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RHODORA

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JOURNAL OF

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Vol. 30. January, 1928. No. 349.

NEWFOUNDLAND MOSSES COLLECTED BY MR. BAYARD LONG IN 1924–26.

EDWIN B. BARTRAM.

(Plate 158)

NEWFOUNDLAND seems to have been neglected by bryologists to a great extent and our knowledge of its moss flora is practically confined to the collections of the Rev. Charles A. Waghorne as recorded in Macoun's Catalogue of Canadian Plants, Part VI—Musci, supplemented by random collections in various herbaria and the treatment by Renauld & Cardot in Delamare's Florule de l'Isle Miquelon.

Mr. Long, who accompanied Prof. Fernald and his associates in the expeditions to Newfoundland in 1924–25 and 26, was naturally preoccupied to a great extent with the flowering plants but generously collected the mosses as opportunity offered. A detailed account of these expeditions will be found in Prof. Fernald's thrilling notes of "Two Summers Botanizing in Newfoundland," reprinted from RHODORA, Vol. 28, Nos. 328–336, April–December 1926, as No. LXXII of the Contributions from the Gray Herbarium of Harvard University. Considering the fact that Mr. Long had no previous bryological experience the number of species represented is surprisingly large and the choice of material evidences a keen discrimination. The limestone areas of the northwest coast bordering the Straits of Belle Isle were naturally the most productive of especially interesting arctic types such as *Distichium Hagenii*, *Dicranum elongatum*, *Dicranum groelandicum*, *Desmatodon systylius*, *Stegonia latifolia*, *Bryum Longii* etc., while the southern sections of the Island are represented by more familiar Canadian types including *Dicranum majus*, *Dicra-*

nella cerviculata, Mnium hornum, Ulota Ludwigii, Ulota phyllantha, Pogonatum capillare etc.

While the following list shows to an interesting extent the relative abundance of the various species in the localities from which collections were made it is, of course, far from a complete reflection of the mosses of Newfoundland and it seems highly probable that the calcareous forelands of the northwestern coast will amply reward further bryological activities in that region.

The list comprises 165 species and varieties of which one, *Bryum Longii*, is described as new. A complete series of specimens has been deposited with the Academy of Natural Sciences in Philadelphia and a nearly complete set has been retained by the writer.

The sequence of genera is that used by Brotherus in Engler & Prantl, Pflanzenfamilien, Ed. 2, Vols. 10 and 11 and excepting *Sphagnum*, which follows the treatment of Dr. A. LeRoy Andrews in the North American Flora Vol. 15, Part 1, the nomenclature is the same as used in these volumes.

SPHAGNACEAE

SPHAGNUM PALUSTRE L. South Hill, St. John's, Aug. 14, 1924; Trepassey, Aug. 16, 1924; Bay Bulls, Aug. 22, 1924.

SPHAGNUM IMBRICATUM Hsch. South Hill, St. John's, Aug. 14, 1924.

SPHAGNUM LINDBERGII Schp. Blanc Sablon, Labrador, Sept. 3, 1925.

SPHAGNUM PULCHRUM (Linbd.) Warnst. Bay Bulls, Aug. 22, 1924.

SPHAGNUM TENELLUM Pers. Port aux Basques, July 21, 1924; Savage Cove, Aug. 7, 1924.

SPHAGNUM SUBSECUNDUM Nees. Quirpon Island, Aug. 7, 1925.

SPHAGNUM PYLAESII Brid. Port aux Basques, July 21, 1924; Burgeo, Sept. 9, 1926; Sept. 11, 1926.

SPHAGNUM WARNSTORFII Russow. Bay Bulls, Aug. 22, 1924.

SPHAGNUM CAPILLACEUM (Weiss) Schrank. Savage Cove, Aug. 7, 1924; South Hill, St. John's, Aug. 14, 1924; Trepassey, Aug. 16, 1924; Bay Bulls, Aug. 22, 1924; Ramea, Aug. 30, 1924.

ANDREAEACEAE

ANDREAEA ALPESTRIS (Thed.) Schp. Bay Bulls, Aug. 20, 1924.

FISSIDENTACEAE

FISSIDENS OSMUNDIOIDES (Sw.) Hedw. Flower Cove, July 30, 1924; Ship Cove, Sacred Bay, Aug. 11, 1925.

DITRICHACEAE

CERATODON PURPUREUS (L.) Brid. Common.

DISTICHIUM CAPILLACEUM (Sw.) Bry. eur. Common on calcareous substrata throughout the Island.

DISTICHIUM INCLINATUM (Ehrh.) Bry. eur. Brig Bay, Aug. 5, 1924; Ship Cove, Sacred Bay, Aug. 9, 1925; Blanc Sablon, Labrador, Sept. 3, 1925.

DISTICHIUM HAGENII Ryan. Ship Cove, Sacred Bay, Aug. 11, 1925; Savage Cove, Aug. 29, 1925.

This interesting little species is very similar in general appearance to *D. inclinatum* but seems to be clearly separable by the curious arrangement of the peristome teeth in eight distinct groups of two teeth each. It is recorded from arctic North America by Briotherus in Die Laubmoose Fennoskandias and in the 2nd edition of Engler & Prantl's Pflanzenfamilien, Vol. **10:** 166 but is not included by Mrs. E. G. Britton in her treatment of the genus in the North American Flora, Vol. **15,** Part 1. It is evident that the species has been very imperfectly known from this continent and its discovery by Mr. Long in Newfoundland is therefore especially noteworthy.

SELIGERACEAE

SELIGERA DONNIANA (Sm.) C. M. Flower Cove, July 30, 1924.

This seems to be the first authentic record for this minute species northeast of Maine. It is a rare moss under any circumstances and its occurrence in northern Newfoundland is a very interesting range extension.

DICRANACEAE

ANISOTHECIUM RUBRA (Huds.) Lindb. Governors Island, Bay of Islands, Sept. 3, 1926.

DICRANELLA CERVICULATA (Hedw.) Schp. Trepassey, Aug. 16, 1924; Burgeo, Sept. 9, 1926.

DICRANELLA HETEROMALLA (L.) Schimp. Curling, Aug. 11, 1924; Burgeo, Aug. 30, 1924.

DICRANELLA SECUNDA (Sw.) Lindb. Bard Harbor, St. John Bay, July 27, 1925.

PARALEUCOBRYUM LONGIFOLIUM (Ehrh.) Loesk. Rose Blanche, Aug. 31, 1924.

CYNODONTIUM POLYCARPUM (Ehrh.) Schp. Blanc Sablon, Labrador, Sept. 3, 1925.

OREOWEISIA SERRULATA (Func.) De Not. Quirpon Island, Aug. 7, 1925.

ONCOPHORUS WAHLENBERGII Brid. Mt. Moriah, Aug. 11, 1924.

ONCOPHORUS VIRENS (Sw.) Brid. Flower Cove, July 14, 1925; Quirpon Island, Aug. 7, 1925.

KIAERIA STARKEI (Web. & Mohr.) Hag. Bard Harbor, St. John Bay, Aug. 13, 1925.

KIAERIA BLYTTII (Schp.) Broth. Bard Harbor, St. John Bay, Aug. 13, 1925.

DICRANUM ELONGATUM Schleich. Bard Harbor, St. John Bay, July 27, 1925.

DICRANUM GROELANDICUM Brid. Quirpon Island, Aug. 6, 1925.

DICRANUM FUSCESCENS Turn. Port aux Basques, July 20, 1924; Whitbourne, Aug. 25, 1924; Gaulton, Aug. 29, 1924; Bard Harbor, St. John Bay, July 27, 1925, Aug. 13, 1925, Aug. 26, 1925.

DICRANUM FUSCESCENS Turn. var. FALCIFOLIUM Braithw. Bard Harbor, St. John Bay, July 27, 1925.

DICRANUM FUSCESCENS Turn. var. CONGESTUM (Brid.) Husn. Bard Harbor, St. John Bay, Aug. 13, 1925.

DICRANUM BERGERI Bland. Flower Cove, July 29, 1924; Quirpon Island, Aug. 7, 1925.

DICRANUM BONJEANI De Not. Port aux Basques, July 20, 1924; Flower Cove, Aug. 1, 1924; Brig. Bay, Aug. 7, 1924; Bay Bulls, Aug. 20, 1924; Argentia, Aug. 27, 1924; Rose Blanche, Aug. 31, 1924; Ha-Ha Point, Aug. 5, 1925; Quirpon Island, Aug. 7, 1925; Bard Harbor, St. John Bay, Aug. 13, 1925.

DICRANUM BONJEANI De Not. var. JUNIPERIFOLIUM (Sendt.) Braithw. Flower Cove, July 27, 1924.

DICRANUM SCOPARIUM (L.) Hedw. Brig Bay, Aug. 5, 1924; Whitbourne, Aug. 25, 1924; Gaulton, Aug. 29, 1924.

DICRANUM MAJUS Turn. Flower Cove, July 24, 1924, July 12, 1925; Savage Cove, Aug. 7, 1925; Mt. Moriah, Aug. 11, 1924; Sandy (Poverty) Cove, July 25, 1925; Ship Cove, Sacred Bay, Aug. 11, 1925; Tweed Island, Bay of Islands, Sept. 2, 1926.

ORTHODICRANUM MONTANUM (Hedw.) Loeske. Bard Harbor, St. John Bay, Aug. 13, 1925.

ORTHODICRANUM FLAGELLARE (Hedw.) Loeske. Ramea, Aug. 30, 1924.

LEUCOBRYACEAE

LEUCOBRYUM GLAUCUM (L.) Schp. Port aux Basques, Aug. 31, 1924.

ENCALYPTACEAE

ENCALYPTA RHABDOCARPA Schwaegr. Brig Bay, Aug. 5, 1924; Mistaken Cove, July 11, 1925; Brandy Island, July 18, 1925; Brig Bay, Aug. 4, 1925; Ha-Ha Point, Aug. 5, 1925; Ship Cove, Sacred Bay, Aug. 9, 1925; Dog Peninsula, Aug. 25, 1925.

POTTIACEAE

GYMNOSTOMUN RUPESTRE Schleich. Brig Bay, Aug. 5, 1924.

HYMENOSTYLIUM CURVIROSTRE (Ehrh.) Lindb. St. John Island, July 31, 1925; Ha-Ha Point, Aug. 5, 1925; Anse aux Sauvages Aug. 11, 1925; Cape Raven, Mauve (Noddy) Bay, Aug. 12, 1925.

TORTELLA TORTUOSA (L.) Limp. Port aux Basques, July 23, 1924; Flower Cove, July 30, 1924; Brig Bay, Aug. 5, 1924; Sandy (Poverty) Cove, July 25, 1925.

DIDYMODON RUBELLUS (Hoffm.) Bry. eur. Brig. Bay, Aug. 5, 1924; Ha-Ha Point, July 17, 1925; Brandy Island, July 18, 1925; Flower Cove, July 23, 1925; Ship Cove, Sacred Bay, Aug. 11, 1925.

BARBULA VINEALIS Brid. Brid Bay, Aug. 5, 1924; Flower Cove, July 14, 1925.

POTTIA HEIMII (Hedw.) Bry. eur. Sandy Cove, Ingornachoix Bay, Aug. 9, 1924.

STEGONIA LATIFOLIA (Schwaegr.) Vent. Doctor Hill, Highlands of St. John, Aug. 24, 1925.

DESMATODON SYSTYLIUS Bry. eur. Doctor Hill, Highlands of St. John, Aug. 24, 1925.

DESMATODON CERNUUS (Hub.) Bry. eur. Flower Cove, Aug. 2, 1924; Sandy Cove, Ingornachoix Bay, Aug. 9, 1924; Bard Harbor, St. John Bay, July 29, 1925; Aug. 19, 1925; St. John Island, July 31, 1925.

TORTULA RURALIS (L.) Ehrh. Brig Bay, Aug. 4, 1925.

TORTULA NORVEGICA (Web. fil.) Lindb. Brig Bay, Aug. 4, 1925.

GRIMMIACEAE

GRIMMIA APOCARPA (L.) Hedw. Flower Cove, July 30, 1924; Brig Bay, Aug. 4, 1925; Cape Raven, Mauve (Noddy) Bay, Aug. 12, 1925; Bard Harbor, St. John Bay, Aug. 13, 1925; Savage Cove, Aug. 29, 1925.

GRIMMIA ALPICOLA Sw. Harbor Breton, Aug. 29, 1924.

GRIMMIA ALPICOLA Sw. var LATIFOLIA (Zett.) Hag. Bard Harbor, St. John Bay, Aug. 13, 1925.

RHACOMITRIUM FASICULARE (Schrad.) Brid. Bay Bulls, Aug. 20, 1924; Harbor Breton, Aug. 29, 1924; Rencontre, Aug. 30, 1924.

RHACOMITRIUM HETEROSTICHUM (Hedw.) Brid. var. GRACILESCENS Bry. eur. Harbor Breton, Aug. 29, 1924.

RHACOMITRIUM HYPNOIDES (L.) Lindb. Port aux Basques, July 21, 1924, Aug. 20, 1924, Aug. 31, 1924; Flower Cove, July 30, 1924; Bay Bulls, Aug. 20, 1924; Four Mile Cove, July 20, 1925; Bard Harbor, St. John Bay, July 27, 1925; South Head, Bay of Islands, Sept. 1, 1926.

RHACOMITRIUM CANESCENS (Weis., Tim.) Brid. Blanc Sablon, Labrador, Sept. 3, 1925.

FUNARIACEAE

FUNARIA MICROSTOMA Bry. eur. Cape Norman, Aug. 13, 1925.

FUNARIA HYGROMETRICA (L.) Sibth. Port aux Basques, July 23,

1924, Aug. 31, 1924; Flower Cove, Aug. 1, 1924, July 26, 1925; Curling, Aug. 11, 1924.

SPLACHNACEAE

TAYLORIA SPLACHNOIDES (Schleich.) Hook. Bard Harbor, St. John Bay, July 27, 1925.

TETRAPLODON BRYOIDES (Zoeg.) Lindb. Port aux Basques, July 20, 1924; St. John Island, July 31, 1925.

TETRAPLODON BRYOIDES (Zoeg.) Lindb. var. CAVIFOLIUS (Schp.) Mol. Blanc Sablon, Labrador, Sept. 3, 1925.

TETRAPLODON BRYOIDES (Zoeg.) Lindb. var. PARADOXUS (R. Br.) Hag. Savage Cove, July 14, 1925; Four Mile Cove, July 20, 1925.

TETRAPLODON ANGUSTATUS (L. f., Sw.) Bry. eur. Bard Harbor, St. John Bay, Aug. 3, 1925.

SPLACHNUM PEDUNCULATUM (Huds.) Lind. Bard Harbor, St. John Bay, July 19, 1925.

SPLACHNUM AMPULLACEUM L. Savage Cove, Aug. 7, 1924; Trepassey, Aug. 16, 1924.

BRYACEAE

WEBERA CRUDA (L.) Bruch. Bard Harbor, St. John Bay, July 27, 1925; Ship Cove, Sacred Bay, Aug. 9, 1925; Cape Norman, Aug. 13, 1925.

WEBERA NUTANS (Schreb.) Hedw. Common.

WEBERA COMMUTATA Schp. Bard Harbor, St. John Bay, Aug. 19, 1925.

WEBERA PROLIGERA (Lindb.) Kindb. Bard Harbor, St. John Bay, July 27, 1925.

ANOMOBRYUM CONCINNATUM (Spruc.) Lindb. Flower Cove, July 23, 1925.

LEPTOBRYUM PYRIFORME (L.) Wils. Flower Cove, July 27, 1924, Aug. 1, 1924; St. Barbe, Aug. 4, 1924; Brig Bay, Aug. 8, 1924; Ha-Ha Point, Aug. 5, 1925.

BRYUM PENDULUM (Hsch.) Schp. Boat Harbor, July 19, 1925; St. John Island, July 31, 1925; Anse aux Sauvages, Aug. 9, 1925.

BRYUM CALOPHYLLUM R. Br. St. Barbe, Aug. 4, 1924.

BRYUM KNOWLTONI Barnes? Bard Harbor, St. John Bay, Aug. 19, 1925.

This collection consists of a very small tuft with but a few capsules in rather poor condition and the determination is therefore uncertain.

Bryum Longii Bartr. sp. nov.

Plate 158. Figs. A–H.

Synoicous. Plants small in dense yellowish green tufts, reddish below; stems 5–10 mm. high, branched, closely matted together with

radicles below, branches short, densely foliate; leaves ovate, short acuminate, concave, about 1.5 mm. long, the lower smaller, margin nearly entire or minutely denticulate in the upper third, revolute in the lower half; costa reddish, ending below the apex in the lower leaves, percurrent or short excurrent into a more or less recurved point in the upper leaves; leaf cells lax, hexagonal-rhomboid above, up to 65 μ long by 20 μ wide, about two rows at the margin narrow and elongate forming a yellowish border, toward the base rectangular, up to 6 times as long as wide; seta 10–14 mm. long, red; capsule pedulous, 2–2.25 mm. long, pryiform, reddish brown, contracted to a short, wrinkled neck when dry, not contracted under the mouth, rather glossy, exothecal cells thin walled; lid convex, apiculate; peristome pale, teeth pale yellow, not darker at the base, finely papillose, hyaline at the tip, inner peristome rudimentary, very fragile and delicate, consisting of a basal membrane about one-third the height of the teeth without segments or cilia; annulus large; spores punctulate, 18–22 μ in diameter.

TYPE: sandy, clayey spots on limestone rock barrens, Boat Harbor, Newfoundland, July 19, 1925, *B. Long*, No. 228. Also from Savage Cove, on limestone barrens, July 14, 1925; Cape Norman, on limestone barrens, Aug. 13, 1925; Sandy (Poverty) Cove, clayey soil on limestone barrens, July 13, 1925; Black Cove, Big Brook, peat on limestone rock, July 16, 1925; Flower Cove July 30, 1924.

When this beautiful little moss is in fruit the abundance of bright ruddy capsules must present one of the striking bryological features of the localities where it is found. The species corresponds very closely to the description of *Bryum globosum* Lindb., which has been recorded from arctic North America, in everything but the imperfect inner peristome which, in all of the capsules examined from the various localities in Mr. Long's collection, shows only a basal membrane without any evidence of segments or cilia. It is a privilege to be able to associate Mr. Long's name with such a distinct species in this very complex genus.

BRYUM PALLENS Sw. St. Barbe, Aug. 7, 1925; Flower Cove, July 23, 1925; Ha-Ha Point, Aug. 5, 1925; Ship Cove, Sacred Bay, Aug. 9, 1925.

BRYUM INCLINATUM (Sw.) Bland. Flower Cove, July 27, 1924, July 29, 1924, July 30, 1924, Aug. 1, 1924; Brig Bay, Aug. 6, 1924; Curling, Aug. 11, 1924; Bard Harbor, St. John Bay, July 29, 1925; Ship Cove, Sacred Bay, Aug. 9, 1925; Anse aux Sauvages, Aug. 11, 1925; Wood's Island, Bay of Islands, Sept. 3, 1926.

BRYUM AFFINE (Bruch.) Lindb. Flower Cove, July 10, 1925.

BRYUM CAPILLARE L. St. Barbe, Aug. 4, 1924; Flower Cove, July 23, 1925.

BRYUM CAPILLARE L. var. OBCONICUM Huebn. Bard Harbor, St. John Bay, Aug. 19, 1925.

BRYUM VENTRICOSUM Dicks. Brig Bay, Aug. 7, 1924; Quirpon Island, Aug. 7, 1925.

BRYUM BIMUM Schreb. Mistaken Cove, July 10, 1925.

BRYUM CAESPITICUM L. Brig Bay, Aug. 8, 1924; Sandy Cove, Ingornichoix Bay, Aug. 9, 1924; Curling, Aug. 11, 1924.

BRYUM ARGENTEUM L. Burgeo, Aug. 30, 1924.

MNIACEAE

MNIUM HORNUM L. Rencontre, Aug. 30, 1924.

MNIUM ROSTRATUM Schrad. Flower Cove, July 27, 1924, July 29, 1924.

MNIUM SUBGLOSUM Bry. eur. Flower Cove, July 27, 1924.

MNIUM PUNCTATUM (L., Schreb.) Hedw. var. ELATUM Schp. Flower Cove, July 12, 1925; Anse aux Sauvages, Aug. 11, 1925; Yankee Point, Aug. 16, 1925.

CINCLIDIUM STYGIUM Sw. Flower Cove, July 29, 1924; Brig Bay, Aug. 7, 1924.

AULACOMNIACEAE

AULACOMNIUM PALUSTRE (L.) Schwaeger. Flower Cove, July 29, 1924, Aug. 1, 1924; St. Barbe, Aug. 4, 1924.

MEESEACEAE

AMBLYODON DEALBATUS (Dicks.) Palis. Boat Harbor, July 19, 1925; Cape Raven, Mauve (Noddy) Bay, Aug. 12, 1925.

MEESEA TRICHODES (L.) Spruc. Flower Cove, July 27, 1924, July 30, 1924; Brig Bay, Aug. 7, 1924; Ship Cove, Sacred Bay, Aug. 9, 1925; Savage Cove, Aug. 29, 1925.

MEESEA TRICHODES (L.) Spruc. var. ANGUSTIFOLIA (Brid.) Hag. Cape Norman, Aug. 13, 1925.

The plants in this collection are very different in appearance from those of the other numbers that are typical of the species and seem to be clearly referable to the variety which apparently has been recognized only in Norway heretofore.

CATOSCOPIACEAE

CATOSCOPIUM NIGRITUM (Hedw.) Brid. Brig Bay, Aug. 7, 1924; Sandy (Poverty) Cove, July 25, 1925; St. John's Island, July 31, 1925; Yankee Point, Aug. 16, 1925.

BARTRAMIACEAE

PLAGIOPUS OEDERI (Gunn.) Limp. Bard Harbor, St. John Bay, Aug. 26, 1925.

BARTRAMIA POMIFORMIS (L. ex p.) Hedw. Bard Harbor, St. John Bay, Aug. 19, 1925.

BARTRAMIA ITHYPHYLLA (Hall.) Brid. Bard Harbor, St. John Bay, Aug. 19, 1925.

PHILONOTIS FONTANA (L.) Brid. Bard Harbor, St. John Bay, July 27, 1925; Cape Raven, Mauve (Noddy) Bay, Aug. 12, 1925.

ORTHOTRICHACEAE

ORTHOTRICHUM ANOMALUM Hedw. Brig Bay, Aug. 5, 1924; Bard Harbor, St. John Bay, Aug. 19, 1925; Doctor Hill, Highlands of St. John, Aug. 24, 1925.

ORTHOTRICHUM BLYTTII Schp. Ha-Ha Point, Aug. 5, 1925.

ULOTA AMERICANA (Palis.) Limp. Brig Bay, Aug. 5, 1924.

ULOTA LUDWIGII (Brid.) Brid. Whitbourne, Aug. 25, 1924.

ULOTA CRISPULA Bruch. Bard Harbor, St. John Bay, July 27, 1925, Aug. 19, 1925.

ULOTA PHYLLANTHA Brid. Argentia, Aug. 26, 1924.

FONTINALACEAE

FONTINALIS ANTIPYRETICA L. Trepassey, Aug. 16, 1924.

FONTINALIS DALECARLICA Schp. Whitbourne, Aug. 25, 1924.

CLIMACIACEAE

CLIMACIUM DENDROIDES (Dill. L.) Web. Flower Cove, July 27–29, 1924.

HEDWIGIACEAE

HEDWIGIA ALBICANS (Web.) Lindb. Gaulton, Aug. 29, 1924.

THELIACEAE

MYURELLA JULACEA (Vill.) Bry. eur. Flower Cove, July 30, 1924; Brig Bay, Aug. 5, 1924; Ha-Ha Point, July 17, 1925.

LESKEACEAE

LESKEELLA NERVOSA (Schwaegr.) Loeske. Bay Bulls, Aug. 4, 1925.

THUIDIACEAE

THUIDIUM DELICATULUM (Dill. L.) Mitt. Brig Bay, Aug. 5, 1924; Savage Cove, Aug. 7, 1924.

ABIETINELLA ABIETINA (Dill. L.) C. M. Flower Cove, July 27, 1924; Bard Harbor, St. John Bay, Aug. 31, 1925.

AMBLYSTEGIACEAE

CRATONEURUM GLAUCUM (Lam.) C. Jens. var. FALCATUM (Brid.) C. Jens. Flower Cove, Aug. 1, 1924; Savage Cove, Aug. 7, 1924, Aug. 29, 1924.

CRATONEURUM FILICINUM (L.) Roth. Brandy Island, July 8, 1925.

CAMPYLIUM STELLATUM (Schreb.) Lang. & C. Jens. Bay Bulls, Aug. 4, 1925.

CAMPYLOPHYLLUM HALLERI (Sw.) Fleish. Flower Cove, July 31, 1924; Sandy (Poverty) Cove, July 25, 1924; Cape Norman, Aug. 13, 1925.

This is a rare species in North America but it seems to be rather well represented on the limestone areas of northern Newfoundland.

LEPTODICTYUM RIPARIUM (L.) Warnst. St. Barbe, Aug. 4, 1924.

AMBLYSTEGIUM SERPENS (L.) Bry. eur. Flower Cove, Aug. 2, 1924, July 10, 1925; St. Barbe, Aug. 4, 1924; Brig Bay, Aug. 5, 1924 (a slender form).

AMBLYSTEGIELLA SPRUCEI (Bruch.) Loesk. Brig Bay, Aug. 5, 1924.

DREPANOCLADUS UNCINATUS (Hedw.) Warnst. Flower Cove, July 30, 1924; Mt. Moriah, Aug. 11, 1924; Curling, Aug. 11, 1924; Harbor Breton, Aug. 29, 1924; Rencontre, Aug. 30, 1924; Bard Harbor, St. John Bay, July 27, 1925; Anse aux Sauvages, Aug. 11, 1925.

DREPANOCLADUS UNCINATUS (Hedw.) Warnst. var. PLUMULOSUM (Bry. eur.) Warnst. Quirpon Island, Aug. 6, 1925; Doctor Hill, Highlands of St. John, Aug. 24, 1925.

DREPANOCLADUS VERNICOSUS (Lindb.) Warnst. Flower Cove, July 28, 1924, Aug. 1, 1924; Quirpon Island, Aug. 7, 1925.

DREPANOCLADUS REVOLVENS (Sw.) Warnst. Quirpon Island, Aug. 7, 1925.

DREPANOCLADUS FLUITANS (Dill.) Warnst. Savage Cove, Aug. 7, 1924.

DREPANOCLADUS FLUITANS (Dill.) Warnst. var. FALCATUS (Bry. eur.) Warnst. Savage Cove, July 14, 1925.

HYGROHYPNUM DILATATUM (Wils.) Loesk. Bard Harbor, St. John Bay, Aug. 19, 1925.

CALLIERGON TURGESCENS (T. Jens.) Kindb. St. Barbe, Aug. 4, 1924; Savage Cove, Aug. 29, 1925.

CALLIERGON GIGANTEUM (Schp.) Kindb. Flower Cove, Aug. 1, 1924.

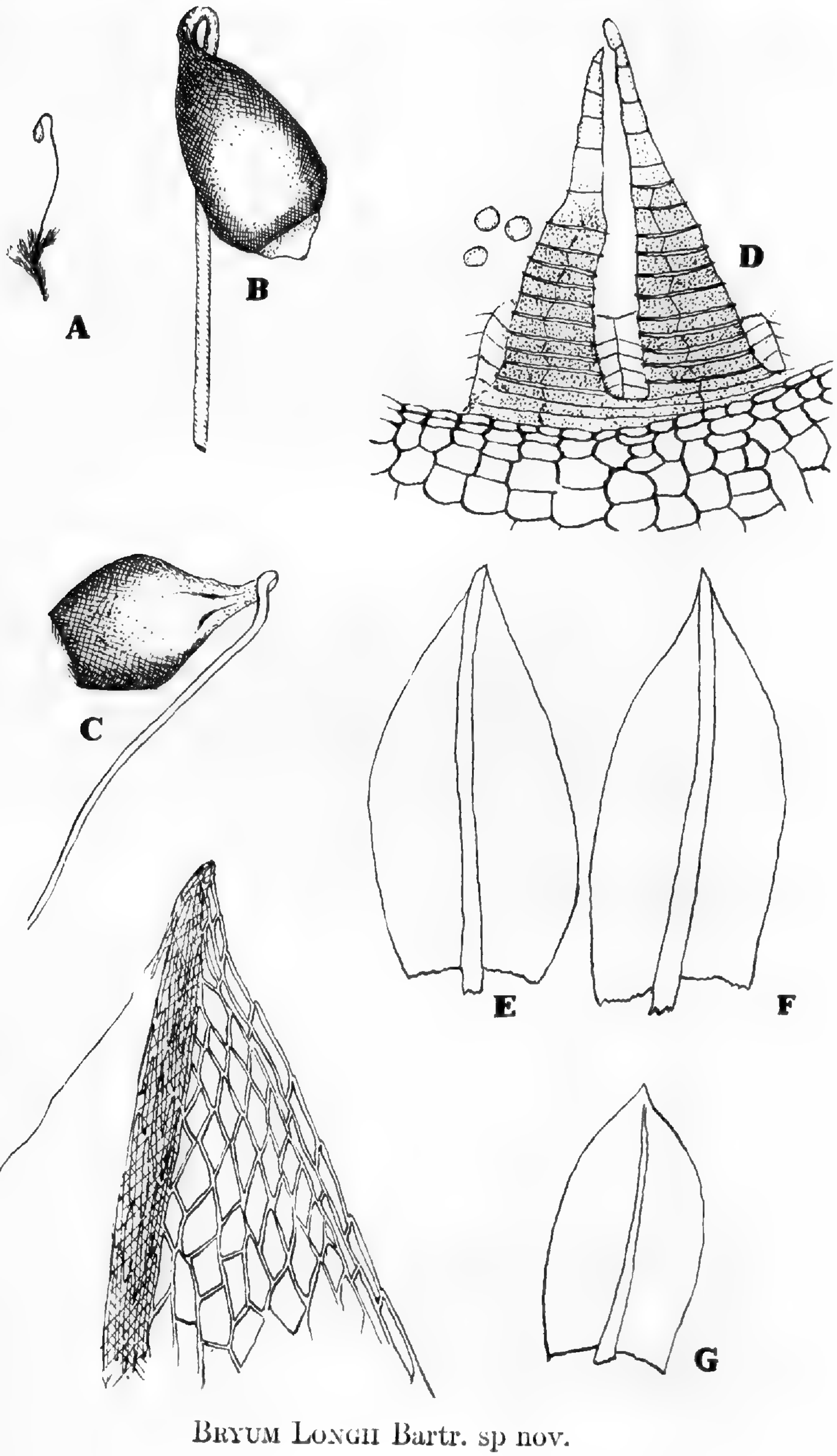
CALLIERGON SARMENTOSUM (Wahlenb.) Kindb. Quirpon Island, Aug. 6, 1925.

