921) Schneider, without a word of explanation, reduced outright to *S. cordata* Muhlenberg (our PLATES 995 and 996) the utterly different *S. cordata* Michx. (our PLATES 997-1006); and, furthermore, that in vol. i. 158 (1920) he had reduced to *S. adenophylla* Hook. (our PLATE 997) the amazingly different *S. syrticola* Fernald (our PLATES 1001 and 1002). I was naturally surprised at what has been called "this Schneid. treatment" of these species, for I had studied Michaux's willows as well as Hooker's type of *S. adenophylla* (PLATE 997) and I knew that *S. cordata* Michx. has quite different aments from those of *S. cordata* Muhl.; in fact, that it is the best kind of *S. adenophylla*! And I also knew the several fundamental characters which distinguish *S. syrticola* from the others. It is,

¹ The title-page says 1806, but the late Mr. James Britten pointed out in *Journ. Bot.* xl. 419 (1902) that the pages including the Muhlenberg reprint were issued "1 June, 1805."



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