CALLIERGON STRAMINEUM (Dicks.) Kindb. Rencontre, Aug. 30, 1924; Cape Raven, Mauve (Noddy) Bay, Aug. 12, 1925.

SCORPIDIUM SCORPIOIDES (L.) Limp. Flower Cove, July 30, 1924; Whitbourne, Aug. 25, 1924; Bard Harbor, St. John Bay, Aug. 26, 1925; South Head, Bay of Islands, Sept. 1, 1926.

BRACHYTHECIACEAE

TOMENTHYPNUM NITENS (Schreb.) Loesk. Flower Cove, July 28, 1924; Savage Cove, Aug. 29, 1925.



BRYUM LONGII Bartr. sp nov.

BRACHYTHECIUM SALEBROSUM (Hoffm.) Bry. eur. Flower Cove, July 27, 1924; Brig Bay, Aug. 8, 1924; Rose Blanche, Aug. 31, 1924.

BRACHYTHECIUM REFLEXUM (Stark.) Bry. eur. Savage Cove, Aug. 7, 1924.

ENTODONTACEAE

PLEUROZIUM SCHREBERI (Willd.) Mitt. Common.

PLAGIOTHECIACEAE

PLAGIOTHECIUM SILVATICUM (Huds.) Bry. eur. Mt. Moriah, Aug. 11, 1924.

PLAGIOTHECIUM DENTICULATUM (L.) Bry. eur. Bard Harbor, St. John Bay, July 27, 1925.

PLAGIOTHECIUM STRIATELLUM (Brid.) Lindb. Port aux Basques, July 21, 1924; Bard Harbor, St. John Bay, July 27, 1925.

SEMATOPHYLLACEAE

BROTHERELLA DELICATULA (James) Fleish. South Head, Bay of Islands, Sept. 1, 1926.

HYPNACEAE

HYPNUM PALLESCENS Hedw. Bard Harbor, St. John Bay, Aug. 19, 1925.

HYPNUM IMPONENS Hedw. Port aux Basques, July 21, 1924.

HYPNUM BAMBERGERI Schp. Ha-Ha Point, Aug. 5, 1925.

HYPNUM CUPRESSIFORME L. Flower Cove, July 30, 1924; Brig Bay, Aug. 5, 1924; Argentia, Aug. 27, 1924; Gaulton, Aug. 29, 1924; Rencontre, Aug. 30, 1924; Rose Blanche, Aug. 31, 1924.

HYPNUM VAUCHERI Lesq. Brig Bay, Aug. 5, 1924.

BREIDLERIA ARCUATA (Lindb.) Loesk. Brig Bay, Aug. 5, 1924.

ISOPTERYGIUM PULCHELLUM (Dicks.) Jaeg. Bard Harbor, St. John Bay, Aug. 19, 1925.

PTILIUM CRISTA-CASTRENSIS (L.) De Not. Savage Cove, Aug. 7, 1924; Brig Bay, Aug. 7, 1924; Bard Harbor, St. John Bay, Aug. 26, 1925; South Head, Bay of Islands, Sept. 1, 1926.

RHYTIDIACEAE

RHYTIDIUM RUGOSUM (Ehrh.) Kindb. Flower Cove, July 27, 1924.

RHYTIDIADELPHUS SQUARROSUS (L.) Warnst. Flower Cove, July 27, 1924.

RHYTIDIADELPHUS TRIQUETRUS (L.) Warnst. Brig Bay, Aug. 5, 1924; Savage Cove, Aug. 7, 1924.

RHYTIDIADELPHUS LOREUS (Dill. L.) Warnst. Mt. Moriah, Aug. 11, 1924.

HYLOCOMIACEAE

HYLOCOMIUM PROLIFERUM (L.) Lindb. Flower Cove, July 27–29, 1924, Aug. 1, 1924; Brig Bay, Aug. 7, 1924; Whitbourne, Aug.

25, 1924; Yankee Point, Aug. 16, 1925; Bard Harbor, St. John Bay, Aug. 19–26, 1925.

POLYTRICHACEAE

POGONATUM CAPILLARE (Rich.) Brid. Curling, Aug. 11, 1924; Trepassey, Aug. 16, 1924; Argentia, Aug. 27, 1924; Harbor Breton, Aug. 29, 1924; Port aux Basques, Aug. 31, 1924; Burgeo, Sep. 9, 1926.

POGONATUM URNIGERUM (L.) Palis. Quirpon Island, Aug. 7, 1925.

POLYTRICHUM ALPINUM L. Curling, Aug. 11, 1924; Gaulton, Aug. 29, 1924; Rencontre, Aug. 30, 1924; Bard Harbor, St. John Bay, July 27, 1925, Aug. 19, 1925; Ha-Ha Point, Aug. 5, 1925; Argentia, Aug. 11, 1925.

POLYTRICHUM ALPINUM L. var. SILVATICUM (Menz.) Lindb. Ha-Ha Point, July 17, 1925; Bard Harbor, St. John Bay, July 27, 1925, Aug. 19, 1925; Cape Raven, Mauve (Noddy) Bay, Aug. 12, 1925.

POLYTRICHUM GRACILE Dicks. Port aux Basques, July 20, 1924; Flower Cove, July 27, 1924; Trepassey, Aug. 16, 1924; Savage Cove, Aug. 29, 1925.

POLYTRICHUM OHIOENSE Ren. & Card. South Head, Bay of Islands, Sept. 1, 1926.

POLYTRICHUM COMMUNE L. var. PERIGONIALE (Michx.) Bry. eur. Bay Bulls, Aug. 20, 1924.

POLYTRICHUM PILIFERUM Schreb. Port aux Basques, July 23, 1924; Bay Bulls, Aug. 20, 1924.

POLYTRICHUM JUNIPERINUM Willd. Common.

POLYTRICHUM STRICTUM Banks. Quirpon Island, Aug. 16, 1925; Yankee Point, Aug. 16, 1925.

BUSHKILL, PIKE CO., PENNSYLVANIA.

EXPLANATION OF PLATE 158

BRYUM LONGII Bartr. sp. nov. Fig. A, plant × 1. Fig. B, moist capsule × 11. Fig. C, dry capsule × 11. Fig. D, part of peristome × 170. Figs. E & F, upper stem leaves × 32. Fig. G, lower stem leaf × 32. Fig. H, apex of upper stem leaf × 170.

REPORTS ON THE FLORA OF MASSACHUSETTS,—I.

No satisfactory flora of the State of Massachusetts has been published, although several good floras of counties or smaller areas have appeared. Consequently we are making serial reports covering the vascular plants of the state, thus giving botanists an opportunity to correct and augment the ranges of species as given before a final assembling of the reports.

Unless otherwise stated the order of the plants in these reports

follows that of the 7th edition of Gray's Manual. Wherever names have been changed from those used in the Manual, synonomy has been indicated and appropriate literature cited.

POLYPODIACEAE (Fern Family)

POLYPODIUM L. Snake Fern, Polypody.

P. virginianum L. (*P. vulgare* of Manual, not L.; cf. Fernald, Rhodora, xxiv. 141 (1922)). Banks and ledges, usually shaded; common except in the southeastern part of the state, where it is occasional on the mainland, rare in Dukes County, and reported from but one station in Nantucket County (Bicknell, Bull. Torrey Botanical Club, xlvi. 429 (1919))where it has since disappeared.

Forma **acuminatum** (Gilbert) Fernald. (*P. vulgare* var. *attenuatum* of Manual, not Milde; cf. Fernald, Rhodora, xxiv. 141 (1922)). Milton, *F. G. Floyd*; Pittsfield and Mt. Washington, *R. Hoffmann*.

Forma **bipinnatifidum** Fernald. (*P. vulgare* var. *cambricum* of Manual, not Willd.; cf. Fernald, Rhodora, xxiv. 141 (1922)). Milton, *F. G. Floyd*.

Forma **deltoideum** (Gilbert) Fernald. (*P. vulgare* var. *auritum* of Manual, not Willd.; cf. Fernald, Rhodora, xxiv. 141 (1922)). Becket (R. Hoffmann, Flora of Berkshire County, Massachusetts, 196 (1922)).

ADIANTUM L. Maidenhair.

A. pedatum L. Rich deciduous woods; locally abundant, becoming rather frequent in the Connecticut Valley, but found only in New Bedford, *E. W. Hervey*, and Taunton, *F. L. Mason* and *F. W. Grigg*, in the southeastern part of the state.

PTERIDIUM Scop. Brake, Bracken.

(*Pteris* of the Manual; cf. Weatherby, Rhodora, xxi. 176 (1919)).

P. latiusculum (Desv.) Hieron., Wissenschaftliche Ergebnisse der Schwedischen Rhodesia-Kongo-Expedition 1911–12, i. Heft 1: 7 (1914). (*Pteris aquilina* of Manual, not L.). Dry open woods, clearings, and uplands; very common throughout.

Var. **pseudocaudatum** (Clute) Maxon. (*Pteris aquilina* var. *pseudocaudata* Clute; cf. Maxon, Am. Fern. Journ. ix. 44 (1919)). Dry sand plains; Needham, *T. O. Fuller*, Barnstable County and Nantucket.

PELLAEA Link. CLIFF BRAKE.

P. atropurpurea (L.) Link. Dry calcareous ledges; rare and local, Connecticut Valley and southern Berkshire County, also Berlin (G. E. Stone, RHODORA, ii. 14 (1900)).

CRYPTOGRAMMA R. Br. ROCK BRAKE.

C. Stelleri (Gmel.) Prantl. Shaded calcareous ledges; Colerain, Gill, Montague, Sunderland, and Williamstown.

WOODWARDIA Sm. CHAIN FERN.

W. virginica (L.) Sm. Wet woods and peat bogs, sometimes in water; frequent near the coast, occasional inland to the Connecticut Valley.

W. areolata (L.) Moore. Swamps and wet woods; occasional near the coast and at rare stations in the Connecticut Valley.

ASPLENIUM L. SPLEENWORT.

×**A. ebenoides** R. R. Scott. A hybrid between *Asplenium platyneuron* and *Camptosorus rhizophyllus*, on limestone ledges; Ashley Falls, *Mrs. J. R. Sanford*, and Sheffield, *F. Walters*.

A. Trichomanes L. Dry often calcareous ledges; frequent except in the southeastern part of the state, where it is known only from Taunton, New Bedford, and Westport.

A. platyneuron (L.) Oakes. EBONY SPLEENWORT. Rocky soil and ledges, also on shaded banks; frequent, becoming only occasional in the southeastern part of the state, and not known from Nantucket.

Forma **serratum** (E. S. Miller) R. Hoffmann, Proc. Bost. Soc. Nat. Hist. xxxvi. 193 (1922). Occuring locally over the same range.

Forma **Hortonae** (Davenp.) L. B. Smith.[1] (*A. platyneuron* var. *incisum* (E. C. Howe) Robinson.) Sunderland, *C. S. Trow*, and Great Barrington, *W. W. Eggleston*.

A. Ruta-muraria L. Calcareous ledges; rare and local, Berkshire County and Mt. Toby, Sunderland.

[1] ASPLENIUM PLATYNEURON (L.) Oakes, forma **Hortonae** (Davenp.) L. B. Smith, n. comb. *A. ebeneum* Ait. var. *incisum* E. C. Howe, Ann. Rep. Regents Univ. N. Y., xxii. 104 (1869). *A. ebeneum* Ait. var. *Hortonae* Davenp., RHODORA, iii. 1. t. 22 (1901). *A. ebeneum* Ait. forma *Hortonae* Clute, Fern Bull., xiv. 86 (1906).

ATHYRIUM Roth. SPLEENWORT.

(*Asplenium* in part, of Manual; cf. Weatherby, RHODORA, xxi. 174 (1919)).

A. angustifolium (Michx.) Milde. Rich calcareous woods; occasional, Mt. Toby in Sunderland and Leverett, and also northwestern Franklin County, and Berkshire County.

A. acrostichoides (Sw.) Diels. SILVERY SPLEENWORT. Rich woods; rather frequent, except in the southeast where found only in Sandwich, *M. L. Fernald & Bayard Long* and New Bedford, *E. W. Hervey*.

A. asplenioides (Michx.) Desv. (*Asplenium Filix-femina* of Manual in part, not Bernh.; cf. Butters, RHODORA, xix. 188 (1917). Low moist woods near the coast from the vicinity of Boston southward; occasional.

Forma **subtripinnatum** Butters, RHODORA, xix. 190 (1917). Milton, *F. G. Floyd*, and West Tisbury, *F. C. Seymour*.

A. angustum (Willd.) Presl. (*Asplenium Filix-femina* of Manual in part, not Bernh.; cf. Butters, RHODORA, xix. 190 (1917)). LADY FERN. Woods, fields, and pastures; common on the mainland but not definitely known from Dukes and Nantucket Counties.

Var. **elatius** (Link.) Butters, RHODORA, xix. 191 (1917). Occasional over the same range as the species.

Var. **rubellum** (Gilbert) Butters, RHODORA, xix. 193 (1917). Occasional over the same range as the species.

Forma **confertum** Butters, RHODORA, xix. 195 (1917). Brockton, *A. A. Eaton*.

Forma **laciniatum** Butters, RHODORA, xix. 195 (1917). West Roxbury, *F. G. Floyd*.

Forma **elegans** (Gilbert) Butters, RHODORA, xix. 196 (1917). Medford, Roxbury, Hyde Park.

CAMPTOSORUS Link. WALKING LEAF.

C. rhizophyllus (L.) Link. Shaded, calcareous rock crevices; occasional in Berkshire County and the Connecticut Valley, also Brookfield, (G. E. Stone, RHODORA, ii. 14 (1900)), Needham, *T. O. Fuller*, (Bull. Torr. Bot. Club. vi. 199 (1878)), and formerly Weston (Flora of the Boston District, RHODORA, ix, 83 (1907)).

Forma **auriculatus** Clute, Fern Bulletin, xv. 87 (1908). New Marlboro, *R. Hoffmann*.

POLYSTICHUM Roth.

P. acrostichoides (Michx.) Schott. CHRISTMAS FERN. Rocky woods, rich soil; frequent except in the southeastern part of the state where it is found in Taunton, New Bedford, Barnstable, Sandwich, and Chilmark.

Forma **incisum** (Gray) Gilbert, List N. A. Pterid., 19 (1901). (*P. acrostichoides* var. *Schweinitzii* (Beck) Small. Occasional over the same range as the species.

Forma **crispum** Clute, Our Ferns in Their Haunts, 317 (1901). Spencer, *Miss E. L. Horr.*

P. Braunii (Spenner) Fée. Rocky woods at high altitudes; rare, Pittsfield, Florida, North Adams, and Williamstown.

THELYPTERIS Schmidel. SHIELD FERN, WOOD FERN.

(*Phegopteris* and *Aspidium* of Manual; cf. Weatherby, RHODORA, xxi. 174, 176 (1919)).

T. palustris Schott. (*Aspidium Thelypteris*). MARSH FERN. Swamps, common.

Forma **Pufferae** (A. A. Eaton) L. B. Smith.[1] Sudbury, *Mrs. J. J. Puffer.*

T. simulata (Davenp.) Nieuwl. (*Aspidium simulatum*). MASSACHUSETTS FERN. Swampy woods; occasional on the mainland and Nantucket, not reported from Dukes County.

T. noveboracensis (L.) Nieuwl. (*Aspidium noveboracense*). NEW YORK FERN. Open woods; occasional in Dukes and Nantucket Counties, common elsewhere.

T. Phegopteris (L.) Slosson. (*Phegopteris polypodioides*). BEECH FERN. Damp rich woods; frequent except from the southeastern part of the state where known only from Plymouth, Lakeville, New Bedford, and Falmouth.

T. hexagonoptera (Michx.) Weatherby. (*Phegopteris hexagonoptera*). BROAD BEECH FERN. Rich open woods; rather frequent in the western and central parts of the state, becoming less common eastward and found only in the vicinity of New Bedford in the southeast.

T. Dryopteris (L.) Slosson. (*Phegopteris Dryopteris*). OAK

[1] THELYPTERIS PALUSTRIS Schott, forma **Pufferae** (A. A. Eaton) L. B. Smith, n. comb. *Nephrodium Thelypteris* Desv. forma *Pufferae* A. A. Eaton, Fern Bull., x. 78 (1902). *Aspidium Thelypteris* Sw. forma *Pufferae* B. L. Robinson, RHODORA, ix. 83 (1907).

FERN. Damp rich woods; common in the western part of the state, becoming occasional eastward but found only in New Bedford (E. W. Hervey, Flora of New Bedford, 51 (1911)) in the southeast.

T. marginalis (L.) Nieuwl. (*Aspidium marginale*). Ledges and rocky woods; common.

Forma **elegans** (J. Robinson) Weatherby, Proc. Bost. Soc. Nat. Hist., xxxvi. 197 (1922). (*Aspidium marginale* var. *elegans*, J. Robinson.) Occasional over same range as species.

Forma **Davenportii** (F. G. Floyd) L. B. Smith.[1] Milton, *F. G. Floyd.*

T. Goldiana (Hook.) Nieuwl. (*Aspidium Goldianum*). Rich woods; rather frequent from the Connecticut Valley westward, also Spencer (Jackson, Flora of Worcester County, 3 (1909)), Mt. Wachusett, *W. W. Bailey;* and Medford (doubtfully native), *L. F. Hobbs.*

×**T. Boottii** (Tuckerm.) Nieuwl. (*Aspidium Boottii*). Wet woods; occasional in the vicinity of *T. cristata* and *T. spinulosa* var. *intermedia* and generally considered a hybrid between them.

T. cristata (L.) Nieuwl. (*Aspidium cristatum*). Swamps and wet woods; frequent except on Nantucket.

Var. **Clintoniana** (D. C. Eaton) Weatherby. (*Aspidium cristatum* var. *Clintonianum*). Occasional except in the southeastern part of the state whence not reported.

T. spinulosa (O. F. Muell.) Nieuwl. (*Aspidium spinulosum*). Moist woods; common.

Var. **fructuosa** (Gilbert) Fernald, RHODORA, xxviii. 146 (1926). Woods; occasional except in the southeast, whence not reported.

Var. **intermedia** (Muhl.) Nieuwl. (*Aspidium spinulosum* var. *intermedium*). Rich woods; common except in the southeast where it is occasional. Not reported from Dukes County.

Var. **concordiana** (Davenp.) Weatherby. (*Aspidium spinulosum* var. *concordianum*). Single plant in swamp, Concord, *H. A. Purdie*, 1902.

Var. **americana** (Fisch.) Weatherby. (*Aspidium spinulosum* var. *dilatatum* forma *anadenium*). Woods, usually at high elevation, Berkshire County; also Brockton, *A. A. Eaton* and Byfield, *E. H. Clarkson.*

[1] THELYPTERIS MARGINALIS (L.) Nieuwl. forma **Davenportii** (F. G. Floyd) L. B. Smith, n. comb. *Nephrodium marginale* Richard forma *Davenportii* F. G. Floyd, RHODORA, iv. 244 (1902). *Aspidium marginale* Sw. forma *Davenportii* Eastman, N. E. Ferns, 27 (1904).

Hybrids between different species of *Thelypteris* have been found occasionally in the state, but with the exception of **T. Boottii** are too critical for inclusion in this list.

CYSTOPTERIS Bernh. BLADDER FERN.

C. bulbifera (L.) Bernh. Rich, especially calcareous slopes; rather frequent, Berkshire County and the western part of Franklin County.

C. fragilis (L.) Bernh. Shaded ledges; occasional in Plymouth and Bristol Counties, becoming frequent to common northward and westward.

WOODSIA R. Br.

W. ilvensis (L.) R. Br. Dry ledges; rather frequent, but not reported from the southeastern part of the state.[1]

W. obtusa (Spreng.) Torr. Dry rocky woods and open places; frequent, except in the southeastern part of the state, where it is known only from New Bedford and Attleboro.

DENNSTAEDTIA Bernh.

(*Dicksonia* of the Manual; cf. Weatherby, RHODORA, xxi. 175 (1919)).

D. punctilobula (Michx.) Moore. HAY-SCENTED FERN. Dry woods and pastures; common on the mainland, found locally in Dukes and Nantucket Counties.

ONOCLEA L.

O. sensibilis L. SENSITIVE FERN. Damp woods and meadows; common.

Forma **obtusilobata** (Schkuhr) Gilbert. A teratological form.

PTERETIS Raf.

(*Onoclea* in part, of the Manual; cf. Weatherby, RHODORA, xxi. 175 (1919)).

P. nodulosa (Michx.) Nieuwl. (*Onoclea Struthiopteris*). OSTRICH FERN. Rich, moist soil, especially alluvium; locally abundant in the western part of the state and occasional in the valley of the Merrimac and the Boston Basin; reported from Worcester and

[1] ***W. alpina*** **has been reported from Boylston (D. C. Eaton, Ferns of North America, ii. 108), but the specimen proved to be diseased *W. ilvensis*.**

Leicester in the central part of the state (J. Jackson, Flora of Worcester County, 4 (1909)).

J. R. Churchill
Walter Deane
F. W. Grigg
C. H. Knowlton
A. S. Pease
S. N. F. Sanford
L. B. Smith, Chairman

Committee on the Flora of Massachusetts.

The Authors of Sonchus arvensis, var. glabrescens.—In 1910 attention was called[1] to the presence in our flora of an extreme variation of *Sonchus arvensis*, with glabrous involucres. The plant was then called var. *glabrescens* Wimm. & Grab. (1829); but it now appears that the name goes back to an earlier publication by Guenther, Wimmer & Grabowski (1824). The plant is frequently referred to by a later varietal name, var. *laevipes* Koch (1846). Its bibliography is S. arvensis, var. glabrescens Guenth. Grab. & Wimm. Enum. Stirp. Phan. Siles. 127 (1824); Wimm. & Grab. Fl. Siles. pt. 2, ii. 220 (1829). Var. *laevipes* Koch, Syn. ed. 2: 511 (1846).—**M. L. Fernald, Gray Herbarium.**

An exceptionally large Quercus ilicifolia.—Ordinarily the common scrub oak, *Quercus ilicifolia*, does not exceed 4 m. in height, although very occasionally individuals of 5 m. are reported. An abnormally large specimen attracted my attention while collecting for the New England Botanical Club during the annual field excursion in southern Rhode Island early this summer. Accurate measurements were not made for lack of time, but conservative estimates justify the following approximations: height, 10 m.; diameter at 2 m. from the ground, 18 cm. In order to convince my companion, Mr. Rehder, of the correct identification, I was obliged to climb the tree for the necessary evidence. The record will be placed in the Herbarium of the New England Botanical Club at Cambridge under date of June 12th, 1927, Washington County, R. I., in the vicinity of West Kingston Station.—R. J. Eaton, Cambridge, Mass.

[1] Fernald & Wiegand, Rhodora, xii. 145 (1910).

"ADDITIONS TO THE FLORA OF WORCESTER COUNTY, MASSACHUSETTS."—When Joseph Jackson died in 1924, he left the nearly completed manuscript of a fourth edition of his *Flora of Worcester County*. It has proved impracticable to print this entire; but Mr. Norman P. Woodward and a committee of the Worcester Natural History Society have culled the new records from it, brought them up to date, and published them in an attractive and well-made pamphlet of 59 pages.[1] The work shows every evidence of care and accuracy and should take its place as a reliable and useful contribution to the record of the New England flora.

As might be expected in a region which has so long possessed a group of active observers, the number of native plants added to those previously known is not large. Any student of weed floras, however, will be interested and impressed by the relatively enormous array of exotic species which have recently turned up, largely as a result of using wool waste and other imported fertilizers in war gardens. They include one, *Perezia aletes* Macb., which was unknown to science until it appeared among the weeds of Worcester.—C. A. WEATHERBY, Gray Herbarium.

[1] Additions to the Flora of Worcester County, Massachusetts, by Joseph Jackson, 1909. Worcester, 1927. Published and for sale by the Natural History Society, 12 State St., Worcester, Mass. Bound in cloth, $1.00; paper, 50 cents.

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CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY,—NO. LXXIX.

M. L. Fernald

I. GEOCAULON, A NEW GENUS OF THE SANTALACEAE

Ever since I first met *Comandra livida* Richardson, in 1894, I have had a strong conviction that it is out of place in the genus *Comandra* Nutt. Many times subsequently in the field, as I have gathered the juicy scarlet false-drupes from the filiform axillary peduncles or have examined the bronze or green, often unisexual, flowers, I have made a mental protest against the inclusion of this plant of the moss and damp humus in the same genus with *Comandra umbellata* (L.) Nutt. or with *C. elegans* (Rochel) Reichenb. f. Finally, in August, 1923, with the intention of settling the question, an abundant series of inflorescences was collected on the Shickshock Mountains; but not until the present time have they been closely studied. It now becomes quite clear that in essentially all its characters *C. livida* departs from all the species of *Comandra* proper: *C. umbellata* (L.) Nutt., *C. Richardsiana* Fernald, *C. pallida* A.DC., *C. elegans* (Rochel) Reichenb. f., *C. californica* Eastw., and perhaps others.

In true *Comandra* the stoutish creeping or sprawling superficial or subterranean stems or rootstocks are covered with a loose and freely exfoliating corky to papery whitish-brown cortex; in *C. livida* the very slender and cord-like reddish to dark-brown subterranean stems have a tight and smooth cortex. In true *Comandra* the inflorescences are terminal panicles or corymbs of numerous small umbels, each umbel subtended by a tardily deciduous or persistent foliaceous involucel; in *C. livida* the 1–3 simple mostly 3-flowered umbels are borne on

filiform peduncles from the axils of the middle leaves, and the brown, scarious involucres are caducous. The flowers of true *Comandra* are perfect, the calyx-tube free from the summit of the ovary and in fruit slightly prolonged as a neck; and the ascending turbinate limb consists of petaloid whitish lobes. The flowers of *C. livida* are androdioeceous, the central 1 (rarely 2) perfect, the lateral mostly staminate and promptly dropping after anthesis, or sometimes all the flowers staminate; the calyx-tube is completely adnate to the ovary, not prolonged above it, and the rotate limb consists of bronze or green herbaceous lobes. In true *Comandra* the elongate disk is shallowly lobed, its lobes much shorter than the filaments, and it reaches the summit of the prolonged tube; in *C. livida* the salverform disk arises from the base of the throat and its long lobes about equal the filaments. In true *Comandra* the style is filiform and prolonged; in *C. livida* conical and very short. Finally, the fruit of true *Comandra* is a dry nut with only the lower half or two-thirds of the coriaceous calyx-tube adherent to it, the upper portion forming a free neck below the erect lobes; in *C. livida* the fruit is a scarlet and juicy false-drupe, with the succulent calyx-tube completely surrounding the nut.

Differing in every fundamental character (of rootstock, flowering habit, involucre, fertility of flowers, shape and texture of perianth, adnation of tube, position and lobing of disk, form and length of style, and, above all, in the very different fruit), and restricted to the Hudsonian to arctic-alpine regions of North America, *Comandra livida* does not seem to be congeneric with the species of true *Comandra*, plants of more southern range in America, with an isolated species in southeastern Europe.

In many characters *Comandra livida* is much closer to the monotypic *Nestronia* (or *Darbya*) of the southeastern United States. Like staminate *Nestronia umbellula* Raf., *Comandra livida* has the simple few-flowered umbels on filiform axillary peduncles, borne always below the terminal leaves, the involucral bracts caducous (in all material of *Nestronia* examined completely absent), and the calyx herbaceous and with spreading limb. The pistillate or perfect flower of *Nestronia*, like that of *Comandra livida*, has the ovary quite inferior and ripening into a false-drupe with completely adnate calyx-tube. But in many characters *Comandra livida* departs from *Nestronia*. The latter is a branching shrub, with opposite leaves; *C. livida* at most suffruticose, with simple herbaceous flowering stems and

alternate leaves. *Nestronia* is dioecious or polygamo-dioecious, the pistillate flowers solitary (not umbellate) and with the limb a mere crown; *C. livida* with the perfect flower central in the umbel with the staminate and with a spreading limb. In *Nestronia* the calyx-lobes are normally 4, in *C. livida* 5; in *Nestronia* the calyx-tube of the staminate flower is elongate and lined by the elongate, shallowly lobed or undulate disk; in *C. livida* short-campanulate or salverform, with the lobes of the disk prolonged.

It is thus clear that in some of its technical characters *Comandra livida* is nearer *Nestronia* than it is to *Comandra;* yet it is not satisfactorily placed with either. It is, therefore, here proposed as

Geocaulon (*Santalaceae*), gen. nov. Flores andro-dioici, centrales plerumque hermaphroditi, laterales masculi. Calyces herbacei, priores et masculi inferne turbinato, feminei campanulati; lobis ovato-acutis, aeneis vel viridibus, patentibus persistentibusque. Fasciculus pilorum e basi interna lobi cujusve ad antheram tendens ubique adhaerens. Stamina lobis opposita, filamento subulato, anthera ovoidea, biloculari. Discus epigynus hypocrateriformis, lobis elongatis filamenta subaequantibus. Ovarium inferum, tubo calycis inclusum. Stylus conicus, brevis. Stigma capitellatum. Drupa ovoideo-globosa coccinea, vestigiis loborum et disci coronata.—Fruticulus caulibus sarmentiformibus, valde repentibus, brunneis vel rufescentibus; ramis floriferis erectis; foliis alternis integris; umbella solitaria axillaris pedunculata 3 (2–4)-flora; bracteis involucri scariosis brunneis caducis; floribus masculis caducis. (Γῆ, *earth*, and καύλος, *stalk*, from the long, slightly subterranean but scarcely modified stems.)—A single species.

G. lividum (Richardson), n. comb. *Comandra livida* Richardson in Frankl. Narr. 1st Journ. App. 734 (1823).—Creeping stems very slender, 1.5–3 mm. thick, with close smooth cortex; flowering stems 0.7–3 dm. high: leaves flaccid, grayish-green to purplish, elliptic to narrowly obovate, 1.5–5 cm. long: peduncles 1–3, filiform, in fruit 1–2 cm. long: limb of perianth about 4 mm. broad: drupes solitary (rarely 2), 6–10 mm. in diameter, with juicy pulp; the stone (or nut) thin-walled, with a very fleshy and oily edible kernel.—Creeping in moss or damp humus, Labrador to Alaska, south to southern New Brunswick, eastern Maine, mountains of northern New England, northern Michigan, northern Minnesota, Saskatchewan, Alberta and British Columbia. Fl. late May–early August; fr. July–September. The following, selected from many specimens, are characteristic. LABRADOR: Makkovik, *Stecker*, no. 99; Hopedale, *Bowdoin College Exped.* no. 245; Square Island, 1864, *B. P. Mann;* Chateau Bay, *Bowdoin College Exped.* no. 75; Forteau, *Fernald & Wiegand*, no. 3284. NEWFOUNDLAND: Burnt Cape, *Fernald, Wiegand, Pease, Long, Griscom, Gilbert & Hotchkiss*, no. 28,113; Mistaken Cove, *Wiegand, Pease, Long & Hotchkiss*, no. 28,112; Brig Bay, *Fernald, Long & Dunbar*,

no. 26,610; Deer Pond, *Wiegand, Gilbert & Hotchkiss*, no. 28,114; Port Saunders, *Fernald & Wiegand*, no. 3283; Bay of Islands, *Eames & Godfrey*, no. 6037; Sandy Lake, *Fernald & Wiegand*, no. 3282; Grand Falls, *Fernald, Wiegand, Bartram & Darlington*, nos. 5327, 5328; Tilt Cove, *Fernald & Wiegand*, no. 5331; St. John's, *Robinson & Schrenk*, no. 152. QUEBEC: Archipel du Petit Mécatina, *St. John*, no. 90,397; Ile à la Proie, Archipel de Mingan, *Victorin & Rolland*, nos. 18,506, 22,055; Baie Sainte-Claire, Anticosti, *Victorin*, no. 4270; Seven Islands, *C. B. Robinson*, no. 731; La Péninsule, Baie de Gaspé, *Victorin et al.* no. 17,331; Tabletop Mts., Gaspé Co., *Fernald, Dodge & Smith*, no. 25,713; New Carlisle, 1902, *Williams & Fernald;* Lac Saint-Jean, *Victorin*, no. 15,754; Tadousac, 1892, *Kennedy;* Rivière du Loup, *Victorin*, no. 134; St. Alexandre de Kamouraska, 1880, *Pringle;* Black Lake, *Fernald & Jackson*, no. 12,077. MAGDALEN ISLANDS: Brion Island, *St. John*, no. 1851. NEW BRUNSWICK: St. John, 1872, *T. P. James.* MAINE: Mt. Katahdin, 1900, *Fernald;* Mt. Saddleback, Franklin Co., 1894, *Fernald*, 1902, *Knowlton;* Mt. Abraham, *Knowlton*, no. 606; West Quoddy Head, Lubec, *Fernald*, no. 1715; Roque Bluffs, 1913, *Knowlton.* NEW HAMPSHIRE: Mt. Clinton, *Eggleston*, no. 2399, *Pease*, no. 12,303; Imp Mt., *Pease*, no. 16,766; Mt. Ingalls, *A. H. Moore*, no. 4096, *Pease*, no. 11,210. VERMONT: Mt. Mansfield, *Pringle et al.* ONTARIO: Pic River, *Loring;* Anvil Lake, Timagami Region, *Anderson & Anderson*, no. 26,100 B. MICHIGAN: Isle Royale, 1849, *Whitney;* Keweenaw Co., 1863, *Robbins;* Marquette Island, 1913, *W. H. Manning.* MINNESOTA: border of Lake of the Woods, south of 49°, *Richardson.* MANITOBA: Churchill, *J. M. Macoun*, no. 79,398; Lake Manitoba, 1881, *Macoun.* SASKATCHEWAN. 1857–8, *Bourgeau.* ALBERTA: Rocky Mts., *Drummond;* Banff, *Canby et al.* BRITISH COLUMBIA: Macleod's Lake, lat. 55°, *Macoun*, no. 1559; Revelstoke, *Shaw*, no. 31. YUKON: Dawson, *Eastwood*, nos. 117, 491. ALASKA: Lake Iliamna Region, *Gorman*, no. 174.

Geocaulon lividum was beautifully illustrated, as *Comandra livida*, in Hooker, Flora Boreali-Americana, t. clxxix B. Although the accompanying description indicates no difference between the central and lateral flowers, the artist noted the difference and showed the central perfect flower much larger than the others.

II. THE AMERICAN AND EASTERN ASIATIC BECKMANNIA

IT has often been pointed out that the plant of northwestern North America and northeastern Asia which has passed as *Beckmannia erucaeformis* (L.) Host is not identical with the true *B. erucaeformis* (*Phalaris erucaeformis* L.) of southeastern Europe and southwestern Asia; but not until Hultén's recent scholarly publication upon the

flora of Kamtchatka[1] have the two plants been adequately contrasted. Hultén shows that there are two quite distinct species of *Beckmannia*.[2] True *B. erucaeformis* of Italy, Greece, Hungary, southern Russia and Asia Minor is a perennial with bulbous or "incrassated" bases, simple or but slightly compound and very short panicle-branches closely appressed to the rachis: spikelets mostly 2-flowered and strongly rounded; the glumes nearly semicircular, coriaceous and with a rounded keel and very narrow membranaceous border; the thick lemma short-mucronate or very short-pointed, scabrous and beset with long hairs along the median nerve. The plant of northeastern Asia and northwestern America, on the other hand, has the culms with soft bases, usually described as annual, commonly coarser and taller; the leaves broader; the panicle much more branched, with the principal branches longer and somewhat spreading; spikelets larger, mostly with 1 perfect and 1 aborted floret, pyriform; glumes rounded-triangular, broadest toward the apex, thin, strongly carinate, with a whitish scarious border; lemma thin, long-mucronate, glabrous or only slightly short-pilose on the dorsal nerve. For this plant of eastern Asia Hultén proposes the name *Beckmannia baicalensis* (W. Kuznetzow) Hultén,[3] based upon *B. erucaeformis*, var. *baicalensis* W. Kuznetzow (1913).

Hultén gives a careful discussion of the two plants and makes a good case for the specific segregation of *B. baicalensis;* but, unfortunately, he overlooked at least two available names which were published earlier than Kuznetzow's in 1913. In order clearly to understand these names it is well to start with the original *Phalaris erucaeformis* L.[4] Linnaeus did not differentiate the two and certainly included them both under *P. erucaeformis* which had its "*Habitat in* Sibiria, Russia, Europa *australi*." After a brief original diagnosis, "PHALARIS panicula lineari secunda, calycibus bifloris," which certainly applies to the plant from "Russia, Europa *australi*," he gave three citations: "Dactylis spicis numerosis alternis culmo adpressis longitudine internodiorum, calycibus bifloris. *Roy. lugdb.*

[1] Eric Hultén, *Flora of Kamtchatka and the Adjacent Islands*, i,—Kungl. Svenska Vetenskapsakad. Handl. Ser. 3, v. no. 1 (1927).

[2] In some of our American manuals we are told that the genus was named "In honor of Johann Beckmann, . . . teacher of Natural History at St. Petersburg." The original statement of Host, however, was: "Hoc proprii generis gramen in honorem Cl. viri Joannis Beckmanni, in Universitate Goettingensi Oeconomiae ruralis Professoris, nominavi"—Host, Ic. Gram. Austr. iii. 6 (1805).

[3] Hultén, l. c. 119 (1927).

[4] L. Sp. Pl. i. 55 (1753).

57. Gmel. sibir. I. p. 130. t. 29" and "Gramen palustre, locustis erucaeformibus. *Barr. rar. 1158. t. 2.*" Royen's description and his citation of the description and plate of Barreliero show that he had the Italian plant and although Barreliero said of the plant "Annum est," [1] he certainly had the plant of Italy, and the Linnean specific name was obviously derived from his *Gramen palustre, locustis Erucaeformibus*, a name given from the resemblance of the green spikes to caterpillars on the branches of a tree. Linnaeus's reference to Gmelin's Siberian plant alone belongs to *Beckmannia baicalensis*. Gmelin's plate is thoroughly typical for the latter species. With Linnaeus's own diagnosis and the plants of Royen and of Barreliero coinciding, and with the specific name clearly derived from Barreliero's account of the Italian plant, there can be no doubt that the name *B. erucaeformis* should be restricted to the plant of southeastern Europe and Asia Minor. The species is well illustrated in Host, Ic. Gram. Austr. iii. t. 206 (1805); Nees, Gen. i.t. 40 (1843) and Reichenbach, Ic. Fl. Germ. i. t. clxxi (1850).

That the wide-ranging northern plant is not identical with the Mediterranean species seems to have been first recognized by Steudel in 1846. Receiving the plant from Japan, Steudel, on account of the single perfect flower, the disarticulation of the spikelets below the glumes and the superficial resemblance of the plant to *Panicum brizoides* Jacq. and others with the inflorescence of *Echinochloa*, described it as *Panicum Syzigachne*.[2] Later, however, recognizing that his Japanese species belonged to *Beckmannia*, he reduced it to a variety of *B. erucaeformis*, "Variat: statura et omnibus partibus majoribus. Panicum Syzigachne. *Steud.* Flora 1846. p. 19. Japon." [3] In 1880 Dr. George Thurber, treating the grasses of California and retaining our plant as *B. erucaeformis*, made the note: "In all American specimens we have thus far examined the upper floret is wanting." [4] Thurber's observation was soon again emphasized by Vasey, who, in diagnosing *Beckmannia*, described the spikelets as "consisting of two perfect flowers, the terminal one only fertile, (or in American specimens the lower flower is suppressed);" and at the same time Vasey called the American plant *B. erucaeformis*, var. *uniflorus* Scribn.,[5] but without diagnosis further than by implication from the

[1] Barr. Plantae per Galliam, Hispaniam et Italiam Observatae, 105 (1714).
[2] Steud. Flora, xxix. 19 (1846).
[3] Steud. Syn. Pl. Gram. 15 (1854).
[4] Thurb. in Wats. Bot. Cal. ii. 264 (1880).
[5] Scribn. in Vasey, Descr. Cat. Grasses U. S. 8 (1885).

preceding note. In 1896 *B. erucaeformis uniflorus* Scribn. was used by Beal[1] for the American plant which was well described and illustrated by drawings of the spikelet supplied by Scribner; and in the 6th edition of Gray's *Manual*, Watson & Coulter took up *B. erucaeformis*, var. *uniflora*, a name dropped by Hitchcock from the 7th edition, where the plant is treated unequivocally as *B. erucaeformis*, although the genus, based upon a 2-flowered species, was by Hitchcock now defined as having "Spikelets 1-flowered in our species." In his later work the American and Asiatic plant is still maintained by Hitchcock as *B. erucaeformis* (without var. *uniflora* cited as a synonym); but the facts of the case are covered by the statement under the generic description: "Spikelets 1-flowered, rarely 2-flowered";[2] and under the specific description: "The European form has 2-flowered spikelets."[2] In 1913, W. Kuznetzow again named the Asiatic and American plant, his material coming from Transbaikalia, whence his new name *B. erucaeformis*, var. *baicalensis*,[3] upon which Hultén based the specific combination *B. baicalensis*. In taking up Kuznetzow's varietal name as the specific name for a plant which extends half way around the northern hemisphere Hultén was apologetic: "Although his variety name is not very suitable for the species, I have thought it most correct to retain it" (p. 121). Unfortunately, however, *correct* following of nomenclatorial rules forces us to use for the species a name in some ways less desirable than *B. baicalensis*. The correct name of the plant seems to be

BECKMANNIA **Syzigachne** (Steud.), n. comb. *Panicum Syzigachne* Steud. Flora, xxix. 19 (1846). *B. erucaeformis*, var. Steud. Syn. Pl. Gram. 15 (1854). *B. erucaeformis*, var. *uniflorus* Scribn. in Vasey, Descr. Cat. Grasses U. S. 8 (1885), name only; in Beal, Grasses N. A. ii. 428, fig. 77 (1896). *B. erucaeformis*, var. *baicalensis* W. Kuznetzow, Bull. Angev. Bot. vi. No. 9: 584 (1913). *B. baicalensis* (W. Kuznetzow) Hultén, Kungl. Svenska Vetenskapsakad. Handl. Ser. 3, v. no. 1: 119 (1927).

Beckmannia Syzigachne, as previously stated, was well illustrated by Gmelin. Scribner's figures of the spikelet of his *B. erucaeformis*, var. *uniflorus* are excellent, and Mrs. Chase's illustration (as *B. erucaeformis*) in Hitchcock, Gen. Grasses U. S. fig. 108 is very characteristic.

[1] Beal, Grasses, N. A. ii. 428, fig. 77 (1896).
[2] Hitchc. Gen. Grasses U. S. 180, 182 (1920).
[3] W. Kuznetzow, Bull. Angev. Bot. vi. No. 9: 584 (1913).

III. THE EASTERN AMERICAN VARIETY OF POLYSTICHUM BRAUNII

(Plate 159)

THE plant which has been passing in eastern America as *Polystichum Braunii* (Spenner) Fée abounds in rich woodlands and glades or on shaded talus and rock-slides of northern and western Newfoundland, Anticosti Island and the Gaspé Peninsula of Quebec. Westward and southward it becomes more local, extending west to Algoma District, Ontario and south (at low altitudes) to Cape Breton Island and Colchester and Kings Counties, Nova Scotia and Charlotte County, New Brunswick, and (chiefly in the mountains) to Aroostook, northern Penobscot, northern Piscataquis, northern Somerset and Franklin Counties, Maine, Carroll and Grafton Counties, New Hampshire, Berkshire County, Massachusetts, Ulster and Delaware Counties, New York, Sullivan County, Pennsylvania and Keweenaw County, Michigan. It is thus completely isolated from *P. Braunii* of Europe, which is there a plant of decidedly southern range: localized in upland woods of the Caucasus and southern Russia, and from the Transylvanian and Croatian Alps to the Maritime Alps and the Pyrenees, extending northward in the mountains to southern Germany, where (according to Milde) it is abundant in some regions of Silesia. North of southern Germany it is found at two stations in southernmost Sweden and at scattered stations in southern Norway, thence extending to a point (Brönnö) about midway along the western coast of Norway. It is not in arctic Europe, nor does it reach the British Isles, Iceland and Greenland; and the plant of eastern America does not extend north of the St. Lawrence basin, being decidedly a Canadian type. Outside Europe, *P. Braunii* is known in Eurasia only in northeastern Asia, whence it apparently extends across into southern Alaska. The Japanese plant is at least varietally distinct, var. *japonicum* Christ; and in Alaska there is a related plant, *P. alaskense* Maxon, which in its more attenuate pinnae and more tapering bases of the pinnules closely simulates the Kamtchatkan *P. Braunii*, var. *kamtschaticum* C. Chr. & Hultén, Kungl. Vet. Akad. Handl. v. no. 1: 38, t. 2 (1927), but its fronds are simply bipinnate, those of var. *kamtschaticum* tripinnatifid. European authors are in the habit of citing the Hawaiian Islands as also having *P. Braunii*, but the Hawaiian plants, *P. haleakalense* Brack. and *P. Hillebrandii* Carruth., are thoroughly distinct in many obvious characters. The Alaskan

material which may belong to *P. Braunii* is fragmentary and its identity, therefore, not readily settled, and at least some of the plants of eastern Asia are more like the eastern American than the European plant.

The plant of the Canadian forest of southeastern Canada and the northeastern states, unknown on the Labrador Peninsula or in Greenland, has obviously been long isolated from the European plant, unknown in arctic Europe, the British Isles and Iceland. As a general rule, flowering plants with such ranges would be found to have quite definite characters of flower and fruit and would stand as good species: such pairs as *Carex loliacea* L. (Eu., e. Asia and n.w. Am.) and *C. trisperma* Dew. (Atl. N.A.), *C. alba* Scop. (Eu., e. Asia) and *C. eburnea* Boott (Atl. N. A.), *Luzula pilosa* (L.) Willd. (Eu. and w. Asia) and *L. saltuensis* Fern. (Atl. N.A.), *Hepatica nobilis* Schreb. (Eu.) and *H. americana* (DC.) Ker. (Atl. N.A.), etc., etc.; but, although showing recognizable, though slight, differences in the scales of the stipe and rachis, in the texture of the frond and the toothing of the pinnules, the American and European plants have essentially identical spores.

P. Braunii of Europe is generally described as having herbaceous fronds: "Blätter . . . weich . . . nicht überwinternd"—Luerssen; "Textur krautig"—Christ; "*Frondes* . . seulement *membraneuses*" —Rouy; but in the plant of eastern America they are subcoriaceous. Consequently, in the European plant the venation of the pinnules is distinctly seen under low magnification; in the American ordinarily it is rather obscure. The largest scales of the stipe-bases in the European plant are rather firm and are prolonged into bristle-tips 5–8 mm. long; in the eastern American they are much thinner and shorter-pointed (the bristle-tip 1–4 mm. long). Under considerable magnification the median cells of the large scales of the European plant appear elongate-linear, with heavy cell-walls and extremely narrow lumina; while in the eastern American plant the thinner scales show shorter-linear to oblong cells (mostly 100–300 μ long) with very thin walls and broad lumina, a difference similar to that separating the European *Thelypteris spinulosa*, var. *dilatata* (Hoffm.) St. John and the American var. *americana* (Fischer) Weatherby. In the European plant the back of the rachis (especially the lower half) bears innumerable retrorse soft acicular scales which are far more numerous than the lanceolate scales; in the eastern American plant the relation is

reversed, the lanceolate scales being more abundant than in the European, the acicular scales fewer and shorter. In the European plant the terminal (and often the marginal) bristles of the pinnules are 1–2 mm. long; in the plant of eastern America 0.5–1.3 mm. long. Only a few good indusia of the European plant have been available for study, consequently it has not been possible to make a satisfactory comparison of this organ in the two plants; but, as stated, the spores present no appreciable difference unless it is that the American are minutely larger.

With essentially identical spores and outline of frond, pinnae and pinnules, the two plants illustrate the conservatism of the ferns. They have obviously been long isolated but their segregation has proceeded only far enough to affect the superficial vegetative characters. These, however, are sufficient to make it clarifying to distinguish the eastern American (and northern Chinese) plant as a geographic variety; and since the first American record of the plant was based upon its discovery by Frederick Pursh in the Green Mountains of Vermont in 1807 it is appropriate that it be called

POLYSTICHUM BRAUNII (Spenner) Fée, var. **Purshii**, n. var., forma typica recedit frondibus subcoriaceis; stipitis squamis scariosis latissimis acutis vel breviter aristatis, arista 1–4 mm. longa, cellulis mediis oblongis vel linearibus 100–300 μ longis lumine lato parietibus tenuibus pallidis; rhacheos squamis lanceolatis fibrillosisque illis pluribus; pinnularum aristis terminalibus 0.5–1.3 mm. longis.—Cool woods, glades and shaded talus, northern and western Newfoundland, Anticosti Island and Gaspé Peninsula, Quebec to Algoma District, Ontario, south to Cape Breton and Colchester and Kings Counties, Nova Scotia, York and Charlotte Counties, New Brunswick, Aroostook, northern Penobscot, northern Piscataquis, northern Somerset and Franklin Counties, Maine, Carroll and Grafton Counties, New Hampshire, Berkshire County, Massachusetts, Ulster and Delaware Counties, New York, Sullivan County, Pennsylvania and Keweenaw County, Michigan; southward chiefly at altitudes from 300–1525 m. (1000–5000 feet); also northern China and Sachalin Island. TYPE: Smuggler's Notch, Vermont, August 9, 1877, *C. E. Faxon* (in Gray Herb.), distributed as *Aspidium aculeatum*, var. *Braunii*.

This is the plant which has regularly passed in eastern America as *Aspidium aculeatum*, *A. aculeatum*, var. *Braunii*, *Polystichum aculeatum*, var. *Braunii* and *Polystichum Braunii*.

EXPLANATION OF PLATE 159

POLYSTICHUM BRAUNII, var. PURSHII. A small plant, × ⅓, from Colebrook, New Hampshire, *Pease*, no. 10,387. Photograph by *Professor J. F. Collins*.

(To be continued)

POLYSTICHUM BRAUNII, VAR. PURSHII, × ⅓

NOTES FROM THE HERBARIUM OF THE UNIVERSITY OF WISCONSIN—II.

BIDENS CONNATA AND ITS VARIETIES IN WISCONSIN

Norman C. Fassett

(Plate 160)

In his key to the northeastern American species of *Bidens*[1] the writer distinguished *Bidens connata* and its allies, *B. bidentoides*, *B. Eatoni*, *B. multiceps*, and *B. heterodoxa*, as having the "margins of the achenes antrorsely barbed, at least at the very base." Some of the achenes do not show this. A more constant character seems to be in the hairs on the surfaces of the achene, which are antrorse, as opposed to the retrorse hairs (or none) on the surfaces of the achenes of *B. laevis*, *B. cernua*, *B. hyperborea*, *B. comosa*, and *B. tripartita*.

The following arrangement of the variations of *Bidens connata* is based on material in the Herbarium of the University of Wisconsin, on the collections of L. M. Umbach recently acquired from North-Central College, material from the Milwaukee Public Museum made available through the courtesy of Dr. H. H. Smith, and material of *B. connata*, var. *pinnata*, kindly loaned from the Herbarium of the University of Minnesota by Professor C. O. Rosendahl.

As it grows in Wisconsin *B. connata* falls into six varieties, as follows:

a. Middle and lower leaves undivided, from coarsely dentate to deeply cleft into 3 broadly lanceolate divisions—*b.*
  b. Margins of achenes retrorsely barbed, except sometimes at base—*c.*
    c. Petioles winged: achenes seldom exceeding 6.5 mm. in length: leaves often 3-cleft—*d.*
      d. Outer involucral bracts seldom exceeding 1.5 cm. in length ..... var. *typica*
      d. Outer involucral bracts 3–6 cm. in length ..... var. *fallax*
    c. Petioles narrowly margined: inner achenes 7–8 mm. long: leaves rarely 2–3-cleft ..... var. *petiolata*
  b. Margins of achenes with at least some antrorse barbs toward the summit—*e.*
    e. Awns with antrorse and retrorse barbs intermixed .... var. *ambiversa*
    e. Awns entirely antrorsely barbed ..... var. *anomala*
a. Middle and lower leaves pinnately 3–7-parted, the divisions narrowly lanceolate ..... var. *pinnata*

B. connata, var. **typica.** *B. connata* Muhl. in Willd. Sp. iii. 1718 (1804); Fernald, Rhodora x. 200 (1908); not Farwell, Ann. Rep. Comm. Parks & Boulevards Detroit xi. 91 (1900). Following Nuttall, Professor Fernald distinguished *B. connata* from its var. *petiolata* on

[1] Rhodora xxvii 184–185 (1925).

the basis of the winged petioles and lobed leaves of the former. Some years later, in RHODORA xvii. 243 (1915), R. W. Woodward pointed out the fact that the achene of var. *petiolata* is larger than that of typical *B. connata.* This achene difference was again emphasized by Fernald in RHODORA xxi. 103 (1919) by the statement that *B. connata* has outer achenes 4–5.3 mm. long, and inner achenes 5–6.5 mm. long, while its variety has outer achenes 6.5 mm. long, and inner achenes up to 8 mm. long.

A number of plants in the Herbarium of the University of Wisconsin have unlobed leaves and short achenes. A study in the field revealed, on the sandy shore of Golden Lake, near Dousman, Wisconsin, plants (Fig. 2) which are almost a perfect match for the material of typical *B. connata* collected by Fernald & Weatherby at Winchester, Massachusetts, in September, 1908, and distributed as Plantae Exsiccatae Grayanae no. 298. Growing with this form at Dousman, and obviously grading into it, was a plant also with short achenes, but with unlobed leaves and winged petioles (Fig. 1). It appears, then, that var. *typica* may have uncleft leaves, and that the short achenes and winged petioles are more constant characters than is the lobing of the leaf-blade.

B. connata, var. *typica,* is apparently widely distributed in Wisconsin.

B. CONNATA, var. FALLAX (Warnst.) Sherff, Bot. Gaz. lxxvi. 154 (1923). *B. connata,* var. *fultior* Fernald & St. John, RHODORA xvii. 24 (1915). This variety, to judge from Wisconsin material, is an offshoot from var. *typica,* for its achenes do not exceed 6.5 mm. in length, the petioles are winged, and the leaves are often 3-cleft. Sherff, *l.c.,* declares that the original material of var. *fultior* has 3-cleft leaves. In Wisconsin, var. *fallax* grades into var. *typica,* although some individuals are well marked with bracts 6 cm. long. The few large irregular teeth of the leaves, mentioned both by Fernald & St. John and by Sherff, do not seem to be characteristic of most Wisconsin plants.

The range of this variety in Wisconsin is as follows: POLK Co.: quaking bog, margin of Deer Lake, St. Croix Falls, September 5, 1927, *N. C. Fassett & L. R. Wilson,* no. 4260; sunny bank of a brook, Interstate Park, St. Croix Falls, September 3, 1927, *N. C. Fassett & L. R. Wilson,* no. 4261; wet woods near Poplar Lake, St. Croix Falls, September 4, 1927, *N. C. Fassett & L. R. Wilson,* no. 4262. BUFFALO Co.: wet shore of Fountain City Slough, Fountain City, September 9, 1926, *N. C. Fassett,* no. 2976; rocky shore of the Mississippi River, Alma, August 23, 1926, *N. C. Fassett,* no. 2888; damp ground near Rohrer's Slough, Cochrane, September 7, 1926, *N. C. Fassett,* no. 2884. LACROSSE Co.: damp ground, French Id., Onalaska, August 22, 1927, *N. C. Fassett,* no. 4263.

In Minnesota, this variety has been found along the Mississippi River bottoms, opposite Alma, Wisconsin.

This plant appears to be of sporadic occurrence in southeastern Massachusetts and southern Connecticut, on Block Island, and on the estuary of the St. Lawrence River. In Wisconsin, however, it is common on the Mississippi River bottoms. We must at least consider the possibility (particularly in view of the German population of this region) that its introduction into Germany (see Sherff, *l.c.*) was not from the East, but from Wisconsin.

B. CONNATA, var. PETIOLATA (Nutt.) Farwell, *l.c.*, as to name-bringing synonym, but not as to plant; Fernald, *l.c.* *B. petiolata* Nutt. Journ. Acad. Nat. Sci. Phila. vii. pt. 1, 99 (1834). This plant seems best distinguished by its large achenes and wingless or narrowly margined petioles. Bordering shady pools at the State Fish Hatchery near Madison, Wisconsin, the writer found a form of this variety with ovate leaf-blades reaching 4.5 cm. in breadth, scarcely margined petioles reaching 5 cm. in length (Fig. 3), and achenes 8 mm. long. This plant is obviously var. *petiolata*, although it has campanulate heads instead of the cylindrical ones Mr. Woodward found to be characteristic of this variety in Connecticut. These plants were about 4 dm. tall. Growing with them were robust plants reaching a meter in height, with similar heads and achenes, and even larger leaves (the blades 1.8 dm. long and the slender petioles 7 cm. long) whose blades were often 2- or 3-cleft (Fig. 4). But since the pressing of one of these plants in its entirety required four or five sheets, it is obvious why these forms of var. *petiolata* with divided leaves are rare in herbaria. Again, however, the achene and petiole characters corroborate one another, although the cleaving of the leaf-blade proves somewhat inconstant. Even these shade forms, with leaves 7 cm. broad exclusive of the lobes, have petioles whose herbaceous margins barely exceed 1 mm. in breadth, or no more than that of a sun form of var. *typica* whose leaf-blade is but 1.5 cm. broad (Fig. 1). A leaf from a sun form of var. *petiolata* is shown in Fig. 5.

Collections of var. *petiolata* from different parts of Wisconsin indicate that it is of general range in the state.

B. CONNATA, var. **ambiversa**, n. var., planta 3–7 dm. alta subsimplex vel cum ramis tenuibus; foliis mediis 4–7 cm. longis cum dentibus utrinque 1–4 plerumque 3 instructis, quorum inferiores sunt saepe 1.5 cm. longi sinibus paene ad rhachem extendentibus; foliis superioribus saepe simplicibus cum dentibus grossis utrinque 1–4 instructis; bracteis exterioribus 1–3.5 cm. longis linearibus vel lanceolatis; marginibus achaeniis cum sparsis vel copiosis plerumque antrorsis setis instructibus; setis aristarum antrorsis vel retrorsis vel saepe ambobus intermixtis; achaeniis exterioribus planis 5 mm. longis 2–2.5 mm. latis, 2 aristis;

achaeniis interioribus 6–8 mm. longis cum 4 angulis ad apicem, 4 aristatis.

Plants 3–7 dm. tall, subsimple or with slender branches: middle leaves 4–7 mm. long, with 1–4, usually 3, long coarse teeth on each side, the lower often reaching 1.5 cm. in length and having a sinus reaching nearly to the midrib (Fig. 6); upper leaves usually not deeply cleft, narrowly lanceolate, with 1–4 coarse teeth on each side; outer foliaceous bracts of the involucre 1–3.5 cm. long, linear to oblanceolate: margins of achenes with sparse to copious, mostly antrorse, hairs; awns with retrorse or antrorse barbs, or commonly with both intermixed (Fig. 7); outer achenes flat, 2-awned, about 5 mm. long and 2–2.5 mm. broad; inner achenes narrowly rhomboidal in cross-section, 4-awned, 6–8 mm. long.—ASHLAND Co.: Sphagnum bog, margin of Loon Lake, Mellen, September 8, 1927, *N. C. Fassett & L. R. Wilson*, no. 5014. ONEIDA Co.: in moist kettle-hole, with copious growth of *Dulichium*, Minocqua, September 14, 1927, *N. C. Fassett*, no. 4257 (TYPE in Herb. Univ. of Wis.); Sphagnum bog, margin of Hill Lake, Minocqua, September 13, 1927, *N. C. Fassett*, no. 4258.

This variety, which is ordinarily distinguished from the next by its peculiarly cut leaves as well as by its achene character, is apparently widely distributed in the Sphagnum bogs of northern Wisconsin.

B. CONNATA, var. ANOMALA Farwell, *l.c.* Leaves 5–11 cm. long, undivided or rarely with 2 basal lobes, and with 2–8 teeth on each side: outer bracts of the involucre as in the preceding: awns and margins of achenes antrorsely barbed; achenes apparently of the same size as in the preceding. (Description made from Wisconsin material only.)—ONEIDA Co.: muddy edge of a ditch, "The Narrows," Minocqua, September 14, 1927, *N. C. Fassett*, no. 4259. LANGLADE Co.: White Lake, August 15, 1921, *J. J. Davis*.

B. CONNATA, var. PINNATA Wats. Gray's Manual, ed. 6: 284 (1899). Plants rather slender, 3–6 dm. tall, usually sparsely, rarely diffusely, branched; lower and middle leaves reaching 9 cm. in length, pinnately parted (Fig. 8), closely simulating those of *B. coronata* (L.) Britton (*B. trichosperma*); the lowermost divisions narrowly linear-lanceolate, rarely exceeding 5 mm. in breadth, entire, or more commonly with 1–5(–7) sharp teeth on each side coming to within 1–2 cm. of the tapering tip; base of each division narrowly decurrent on the petiole; terminal divisions with 2–8 unequal teeth on each side, which become progressively larger toward the base and often grade into the divisions; rhachis and petiole narrowly winged with the decurrent bases of the leaf-divisions: upper leaves undivided, 3–6 cm. long, with 2–10 sharp slender teeth on each side, the leaf-margins between the teeth parallel to the midrib: outer foliaceous bracts of the involucre, on well-developed heads, mostly 1–1.5 cm. long and 1.5–2 mm. broad, oblanceolate: outer achenes 4.5–5 mm. long, 3-awned; inner achenes 6–7 mm. long, 4-awned, the outer pair of awns 2–2.5 mm. long, retrorsely

barbed.—Polk Co.: sandy shore of Poplar Lake, Osceola, September 4, 1927, *N. C. Fassett & L. R. Wilson*, nos. 4016 and 4017. Also in Minnesota: Hennepin Co.: Minneapolis, July, 1878, *C. H. Herrick.* Ramsey Co.: White Bear, August, 1890, *J. H. Sandberg;* wet places [no further locality], August, 1891, *J. H. Sandberg;* wet sandy shores [no further locality], August, 1890, *J. H. Sandberg.*

Madison, Wisconsin.

Explanation of Plate 160

Figure 1. *B. connata*, var. *typica*, leaf × ⅔.
Figure 2. *B. connata*, var. *typica*, leaf × ⅔.
Figure 3. *B. connata*, var. *petiolata*, leaf × ⅔.
Figure 4. *B. connata*, var. *petiolata*, leaf × ⅔.
Figure 5. *B. connata*, var. *petiolata*, leaf × ⅔.
Figure 6. *B. connata*, var. *ambiversa*, leaf × ⅔.
Figure 7. *B. connata*, var. *ambiversa*, achene × 2½.
Figure 8. *B. connata*, var. *pinnata*, leaf × ⅔.

Utricularia subulata in Plymouth, Massachusetts.—On September 21, 1927, Mr. H. K. Svenson and I started to investigate some of the numerous small ponds in southern Plymouth just over the Wareham line, in hopes of discovering something novel in this comparatively little worked region. The larger ponds, such as White Island Pond, yielded nothing of interest and several promising areas had been made botanically useless by the construction of cranberry bogs. Finally, however, we struck good collecting on a group of little ponds centering on Whites Pond. The discovery of such plants as *Lachnanthes tinctoria* (Walt.) Ell., *Xyris Smalliana* Nash, and *Panicum minutulum* Desv., although not constituting any extension of range is uncommon enough in this vicinity. The one noteworthy collection of the trip was *Utricularia subulata* L. forma *cleistogama* (Gray) Fernald, two small plants being found in a slough a few rods north of Whites Pond. So far as is known this is the first record in Massachusetts outside of Nantucket and Cape Cod. A little later Mr. Svenson found the *Utricularia* in fairly large numbers in shallow water on the muddy edge of Ezekiel Pond.

On October 14, we made a second trip to the southern Plymouth region, but worked more to the westward, collecting first at Fearings Pond. Here, just above the pond in the damp sand of a little spring, we found a single flowering specimen of the typical *Utricularia subulata.*—Lyman B. Smith, 1 Wolcott Terrace, Winchester, Mass.

TWO WEEDS NEW TO MILTON, MASSACHUSETTS.—There is little credit attached to introducing new weeds, but two plants unusual if not new hereabout have appeared in my garden last summer.

In May I found two plants of *Polemonium micranthum* Benth. growing among my hardy perennials. In June a few plants of *Madia sativa* Molina appeared on newly sown grass and to date perhaps twenty-five plants have come into flower on a half acre.

Both of these plants were beyond the range of my experience and of Gray's Manual, and I am indebted to Dr. Ivan M. JOHNSTON for their determination.—NATHANIEL T. KIDDER, Milton, Massachusetts.

EXCEPTIONAL DIMENSIONS IN CORYDALIS SEMPERVIRENS.—Late in September, 1927, I collected at Winchendon, Massachusetts, a specimen of *Corydalis sempervirens* (L.) Pers. which is apparently the largest plant of the species on record. By careful measurement of a portion of the fresh plant, which I subsequently pressed, the height was 13.2 dm. and the cross section of the stem at its thickest point between nodes was 1.8 cm. in diameter. While motoring north from Winchendon toward Rindge along a new piece of State Road where a shallow cut had been made through moist red gravel, I saw several enormous plants growing among weeds. The largest, covered with pods and flowers in all stages of development, consisted of stout wide spreading branches, forming a hemispherical bush more than waist high. The largest specimens I find in the herbaria at Cambridge record nothing exceeding 6 dm. which is well under one-half the size of my plant.—R. J. EATON, Cambridge, Massachusetts.

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N. C. Fassett del.

VARIETIES OF BIDENS CONNATA.

RHODORA

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CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY,—NO. LXXIX.

(*Continued from page 30.*)

IV. THE AMERICAN REPRESENTATIVES OF ASPLENIUM RUTA-MURARIA

It has been repeatedly remarked by American students of ferns that, whereas *Asplenium Ruta-muraria* L. of Europe acquired its name from its common habitat, the plant of North America is rarely, if ever, found on brick- or stone-walls. European botanists are essentially unanimous as to the habitat of their plant. Thus, more than a century ago, the great student of the ferns, Schkuhr, stated it: "Hab. ad muros et in fissuris rupium";[1] and later authors give the following statements. Moore: "on rocks and on ruins, and in abundance on old walls";[2] Hooker: "Common on rocks and old walls and buildings";[3] Lowe: "Delighting to grow on old walls, both brick and stone, and more especially on the northern side, and preferring to mount up the walls as high as possible";[4] Britten: "The name is an apt one, . . . although not confined to walls, it is essentially a wall plant";[5] Christ: "In bewohnten Europa ist die Art von dem anstehenden Fels und den grössern Blöcken auf die Mauern, sowohl die rohen Trockenmauern der Strassenborde und Kulturterrassen, als auf die ältern, mit Mörtel verbundenen Mauern gewandert, sodass wohl im ganzen solche künstliche Standorte vorwiegen; daher

[1] Schkuhr, Krypt. Gewächse, 75 (1809); rupium *misprinted* "pupium."
[2] Moore, Nat. Printed Brit. Fern. oct. ed ii. 121 (1860).
[3] Hooker, Brit. Ferns, t. 28 (1861).
[4] Lowe, Our Native Ferns, ii. 222 (1867).
[5] Britten, Eur. Ferns, 111 (1881).

der Name";[1] Druery: "common on old walls, bridges, etc. . . . . almost invariably rooted in old mortar."[2] Contrasted with these typical statements of the European habitat we have in America, such statements as the following. Torrey: "Limestone rocks, usually in shady situations: rare";[3] D. C. Eaton: "clefts of calcareous rocks . . . but not seen on walls in America";[4] Clute: "It loves the sheltered nooks on dry cliffs";[5] Waters: "It grows on sunny, exposed cliffs, or boulders";[6] Slosson: "Seams, pockets, and ledges of calcareous rock: usually exposed to sun or in partial shade."[7] From these characteristic statements it would appear that the plant of eastern America is a conservative and comparatively rare fern, that of Europe an aggressive and common type.

The ranges of the Eurasian and the American plants are also strikingly contrasted. *Asplenium Ruta-muraria,* according to the late James Britten, is "found in most parts of the United Kingdom [Great Britain and Ireland]"; thence "It extends throughout Europe, from Norway to Spain and Portugal, Italy, the Mediterranean Islands, Greece, and Turkey. It is found both in North and South Africa, and in many parts of Asia, from the Ural Mountains to Thibet and Kashmir,"[8] etc. Christensen, however, cuts out the South African occurrence and says merely: "Europa. Asia septentr.—Himalaya. U. S. A. orient.";[9] but he has subsequently cited it from southwestern China near the Thibetan border.[10] Ledebour[11] does not cite it from east of Lake Baikal and it is apparently not found in extreme eastern Asia.[12] The American plant occurs from Vermont to southern Ontario, south to Alabama and Arkansas; *i. e.* it has an Alleghenian range.

Long experience has shown that the Alleghenian flora is to a great extent made up of ancient species, with their nearest affinities in Japan or adjacent continental eastern Asia, rather than in western

[1] Christ, *Die Varietäten und Verwandten des Asplenium Ruta muraria L.*, Hedwigia, xlii. 155 (1903).

[2] Druery, Brit. Ferns, 76 (1910).

[3] Torr. Fl. N. Y. ii. 492 (1843).

[4] D. C. Eaton, Ferns N. A. i. 108 (1879).

[5] Clute, Our Ferns in their Haunts, 162 (1901).

[6] Waters, Ferns, 157 (1903).

[7] Slosson, How Ferns Grow, 28 (1906).

[8] Britten, l. c. 112 (1881).

[9] C. Christens. Ind. Fil. fasc. iii. 130 (1905).

[10] C. Christens. Acta Hort. Gothob. i. 80 (1924).

[11] Ledebour, Fl. Ross. iv. 520 (1852–3).

[12] It has been recorded as very rare in Japan, but neither Christ nor Christensen admit it from there.

Eurasia. Consequently, it would be most unusual for a rare or conservative plant, which in America is unknown north of Vermont and southern Ontario, to be common in Europe but rare or quite unknown in eastern Asia. Furthermore, it is quite contrary to our ordinary experience, that a local and non-aggressive Alleghenian species should in Europe be a common plant, there taking possession of the artificial walls built by man: roadside- and garden-walls, the mortar of brick or stone buildings, bridges, and even church-steeples. There are plenty (more than a thousand) of cases of youthful and aggressive European plants introduced into temperate eastern America and quickly overrunning the region; but, with the exception of the calcicolous aquatic, *Elodea canadensis*, conservative plants of temperate eastern America have rarely, if ever, shown pioneering tendencies in Europe.

From these considerations it would be surprising if the common European *Asplenium Ruta-muraria* and the rare fern of Alleghenian America are really identical. Nevertheless, I can find little indication in literature that they have even been suspected of being different. Most students of the ferns, Hooker, Moore, Mettenius, Luerssen, Milde, D. C. Eaton, Underwood, Slosson, Christensen and many others, seem to have regarded them as strictly identical; and some have even made positive assertions of the identity. Thus, Torrey, in 1843, said of the American fern: "In all respects similar to the European plant, except that it is usually smaller";[1] and Christ,[2] making a detailed study of the variations of the species, recognized no less than 17 varieties and subvarieties in Europe and identified with 4 of these European varieties the plants of eastern America. Very rarely a mild suggestion of a difference has been voiced. Thus, Michaux made the "*Obs.* Europaeo multo minus";[3] Pursh, similarly said: "The American plant is very small, scarcely ever exceeding an inch or two in height";[4] and Torrey's comment to the same effect has just been quoted. But since Torrey, apparently no one has commented even on the difference of size.

When the two series are carefully measured, however, the accuracy of the observations of Michaux, Pursh and Torrey becomes quite evident. I have studied 154 plants of the European series, with an

[1] Torr. l. c. 492 (1843).
[2] Christ, l. c. (1903).
[3] Michx. Fl. Bor.-Am. ii. 266 (1803).
[4] Pursh, Fl. Am. Sept. ii, 667 (1814).

average of 10 or 12 fronds each, and 290 plants of the American series, with an average of 6 or 8 fronds each. Measurements of stipe and frond and count of segments give the following results: the stipes of the European plant range from 1.8–15 cm. long, with an average length of 7 cm., of the American series 1–7.5 cm. with an average length of 4.5 cm.; the fronds of the European plant range from 1.5–7.5 cm. in length, with an average of 4 cm., those of the American plant from 1–6.5, with an average of 3.3. cm.; the largest fronds of each collection show in the European 7–60 segments (average 33) in the American 3–42 (av. 15). The difference of size noted by Michaux, Pursh and Torrey is, thus, very real.

But the differences are not limited to size. In European *Asplenium Ruta-muraria* the teeth of the segments are commonly bordered by a whitish cartilaginous rim which is frequently prolonged into a minute tip, and the mature sori become so confluent that their boundaries are quite obscured. In the American plant the teeth of the segments are coarser than is usual in the European and the cartilaginous border is only slightly, if at all, developed; and the mature sori are rarely completely confluent.

In the European plant the chaffy tips of the rhizomes and the chaffy bases of the stipes project above the root-bearing region of the short and thick rhizome and are easily seen under a low-power lens; in the American the tips of the rhizome and the chaffy stipe-bases are hidden among the rootlets of the elongate rhizome and can be seen only by dissecting away rootlets and marcescent old stipe-bases. This really important difference of the rhizomes has been beautifully shown, but apparently quite unappreciated, in some of the best illustrations. It is well displayed in such European illustrations as those of Schkuhr,[1] Lowe,[2] Britten[3] and Druery[4] and in the American plates of John Robinson,[5] Williamson,[6] D. C. Eaton[7] and Tilton.[8]

When the basal chaff is examined it will be found that the scales of the European *Asplenium Ruta-muraria* are 3–6 mm. long, made up of a lattice-like frame with whitish lumina, the broadest part of the scale with usually 6–9 rows of cells, the cell-walls much thinner than

[1] Schkuhr, l. c. t. 80b (1809).
[2] Lowe, Our Native Ferns, ii. t. xlviii. (1869).
[3] Britten, l. c. figs. on pp. 111 (copied from Gerarde's Herbal) and 112 (1881).
[4] Druery, Brit. Ferns and Vars. t. v. (1910).
[5] J. Robinson, Ferns in their Homes and Ours, t. xvi. (1878).
[6] Williamson, Ferns of Ky. t. xix. (1878); Fern Etchings, t. xxiv. (1879).
[7] D. C. Eaton, l. c. t. xv. fig. 1 (1879).
[8] Tilton, Fern Lover's Comp. 89 (1922).

the broad lumina; while the basal scales of the American plants are shorter and firmer, 1.5–4 mm. long, with fewer rows of cells, the cell-walls as thick as the lumina. In the European plant the stipe usually bears slender curving trichomes or linear-filiform scales 1–3 mm. long; in the American series the stipe is quite naked or only rarely with a few short trichomes.

The indusia of the two plants are so similar as to present no quickly recognized differences, but, as already noted, the sori of the American are rarely as confluent as in the European. The spores are of practically the same size; but, whereas those of the European plant are marked with coarse irregular ridges, the spores of the American have a much finer sculpturing.

From this analysis it is apparent that Eurasian *Asplenium Ruta-muraria* is in its behavior and its technical details quite different from the Alleghenian plant which for a century and a quarter has been confused with it. It is, therefore, proper to separate the Alleghenian species as

ASPLENIUM **cryptolepis**, n. sp., ab *A. Ruta-muraria* recedit rhizomate elongato apicibus radiculis basibusque stipitium marcescentibus vestito; stipitibus 1–6.5 (medio 4.5) cm. longis ad basin squamis setiformibus paucis instructis supra plerumque esquamosis; squamis basilaribus firmis lanceolatis 1.5–4 mm. longis loco latissimo cellulis 3–6-seriatis, parietibus cellularum crassis diametro luminum subaequantibus; lamina deltoidea vel deltoideo-ovata 1–6.5 (medio 3.3) cm. longa subcoriacea; segmentis 3–42 (medio 15) cuneato-rhombeis grosse dentatis, dentibus deltoideis vel oblongis obtusis vel subacutis margine plerumque vix hyalino; soris distinctis vel subconfluentibus; sporis minute rugulosis.—*A. Ruta-muraria* of Am. authors, not L.—Calcareous cliffs and ledges, rare and local, Vermont to southern Ontario, south to Alabama and Arkansas. The following, selected from many specimens, are typical. VERMONT: North Willoughby Cliff, July 14, 1887, *Faxon;* dry limestone ledge, Milton, August 6, 1924, *C. H. Knowlton;* Winooski Gorge, Colchester, *Blake*, no. 2153; Sharpshin Point, Burlington, October 3, 1857, *Wm. Boott;* Burlington Bay, July 7, 1909, *Kirk;* High Bridge, Winooski, August 7, 1877 and June 14, 1881, *Faxon;* Shelburne Bay, September 29, 1855, *Wm. Boott;* Mt. Philo, Charlotte, September 9, 1881, *Faxon;* Snake Mt., Addison, June 31, 1896, *Eggleston;* Pittsford, *Slosson;* Clarendon Gorge, August 27, 1897, *G. H. Ross;* rocks, Dorset, 1915, *E. H. Terry;* Mt. Aeolus, East Dorset, August 29, 1897, *Eggleston;* limestone ledges in hillside pasture, East Dorset, July 24, 1907, *G. G. Kennedy;* Manchester, *M. A. Day*, no. 253; cliffs, North Pownal, July 25, 1898, *Eggleston;* August 1, 1898, *Churchill;* crevices of ledges, usually in half-shade, The Cliff, North Pownal, June 22, 1901, *F. G.*

Floyd; with *Camptosorus*, Gregor Rocks, North Pownal, August 12, 1902, *Blanchard*. MASSACHUSETTS: Mt. Toby, Sunderland, August 10, 1871, *L. B. Tuckerman*, and later collections by *Bishop, Jesup et al;* rocky hill, Stockbridge, June 27, 1900, *Ralph Hoffmann;* shaded limestone ledges, Sheffield, July 6, 1906, *Bissell* (TYPE in Gray Herb.); lime ledge, Sheffield, June 1, and September 30, 1919, *Churchill*. CONNECTICUT: lime ledges, Canaan, August 14, 1912 and October 28, 1916, *F. G. Floyd;* shaded limestone ledges, Salisbury, September 22, 1903, *Bissell;* ledges, Miles Mt., Salisbury, October 19, 1916, *F. G. Floyd;* calcareous rocks by Housatonic River, Kent, *Austin & Eames*, no. 4059; Bull's Falls, above Gaylordsville, July 28, 1889, *I. Holden;* dry calcareous rocks, Gaylordsville, *Austin & Eames*, no. 8308; moist shaded limestone ledge by Housatonic River, New Milford, *A. E. Blewitt*, no. 1205; dry limestone on shaded bank of Housatonic, New Milford, *Austin & Eames*, no. 8308. NEW YORK: Poughkeepsie, *Van Gieson;* Little Falls, *Vasey;* Jamesville, July, 1885, *Hulst*. NEW JERSEY: vicinity of Newton, *Dowell*, no. 4816; limestone rocks, Sussex Co., 1867, *Austin*. PENNSYLVANIA: Wilkesbarre, 1867, *H. Coultas;* Easton, *Traill Green;* Bushkill Creek, Northampton Co., *L. M. Stevens;* along Mill Creek, near Lancaster, July 15, 1890, *Small;* limestone cliffs, Centre Co., *Tuttle & Rothrock*. VIRGINIA: at 365–460 m. (1200–1500 ft.), Mt. Crawford, Rockingham Co., *Heller*, no. 785; Natural Bridge, May 30, 1891, *Churchill*, and at later dates by *Kennedy, T. O. Fuller et al;* Wythe Co., June 7, 1872, *A. H. Curtiss*. WEST VIRGINIA: Harper's Ferry, *B. D. Greene;* shaded limestone bluff by Shenandoah R., Jefferson Co., September 9, 1899, *Wm. Palmer*. NORTH CAROLINA: on ledges at 1220 m. (4000 ft.), Pilot Mt., July 4, 1915, *P. O. Schallert*. ONTARIO: north end of Manitoulin Island, Georgian Bay, *Scott* in herb. Geol. Surv. Can. no. 66,415. MICHIGAN: without locality, *State Collection*. INDIANA: limestone, Jefferson Co., 1872, *J. Hussey*. TENNESSEE: on rocks along Tennessee R., Knoxville, *Ruth*, no. 556; Holston River, below Concord, July, 1872, *W. Faxon;* Post Oak Springs, Roane Co., *Pollard & Maxon*, no. 412. MISSOURI: calcareous rocks, near Lott's Mills, Perry Co., November 15, 1886, *C. H. Demetrio;* wet mossy rocks, Shannon Co., *Bush*, no. 436; on boulders in woods, Montier, *Bush*, no. 2795; shaded limestone rocks, near Montier, *E. J. Palmer*, no. 19,343.

ILLUSTRATIONS (as *A. Ruta-muraria*): J. Robinson, Ferns in their Homes and Ours, t. xvi. (1878); Williamson, Ferns of Ky. t. xix. (1878) and Fern Etchings, t. xxiv. (1879); D. C. Eaton, Ferns N. A. i. t. xv. fig. 1 (1879); Tilton, Fern Lover's Comp. 89 (1922).

European *Asplenium Ruta-muraria* is so variable that many varieties have been proposed, Milde recognizing 10, Christ 17. *A. cryptolepis*, on the other hand, is a tolerably constant plant. The fronds of young or small individuals have fewer and more dilated segments than in the older or larger plants but such variation is found in the

individual colonies and is of no taxonomic importance. In one area, however, the limestone cliffs of Clifton Gorge, of the Little Miami River in Greene County, Ohio, the plant has so far departed from typical *A. cryptolepis* that it may well be designated as a geographic variety. The six different collections before me are constant in having lanceolate segments with long-attenuate tips and incised margins. This extreme may be called

A. CRYPTOLEPIS, var. **ohionis**, n. var., segmentis lanceolatis incisis apice longe attenuatis.—OHIO: Springfield, *T. G. Lea;* Clifton, Greene County, 1873, *J. Y. Bergen, Jr.;* limestone rocks, Yellow Springs, Greene Co., August 3, 1902, June 15, 1905, *L. S. Hopkins* (TYPE in Gray Herb.); on Niagara limestone, Clifton Gorge, Little Miami River, August 22, 1920, *Clara G. Mark.*

Of this Ohio variety, Mr. L. S. Hopkins wrote, in 1907:

"The single station known for it is in Greene County, and at the present time numbers approximately one hundred plants whose short stiff rootstocks find solid footing in the cracks and crevices of a western exposure of Niagara Limestone. No other fern with which I am acquainted is so exacting in its choice of a home. This station has been under my observation for several years, and quite a number of plants have been collected from it. Just around a corner and not over five feet from the place where strong, vigorous plants grow, not a single plant has been found on a southern exposure of the same material and ecological conditions."—L. S. Hopkins, Fern. Bull. xv. 6 (1907).

That the plants of var. *ohionis* have been more numerous is indicated by the collections of Lea and of Bergen (two different collections) and by the fact that material of it has been widely distributed to different herbaria. Such a specimen, collected at Clifton in 1877 by G. E. J. Spencer, was the basis of the erroneous identification by Christ[1] of the Ohio plant with the European *A. Ruta-muraria*, var. *lanceolum* Christ—the European plant, as shown in Christ's plate, having the numerous (42–54) segments of *A. Ruta-muraria*, with their teeth few and small or obsolete, *A. cryptolepis*, var. *ohionis* having the few (5–28) segments and other characters of *A. cryptolepis*, but with elongate tips and incised margins.

[1] Christ, Hedwigia, xlii. 171 (1903).

V. THE EASTERN AMERICAN OCCURRENCE OF ATHYRIUM ALPESTRE

(Plates 161–168)

In 1917 Dr. F. K. Butters pointed out[1] that the plants which had long passed in America as *Athyrium alpestre* (Hoppe) Rylands or as *Phegopteris alpestris* (Hoppe) Mett. differ from the Eurasian type and he called our plant *A. alpestre*, var. *americanum;* and a year later Maxon, emphasizing, besides the characters noted by Butters, some habital points of the plant of western North America, elevated it to specific rank as *A. americanum* (Butters) Maxon[2] and designated as the type (which Butters had neglected to do) a plant from the Selkirk Mountains. Still later, Christensen, who certainly knows the Eurasian plant, after discussing the Eurasian range of *A. alpestre* said: "In America the closely allied form *A. alpestre americanum* Butters."[3] The treatments recently published give us, then, the choice of calling the American plant either *A. alpestre*, an endemic American variety, an endemic American species or a "closely allied form," and it is with the hope of throwing some clearing light upon the dilemma that the present notes and the accompanying photographs are presented.

In eastern America *Athyrium alpestre* or its representatives are as yet known from only two regions: the gulches of Bard Harbor Hill, one of the Highlands of St. John, in northwestern Newfoundland, and the northern and northeastern slopes of the Table-top Range in Gaspé County, Quebec. On my four different visits to these areas I have during the first days studied the plants with enthusiasm and have put up, altogether, hundreds of sheets of specimens; but in each case, the plants soon proving to be abundant, my enthusiasm for them has gradually waned. The plant of Gaspé had been included by Butters and by Maxon with the cordilleran var. *americanum* or *A. americanum;* consequently, when the Newfoundland material was labeled it was assumed to be the same and it was later recorded[4] without question as var. *americanum*. Comparison now shows, however, that the Newfoundland and Gaspé plants are not quite identical, nor are either of them satisfactorily placed with the cordilleran plant. The plant of Eurasia has decidedly "leafy" fronds,

[1] Butters, Rhodora, xix. 204 (1917).
[2] Maxon, Am. Fern. Journ. viii. 120 (1918).
[3] C. Christens. in Hultén, Fl. Kamtch. and Adj. Isl. i. 40 (1927).
[4] Fernald, Rhodora, xxviii. 117, 148 (1926).

ATHYRIUM ALPESTRE FROM SWITZERLAND, × ⅓

ATHYRIUM ALPESTRE FROM ICELAND, × ⅓

ATHRYIUM ALPESTRE, VAR. AMERICANUM FROM CALIFORNIA, × ⅓

ATHRYIUM ALPESTRE, VAR AMERICANUM FROM CALIFORNIA, × ⅓

ATHYRIUM ALPESTRE FROM NEWFOUNDLAND, × ⅓

ATHYRIUM ALPESTRE FROM NEWFOUNDLAND, × ⅓

TYPE OF ATHYRIUM ALPESTRE, VAR. AMERICANUM, × 1/3

TYPE OF ATHYRIUM ALPESTRE, VAR. GASPENSE, × ⅓

ordinarily elliptic-lanceolate to ovate-lanceolate (pl. 161), one-fourth to one-half as broad as long, but in extreme specimens from open habitats (pl. 162) they are narrowly elliptic-oblong. Their larger pinnae are spreading or obliquely ascending, from oblong-lanceolate to narrowly deltoid and pinnatifid into broad-based oblong ultimate lobes; the sori are median and when well developed 0.75–1.4 mm. across and seemingly without any indusium. According to Butters, "Careful dissection shows, however, that the receptacle of the sorus is slightly elongated along the vein, and under a compound microscope it is almost always possible to find a vestigial indusium in the same position that the indusium holds in forms of *A. Filix-femina* with round sori. This indusium . . . often consists merely of two or three hairs joined together side by side at the base."

Athyrium alpestre, var. *americanum* Butters was described as having the segments of the fronds narrower and more distant than in the European plant, the ultimate ones linear; sori only 0.5–0.7 mm. across, submarginal and partly covered by the reflexed marginal teeth; vestigial indusium wanting. Butters added that, "As certain intermediate forms occur, it is the opinion of the author that this plant should be considered a distinct geographical variety rather than a species." Maxon, on the other hand, subsequently said "An examination of the very ample material in the National Herbarium, however, including some of the numbers cited by Butters as intermediate in leaf cutting, reveals no specimens which are truly intermediate in this or other respects . . . The American material is essentially uniform in all respects save size, and since it differs constantly from the European plant it should rank as a distinct species, **Athyrium americanum**. The invariable absence of reduced indusia, which might be regarded as an inconsequential point if the plants were otherwise like the European, is a substantiating character of some worth; but disregarding this feature, the plant is different enough in gross characters to warrant separation. The conspicuously narrow, oblique, widely separated segments give it a strict, singularly skeleton-like aspect widely different from that of the leafy European plant, which has the segments spreading and more broadly attached; and the oblique, elongate-deltoid pinnae (with the basal pinnules often greatly produced) are equally at variance from the spreading, oblong-acuminate pinnae of the European species." Another character of the plant of northwestern North America not emphasized by Butters

nor by Maxon is the almost consistently linear-oblong to lance-oblong outline of the frond which certainly averages much narrower in proportion to its length than does the European frond. Reduced specimens of the European plant (pl. 162) have fronds very similar in outline to some of var. *americanum* (pl. 163) but well-developed European plants (pl. 161), have an elliptic- to ovate-lanceolate outline.

If the extreme plant of western North America (pl. 164) were alone to be considered, *Athyrium americanum* would upon some characters stand well apart; but when we take into account the Gaspé material, which both Butters and Maxon identify with *A. americanum*, and the Newfoundland material, the specific separation of the American from the European plant becomes more difficult. Such typical Newfoundland specimens as shown in pl. 165 and 166 (a small plant and a large frond from the same station) have essentially the outline, pinnae and degree of dissection of the two extremes of the European plant shown (pl. 161 and 162) and they also have the sori large and submedian as in the European plant. It does not seem possible, then, to separate them specifically or even varietally from the European material. It should be noted, furthermore, that their pinnae and those of the two European specimens illustrated are a bit more oblique than and quite as "elongate-deltoid" as in the type of *A. americanum* (pl. 167) specially selected by Maxon. Incidentally, one of the stated characters of *A. americanum* was that each sorus is "protected by a reflexed tooth of the pinnule." This character (which seems to be more ecological than morphological) is obvious in most American specimens but in some extra-American material (for instance Davidsson's Iceland plant, pl. 162) the teeth are even more vigorously reflexed than in the type of *A. americanum;* and many continental European specimens show some reflexing of the teeth. As a differential character it has no value.

The Gaspé plant (pl. 168) differs at once from the European and Newfoundland material seen in its tripinnate or, in large plants, almost quadripinnate fronds, with the ultimate strongly toothed segments linear or linear-lanceolate and remote; and its submarginal sori are only 0.3–0.8 mm. across. Its fronds have the elliptic-lanceolate to ovate-lanceolate outline of the European and Newfoundland plant, rather than the linear-oblong to narrowly lance-oblong outline of *A. americanum*. The Gaspé plant is, therefore,

intermediate between that of Europe and Newfoundland and that of the cordilleran region; the European and Newfoundland plant at one extreme, the cordilleran at the other extreme of a series.[1]

Of the characters which have been ascribed to *Athyrium americanum* as distinctive the reputedly more oblique and elongate-deltoid pinnae are no more oblique nor deltoid in the type of *A. americanum* than in some characteristic specimens of the European plant, while the recurving of the marginal teeth is more conspicuous in some European specimens than in many of the American. The characteristically narrow outline of *A. americanum* appears in several sheets of European material, while the Gaspé plant, which both Butters and Maxon have considered identical with the cordilleran, has, when well developed, as broad an outline as the most extreme European plant. There remain to distinguish the continental American plants the narrower and more distant segments with smaller and mostly submarginal sori and the absence of the minute vestigial indusium which is often found, after sufficient search, in the European. But some specimens of the European plant before me have sori as small as in the American, the Gaspé plant has fronds as broad as in the broadest European, and at one of its stations (Southwest Gulch, *Fernald, Wiegand, Long, Gilbert & Hotchkiss*, no. 27,245) the fronds of the Newfoundland plant are unusually divided and thus make a strong approach to those of the Gaspé plant. In view of these facts I am forced to the conclusion, originally reached by Butters and recently subscribed to by Christensen, that *A. alpestre*, var. *americanum* is a geographic variety rather than a species; but that the plant of Gaspé is not var. *americanum*, but is a second variety standing morphologically as well as geographically midway between typical *A. alpestre* and its var. *americanum*.

These conclusions may be summarized in the following brief synopsis.

[1] This geographic phenomenon, the Newfoundland variant of a circumpolar series being nearer to the European than to the plant of continental eastern America, is frequent and I have specially noted it in the case of *Cypripedium parviflorum*, var. *planipetalum* Fern. Rhodora, xxviii. 168 (1926) and *Habenaria viridis*, var. *interjecta* Fern. l. c. 173 (1926). The Cypripedium of northern and western Newfoundland is so similar to the Eurasian species that, at the time of describing the Newfoundland plant, I suggested that *C. Calceolus* of Eurasia and *C. parviflorum* of continental North America might be extremes of one circumpolar type, with the Newfoundland plant bridging the morphological gap which separates them. Similarly, the northern Newfoundland (and northwest American) variety of *Habenaria viridis* is exactly intermediate between typical *H. viridis* of Europe and its var. *bracteata* of eastern North America. It is interesting, therefore, to add *Athyrium alpestre* to the species showing this European and Newfoundland relationship.

Fronds bipinnate or somewhat tripinnatifid, elliptic-lanceolate to ovate-lanceolate (rarely lance-oblong), mostly one-fourth to one-half as broad as long; pinnules oblong-lanceolate, with the broad-based oblong ultimate lobes mostly approximate: sori median or submedian, the larger ones 0.75 to 1.4 mm. across. ..... *A. alpestre*, var. *typicum*.

Fronds tripinnatifid, tripinnate or nearly quadripinnate; ultimate segments of the pinnules linear or linear-lanceolate and distant: sori chiefly submarginal, mostly 0.3–0.8 mm. across.

Fronds elliptic-lanceolate to ovate-lanceolate, from three-tenths to nearly one-half as broad as long, tripinnate to nearly quadripinnate ..... Var. *gaspensis*.

Fronds linear-oblong to narrowly lance-oblong, from one-tenth to one-fourth as broad as long, tripinnatifid to tripinnate ..... Var. *americanum*.

Athyrium alpestre (Hoppe) Rylands, var. **typicum.** *Aspidium alpestre* Hoppe, Neue Taschenbuch, 216 (1805). *Pseudathyrium aspestre* (Hoppe) Newm. Phytologist, iv. 370 (1851). *Phegopteris alpestris* (Hoppe) Mett. Fil. Hort. Lips. 83 (1856). *Athyr. alpestre* (Hoppe) Rylands in Moore, Ferns Gr. Brit. and Irel. Nat. Print. fol. ed. t. 7 (1857).—Eurasia and northwestern Newfoundland. The following are from Newfoundland: wet quartzite rocks and seepy banks along upper Deer Pond Brook, Highlands of St. John, July 28, 1925, *Fernald & Long*, no. 27,242; quartzite escarpment one-half mile south of Deer Pond, August 20, 1925, *Wiegand, Gilbert & Hotchkiss*, nos. 27,212, 27,243—see pl. 165 and 166; turfy and mossy quartzite rocks along Man's Humbug Brook, Highlands of St. John, August 21, 1925, *Fernald & Long*, no. 27,244; wet quartzite rocks and gravel along brook, Southwest Gulch, northeast of summit of Bard Harbor Hill, August 22, 1925, *Fernald, Wiegand, Long, Gilbert & Hotchkiss*, no. 27,245; these stations all at altitudes from 260–460 m. (850–1500 ft.), the specimens all distributed as var. *americanum* and so recorded by Fernald, Rhodora, xxviii. 117, 148 (1926).

Superficially *Athyrium alpestre*, var. *typicum* so strongly resembles *A. Filix-femina* (Willd.) Presl as readily to be mistaken for it; in fact, the two were both included by Linnaeus in his *Polypodium rhaeticum*. It is at once distinguished by its almost complete lack of an indusium (sometimes represented by a minute vestige), on which account the plant has found a place in *Polypodium* and *Phegopteris* and as a distinct genus, *Pseudathyrium*. Its fronds are firmer than in *A. Filix-femina*, almost coriaceous, and its spores are blackish and reticulated. Fronds of the European plant are shown in pl. 161 and 162, of the Newfoundland plant in pl. 165 and 166, the photographs most kindly made by Professor J. F. Collins.

Var. **gaspense**, n. var., frondibus elliptico-lanceolatis vel ovato-lanceolatis 2–7 dm. longis 0.7–2.5 dm. latis tripinnatis vel subquadri-

pinnatis, segmentis ultimis linearibus vel lineari-lanceolatis plerumque distantibus; soris 0.3–0.8 mm. diametro submarginalibus.—Northeastern region of the Table-top Range, Gaspé County, QUEBEC: crevices of granitic rock, altitude 750–1050 m., easterly and northerly slopes of Table-top Mountain, August 9, 1906, *Fernald & Collins*, no. 151 (small plants of exposed situation); forming extensive areas in alluvium of alpine brooks, easterly and northerly slopes of Table-top Mountain, August 9, 1906, *Fernald & Collins*, no. 151*a* (large plants up to 9 dm. high)—nos. 151 and 151*a* distributed as *Phegopteris alpestris* and cited by Butters as *A. alpestre*, var. *americanum;* alpine and subalpine meadows and brooksides at about 1100 m. alt., northeastern slope of Mt. Dunraven, August 2, 1923, *Fernald, Dodge & Smith*, no. 25,384 (TYPE in Gray Herb.); brooksides and meadows at about 975 m. alt., above the cascades, head of Gorge of Northeast Branch of Rivière Ste. Anne des Monts, August 5, 1923, *Fernald, Dodge & Smith*, no. 25,385; subalpine meadows on eastern base (alt. about 900 m.) of Mt. Au Clair, August 10, 1923, *Fernald & Smith*, no. 25,386; nos. 25,384–25,386 distributed as var. *americanum*.

The type-specimen, photographed by Professor Collins, is illustrated in pl. 168.

Var. AMERICANUM Butters, RHODORA, xix. 204 (1917), excluding plant of Quebec. *A. americanum* (Butters) Maxon, Am. Fern. Journ. viii. 120 (1918), where a type-specimen is designated (*Heacock*, no. 554).—Alaska to Colorado, Nevada and California.

The type-specimen is illustrated in pl. 167; other specimens in pl. 163 and 164.

EXPLANATION OF PLATES 161 TO 168

(Photographs by *J. F. Collins*)

161, ATHYRIUM ALPESTRE from Switzerland; 162, from Iceland. 163, A. ALPESTRE, var. AMERICANUM from Tulare Co., California, *Culbertson*, no. 9538; 164, from Tuolumne Meadows, California, *Smiley*, no. 810. 165 and 166, A. ALPESTRE from Newfoundland, *Wiegand, Gilbert & Hotchkiss*, no. 27,243. 167, TYPE of A. ALPESTRE, var. AMERICANUM, from Selkirk Mts., British Columbia, *Heacock*, no. 554. 168, TYPE of A. ALPESTRE, var. GASPENSE, from Gaspé Co., Quebec, *Fernald, Dodge & Smith*, no. 25,384.

(*To be continued.*)

THE GRASS GENUS DIGITARIA

KENNETH K. MACKENZIE

IN the June 1927 number of RHODORA Dr. A. S. Hitchcock has an article concerning "The Validity of the Grass Genus Digitaria." This genus originated with Heister, and was successively taken up by various authors, namely by Fabricius in 1759, Adanson in 1763,

Haller in 1768 and Scopoli in 1772. Each and every one of these authors attributed the genus to Heister. In going into this matter Prof. Hitchcock kindly gave full information concerning what these other authors stated concerning this genus, but he entirely ignored Heister, the universally recognized author of the genus.

Following a procedure common in those days of few botanical works the authors who cited Heister did not give a definite reference. This fortunately was supplied by Ludwig (Def. Gen. Pl. 417. 1760), who gave the reference "Dactylis Roy. 56. Linn. Ed. V. n. 80. Digitaria Heist. Syst. 12. Fabric. p. 207." Heister's Systema plantarum generale, published in 1748, is a rare work, and neither the New York Botanical Garden nor my own library possessed it. However, Dr. B. D. Jackson kindly sent me the necessary extract from the copy of the work which once belonged to Linnaeus in the library of the Linnean Society of London. This reads as follows:

"Plantae monocotyledones apetalae sive gramineae
Ordo I Monoclinae
* * * *
3. Digitatae
Digitaria, H. (= Heister)
Dactylis Royeni
Mannaria (pro gramine mannae)"[1]

In other words it was evident that Digitaria Heist. was merely a change in name for Dactylis Royen. Consulting Royen (Fl. Leyd. Prodr. 56–7. 1740) one finds that he devoted over a page to a full treatment of his genus *Dactylis*.[2] After a long description he gave four species, as follows:

1. Dactylis spicis numerosis alternis patentibus, calycibus unifloris.
Gramen dactylon majus, panicula longa, spicis plurimis nudis crassis. Sloan. flor. 34. hist. 1. p. 112. t. 69. f. 1.
2. Dactylis spicis saepius quaternis alternis patulis, calycibus unifloris.
Gramen paniceum minus, spica divulsa, insulae barbadensis. Pluk. alm. 174. t. 189. f. 5.

[1] The Gramen Mannae of Matthiolus (1583 ed. p. 348; Camerarius Epitome p. 742, 1586) was *Syntherisma sanguinale* (Haller Hist. Stirp. Helv. **2**: 244, 1768). Although there is doubt whether this was the correct use of this name (Haller l. c. 244, 220), it is probable that this was the plant to which Heister referred when he used the name Mannaria "pro gramine mannae."

[2] It may be here remarked that, while Linnaeus took up Royen's genus Dactylis, yet he radically changed his generic description, and gave entirely different species than those given by Royen. In other words Dactylis L. is really an entirely different thing than Dactylis Royen (Linnaeus Gen. Pl. (Ed. 5) 80. 1754; Sp. Pl. 71. 1753).

3. Dactylis spicis binis terminatricibus linearibus, calycibus unifloris.
4. Dactylis spicis numerosis alternis culmo appressis, longitudine internodiorum, calycibus bifloris.
Gramen palustre, locustis erucaeformibus. Bar. rar. 105. t. 2.

No. 1 is *Paspalum virgatum* L. (Hitchcock RHODORA **29**: 114; Linnaeus Sp. Pl. Ed. 2, 81. 1762). This Sloane species was at first erroneously referred by Linnaeus to his *Panicum dissectum* (Sp. Pl. 57. 1753).

No. 2 is referred to *Panicum colonum* L. (Syst. Ed. 10, 870. 1759) by Linnaeus (Sp. Pl. Ed. 2, 84. 1762). This is now known as *Echinochloa colona* (L.) Link.

No. 3 I have not identified.

No. 4 is cited under *Phalaris erucaeformis* L. (Sp. Pl. 55. 1753) by Linnaeus. This is now known as *Beckmannia erucaeformis* (L.) Host.

It will be seen from the above that Fabricius, the first author after Linnaeus to take up the name used it with absolute correctness, (except possibly the reference to Ray) when he wrote "Digitaria Heist. Dactylis Rai. Gramen dactylon majus panicula longa, spicis pluribus nudis crassis. Sloane." He took the first species given by Royen and specifically cited it, and he specifically cited Heister the author of the genus, who in turn had specifically cited Royen. The remaining species of Royen he did not cite, but it is to be noted that none of them belong to the genus to which Prof. Hitchcock wishes to apply the name Digitaria.

Following Fabricius, the name Digitaria as used by Adanson (Fam. Pl. **2**: 38, 550. 1763) represents the genus of Heister and Fabricius plus three references, all of which represent *Tripsacum dactyloides* L. (Sp. Pl. 972. 1753).

Haller's use of the name (Hist. Stirp. Helv. **2**: 244. 1768) represents the genus of Heister and Fabricius as added to by Adanson, plus *Syntherisma sanguinale* (L.) Dulac and *Capriola Dactylon* (L.) Kuntze. And Scopoli's use of the name (Fl. Carn. Ed. 2, **1**: 52. 1772) represents the genus of Heister and Fabricius, as added to by Adanson and Haller.

Prof. Hitchcock says "Since Adanson does not propose a new genus but credits the name to Heister his use of Digitaria should be regarded as a misapplication, not the publication of a new genus." This is

quite correct, but Scopoli did exactly the same thing, and yet our Washington agrostologist insists that Scopoli's publication must be treated as a publication. I must confess that I cannot follow such logic.

Under all codes of nomenclature the name Digitaria is a synonym of Paspalum L. and it is typified by *Paspalum virgatum* L.

Maplewood, New Jersey.

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THE STANDARD-SPECIES OF NYMPHAEA L.

T. A. Sprague.

The appearance of Mr. Kenneth K. Mackenzie's paper on the "Proper Use of the Name Nymphaea" (Rhodora, Nov. 1927, xxix. 234) raises once more a question which seemed to have been finally laid to rest by Conard (Rhodora, July 1916, xviii. 161), namely the correct application of the name *Nymphaea* L. Mr. Mackenzie's case for the application of *Nymphaea* to the yellow waterlilies depends on the acceptance of two points: (1) that Linné in 1753 had a type-species of *Nymphaea* in mind: (2) that it was *Nymphaea lutea* L.

(1) The *type-concept* of genera (and other groups) is now so familiar that its adherents sometimes do not realize or else have forgotten that another concept is not only possible, but was actually held by various eminent botanists during a great part of the eighteenth and nineteenth centuries. This alternative concept of genera, which may be termed the *diagnosis-concept*, is that a genus includes (and the generic name is equally applicable to) all those species that agree with the generic description. No idea of a type-species entered the diagnosis-concept, though species which agreed in all but one or a few of the generic characters might be appended provisionally to the genus as "aberrant" elements. If they were definitely included, however, the generic diagnosis had to be amended.

Acceptance of the diagnosis-concept, combined with inadequacy of the original diagnosis, led in many cases to the transference of a generic name from one group to another which contained none of the original species. This was possible because the sole criterion

for inclusion in the genus was agreement with the description. Thus the names *Epidendrum* L. and *Satyrium* L. came to be applied to (and are still widely used for) genera containing none of the species originally included under them by Linné. Such transferences would not have occurred had those botanists who introduced or first accepted them held the type-concept of genera. The cases of *Banisteria* L. and *Gesneria* L. are similar. The principle governing the application of the generic name in the event of segregation was apparently that it should be applied to the group containing (at the time of segregation) the largest number of species.

It is clear that many of Linné's successors did not hold the type-concept of genera. What evidence is there that Linné himself held it? I know of none.

(2) Mr. Mackenzie states that Linné took up Boerhaave's view that the yellow waterlily was typical of the genus *Nymphaea*, apparently[1] basing this conclusion on the fact that Linné (Gen. Pl. ed. 1, 149) cited Boerhaave, and gave the three elements of the genus in the following order: (1) *Nymphaea* Boerh. (*N. lutea*), (2) *Leuconymphaea* Boerh. (*N. alba*), (3) *Nelumbo* Tourn. (*N. Nelumbo*); and in the generic description mentioned the characters of *N. lutea* before the corresponding ones of *N. alba*. In other words Mr. Mackenzie thinks that "*priority of place*" indicated the Linnean type. I suggest that Linné adopted Boerhaave's sequence as the line of least resistance. Unless he had any special reason to change it, it was obviously less trouble to retain the same sequence.

In this connection it is pertinent to enquire in what order Linné cited the constituent elements of other genera. The first similar case in Gen. Pl. ed. 5 is *Verbena* (p. 12), under which he mentioned the generic components in the following order (1) *Sherardia* V.; (2) *Blairia* H.; (3) *Verbena* V.; (4) *Kempfera* H. The modern equivalents are (1) *Lippia, Stachytarpheta,* etc.; (2) *Priva;* (3) *Verbena;* (4) *Tamonea.* There can be no question that if Linné regarded *any* of the elements of his *Verbena* as typical it was *Verbena* V., which included *V. officinalis* L., the generic type according to modern ideas. Yet *Verbena* V. was only third in order. A possible explanation of this is as follows: the genus included both diandrous and tetrandrous components, and as it was placed in *Diandria,* the groups *Sherardia* and *Blairia* (diandrous) would naturally precede *Verbena* (tetran-

[1] Mr. Mackenzie writes that his argument was not based on priority of position: see postscript.

drous). *Kempfera* (diandrous) may have been placed at the end because it was aberrant as regards its calyx.

The next case in order is *Iris* (Gen. Pl. ed. 5, p. 24) in which the generic constituents are (1) *Xiphium* T.; (2) *Sisyrinchium* T.; (3) *Hermodactylus* T.; (4) *Iris* T. Here the arrangement was based on the morphology of the underground parts: bulb, double bulb, tuberous "root," fleshy creeping "root," respectively; *Iris* T., which includes *I. Pseudacorus*, now regarded as the type-species, came last.

In the case of *Rhus* (p. 129), the order of the constituents is (1) *Rhus* T.; (2) *Toxicodendron;* (3) *Vernix;* the element now recognized as typical coming first in this instance.

Linné (p. 160) united *Alisma* Dill. and *Damasonium* Tourn. under the former name, but mentioned the characters of these genera in the order (1) *Damasonium;* (2) *Alisma.*

The above examples show conclusively that *priority of mention* by Linné of a generic component may be of no value in determining what component, if any, he had chiefly in mind.

Linné's disregard of "priority of position" may be further illustrated by his treatment of species and varieties. In Sp. Pl. ed. 1, 7 he united *Phillyrea folio ligustri* C. Bauh. and *P. angustifolia* (*prima et secunda*) C. Bauh. under the name *P. angustifolia*, making *P. folio ligustri* his var. α (without the symbol), and *P. angustifolia* C. Bauh. his var. β, although according to modern ideas the latter is the "historic type" of *P. angustifolia* L. But in Sp. Pl. ed. 2, 10, where Linné recognized the two varieties as independent species, he retained the name *P. angustifolia* L. for his var. β, and proposed a new name, *P. media* L., for his var. α. Clearly in this case the var. β was—to say the least—just as representative of *P. angustifolia* L. (1753) as the var. α. Why did Linné place *P. folio ligustri* C. B. before *P. angustifolia* C. B.?—apparently because it was the line of least resistance to accept Bauhin's sequence.

The case of *Mesembryanthemum scabrum* L. Sp. Pl. ed. 1, 483, points in the same direction. Linné united *M. purpureum scabrum staminibus expansis* Dill. and *M. purpureum scabrum, staminibus collectis* Dill., as varieties α (without symbol) and β respectively, under the name *M. scabrum.* In Sp. Pl. ed. 2, 692, however, where he recognized the two Dillenian plants as distinct species, he retained the name *M. scabrum* for his var. β. Reference to Dill. Hort. Eltham. 259, 260, shows that Linné, when he (Hort. Cliff. 219) originally

united the two Dillenian species, retained the sequence in which they had been given by Dillenius, again following the line of least resistance.

The example of *M. tortuosum* L. Sp. Pl. ed. 1, 487, is similar, the binary combination being again retained for the var. β. When Linné (Hort. Cliff. 217) originally united the two Dillenian species, however, he reversed the sequence, without any apparent reason, but possibly in order that the variety having the greater number of references should come first.

In the case of *M. loreum* L. Sp. Pl. ed. 1, 486, where Linné—perhaps for the same reason—also departed from the Dillenian sequence, he retained the specific name on segregation for his var. γ, to which it had originally been applied by Dillenius.

Similarly when in 1764 (Sp. Pl. ed. 2, 731, 732) he divided *Ochna Jabotapita* (Sp. Pl. ed. 1, 513) into two species, he retained the name for var. γ, with which *Jabotapita* was originally associated as a vernacular name; and when he divided *Geranium triste* (Sp. Pl. ed. 1, 676) into two species, *G. lobatum* and *G. triste* (Sp. Pl. ed. 2, 950) he reserved the name *triste* for his varieties β and γ, the former being the original *Geranium triste* of Cornuti. These various examples demonstrate that the sequence of varieties in the Species Plantarum, ed. 1, does not necessarily indicate which element, if any, Linné regarded as most representative of the species in question.

To apply "priority of place" in retrospectively typifying a Linnean species, is equivalent to ascribing to Linné in 1753 nomenclatural views held at the present day by a particular body of botanists in the United States.

In the cases of *Phillyrea angustifolia, Mesembryanthemum loreum, Ochna Jabotapita* and *Geranium triste*, when Linné, in Sp. Pl. ed. 2, separated two or more groups which he had previously united under the name of one of them, he retained that name for the group to which it was originally given. How does this principle apply in the case of *Nymphaea?* Linné united *Nymphaea* Tourn. and *Nelumbo* Tourn. under the former name: hence *Nymphaea* Tourn. was presumably the "typical" section. But what was its "typical" element? Tournefort gives no indication. The earliest references cited in L. Sp. Pl. ed. 1, 510, 511, are to *Nymphaea lutea major* C. Bauh. Pinax, 193, and to *N. alba major* C. Bauh. l. c. Caspar Bauhin divided *Nymphaea* into two sections to which he gave the binary names *Nymphaea alba* and *Nymphaea lutea;* but he did not indicate either section as being more representative. The earliest references cited by Bauhin are

to *Nenuphar album* Brunf. and *Nenuphar luteum* Brunf. Brunfels (Herb. i. 38, 40) did not indicate either of these as more representative of *Nymphaea* than the other. Thus from the time of Brunfels to that of Tournefort there is no indication of a "type" of *Nymphaea*.

The previous history of the name *Nymphaea* is immaterial for the following reason: just as nowadays the starting-point for nomenclature is 1753, so for Linné the starting-point both for taxonomy and nomenclature seems to have been Brunfels' Herbarum Vivae Eicones (1530). It may be mentioned, however, that the earliest application of the Greek word νυμφαία was to the yellow waterlily, for which it was used by Theophrastus (Enquiry into Plants, ed. Hort, ii. 466); and that, on the other hand, Dioscorides, who included both kinds of waterlily under *Nymphaea*, called the white kind *Nymphaea*, and the yellow kind *Nymphaea altera*, thus apparently regarding the former as more representative (Dioscorides, Mat. Med., ed. Sprengel, i. 478).

During the period 1530–1720 A.D. the yellow and white waterlilies were regarded as belonging to the same genus. As Mr. Mackenzie points out, Boerhaave (Ind. alt. Pl. Hort. Acad. Lugd.-Bat. i. 281: 1720) restricted *Nymphaea* to the yellow water-lilies, and proposed the new name *Leuconymphaea* for the white. In Syst. Nat. ed. 1 (1735) Linné cited *Leuconymphaea* as a synonym of *Nymphaea*, and in Gen. Pl. ed. 1, (1737) he included *Nelumbo* in the genus.

I do not find any evidence that during the period 1735–1754 Linné considered the question of which was the most typical element of *Nymphaea* Tourn. He not only rejected Boerhaave's division of that genus, but went still further by uniting *Nelumbo* Tourn. with it. Hence the question of the type of *Nymphaea* Tourn. did not arise.

Examination of the description of *Nymphaea* in Gen. Pl. ed. 5, shows that it covered both *N. lutea* and *N. alba*, the words "perianthium pentaphyllum" and "petala calyce minora" referring to the former, while "perianthium tetraphyllum" and "petala germinis lateri insidentia" refer to the latter. Surely the conclusion to be drawn is that Linné in 1754 considered the yellow and white waterlilies equally typical of *Nymphaea*. By 1764, however, his conception of the genus had changed, and the white waterlilies were definitely indicated in the description in Gen. Pl. ed. 6, 264, as the typical element.

I do not for a moment suppose that all adherents of the American Code will be convinced by my facts and arguments, for that would imply abandonment on their part of the principle of "priority of place." The object of my reply is to demonstrate that, starting from the same basis of facts, a very different view as to the type (or absence of type) of *Nymphaea* (1753–54) may be taken, according to the methods adopted in retrospective typification. Until there is general agreement among botanists as to these methods there will necessarily be differences of opinion as to the "type-species" of many of the Linnean genera. And even where botanists follow the same methods they may reach different conclusions: thus in 1922–23 I regarded *Bignonia capreolata* L. as the type-species of *Bignonia* L. whereas Dr. S. F. Blake regarded *B. radicans* L. as the type (*vide* Journ. Bot. 1922, 236, 363; 1923, 191). Here the different results arose from different identifications of certain of Tournefort's figures. Reviewing the case of *Bignonia* L. (1753) in the light of that of *Nymphaea*, I now consider that Linné in 1753 had no particular species of *Bignonia* more in mind than the others. A similar conclusion might be reached in many other cases of Linnean genera. It follows that the only method of securing uniformity in the application of Linnean generic names is the acceptance by an International Congress of a list of Standard-species (vide Kew Bull. 1926, 96). In the case of *Nymphaea*, a suitable standard-species would be *N. alba* L., as that would ensure the retention of the generic name *Nymphaea* as generally applied.

Royal Botanic Gardens, Kew.

Postscript. Since the above was written, Mr. Mackenzie, to whom I had sent a copy, has informed me that his "argument about the proper use of *Nymphaea* was not based on priority of position, but was based on the division of the genus into sections by Linnaeus 1737–1753, and his change of generic description in 1764, when he first treated the yellow water lily as differing from the others." In that case, I fail to see that there is any evidence left in support of Mr. Mackenzie's contention. Linné in 1737 did not divide *Nymphaea* into sections or other subdivisions: he merely gave the characters of the three reduced genera, *Nymphaea* Boerh., *Leuconymphaea* Boerh., and *Nelumbo* Tournef. Fortunately the parallel case of

Trifolium shows what Linné really meant. In 1737 he cited five reduced genera with their diagnoses in an "Observation" under *Trifolium*, and in 1742 he added a sixth reduced genus (Gen. Pl. ed. 1, 229; ed. 2, 356; ed. 5, 337). In Species Plantarum, ed. 1, 764, however, he recognized only five subdivisions of *Trifolium*. These were *Meliloti* (corresponding with *Melilotus* Tourn.), *Lotoidea* (comprising, two reduced genera, *Lupinaster* Buxb. and *Trifoliastrum* Mich.), *Lagopoda* (including both *Lagopus* Riv. and *Triphylloides* Pont.), *Vesicaria* (corresponding to none of the reduced genera) and *Lupulina* (corresponding to *Lupulinum* Riv.). Here, where Linné actually published subdivisions of a genus, only two out of five corresponded with individual reduced genera, two other subdivisions each comprised two of the reduced genera, and the fifth corresponded to none of them.

Take another example, that of *Centaurea* L. Gen. Pl. ed. 5, 389. The "Observation" included the names of *eight* reduced genera with their diagnoses, namely, *Calcitrapa, Calcitrapoides, Rhaponticum, Rhaponticoides, Amberboi, Jacea, Cyanus, Crocodilium.* In Sp. Pl. ed. 1, 909, Linné recognized only six subdivisions, namely *Jacea, Cyani, Rhapontica, Stoebae, Calcitrapae, Crocodiloidea.* It should be obvious that reduced genera cited in an "Observation" by Linné with diagnoses were not necessarily regarded by him as sections.

In conclusion I may refer to Mr. Mackenzie's argument that Linné's "account of certain parts of the flower in his description of the genus in the first five editions of the Genera Plantarum *began* with certain phrases applicable only to the yellow water lily" [the italics are mine]. As Conard has pointed out, Linné's description *went on* with certain phrases applicable only to the white water lily. Perhaps I may be pardoned for having assumed that Mr. Mackenzie was here relying on "priority of place" in the description.

CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY,—NO. LXXIX.

(*Continued from page 49.*)

VI. PRIMULA § FARINOSAE IN AMERICA

(Plate 169)

THE genus *Primula*, only slightly represented in America, but one of largest genera in the flora of Eurasia, is notoriously difficult of

classification. In America we know little of the complications which the student of the Eurasian flora must consider in untangling the species; but in the § *Farinosae* we have a slight illustration of these difficulties. This is best shown by the fact that the European *P. farinosa* L., which is apparently not found in America, has for more than a century held an undisputed, though changeable, position in our flora; and, although perfectly distinct species with natural geographic ranges, such as *P. mistassinica* Michx. (1803), *P. decipiens* Duby (1844), *P. incana* Jones (1895) and *P. specuicola* Rydb. (1913), have from time to time been set off, their authors have often stated that their new segregates were being distinguished from *P. farinosa*, which they believed to occur elsewhere in America.

Primula farinosa seems first to have been listed as a member of the American flora in 1813 when Muhlenberg[1] cited it as a Canadian plant with *white* corolla. Just what he referred to is not clear unless it were *P. mistassinica*, forma *leucantha*. *P. farinosa* was more definitely admitted to our flora by Nuttall[2] in 1818, as growing "On the calcareous gravelly shores of the islands of Lake Huron; . . . and . . . in the outlet of Lake Michigan," Nuttall's plant being really a species intermediate between *P. farinosa* and *P. mistassinica*. In 1822 Torrey[3] again identified the plant of the shores of Lake Huron with *P. farinosa*, saying: "On a careful comparison of the American plant with specimens of *P. farinosa*, from Germany and Norway, I can find no difference except that the leaves are more *toothed* than *crenate* in the former"; and, on account of the leaves Torrey[4] later called the plant of Lakes Huron and Michigan *P. farinosa β. americana* but wrongly identified with it *P. pusilla* Goldie,[5] this time saying: "*Professor Hooker*, however, thinks the P. *pusilla* of *Goldie* to be very distinct from P. *farinosa;* though there can be no doubt that it is the plant described above." Goldie's *P. pusilla*, however, as shown by his description, illustration and locality (near Quebec), was a common broad-leaved phase of *P. mistassinica*, with which species it has subsequently been generally united; and it is not conspecific with the plant described by Torrey.

Gradually in America the conviction became firmly established, that *P. farinosa* has farinose lower leaf-surfaces and calyx, *P. mistas-*

[1] Muhl. Cat. 19 (1813).
[2] Nutt, Gen. i. 119 (1818).
[3] Torr. Am. Journ. Sci. iv. 59 (1822).
[4] Torr. Fl. No. and Mid. U. S. i. 213 (1824).
[5] Goldie, Edinb. Phil. Journ. vi. 322, t. xi, fig. 2 (1822).

sinica green and efarinose; and with this highly inconstant vegetative character as the leading difference the two are distinguished in recent manuals. In the *Synoptical Flora* Gray[1] so maintained *P. farinosa* for the farinose plants of the Gulf of St. Lawrence region (Labrador to Nova Scotia and eastern Maine), Lake Superior, the Rocky Mountains and southern South America (four quite distinct species) and merged them without question with the very different Eurasian plant; while, merely because of its efarinose quality, he placed under *P. mistassinica* the otherwise quite distinct *P. stricta* Hornem. of the arctic regions. In 1907, still clinging to the tradition that all plants with pronounced mealiness on the foliage or calyx are *P. farinosa* but not satisfied that the species was a unit, I suggested[2] the division of the American plant into typical *P. farinosa* and three varieties; var. *americana* Torr. (a species endemic on the shores of the upper Great Lakes), var. *macropoda* Fernald (a mixed series, but primarily based on the plant centering about the Gulf of St. Lawrence) and var. *incana* (Jones) Fernald, based on *P. incana* of the Rocky Mountains and Great Plains. But the most reactionary treatment is that of Pax & Knuth[3] in *Das Pflanzenreich*, where not only are *P. mistassinica* and *P. decipiens* ("*P. magellanica*") mingled with *P. farinosa*, but where *P. farinosa*, subsp. *eufarinosa*, var. *genuina* Pax is made to include, of course, true *P. farinosa* of Europe, but also the Rocky Mountain and Great Plain *P. incana* and (by citation of specimens) the species of the Gulf of St. Lawrence which I have called *P. farinosa*, var. *macropoda*, but which is really quite distinct from both the European and the Rocky Mountain species. Only a casual examination of typical European *P. farinosa*, the Great Plain and Rocky Mountain *P. incana* and the eastern American *P. farinosa*, var. *macropoda* is needed to show how artificial is a classification which makes the three species quite identical (subsp. *eufarinosa*, var. *genuina*!): European *P. farinosa*, a very slender plant with the subulate involucral bracts 4–7 mm. long, mostly only ½–⅓ as long as the filiform pedicels, the mature (fruiting) strongly ribbed calyx 4–6 mm. long, the corolla-lobes 4–6 mm. broad; *P. incana* coarser, with the lanceolate to linear-oblong flat involucral bracts 0.5–1 cm. long, mostly nearly equaling to exceeding the short and stout flowering pedicels, the mature calyx 8–10 mm.. long and only obscurely ribbed,

[1] Gray, Syn. Fl. ii. pt. 1: 58 (1878).
[2] Rhodora, ix. 15, 16 (1907).
[3] Pax & Knuth in Engler, Pflanzenr. iv[237]. Primulaceae (1905).

the corolla-lobes 2–3 mm. broad; *P. farinosa*, var. *macropoda*, a coarse plant with subulate involucral bracts 0.5–1.4 cm. long and with stout pedicels, the mature almost ribless calyx 5.5–11 mm. long, the corolla-lobes 3.5–5.5 mm. broad.

Or again, the essentially Canadian *Primula mistassinica*, which superficially more closely simulates *P. farinosa* than do the other species, but which has consistently different seeds, is a very delicate and slender plant with subulate involucral bracts only 2–6 mm. long, elongate filiform pedicels, mature calyx 3–6 mm. long and only 2–3.5 mm. in diameter, and tiny smooth or obscurely reticulated seeds rarely 0.5 mm. long (European *P. farinosa* with coarser and conspicuously pebbled or reticulated seeds); but the Magellanic species (included by Pax & Knuth along with the Canadian *P. mistassinica* under *P. farinosa*) is stout (scapes up to 4 mm. thick), with flat lanceolate involucral bracts 6–10 mm. long, umbel almost capitate owing to the abbreviated stout pedicels, mature calyx about 1 cm. long and 5 mm. in diameter, and with the largest seeds of the section, fully 1 mm. long and covered with long and conspicuous murications. That as plants *P. mistassinica* and the coarse plant of southern South America are not conspecific is perfectly apparent and their inclusion along with *P. incana* and others in *P. farinosa* by Pax & Knuth is due to the reliance by those authors upon single key-characters, rather than upon the sum-total of characters which really mark the different species but which, throughout their work, they largely ignore.

The result of reliance upon single, and almost exclusively vegetative, characters is inevitably either under-classification, such as has just been illustrated, or over-classification and the complete segregation in a treatment of plants which are really closely related or even of individuals of a single species. The sections of *Primula* defined by Pax and Knuth well illustrate this difficulty. Thus, the only character given by them in *Das Pflanzenreich* for the § *Minutissimae* (3 species of Thibet and the Himalaya) is "Species stoloniferae," the succeeding 16 sections (including § *Farinosae*) being "Species astolonae." Nevertheless, *P. mistassinica* (included by them under *P. farinosa*) may sometimes develop flagelliform and leafy stolons up to 7 cm. long! Again, § *Farinosae* is distinguished from all the 8 succeeding sections by "Bracteae involucrales basi gibbosae vel saccato-productae," yet *P. farinosa* and four others in the section

are promptly grouped together because they have "Bracteae basi vix gibbosae." Based upon single characters, such as are above illustrated, the sections and keys to species of *Das Pflanzenreich* are perplexing and contradictory in the extreme; and it is impossible to avoid the conviction that a vast reduction and reorganization will be necessary before *Primula* attains a natural classification. The *Farinosae* in America are certainly real entities and when their different characters are closely studied they resolve themselves very satisfactorily into species with definite combinations of characters, especially of flowers, fruits and seeds, and with clearly defined and natural geographic ranges. As a result of an intensive study of this small group extending over several weeks the following treatment of the American species is proposed as at least some advance over the treatments heretofore available, although, on account of poor material, it is still necessary to treat two or three plants in a tentative and, therefore, unsatisfactory manner.[1]

Besides the material in the Gray Herbarium and the herbarium of the New England Botanical Club, I have had the great advantage of examining the splendid series of specimens in the National Herba-

[1] One species of § *Nivales* and, therefore, not included in the following synopsis is not generally passing under its earliest specific name and should have its nomenclature clarified. This is the species treated by Gray in the *Synoptical Flora* as *P. nivalis* Pallas. Subsequently, it has been repeatedly shown that the plants of the Bering Sea region are quite distinct from Pallas's species of central and western Asia; but the characters relied upon by Pax and by Greene to separate the Bering Sea plant into two species do not hold. Thus Pax, following Greene, distinguished *P. eximia* Greene from *P. pumila* (Ledeb.) Pax by "Corollae lobi . . . acuti, non emarginati" as contrasted with "Corollae . . . lobi . . . retusi vel leviter emarginati vel integri" in *P. pumila;* but Mrs. Busch's beautiful plate shows them both with obtuse and strictly entire summits, while specimens from the type-station, St. Paul's Island, show conclusively that the lobes of *P. eximia* may be definitely emarginate. Differing only in size of parts the two are apparently not separate species, but they are well marked varieties and Mrs. Busch so treats them. She fails, however, to take up the earliest specific name, not apparently because it is of difficult pronunciation, but because she consistently retains the oldest name of whatever rank and consequently adhers to *P. pumila* (Ledeb.) Pax. By the International Rules the names of the two varieties are

P. Tschuktschorum Kjellm., var. **pumila** (Ledeb.), n. comb. *P. nivalis*, γ. *pumila* Ledeb. Fl. Ross. iii. 10 (1847–49). *P. nivalis* Gray, Syn. Fl. N. A. ii. pt. 1: 59 (1878), not Ledeb. *P. Tschuktschorum* Kjellm. in Nordensk. Vega-Exp. Vetensk. Jagtt, i. 516, t. ix. (1882) in part, and Wissenschaftl. Ergebn. Vega-Exped. 331, t. 5 (1883). *P. pumila* (Ledeb.) Pax, Engler's Bot. Jahrb. x. 208 (1889). *P. pumila*, var. *Ledebouriana* E. Busch, Fl. Sib. et Orient. Extr. Cem. 65: 75, fig. B (1926).

Var. **arctica** (Koidzumi), n. comb. *P. nivalis* Gray, Syn. Fl. N. A. ii. pt. 1: 59 (1878) in part, not Ledeb. *P. eximia* Greene, Pittonia, iii. 251 (1897); J. M. Macoun in Fur Seals and Fur-Seal Isl. N. Pacif. Oc. iii. 568, t. xcii. (1899). *P. Macounii* Greene, l. c. 251, 260 (1897); J. M. Macoun, l. c. 569, t. xciii (1899). *P. arctica* Koidzumi, The Bot. Mag. (Japan), xxv. 216 (1911). *P. pumila*, var. *arctica* (Koidzumi) E. Busch, Fl. Sib. et Orient. Extr. Cem. 65: 75, fig. A (1926).

rium of Canada (cited as "Can.") kindly placed at my disposal by Dr. Malte, and the Primulas in the herbaria of the University of Minnesota (cited as "Minn.") generously loaned by Dr. Butters, and of the University of Pennsylvania submitted by Mr. Fogg.

Key to American Species of Primula § Farinosae

a. Bracts of involucre subulate, lanceolate or linear-oblong above the dilated base, tapering gradually to the tip; their bases either gibbous, rounded or tapering, rarely much prolonged —*b.*

b. Leaves mostly dentate or at least distinctly crenate, petioled or merely narrowed to base, farinose or efarinose: limb of corolla 0.5–2 cm. across: mature capsule from shorter than to at most twice as long as the calyx, thick-cylindric to ellipsoid-ovoid, 2–5 mm. in diameter: seeds dark-brown or fulvous, smooth or rough—*c.*

c. Comparatively stout plants: scape 0.6–4 mm. in diameter just below the involucre, excluding the umbel 0.1–4.5 dm. high: involucral bracts 0.3–1.4 cm. long: pedicels 0.4–1 mm. in diameter: mature calyx 3.8–11 mm. long, 2.5–6 mm. in diameter at summit of tube: anthers and stigma overtopped by the corolla-tube, not exserted from the throat of the shrivelled corolla: capsules 2.5–5 mm. in diameter: seeds muricate or distinctly reticulated (cf. no. 6), 0.5–1 mm. long—*d.*

d. Lobes of mature calyx obtuse to acute but not subulate-tipped: corolla-tube 4–7 (rarely –9) mm. long; lobes shallowly emarginate to deeply obcordate: capsule equaling to exceeding the calyx—*e.*

e. Bracts of involucre subulate or tightly involute above the dilated base.

Leaves green beneath, very rarely a little farinose, subentire or obscurely undulate-dentate, 0.5–4 cm. long, 0.2–1.5 cm. broad: mature calyx 3.8–6 mm. long, efarinose or only scantily farinose; the lobes about half as long as the tube: limb of corolla 5–8 mm. broad; lobes oblong or narrowly cuneate, 1–3 mm. broad, shallowly emarginate, the segments 0.2–1 mm. long ..... 1. *P. stricta.*

Leaves strongly farinose (rarely efarinose) beneath, mostly dentate, 1–13 cm. long, 0.3–3 cm. broad: mature calyx 5.5–11 mm. long, usually strongly farinose; lobes about equaling the tube: limb of corolla 9–13 mm. broad; lobes broadly obcordate, 3.5–5.5 mm. broad, with segments 1.5–3 mm. long ..... 2. *P. laurentiana.*

e. Bracts of involucre lanceolate to linear-oblong, flat (slightly involute only on drying).

Calyx copiously farinose; the oblong obtuse or rarely acutish lobes shorter than the tube: corolla-tube slightly exceeding the calyx; limb 6–10 mm. broad, lilac, with oblong to cuneate-obovate lobes 2–3 mm. broad: capsule only slightly exceeding the calyx: seeds 0.5–0.7 mm. long, strongly angled ..... 3. *P. incana.*

Calyx efarinose or only sparingly farinose; the oblong-lanceolate acute to obtuse lobes equaling the tube: corolla-tube shorter than to barely equaling the calyx; its white (rarely lilac-tinged) limb 1.2–2 cm. broad, with lobes 3.5–6 mm. broad: capsule distinctly exceeding the calyx: seeds 1 mm. long, rounded-obovoid.....4. *P. decipiens.*

d. Lobes of mature calyx sharply acuminate to subulate-tipped: corolla-tube 8–10 mm. long; its limb 6–10 mm. broad, with the narrowly cuneate lobes merely emarginate: capsule much overtopped by the calyx-lobes.....5. *P. specuicola.*

c. Comparatively slender: scapes 0.3–1.8 mm. in diameter just below the involucre, excluding the umbel 0.1–2.5 dm. high: involucral bracts 2–6 mm. long: pedicels 0.2–0.5 mm. in diameter: mature calyx 3–6 mm. long, 2–3.5 mm. in diameter at summit of tube: stigma or tops of anthers exserted from the throat of the shrivelled corolla: capsule 2–3 mm. in diameter: seeds smooth or only obscurely reticulated (strongly reticulated in no. 6), 0.3–0.6 mm. long—*f.*

f. Most of the leaves merely cuneate at base or narrowed gradually to the broad subpetiolar base, with 2–15 pairs of teeth: involucral bracts rarely saccate-gibbous at base—*g.*

g. Seeds strongly angulate and truncated, prominently rugose or reticulated: leaves often farinose beneath. 6. *P. intercedens.*

g. Seeds rounded-obovoid, nearly smooth or obscurely linear-reticulated.

Leaves copiously farinose beneath, somewhat rhombic: pedicels and calyx farinose.....7. *P. ajanensis.*

Leaves green, very rarely farinose, oblanceolate to obovate: pedicels efarinose: calyx usually efarinose.....8. *P. mistassinica.*

f. Most of the leaves with petioles longer than the rather abruptly dilated rhombic, ovate or cuneate-obovate blades; the blades with few (1–7) pairs of teeth confined to the upper half or entire.

Corolla-limb 7–10 mm. broad; its emarginate to obcordate lobes 1.5–3 mm. broad: involucral bracts not saccate at base.....9. *P. parvifolia.*

Corolla-limb 1.2–2 cm. broad; its deeply obcordate lobes 5–8 mm. broad: involucral bracts usually saccate-gibbous at base.....10. *P. borealis.*

b. Leaves entire, undulate or rarely slightly dentate, distinctly slender-petioled, efarinose: limb of corolla 5–9 mm. broad, white or violet; its cuneate lobes distinctly shorter than the tube, 1.6–4 mm. broad, cleft a third or half their length: mature capsules slender-cylindric, tapering at summit, becoming 2–3 times as long as the calyx, 7–13 mm. long, 1.8–2.1 mm. in diameter: seeds pale-brown to stramineous, smooth.....11. *P. egaliksensis.*

a. Bracts of involucre oblong or narrowly obovate, obtuse or abruptly contracted at tip; their bases often prolonged into narrow saccate auricles 1–1.5 mm. long: leaves slender-petioled, entire.....12. *P. sibirica.*

1. P. STRICTA Hornem. *Leaves green*, or only sparingly farinose beneath, oblanceolate to narrowly obovate, *entire to obscurely undulate-dentate*, 0.5–4 cm. long, 0.2–1.5 cm. broad: *scape* 1.5–30 cm. high, rather strict and stout, *1–2 mm. in diameter* below the inflorescence, green or purplish and *efarinose: involucral bracts lance-subulate*, usually saccate or gibbous at base, *3–8 mm. long:* umbel 2–8-flowered: pedicels erect or nearly so, in anthesis from shorter than to twice as long as the bracts: *calyx* urceolate-campanulate, *efarinose, in maturity 3.8–6 mm. long, 3.5–5 mm. in diameter* at summit of tube; the *lobes* oblong to narrowly deltoid, obtuse to acute, *about half as long as the tube: corolla* lilac or violet; the *tube distinctly exserted; the limb 5–8 mm. broad; lobes oblong to narrowly cuneate, 1–3 mm. broad,* shallowly notched, the *segments 0.2–1 mm. long; capsule* ellipsoid, *only slightly exceeding the calyx,* 3–4 mm. in diameter: seeds more or less angulate, dark-brown or fulvous, 0.5–0.8 mm. long, conspicuously reticulated. —Hornem. in Fl. Dan. viii. fasc. 24, t. mcccIxxxv. (1810); Duby in DC. Prodr. viii. 44 (1844); Lange, Consp. Fl. Groenl. 70 (1880); Pax & Knuth in Engler, Pflanzenr. iv[237]. 86 (1905); J. M. Macoun & Holm, Rep. Can. Arct. Exped. 1913–18, v. pt. A. t. xi. fig. 6 (1921); E. Busch, Fl. Sib. et Orient. Extr. iv. Cem. 65: 38 (1926). *P. farinosa, β. stricta* (Hornem.) Wahlenb. Fl. Lapp. 60 (1812). *P. Hornemanniana* Lehm. Monogr. Prim. 55, t. 4 (1817); Hook. Fl. Bor.-Am. ii. 120 (1838), in small part only. *P. glabrescens* F. Nylander ex W. Nyl. & Saelan, Herb. Mus. Fenn. (1859) 32, acc. to Pax & Knuth. *P. mistassinica* Gray, Syn. Fl. N. A. ii. pt. 1: 58 (1878) in part, not Michx. (1803). *P. farinosa,* var. *mistassinica* Pax, Engler's Bot. Jahrb. x. 200 (1889) in part, not *P. mistassinica* Michx. (1803). *P. farinosa,* var. *groenlandica* Pax in Engler, Pflanzenr. iv[237]. 84 (1905) in part, not *P. stricta,* var. *groenlandica* Warming (1886). *P. farinosa,* var. *macropoda* Fernald, RHODORA, ix. 16 (1907) in small part (as to citation of Keewatin plant). *P. stricta* var. *jacutensis* E. Busch, Fl. Sib. et Orient. Extr. iv. Cem. 65: 36 (1926).—Arctic and subarctic Eurasia, Greenland and North America; with us south to northern Labrador, northwestern Quebec, northern Ontario and Alberta. The following American specimens have been examined. GREENLAND: without locality, ex *Lehmann;* Umenak, *Rink;* Atâ, lat. 70° 16′, August 6, 1921, *A. E. Porsild;* Qeqerlatik Najarsuit, lat. 66° 44′, August 3, 1911, *M. P. & A. E. Porsild;* Kügsinerssuaq and Atâ, lat. 70° 17′, July 11, 1923, *M. P. Porsild;* Itivdleq-Fjord, Quingua, lat. 66° 29′, July 6, 1926, *M. P. Porsild;* the Porsild specimens all distributed as *P. mistassinica.* LABRADOR: moist banks, Nachvak, *R. Bell,* no. 15,829 (Can.), as *P. mistassinica;* Rama, *A. Stecker,* no. 78, as *P. farinosa.* QUEBEC: Ungava ("northern Labrador"), 1884, *L. M. Turner,* July, 1897, *A. P. Low,* no. 24,529 (Can.), as *P. egaliksensis;* River Kovik, lat. 61° 59′, Hudson Straits, *Low,* no. 23,025 (Can.), as *P. farinosa;* Richmond Gulf, June 28, 1890, *Spreadborough,* no. 14,421, June 12, 1899, *Low,* no. 63,242 (Can.), both as *P. sibirica;*

north of Cape Jones,[1] James Bay, *A. P. Low*, no. 63,244, as *P. stricta*, altered to *P. sibirica;* damp banks, South Twin Island, James Bay, *J. M. Macoun*, no. 15,831 (Can.), as *P. farinosa*. ONTARIO: "growing below high-water mark," west coast of Hudson Bay, lat. 56°, August, 1886, *J. M. Macoun*, no. 15,850 (Can.), as *P. mistassinica* or *P. sibirica;* Cape Henrietta Maria, *Spreadborough*, no. 62,555 (Can.); mouth of Ekwan River, James Bay, *Dowling*, no. 34,526 (Can.), as *P. farinosa;* The Beacon, mouth of Moose River, *Spreadborough*, no. 62,554 (Can.), as *P. sibirica*. MANITOBA: Churchill, lat. 58° 50′, *J. M. Macoun*, no. 79,388, as *P. stricta* or *P. farinosa;* Churchill River, *C. E. Cairnes*, no. 89,722 (Can.), as *P. mistassinica*. MACKENZIE: Arctic seacoast, *Richardson;* Mackenzie River, *Richardson;* south coast of Coronation Gulf, Port Epworth, *Cox & O'Neill*, no. 581; Bernard Harbour, *Frits Johansen*, no. 347; Great Bear River, *Elizabeth Taylor*, no. 87; shore, Great Slave Lake, *R. Bell*, no. 23,151 (Can.). YUKON: near mouth of Lewis River, *Gorman*, no. 1052 (Can.). ALBERTA: Rocky Mountains, *Drummond*, as *P. farinosa* or *P. scotica;* head of Pabocton Trail, *S. Brown*, no. 1107, as *P. borealis*.

The Greenland and American plants cited seem to me quite inseparable from Scandinavian material of typical *P. stricta*, although the tiny plants from the Arctic coast of Mackenzie might be set off as var. *jacutensis* E. Busch; they agree closely with Mrs. Busch's description and figure of the plant of northeastern Siberia, but seem more like dwarfed arctic extremes than a true variety.

Pax & Knuth exclude *P. stricta* from America and cite all Greenland and Labrador material under *P. farinosa*, var. *groenlandica*, which they base upon *P. stricta*, var. *groenlandica* Warming, Svensk. Vet. Akad. Handl. xii. Afd. iii. No. 2: 21, fig. 7, A–D (1886). Lange, Conspect. Fl. Groenl. 260 (1887), however, maintained both *P. stricta* and *P. stricta*, var. *groenlandica* Warm. in the Greenland flora, remarking that the latter is a "Forma intermedia inter P. strictam et P. egaliksensem." Surely, the figures of var. *groenlandica* published by Warming are of a plant scarcely, if at all, separable from *P. egaliksensis*. The distinctly petioled leaf with abruptly dilated entire blade, the large and plane involucral bracts, short flowering pedicels, comparatively slender calyx with narrow lobes, only slightly exserted corolla-tube with deeply-notched lobes are all characters of *P. egaliksensis* and Warming's figures are readily matched in that species, but not in *P. stricta*. In fact, Warming's

[1] The material is labeled in the hand of the late J. M. Macoun "North of Cape Jones, Hudson Strait"; but Low's report for 1899, when it was collected, explicitly refers to "Cape Jones at the entrance to James Bay"—See Low, Geol. Surv. Can. Ann. Rep. n. s. xii. 144A (1902).

figures are not appreciably unlike the original plate of the white-flowered *P. egaliksensis* Wormsk. in Hornem. Fl. Dan. ix. fasc. 26: t. mdxi. (1816), except that *P. stricta*, var. *groenlandica* has purple corollas. Just such a plant occurs across boreal America, in northern Newfoundland, northern Quebec, Alberta, British Columbia and Alaska; and of the abundant series which I have collected and studied in Newfoundland (six numbers, representing all stages from young flowers to mature fruit) the smaller specimens exactly match Warming's original figures of *P. stricta*, var. *groenlandica* and, better still, the four individuals in the Gray Herbarium of his type collection, gathered at Itivnek-Elvens in the Holstensborg District of Greenland on July 13, 1884. The Newfoundland plant with violet corollas, watched closely in the field, can be separated from typical white-flowered *P. egaliksensis* only by its intense color. Its fruit, collected at a specially marked station, is quite like that of *P. egaliksensis*, except that the capsules are deeper-colored: the slenderly cylindric capsules 2–3 times as long as the calyx and only 1.5–1.8 mm. thick (the capsules of *P. stricta* ellipsoid, only slightly exceeding the calyx and 3–4 mm. in diameter; the capsules of *P. farinosa* likewise ellipsoid, only slightly exserted and thick). Furthermore, in both *P. farinosa* and *P. stricta* the dark-brown seeds are obviously muricate or reticulated, in P. *egaliksensis* the stramineous or pale-brown seeds smooth or at most obscurely reticulated; and the seeds of *P. stricta*, var. *groenlandica* are like those of *P. egaliksensis*. It is now very clear, then, that *P. stricta*, var. *groenlandica* Warming belongs neither to *P. stricta* with which he placed it not to *P. farinosa* to which it was transferred by Pax & Knuth, but that it is a variation of *P. egaliksensis*, as Lange has already suggested. It is, furthermore, clear that most of the material cited by Pax & Knuth under *P farinosa*, var. *groenlandica* really belongs to *P. stricta*.

2. P. **laurentiana**, Fernald, nom. nov. (Plate 169). *Leaves farinose* (rarely efarinose) *beneath*, oblanceolate, spatulate or narrowly rhombic-ovate, *mostly* petioled and *dentate*, 1–13 cm. long, 0.3–3 cm. broad: *scape* 0.1–4.5 dm. high, strict and stout, *0.6–3 mm. in diameter* below the inflorescence, *often farinose at summit: involucral bracts lance-subulate or strongly involute*, usually strongly saccate or gibbous at base, *0.5–1.4 cm. long:* umbel 1–17-flowered: pedicels erect or strongly ascending, from practically wanting to 5 cm. long, comparatively stout (up to 1 mm. thick): *calyx* urceolate-campanulate, *usually farinose, in maturity 5.5–11 mm. long and 3–6 mm. in diameter* at summit of tube; the *lobes* lanceolate, oblong or narrowly deltoid,

obtuse to acute, *about equaling the tube: corolla* lilac; the *tube but slightly exserted; the limb 9–13 mm. broad; lobes broadly obcordate, 3.5–5.5 mm. broad, with segments 1.5–3 mm. long:* style and anthers not exserted from the yellow throat: capsule ellipsoid, from slightly exserted to twice as long as the calyx, 2.5–5 mm. in diameter; its valves splitting into linear halves 1.5–2 mm. wide: seeds angulate, 0.5–0.8 mm. long, conspicuously reticulated: flowers with the fragrance of *Narcissus Jonquilla;* roots musky.—*P. pusilla* Sweet, Brit. Fl. Gard. ser. 2, i. t. 5 (1831), not Goldie (1822). *P. farinosa* var. *macropoda* Fernald, Rhodora, ix. 16 (1907) mostly, including the type-specimen, not *P. macropoda* Craib, Notes Roy. Bot. Gard. Edinb, xi, 176 (1919). *P. scotica* Hook. Fl. Bor.-Am. ii. 120 (1838), not Hook. in Curt. Fl. Lond. iv. t. 133 (1821). *P. farinosa*, var. *genuina* Pax in Engler, Bot. Jahrb. x. 199 (1889) as to eastern American citations. *P. farinosa*, subsp. *eufarinosa*, var. *genuina* Pax & Knuth in Engler, Pflanzenr. iv[237]. 83 (1905), as to citation of eastern Canadian plant. *P. farinosa*, var. *americana* Fernald, Rhodora, xxviii. 224 (1926), not Torr. Fl. No. and Mid. U. S. i. 213 (1824). *P. farinosa*, var. *incana* St. John, Can. Dept. Mines. Mem. no. 126: 104 (1922); Fernald, Rhodora, xxviii. 224 (1926); not var. *incana* (Jones) Fernald Rhodora, ix. 16 (1907). *P. farinosa* of eastern Am. authors, not L. (1753).—Ledges and cliffs, chiefly calcareous, southern Labrador to Nova Scotia and eastern and north-central Maine. The following, selected from many specimens, are characteristic. Labrador: banks of Naskaupi River, about 18 miles from mouth, *Wetmore*, no. 103,037; Indian Harbor, lat. 54° 27′, *Ralph Robinson*, no. 102; Battle Harbor, *Bowdoin College Exped.* no. 104; Barge Point, July 17, 1913, *W. E. Ekblaw;* Forteau, 1870, *S. R. Butler.* Newfoundland: turfy limestone barrens, Burnt Cape, *Fernald, Wiegand, Pease, Long, Griscom, Gilbert & Hotchkiss*, no. 28,905; gravelly limestone shore, Schooner (or Brandy) Island, *Pease & Long*, no. 28,907; wet limestone ledges, St. Barbe, *Fernald, Long & Dunbar*, no. 26,956; talus of calcareous sandstone escarpments, Bard Harbor Hill, *Fernald & Long*, no. 28,912; calcareous rocks and talus, Port Saunders Harbor, *Fernald & Wiegand*, no. 3889; conglomerate limestone, etc., Cow Head, *Fernald & Wiegand*, nos. 3885, 3887; boggy spots on rocky crests, Twillingate, *Fernald, Wiegand & Bartram*, no. 6068; dry sea-cliffs, Tilt Cove, *Fernald, Wiegand & Darlington*, no. 6069; bare spots, French (or Tweed) Island, *Fernald, Long & Fogg*, no. 375; cliffs near Frenchman's Cove, Bay of Islands, *Mackenzie & Griscom*, no. 10,402; calcareous gravelly bank, Port au Port, *Fernald & Wiegand*, no. 3886. Quebec: limestone and calcareous sandstone terraces, Blanc Sablon,[1] *Fernald & Wiegand*, nos. 3888, 3890, *Fernald, Wiegand & Long*, no. 28,914; grassy shore, Wapitagun, July 14, 1927, *H. F. Lewis* (Can.); rocky shore, Goynish, *St. John*, no. 90,675; limestone headland,

[1] The original labels read "Labrador," but by recent decision of the Privy Council Blanc Sablon is transferred to Quebec.

Pointe-aux-Esquimaux, Mingan, *St. John*, no. 90,674; plages calcaires de la petite rivière, Pointe-aux-Esquimaux, *Victorin & Rolland*, no. 18,485; sur les calcaires du rivage, Ile à Marteau, Mingan, *Victorin & Rolland*, no. 18,565; sur les rivages calcaires, Grande Ile, Mingan, *Victorin & Rolland*, no. 21,832; Baie Ellis, Anticosti, *Victorin*, no. 4188; alluvion argilo-calcaire, Rivière Jupiter, Anticosti, *Victorin & Rolland*, no. 25,139; Salt Lake, Anticosti, *J. Macoun*, no. 15,833 (Can.); Bonaventure conglomerate (calcareous) sea-cliffs, Bonaventure Island, *Fernald & Collins*, no. 1148, *Victorin et al*, nos. 17,642, 17,644; cliffs and ledges, Percé, *J. M. Macoun*, no. 68,949 (Can.), *Collins, Fernald & Pease*, nos. 5319, 5320, 5434, 5435, 5554, *Fernald & Collins*, nos. 1147, 1149; sur les calcaires, Anse à l'Indien, *Victorin, Rolland, Brunel & Rousseau*, no. 17,643; limestone cliffs, Cape Rosier, *Frits Johansen*, no. 103,287 (Can.); calcareous sea-cliffs, Christie, *Fernald & Pease*, no. 25,233; sea-cliffs, Tourelle, *Griscom, Mackenzie & Smith*, no. 25,981; calcareous sea-cliffs, Jaco Hughes, *Fernald & Pease*, no. 25,232; wooded banks of the St. Lawrence, Matane, August 7, 1904, *F. F. Forbes;* shaded calcareous cliffs, Bic, *Fernald & Collins*, nos. 243 (TYPE in Gray Herb.), 1146; wet shore of the St. Lawrence, Temiscouata, August 7, 1879, *Pringle;* Pointe à Persil, Rivière du Loup, *Victorin*, no. 131. MAGDALEN ISLANDS: Entry Island, June 23, 1861, *Hyatt, Verrill & Shaler*. NOVA SCOTIA: dripping cliffs, Baxter's Harbour, July 10, 1900, *F. G. Floyd;* cliffs and ledges, Morden, *W. H. Harrington*, no. 644 (Can.); crests of basalt cliffs by Bay of Fundy, near Margaretville, *Bissell, Bean, White & Linder*, no. 22,234; turfy crests and slopes of exposed headlands, Markland (Cape Forchu), *Fernald, Bartram, Long & Fassett*, no. 24,327; Chebogue Point, *John Macoun*, no. 81,152. MAINE: Houlton, 1880, 1881, *Kate Furbish;* foot of Mt. Kineo, Moosehead Lake, August, 1866, *A. H. & C. E. Smith;* north side of Mt. Kineo, September 21, 1887, *G. G. Kennedy;* gravel, Libby Islands, Machiasport, *Cushman & Sanford*, no. 1515.

P. laurentiana is the plant published originally as *P. farinosa*, var. *macropoda*. On account of *P. macropoda* Craib it is necessary to assign a new name. It is a coarser plant than the European *P. farinosa* to which it has always been referred, either as identical or as a geographic variety. The dwarf northern extremes (from southern Labrador and northern Newfoundland) simulate *P. farinosa* and have often been mistaken for it, but in its typical development, *P. laurentiana* is taller and stouter; the bracts of the involucre longer, 0.5–1.4 cm. long (in European *P. farinosa* 4–7 mm. long); the pedicels stouter; the calyx commonly much more farinose, urceolate-campanulate, in fruit 5.5–11 mm. long and 3–6 mm. in diameter (the efarinose to but slightly farinose calyx of *P. farinosa* more turbinate,

in fruit only 4–6 mm. long and 2.5–4 mm. in diameter); the capsules larger and the seeds with more conspicuous reticulation. Plate 169 is from a photograph taken at the type-station by Professor J. F. Collins.

In view of the pronounced selection of calcareous habitats by *P. laurentiana* it is worth noting that Contejean classified the European *P. farinosa* as one of the "*Calcifuges presque indifférentes, cependant plus nombreuses sur les sols privés de calcaire;*"[1] and that Warming indicates[2] *P. farinosa* as a typical oxylophyte, listing it along with *Vaccinium uliginosum* and *V. Oxycoccus*. On the other hand, Tansley makes *Primula farinosa* in Great Britain distinctly calcicolous, saying, "*Actaea spicata* and *Primula farinosa* also seem to have found the siliceous soils of the Leeds and Halifax district an effectual barrier against a southern extension of their range";[3] and he definitely lists it as one of the characteristic plants which "On the Pennines, for example, . . . occur on the swamps of the limestone hills."

In *P. laurentiana* the pedicels are commonly elongate, but at the northern part of its range they may be very short or almost wanting. These specimens with abbreviated pedicels have been confused with the Great Plain and Rocky Mountain *P. incana*, but they differ from that species in their involucral bracts, broad corolla-lobes, and other characters which show them to be merely dwarfed states of *P. laurentiana*. Other plants of *P. laurentiana* with unusually small calyces and capsules have sometimes been identified with the plant of the Great Lakes which Torrey described as *P. farinosa*, var. *americana;* but the Great Lake material, though often quite farinose (and thus strongly simulating *P. farinosa* and *P. laurentiana*) has a technical character which allies it as much to *P. mistassinica:* the capitate stigma or the tops of the anthers protruding from the throat of the shrivelling corolla. The plants of Newfoundland and Quebec which have been misidentified with *P. farinosa*, var. *americana* are clearly only attenuate forms of *P. laurentiana*. The plants of Mt. Kineo, Maine are extreme cases of this attenuation; the leaves being remarkably thin and delicate, the scapes unusually slender, and the small calyces with unusually thin and sharp lobes; but these seem to be only slight ecological modifications, presumably due to the habitat,

[1] Contejean, *Influence du Terrain sur la Végétation*, Ann. Sci. Nat. sér. 6. ii. 300 (1875).

[2] Warming, Oecology of Pl. ed. Groom & Balfour, 193 (1909).

[3] Tansley, Types of British Vegetation, 157 (1911).

at the foot of a north-facing precipice rather than in more exposed and better illuminated spots, such as the plant usually selects.

Ordinarily *P. laurentiana*, like *P. farinosa* and *P. incana*, has the lower surface of the leaf strongly farinose or whitened with waxy particles. When the specimens have been dried over extreme heat or when immersed in alcoholic solutions in poisoning, the wax is often removed and the leaves have a deceptive post-mortem greenness. Occasionally, however, considerable colonies of *P. laurentiana* are found with absolutely green and efarinose foliage; and, unless their characters of calyx, corolla, capsule and seeds are carefully examined, they are likely to be misidentified either as *P. stricta*, which is high-northern, or with *P. mistassinica*, which abounds through much of the range of *P. laurentiana* but which has more slender scapes and pedicels, calyx and capsules, shorter bracts and smaller and only obscurely pebbled seeds. The green form of *P. laurentiana* is apparently parallel with *P. farinosa*, var. *denudata* Koch of Europe. It is merely a minor form, but as a striking variation, may appropriately be designated

P. LAURENTIANA, forma **chlorophylla**, n. f., foliis subtus efarinosis.—NEWFOUNDLAND: Cape Norman, *Wiegand & Long*, no. 28,909; Sacred Island, *Wiegand, Gilbert & Hotchkiss*, no. 28,908; Sandy (or Poverty) Cove, *Fernald, Long & Dunbar*, no. 26,955; Capstan Point, Flower Cove, *Fernald, Long & Dunbar*, no. 26,957; Yankee Point, *Wiegand & Hotchkiss*, no. 28,904; turfy limestone barrens, Dog Peninsula, August 27, 1925, *Fernald, Wiegand, Long, Gilbert & Hotchkiss*, no. 28,913 (TYPE in Gray Herb.); Bard Harbor, *Fernald & Long*, no. 28,911. QUEBEC: Anticosti Island, *Pursh;* Ilets Perroquets, Mingan, *Victorin & Rolland*, no. 18,421; wet mossy swale, Puffin Island, St. Mary Islands, July 27, 1927, *H. F. Lewis* (Can.). MAINE: base of Kineo Cliff, Moosehead Lake, July 24, 1866, August, 1867, *A. H. & C. E. Smith* (Penn.), June 8, 1878, *F. S. Bunker*.

3. P. INCANA Jones. *Leaves* strongly (rarely only slightly) *farinose beneath*, elliptic, oblong-obovate or spatulate, without petioles or in attenuated plants with winged petioles, obtuse, *shallowly denticulate*, 1.5–8 cm. long, 0.5–2 cm. broad: *scape* 0.5–4.5 dm. high, strict and stout, *1–2 mm. in diameter* below the inflorescence, *farinose at summit: involucral bracts lanceolate to linear-oblong, flat* (slightly involute only on drying), broadly gibbous at base, 0.5–1 cm. long, *mostly equaling or exceeding the short* and stout *flowering pedicels: umbel* 2–14-flowered, *subcapitate*, but with some fruiting pedicels elongating to 1–2.5 cm. long: *calyx* urceolate-campanulate, usually *strongly farinose*, in maturity 8–10 mm. long and 4–5 mm. in diameter; the *oblong* obtuse or rarely acutish *lobes shorter than the tube: corolla* lilac; the *tube*

slightly exceeding the calyx; the limb 6-10 mm. broad, with oblong to cuneate-obovate lobes 2–3 mm. broad; stigma and anthers not exserted from the yellow throat: *capsule* ellipsoid, *only slightly exceeding the calyx: seeds strongly angled, 0.5–0.7 mm. long, conspicuously reticulated.* —Proc. Cal. Acad. ser. 2, v. 706 (1895). *P. farinosa,* var. Gray, Proc. Acad. Nat. Sci. Phila., 1863: 70 (1863). *P. dealbata* Engelm. in Gray, l. c. (1863) as synonym. *P. americana* Rydb. Bull. Torr. Bot. Cl. xxviii. 500 (1901). *P. farinosa,* var. *genuina* Pax, in Engler's Bot. Jahrb. x. 199 (1889) in part, as to Rocky Mt. material. *P. farinosa,* subsp. *eufarinosa,* var. *genuina* Pax & Knuth in Engler, Pflanzenr. iv[237]. 83 (1905), as to synonymy in part and citation of Colorado material. *P. farinosa,* var. *incana* (Jones) Fernald, RHODORA, ix. 16 (1907). *P. farinosa,* var. *macropoda* Fernald, RHODORA, ix. 16 (1907) in small part (as to plants of Saskatchewan, Athabasca and Mackenzie). Illustrated as *P. farinosa* in Clements & Clements, Rocky Mt. Flowers, t. 16, fig. 1 (1914) and by McCalla, Wild Fl. W. Can. 37 (1920).—Meadows, bogs and damp places, Mackenzie to Colorado and Utah. MACKENZIE: Great Slave Lake, *Richardson.* SASKATCHEWAN: without locality, 1858, *Bourgeau;* Carlton House, *Richardson;* bank of Saskatchewan R., Prince Albert, *J. Macoun,* no. 12,211 (Can.); borders of marshes, Pleasant Plain, *J. Macoun,* no. 15,837 (Can.); borders of marshes near the South Saskatchewan, *J. Macoun,* no. 15,838 (Can.); Souris Plain, *J. Macoun,* no. 15,830 (Can.); damp thickets along Humber Creek, Moose Jaw, *J. Macoun,* no. 12,742 (Can.); Cypress Hills, *J. Macoun,* no. 5313; Farewell Creek, Cypress Hills, *J. Macoun,* no. 11,776 (Can.). ALBERTA: The Cascade, Athabasca River, *Elizabeth Taylor,* nos. 38, 110; White Mud River, *Spreadborough,* no. 19,852 (Can.); wet spots, Edmonton, *McCalla,* no. 2590 (Can.); grassy banks, Red Deer, *H. H. Gaetz,* no. 7476 (Can.); boggy ground, West Fork, Water Coulée, near Rosedale, *Moodie,* no. 942; bank of Bow River, Calgary, *Malte & Watson,* no. 118,331 (Can.); Elbow River, *J. Macoun,* no. 24,528 (Can.); Rocky Mountains, *Burke;* foot of Devil's Lake, *J. Macoun,* no. 101,401 (Can.). MONTANA: Willow Creek, *Scribner,* no. 143; moist meadow, Armstead, Beaverhead Co., *Payson & Payson,* no. 1735; mountain canyons, Anaconda, *Blankinship,* no. 727 (Can.). WYOMING: Little Laramie River, *Nelson,* nos. 1871, 1961; damp soil, Hot Spring Bar, 20 mi. south of Jackson, *Merrill & Wilcox,* no. 1039; wet soil, Adams Ranch, Jacksons Hole, *Merrill & Wilcox,* no. 990; low meadow near North Pilot Butte, *Merrill & Wilcox,* no. 749; meadow 20 mi. west of Big Piney, Sublette Co., *Payson & Payson,* no. 2648. COLORADO: Rocky Mts., lat. 39° 41′, 1862, *Hall & Harbour,* no. 378; South Park, *E. L. Hughes,* no. 45; Grape Creek, Custer Co., July 2, 1888, *Demetrio;* Gunnison, *Baker,* no. 361.

Jones's original material was from cold bogs at the head of Sevier River, Utah, I have not seen the type but the description clearly

belongs to the characteristic plant of the Rocky Mountain and Great Plain area. The name *P. dealbata* Engelm. (1863), having been published merely as a synonym, cannot displace the validly published, but later *P. incana* Jones (1895). In its smaller extremes *P. incana* closely simulates *P. stricta*, but when well-developed it is quite distinct in its large and copiously farinose leaves, flat and rather broad bracts, and longer and broader strongly farinose calyx.

In its subcapitate inflorescence and plane bracts *P. incana* is nearer related to *P. decipiens* of southern South America (*P. magellanica* of authors) than to other members of the *Farinosae*. This relationship of the Magellanic and Rocky Mountain plants, long familiar in other groups, was clearly recognized by Asa Gray, who, however, failed to detect the characters which separate the two. In enumerating the Rocky Mountain plants of Hall & Harbour, Gray said:

"378. Primula farinosa L., var. foliis sessilibus; umbella capitata; calyce cylindraceo tubum corollae subaequante. *P. dealbata*, Engelm. in litt. But it exactly accords with the left-hand figure of *P. farinosa*, var. *Magellanica* of Hooker's Flora Antarctica (*P. decipiens*, Duby), and with my Antarctic specimens, except that the calyx is perhaps a little longer, and the corolla bluish-purple. . . . It is interesting thus to connect the Antarctic with the northern forms, by specimens from the Rocky Mountains in about lat. 40°."[1]

As stated, Gray overlooked some very real characters: *P. decipiens* (*P. farinosa*, var. *magellanica*) with longer calyx-lobes, the corolla with shorter tube and with much larger white (rarely lilac-tinged) limb (1.2–2 cm. broad) with lobes twice as broad, capsule much longer, and seeds the largest in the section (1 mm. long), rounded-obovoid and conspicuously muricate; but the affinity of *P. incana* is, nevertheless, with *P. decipiens* rather than with *P. farinosa*.

4. P. decipiens Duby. *Leaves* spatulate to narrowly ovate, obovate or rhombic, tapering to a sessile base or broad petiole, *serrulate-dentate*, 1–9 cm. long, 0.7–2 cm. broad, efarinose or farinose beneath: *scape* 0.3–5 dm. high, *stout*, up to 4 mm. in diameter below the umbel, farinose at summit: *involucral bracts flat, lanceolate*, 6–10 mm. long, broadly gibbous at base: *umbel subcapitate*, few- to many-flowered: pedicels stout, pulverulent, lengthening in fruit to 2–10 mm.: *calyx* urceolate-campanulate, *efarinose* or sparingly farinose, in maturity about 1 cm. long and 5 mm. in diameter; the oblong-lanceolate obtuse to acutish *lobes equaling the tube: corolla white* or sometimes tinged with lilac; the greenish *tube shorter than to barely equaling the calyx:*

[1] Gray, Proc. Acad. Nat. Sci. Phila. (1863) 70.

the limb 1.2–2 cm. broad, with obcordate and cuneate-obovate *lobes 3.5–6 mm. broad:* anthers and stigma not exserted from the yellow throat: *capsule* ellipsoid or slenderly ovoid, *distinctly exceeding the calyx: seeds* dark-brown, *1 mm. long, rounded-obovoid, conspicuously muricate.*—Mém. Fam. Prim.—Mém. Soc. Phys. d'Hist. Nat. Genève, x. 46, t. ii. fig. 1 (1844); Duby in DC. Prodr. viii. 44 (1844). *P. magellanica* Hook. Fl. Ant. ii. t. cxx. (1847); Skottsberg, Bot. Surv. Falk. Isl.—Kungl. Sv. Vet. Akad. Handl. l. no. 3: 46 (1913); Skottsb. Vegetationsverhältnisse längs der Cordillera de los Andes. —Bot. Ergebn. Schwed. Exped. Patag. Feuerl. 1907–1909, v. 285 (1916); not Lehm. Mon. Prim. 62, t. vi (1817). *P. farinosa,* var. *magellanica* Hook. Fl. Ant. ii. 337, t. cxx (1847)[1]; Decaisne in Dumont-D'Urville, Voy. au Pole Sud, Bot. ii. 24, t. 31, fig. 5 (1848–53); Franchet, Miss. Scientif. Cap Horn, 1882–1883, v. 354 (1889); Dusén, Svenska Exped. Magellansl. iii. no. 5: 139 (1900); Macloskie, Rep. Princeton Univ. Exped. Patag. 1896–1899, viii[2]. 650 (1905); Pax & Knuth in Engler, Pflanzenr. iv[237]. 85 (1905); De Wildem. Phan. des Terres Magel. 138 (1905); Reiche, Fl. Chil. v. 93 (1910); Vallentin & Cotton, Ill. Fl. Pl. and Ferns Falk. Isl. t. 41 (1921); not *P. magellanica* Lehm. (1817). *P. farinosa* Gay, Fl. Chil. iv. 367 (1849), not L.—Falkland Islands and from Fuegia northward along the Andes of Chili and Argentina to lat. 38° (acc. to Skottsberg).

There is no doubt as to the application of the name *Primula decipiens.* Duby clearly illustrated the plant and his description explicitly gives the diagnostic characters: "foliis . . . serrulatis . . . . , ... invol. . . . calyces subaequantis foliolis elongato-lanceolato-linearibus . . ., calycis . . . . laciniis . . . obtusis, cor. . . . . lobis late obcordatis . . . Flores subsessiles etiam in planta fructifera; corollae majores quam in P. farinosa."

Lehmann's *P. magellanica,* to which all subsequent authors except Duby have referred the Falkland and Patagonian plant, differed in many striking characters from the plant with subcapitate white flowers which Duby correctly set off as *P. decipiens.* Lehmann's description called for "Folia . . . dentato-crenata" and his figure of a large plant shows teeth less salient than in large plants of *P. decipiens. P. magellanica* had "Involucri foliola . . . unguicularia," but the bracts of *P. decipiens* are flat and hardly unguiculate. The umbel of *P. magellanica* was described: "Pedicelli . . . unciales . . . Calyx . . . laciniis ovatis, acutis, . . . Corolla . . . carnea: . . . laciniis cuneiformi-

[1] In the text Hooker treats the plant as a variety, but the caption of the plate reads *Primula Magellanica.*

bus"; and the plate accurately coincides with the description, showing flowering pedicels twice as long as the involucre, ovate acute calyx-teeth only half as long as the tube, and narrowly cuneate corolla-lobes only 3–3.5 mm. wide. *P. decipiens*, however, has pedicels nearly obsolete or in fruit only a few millimeters long, the calyx-lobes oblong and obtuse to only subacute and equaling the tube; the white (rarely lilac-tinged) corolla with cuneate-obovate lobes much broader (3.5–6 mm. broad). All authors except Duby have, as said, consistently treated the plant of subantarctic South America as *P. magellanica* or as *P. farinosa*, var. *magellanica* (or sometimes as *P. farinosa*), but either Lehmann's plant did not come from the Straits of Magellan, as he supposed, or else he had a very rare species which has escaped subsequent collectors. It is to be noted that he received the plant indirectly and it is probable that there was some error as to its geographic origin: "Pulchra haecce et nova species Parisiis a Dom. de JUSSIEU absque nomine, sed cum nota: hab. ad fretum Magellanicum, communicata mecum est. In nullo alio herbario eam vidi; neque minus, qui plantam detexerit, cognitum habeo." At any rate, unless *P. decipiens* is far more variable than the six collections before me and the descriptions or plates of such authors as Duby, Hooker, Decaisne, Skottsberg and Vallentin & Cotton indicate, it is wiser not to take up for it the name *P. magellanica* Lehm.

The occurrence of *P. decipiens* in southern South America, separated by about 78 degrees of latitude from its nearest ally in Colorado and Utah, has naturally attracted comment. Thus Hooker, failing to note the characters of the involucre and the very distinct seeds and consequently reducing the plant to varietal rank under *P. farinosa*, said: "One argument which militates against the common origin of the individuals from the opposite hemispheres, must not be overlooked; it is the absence of the plant, and, indeed, of the whole genus, in any part of the Andes [i. e. the Cordillera] south of 39° north lat.; a circumstance which makes it very difficult to account for its appearance in the two opposite temperate zones, if all the individuals of both hemispheres are supposed to have sprung from one parent."[1] Gray's comment in 1863, when he identified the Great Plain and Rocky Mountain plant with the Magellanic, has been quoted in the discussion of *P. incana*. Franchet (1889) and Macloskie (1905)

[1] Hook. Fl. Ant. ii. 337 (1847).

have reiterated the fact, but have added nothing to its interpretation. It is at least noteworthy that the Magellanic plant is closest related apparently, to *P. incana* of the northern Cordillera and Great Plains (Utah and Colorado north to Mackenzie) and that the smallest extremes of the latter are separated only with difficulty from the circumpolar arctic and subarctic *P. stricta*. In eastern North America, centering on the unglaciated areas about the Gulf of St. Lawrence, dwarf extremes of *P. laurentiana*, superficially so strongly resemble *P. incana* that they have been mistaken for it, and in its efarinose form *P. laurentiana* is separated from the arctic *P. stricta* only with difficulty. Similarly, *P. farinosa* of temperate Eurasia is often difficult to distinguish from *P. stricta* and under their treatment of the latter species Pax & Knuth specially say: "Species haec valde affinis *Pr. farinosae* et forsan melius pro ejus varietate habenda." From this line of evidence it may well be that the arctic *P. stricta* is the progenitor from which have been derived *P. farinosa* and other species of Eurasia, *P. laurentiana* of the Gulf of St. Lawrence region, *P. intercedens* of the upper Great Lakes, *P. incana* of the North American cordillera and still farther isolated, *P. decipiens* of the southern American cordillera.[1]

(To be continued.)

SOME ILLINOIS ASTERS AND A NEW VARIETY OF A. MULTIFLORUS.

H. C. Benke.

In September and October of 1927 the writer made a trip from Chicago to southern Illinois and adjacent Missouri, making numerous stops for collecting, with the genus *Aster* under particular observation. Among many specimens obtained the following seem worth recording.

Specimens of *Aster furcatus* Burgess, secured at Crystal Lake, McHenry County, on Sept. 15th (*Benke 4366*) were found to be with-

[1] Similar lines of descent from living arctic species have been suggested in Fernald, *Persistence of Plants in Unglaciated Areas of Boreal America*, Mem. Am. Acad. xv. 334 (1925); and numerous arctic species besides *Primula stricta*, with endemic representatives along the North American cordillera or about the Gulf of St. Lawrence, have their isolated Magellanic or Falkland ally or allies; in such genera as *Puccinellia*, *Draba*, *Saxifraga*, *Empetrum*, *Euphrasia*, *Antennaria*, *Agoseris*, *Taraxacum*, etc.; while others, like *Carex incurva*, *C. Macloviana*, *Plantago juncoides*, etc., show little, if any, differentiation.

out the usual leaf-laciniations. The region furnished no other specimens of this form.

In the region about Peoria, *Aster Shortii* Lindl., usually in Illinois occurring locally and in small colonies only, became the commonest species—the woods being literally filled with it (*Benke 4371*).

Further on, in the Bushnell-Quincy region, it was noted that *Aster novae-angliae* L., var. *roseus* (Desf.) DC. (*Benke 4372*) was about as common as the usual purple-blue color-form of the species and *Aster salicifolius* Ait. (*Benke 4364*), rare upstate, became very luxuriant and plentiful.

Along the railroad track to the north of Bushnell the well-known *Aster multiflorus* Ait. with bright white rays was found in profusion. Beyond the first mile out of town and to the west of the track my attention was attracted by a small colony of very decidedly blue Asters. These also proved to be *Aster multiflorus* Ait., but with rays blue, or rather blue with a suggestion of purple. The plants, too, were rather more strict, with branches ascending, making them appear somewhat taller than the neighboring white-rayed ones. It was especially noteworthy that the pappus was white as in *Aster ericoides* L., and not tawny colored as is so characteristic of *Aster multiflorus* Ait., but otherwise the plants were not to be distinguished from the latter. The bracts were entirely characteristic of *multiflorus*. About a quarter mile further north I came upon a second and larger colony of several square yards extent. No other colonies were observed in the region, though the territory was travelled in several directions for a number of miles out of the city. Of thousands of the plants of this species through many miles and through many years' observation in the field, these were the first specimens noted that did not have the typical white rays or at most the merest suggestion of color, so at once they were very striking to me. Certainly they formed a conspicuous bit of color in the landscape. For these reasons I feel justified in proposing this variation as

Aster multiflorus Ait., var. **caeruleus**, var. nov. Caule stricto; ramis valde adscendentibus; foliis non confertis acutis; ligulis definite caeruleis vel aliquid purpureo-caeruleis; pappo albo.

With the species, but rather more strict, with branches strongly ascending; cauline and rameal leaves acute, not crowded; rays definitely blue, tending slightly to purplish; pappus white.—The type is *H. C. Benke 4373*, Sept. 29, 1927, in Field Museum of Natural

History, Chicago, Illinois. The color of the rays is best described by my field note as blue with a very slight suggestion of purplish. Specimens of *Aster multiflorus* Ait. looked over in Field Museum Herbarium show an occasional tendency to purplish or roseate ligules but none to the blue of this specimen.

Further south, in the triple valley of the Illinois, Mississippi and Missouri Rivers, lies the city of Jerseyville, at the east edge of which, on uncultivated land, I came upon a couple of small colonies—one a mere clump of plants—of *Aster tataricus* L. f. (*Benke 4536*, ex descr.). The region being an old-settled one, it is probable that the species was cultivated a long time back and has persisted. The only published record found for the occurrence in America of this Old World Aster is for New York City, Mem. N. Y. Bot. Gard. **5**: 615. (1915).

During the entire trip *Aster ericoides* L., var. *villosus* T. & G. was the single species constantly and abundantly present, for example, *Benke 4362*, Jerseyville.

CHICAGO, ILLINOIS.

VICTORIN'S LES ÉQUISÉTINÉES DU QUÉBEC.—Brother Victorin has followed his detailed studies of the Ferns and the Lycopods of Quebec by a similar elaborate study[1] of the genus *Equisetum*. Covering a region along our northern border, the treatment must be of the greatest interest to students of the New England flora. Like its predecessors in the series this number gives with remarkable detail the histories of treatments of the species and a very full consideration of the more striking variations. The work seems refreshingly sane and the recent proposition to recognize two genera, *Equisetum* and *Hippochaete*, is well met. The revisions which will be of interest to New England botanists are the following. Typical *Equisetum arvense*, with the branches 4-angled and their sheaths 4-toothed, is found to be comparatively southern, the extreme northern plant (Greenland, Labrador and Quebec, and doubtless northern New England), with the branches 3-angled and their sheaths 3-toothed, being var. *boreale* (Bong.) Rupr. Numerous minor forms are recognized under each. Typical *E. palustre* is believed not to occur in America; our plant, distinguished by the sheaths having sharper teeth with narrower white margins, being var. *americanum* Vict. In *E. littorale* several forms are recognized and, as under the other species, beautifully illustrated. *E. limosum* is accorded five vegetative forms besides the typical one, forma *natans* Vict. being new. *E. hyemale* is retained, with the

[1] MARIE-VICTORIN. Les Équisétinées du Québec. Contrib. Lab. Bot. de l'Univ. de Montréal, No. 9. 137 pp. and numerous illustrations. 1927.

American varieties *affine* and *Jesupi* (*E. variegatum*, var. *Jesupi* A. A. Eaton) and several forms are accorded each variety (Eaton's vars. *pumilum* and *intermedium* treated as minor forms of var. *affine*). *E. variegatum*, now without its traditional var. *Jesupi*, is accorded the single var. *anceps* Milde; while *E. scirpoides* is found to be too stable for the segregation of named forms. Space does not permit fuller discussion of the most thorough study of *Equisetum* which has yet appeared in America; but it is needless to say that l'Université de Montréal will receive many requests for copies of this most helpful revision. Not least interesting, from a personal standpoint, is an excellent portrait (fig. 12) of Bro. Victorin in field-costume, displaying the full length of a rootstock of *E. palustre*, var. *americanum*.—M. L. F.

Vol. 30, no. 351, including pages 37 to 52 and plates 161 to 168, was issued 10 April, 1928.

PRIMULA LAURENTIANA × ¾

△

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Rhodora

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THE CLANDESTINE FORM OF LEERSIA ORYZOIDES

JOHN M. FOGG, JR.

THE common Rice Cut-grass of North America, Europe and Asia seems first to have been mentioned by Gronovius[1] who characterized it as "ORYZA glumis carina hispidus," basing his designation upon Clayton's Number 595. This record is incorporated by Linnaeus[2] in his description of *Phalaris oryzoides* where he cites Gronovius's diagnosis in synonymy, and gives as the habitat of this plant, "in Virginiae paludibus nemorosis."

In 1780, Weber[3] described *Ehrhartia clandestina,* basing it upon *Phalaris oryzoides* L., which he included as a synonym. That the author had the plant of Linnaeus clearly in mind while thus establishing a new genus and a new species becomes apparent upon a careful comparison of his citations with those included in the first and second editions of the Species Plantarum. Also, Weber's description of *E. clandestina* follows in the main that drawn up by Linnaeus for *P. oryzoides,* the chief difference seeming to lie in the statement concerning the inflorescence, which reads, "panicula ramosa, contracta, vagina semper arcte inclusa, ut in plerisque florescentiam in illa absoluat & semina maturet." Here, then, were the characters which doubtless led to the proposal of the new specific name *clandestina* as more applicable to the plant at hand. It is thus clear that Weber was merely indulging in a practice prevalent among early post-Linnaean writers of not only altering and augment-

[1] Gron. Fl. Virg. 153. 1739.
[2] Linn. Sp. Pl. 55 1753.
[3] Weber in Wiggers, Prim. Fl. Holsat. 64. 1780.

ing original descriptions but of replacing established specific names with totally new ones which may have been considered more appropriate.

The name *Leersia* was first applied to a genus of flowering plants in 1788 by Swartz[1] who referred to it *Phalaris oryzoides* L. and two new species from Jamaica, *L. monandra* and *L. hexandra*.[2] Subsequent authors adopted the treatment of Swartz and we find *Leersia oryzoides* recognized by Willdenow, Poiret, Michaux, Pursh, Muhlenberg, Trinius and many others.

In 1861 Alexander Braun considered the generic status of *Leersia* in a paper entitled "Zurückführung der Gattung *Leersia* Sw. zur Gattung *Oryza* L."[3] After a detailed comparison of the characters of the two genera, Braun concludes that they are but superficially distinct and proposes to unite them under *Oryza*. In so doing he discards the specific name *oryzoides*, as being too close to a repetition of *Oryza*, and takes up Weber's *clandestina*, giving the following justification for this step, "Der gebräuchliche Artname *oryzoides* verliert dadurch natürlich seine Anwendbarheit; ich verabschiede ihn und begrüsse den heimischen Reis aus den oben ausgegebenen Gründen als *Oryza clandestina*."

Leaving entirely to one side the justice of the claim of *Leersia* to generic distinction, it at once becomes apparent that those who consider it congeneric with *Oryza* are still violating recognized international nomenclatorial practice in taking up the name *O. clandestina* (Weber) A. Br. Braun's reasons for rejecting the specific name *oryzoides*, which does not "merely repeat the generic name," will certainly not appear justifiable today in the eyes of those keeping in mind Articles 55 and 57 of the International Rules. If, then, the plant in question be maintained under *Oryza*, its correct designation is *O. oryzoides* (L.) Brand.[4] By such eminent authorities as Koch, Godron, Boreau, Karsten, Babington, Sowerby, Bentham and Hooker, however, it has been continued under the name of *Leersia oryzoides* (L.) Sw.

Anyone who will take the trouble to aquaint himself with the references in literature to *L. oryzoides* can not fail to be impressed

[1] Swartz Prodr. Veg. Ind. Oc. 21. 1788.

[2] As *Leersia* Sw. was antedated by *Homalocenchrus* Mieg (1760) and *Leersia* Hedw. (1782) it was deemed advisable by the International Botanical Congress at Vienna to insure its continuance in the long established sense by conserving it.

[3] Verh. Bot. Ver. Brandenburg **2**: 195–205. 1861.

[4] Brand in Koch Syn. Deutsch. Schweiz. Fl. pt. 3. 2704. 1905.

by the very frequent mention of its habit of concealing its inflorescences within the closed upper leaf-sheaths, a character which, it will be remembered, apparently suggested to Weber the name *clandestina*. Thus, Sowerby and Johnson[1] say, "This grass rarely, if ever, produces its inflorescence in England: it may, however, be found about the end of August enclosed within the inflated sheath of the uppermost leaf and occasionally even with a few flowers pushing forth, to fall off probably without maturing." Jessen,[2] speaking of *Oryza clandestina*, makes the comment, "Rispe, besonders im Norden, oft in der obersten Blattscheide eingeschlossen." Boreau[3] describes the panicle as "renfermé d'abord dans la gaine d'une feuille supérieure." Observations of this nature might be adduced at great length.

In 1877 Wiesbaur distributed, in his Herbarium Europaeum, material of a clandestine form of this grass under the name of *Oryza clandestina* A. Br., forma *inclusa* Wiesb. (No. 3062). At the same time specimens of the open-panicled form were sent out as *O. clandestina*, forma *patens* Wiesb. (No. 3063). Neither of these formal epithets was accompanied by a diagnosis and both persisted merely as herbarium names until 1897 when Baenitz[4] gave them proper publication in the Deutsche Botanische Monatschrift. Baenitz here cites the comments of such botanists as Reichenbach, Wimmer, Ascherson and Fiek, all of whom have observed the tendency of the panicle of this grass to remain enclosed within the leaf-sheath and who unite in correlating the emergence of the inflorescence with the extreme heat of late summer or of a particularly warm season. The author puts forth his own views in support of these observations and concludes by presenting a key whereby the two forms of *O. clandestina* may be differentiated; this may be translated as follows:

Culms caespitose, up to 0.5 m. high; leaves dark-green; flowers and fruiting panicles remaining in the closed leaf-sheaths and tightly compressed.....f. *inclusa* Wiesb.
Culms single, up to 2 m. high; leaves yellowish-green; flowers and fruiting panicles well developed, emerging from the leaf sheath and spreading.....f. *patens* Wiesb.

That the occurrence of forma *inclusa* may be considered as widespread in Europe is evidenced not only by the references already

[1] Grasses of Gr. Brit. 4. 1861.
[2] Deutsch. Gräser u. Getreidearten 252. 1863.
[3] Fl. Centre Fr. Ed. 3. pt. 3. 685. 1857.
[4] Deutsche Bot. Monats. **15**: 19–21. 1897.

cited but by the observations of Junge,[1] Hackel,[2] Hegi[3] and Ascherson and Graebner,[4] all of whom have encountered it and make special mention of its peculiar characteristic. No one, however, seems to have deemed it worthy of more than formal recognition.

In North America the clandestine form of the Rice Cut-grass has been awarded a taxonomic appellation by Eames,[5] who, seemingly under the impression that he was characterizing it as new and disregarding Ehrhart's old specific name, called it *Leersia oryzoides*, forma *clandestina*, and described it as follows: "paniculis et terminalibus et lateralibus intra vaginas omino inclusis; ceteris formae typicae similis." This diagnosis, with the additional comment, "Usually very slender, simple, attaining a length of about 1 m.," leaves very little doubt that Eames's plant is identical with the wide-spread form long recognized in Europe. In view, therefore, of the apparent absence of a correct nomenclatorial designation, the following new combination is here proposed:

LEERSIA ORYZOIDES (L.) Sw., forma **inclusa** (Wiesb.), n. comb. *Oryza clandestina* (Weber) A. Br., f. *inclusa* Wiesb. Baenitz in Deutsche Bot. Monatschr. **15:** 19. 1897. *L. oryzoides* (L.) Sw., f. *clandestina* E. H. Eames RHODORA **18:** 239. 1916. Occasional with the species. The following specimens in the Gray Herbarium and the Herbarium of The New England Botanical Club may be referred here: QUEBEC: Black Lake, Aug. 27, 1915, *Fernald & Jackson*, no. 12,003; Sainte Geneviève, Sept. 5, 1925, *Victorin*, no. 20,567; Rosemère, Sept. 22, 1922, *Victorin*, no. 16,260; Longeuil, Sept., 1922, *Victorin*, no. 15,225. NOVA SCOTIA: George River, Aug. 27, 1920, *Bissell & Linder*, no. 19,853; North Sydney, Aug. 30, 1920, *Bissell & Linder*, no. 19,849; Gavelton, Sept. 4, 1920, *Fernald, Long & Linder*, nos. 19,850 & 19,851. NEW HAMPSHIRE: Randolph Hill, Sept. 11, 1904, *Pease*, no. 4055; Gorham, Sept. 2, 1907, *Pease*, no. 10,723. VERMONT: Townshend, Sept. 5, 1912, *L. A. Wheeler*. MASSACHUSETTS: Newburyport, Oct. 2, 1902, *Eaton & Fernald;* Chatham, Sept. 9, 1913, *Fernald & Long*, no. 8686; Naushon, Oct. 1, 1927, *Fogg*, no. 3135. RHODE ISLAND: Warwick, Sept. 8, 1914, *Collins, Fernald & York*, no. 11,283. CONNECTICUT: Stratford, Oct. 6, 1901, *E. H. Eames*. ILLINOIS: Joliet, Aug. 22, 1904, *H. C. Skeels*, no. 463.

In view of the oft-repeated statement by European writers that in many regions *L. oryzoides* puts forth its panicles only in late summer or very warm seasons, the restriction of forma *inclusa* in eastern North

[1] Die Gram. Schleswig-Holst. 120–122. 1913.
[2] Österreich Bot. Zeitschr. **56:** 82. 1906.
[3] Ill. Fl. Mittel-Eur. **1:** 194. 1907.
[4] Syn. Mitteleur. Fl. **1:** 12–14. 1898–1902.
[5] RHODORA **18:** 239. 1916.

America to an essentially northern range (Quebec to Connecticut and westward), and the wide-spread occurrence of the open-panicled form (Quebec and Nova Scotia to Oregon, Florida, Texas and California) would seem to indicate a response to the length of the growing period. Thus, Professor Fernald states,[1] "This form [forma *inclusa*] seems to be more common in Nova Scotia than the typical form of the species with exserted panicles." Also, the general lateness of the dates of collection of the specimens cited above serves to suggest that in some cases the clandestine habit may be associated with secondary flowering.

GRAY HERBARIUM.

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

(*Continued from page 78.*)

5. P. SPECUICOLA Rydb. *Leaves* spatulate, rounded at summit, narrowed to a subpetiolar base, *membranaceous*, *sinuate-dentate*, 4–13 cm. long, 0.7–2 cm. broad, farinose to efarinose beneath: *scape* 1–1.6 dm. high, 1.5–2 mm. in diameter, *efarinose: involucral bracts* lance-attenuate or -involute, 4–10 mm. long, *dorsally thickened but scarcely gibbous at base:* umbel 6–12-flowered: pedicels strongly ascending, in anthesis 0.5–1 cm., in fruit sometimes elongating to 4 cm. long: *calyx farinose*, campanulate, *becoming turbinate*, in maturity 6–9 mm. long and 3 mm. in diameter; the *lance-attenuate to -subulate lobes* about equaling the tube: *corolla-tube* yellowish, *8–10 mm. long*, its *violet limb* 6–10 mm. broad, with the narrowly cuneate lobes emarginate: stamens inserted near the middle of the tube; the anthers and stigma not exserted; *capsule much overtopped by the calyx-lobes:* seeds angulate, 0.4–0.6 mm. long, fulvous, muriculate.—Bull. Torr. Bot. Cl. xl. 461 (1913). *P. farinosa* Eastwood, Proc. Cal. Acad. ser. 2, vi. 304 (1897). —Southeastern UTAH: moist bench of cliffs near Bluff City, *Eastwood*, no. 68; Moab, June 7, 1913, *M. E. Jones*. Rydberg's type was from "loose soil, under overhanging cliffs in the alcove-like heads of the canyons, characteristic of the limestone bluffs of San Juan River," near Bluffs.

P. specuicola differs from *P. farinosa* and from all other American species which have been called *P. farinosa* in the very sharp calyx-lobes, long corolla-tube and short capsule. I have seen no good flowers but Rydberg's description of the corolla-limb as "dark

[1] RHODORA **23**: 229. 1921.

violet" and Miss Eastwood's characterization of it as "crimson," suggest much deeper coloring than in the other *Farinosae*. Neither of these authors mentions a yellow eye such as occurs in most of the species. The long corolla-tube, deep color of the limb, shape of fruiting calyx, scarcely gibbous bracts, and thin sinuate-dentate leaves suggest that *P. specuicola* may be nearer related to *P. Rusbyi* Greene than to the *Farinosae;* but *P. Rusbyi* has much larger flowers, the leaves with cartilaginous or callous teeth and the caudex bearing marcescent brown sheaths.

6. P. **intercedens**, nom. nov. *Leaves yellow-farinose beneath*, sometimes green, *firm*, obovate, spatulate or oblanceolate, 1–7 cm. long, cuneate at base but scarcely petioled, crenate-dentate or subentire, with the margin commonly revolute: scape 0.4–2.5 dm. high, filiform to stoutish, 0.5–1.8 mm. in diameter and sometimes slightly farinose at summit: *bracts of the involucre* lance-attenuate, involute or subulate at tip, *3–6 mm. long*, slightly dilated and thickened but *scarcely gibbous at base:* umbel 1–10-flowered: the stiffly fastigiate filiform pedicels at first only 1–10 mm. long, in fruit lengthening to 0.6–3 cm.: *calyx* turbinate-campanulate, *commonly farinose*, in anthesis 3.5–4 mm. long, *in fruit 4–6 mm. long*, cleft nearly to the middle into lanceolate to narrowly ovate acute to obtuse lobes: *corolla* lilac; the slender tube slightly exserted: the *limb 1–1.5 cm. broad;* its obovate or cuneate deeply obcordate *lobes 4–7 mm. broad; stigma or tops of anthers slightly exserted* from the yellow throat, at least of shrivelled corollas: *capsule* cylindric, once-and-a-half the length of the calyx, *2–3 mm. in diameter;* its valves splitting into linear halves 0.5–1 mm. wide: *seeds angulate and truncated, strongly rugose* or reticulated, 0.5–0.7 mm. long.—*P. farinosa* Nutt. Gen. i. 119 (1818); Torr. Am. Journ. Sci. iv. 59 (1822); not L. (1753). *P. farinosa, β. americana* Torr. Fl. No. Mid. U.S. i. 213 (1824), excluding syn. *P. pusilla* Goldie; Fernald, Rhodora, ix. 16 (1907); not *P. americana* Rydb. (1901). *P. pusilla* Hook. Bot. Mag. lvii. t. 3020 (1830), not Goldie (1822).—Shores of the upper Great Lakes, southwestern Ontario, northern Michigan and northeastern Minnesota; also Lake Nipigon. Ontario: Johnstone's Harbor, Lake Huron, August 22, 1901, *J. Macoun*, no. 54,260; shore of Lake Superior, July 16, 1867, *J. Macoun* (Can.); dampish places, Lake Nipigon, July 15, 1884, *J. Macoun*, no. 15,846, in part (Can.). Michigan: Isle Royale, August 2, 1865, *A. H. & C. E. Smith* (Penn.); wet rocks, Isle Royale, July, 1889, *Sandberg*, (Minn.); north shore of Thunder Bay, Lake Huron, Alpena Co., July 3, 1895, *C. F. Wheeler;* shore of Thunder Bay near Alpena, July 5, 1895, *C. F. Wheeler;* on and near Lake Huron beach, in damp sand, near Alpena, June 24, 1912, *C. K. Dodge*, no. 3; open pasture near cedars and near shore of Straits of Mackinac, St. Ignace, May 14, 1914, *W. H. Manning;* Keweenaw Peninsula, *Robbins*. Minnesota: Two Harbors, Lake

Co., June, 1891, *Sandberg* (Minn.), June 1891, *E. P. Sheldon*, no. 4400; damp basic eruptic rocks, Susie Island, Cook Co., September, 1927, *Butters* (Minn.); Agate Bay, *L. H. Bailey*, no. 477 (Minn.); Grand Marais, Cook Co., August 4, 1875, *T. S. Roberts* (Minn.), August 17, 1906, *H. L. Lyon*, no. 924 (Minn.).

Nuttall's *P. farinosa* was from "calcareous gravelly shores of the islands of Lake Huron; around Michilimakinak, Bois Blanc, and St. Helena, in the outlet of Lake Michigan: abundant." Torrey's *P. farinosa, β. americana,* described in detail by him, came from "shores of Lake Huron, Lake Michigan, &c. *Douglass* and *Nuttall.*" It is the plant of upper Michigan and the adjacent region of Ontario and Minnesota which has passed as *P. farinosa.* Unlike true *P. farinosa, P. intercedens* has the involucral bracts without basal auricles, the umbels few-flowered (in *P. farinosa* often with 20–25 flowers), the tube of the fruiting calyx only obscurely (in *P. farinosa* strongly) nerved, and the anthers borne higher on the tube, near the throat and slightly protruding from the shrivelled corolla. In the latter character and in the protruding of the style in the long-styled form *P. intercedens* is closer to *P. mistassinica* than to *P. farinosa, P. stricta, P. laurentiana* and *P. incana;* but it has the strongly angled and conspicuously rugose seeds as in these species, in this important character as well as in the ordinarily heavy development of wax on most of the leaves at once departing from typical *P. mistassinica.*

In perfectly characteristic fruiting material *P. intercedens* seems to stand quite apart, but as yet I have been unable to find floral differences; and, in view of the fact that *P. mistassinica,* with its rounded and less rugose seeds, may be sometimes farinose, the difficulty is increased. *P. intercedens* is here proposed without full confidence of its specific value; but it seems most likely that, in the upper Great Lake region, where it occurs in the same areas as typical *P. mistassinica,* the two have become much crossed. Elsewhere across the continent, from Newfoundland to Yukon and British Columbia, *P. mistassinica* is very constant in its seed-characters. It does not seem probable, then, that *P. intercedens* (*P. farinosa,* β. *americana* Torr.) is to be considered a variation of *P. mistassinica* in which the seeds have taken on (or retained) the characteristics of the coarser *P. stricta, P. laurentiana* and *P. incana.* The true status of the plant can be worked out only by the botanists of the upper Great Lake region.

7. P. AJANENSIS E. Busch. *Leaves densely yellow-farinose* beneath, obovate or rhombic-spatulate, 0.6–2 cm. long, 0.5–1.1 cm. broad, narrowed to a *winged or broad and short petiole;* the blade *dentate:* scape slender, 0.3–1 dm. high, farinose at summit: *involucral bracts subulate-lanceolate, 3–5 mm. long,* gradually dilated and thickened but *hardly saccate at base:* umbel 2–12-flowered: *pedicels* filiform, *farinose,* 5–10 mm. long, in fruit sometimes up to 2 or 3 cm. long: calyx campanulate, in maturity 4–6 mm. long and about 3 mm. in diameter, cleft about half its length into lanceolate to oblong lobes: *corolla* violet; the tube only slightly exceeding the calyx; the *limb 1–1.2 cm. broad,* with obcordate lobes about 5 mm. broad: stigma or summits of anthers slightly exserted from the throat: capsule cylindric, about twice the length of the calyx, 2.5 mm. in diameter: seeds not seen.—Fl. Sib. et Orient. Extr. iv. Cem. 65: 34 (1926).—Eastern Siberia and Alaska. ALASKA: dampish moorlands, Nunivak Island, August 8, 1891, *J. M. Macoun,* as *P. stricta* or *P. borealis.*

Primula ajanensis was based on material from Ochotsk Province in eastern Siberia, but Mrs. Busch's clear description and beautiful illustration of it show it to be the plant twice collected by J. M. Macoun on the cruise of the British Bering Sea Commission, once on Nunivak Island (above cited) and later at Plover Bay, Siberia (distributed as *P. borealis*).

8. P. MISTASSINICA Michx. *Leaves efarinose* or rarely a little farinose, oblanceolate, spatulate or cuneate-obovate, sessile or narrowed to short winged petioles, 0.5–7 cm. long, 0.2–1.6 cm. broad, *many of the blades dentate from near or from below the middle: scape* filiform or stouter, 0.3–1.4 mm. in diameter at summit, *efarinose* or but slightly farinose, 0.3–2.1 dm. high: *bracts of the involucre linear-subulate,* 2–6 mm. long, broadened and thickened but *commonly not saccate at base:* umbel 1–10-flowered: *pedicels filiform, 0.2–0.5 mm. in diameter,* much exceeding the bracts, in maturity 0.5–3.5 cm. long: *calyx slenderly campanulate,* 3–6 mm. long, *2–3.5 mm. in diameter, efarinose* or rarely farinose, cleft to the middle into lanceolate, oblong or narrowly ovate obtuse to acute lobes: corolla-tube yellow, exserted; the pale-pink, lilac or bluish-purple (or white in forma LEUCANTHA) limb 0.8–2 cm. broad, its obovate or cuneate-obcordate or emarginate lobes 3–6 mm. broad; eye orange or yellow (except in var. NOVEBORACENSIS): *stigma or tops of anthers protruding* from the throat of the shrivelled corolla: *capsule subcylindric,* once-and-a-half to twice as long as the calyx, *2–3 mm. in diameter;* its valves splitting into linear halves 0.5–0.9 mm. wide: *seeds* 0.4–0.6 mm. long, *rounded,* nearly smooth or obscurely linear-reticulated.

A very variable species, with three strongly marked variations

Limb of corolla 0.8–2 cm. broad, with conspicuous orange or yellow eye.
  Corolla-limb pink, lilac or bluish-purple.....Var. *typica.*
  Corolla white.....Forma *leucantha.*
Limb of corolla 0.8–1 cm. broad, without conspicuous yellow eye.
Var. *noveboracensis.*

Var. **typica.** *P. mistassinica* Michx. Fl. Bor.-Am. i. 124 (1803); Lehm. Monogr. Prim. 63, t. 7 (1817); Hook. Bot. Mag. lvii. t. 2973 (1830); Duby in DC. Prodr. viii. 43 (1844); Gray, Syn. Fl. N. A. ii. pt. 1: 58 (1878) in part. *P. pusilla* Goldie, Edinb. Phil. Journ. vi. 322, t. 11, fig. 2 (1822). *P. Hornemanniana* Hook. Fl. Bor.-Am. ii. 120 (1838), in part, not Lehm. (1817). *P. farinosa*, var. *mistassinica* (Michx.) Pax, Engler's Bot. Jahrb. x. 200 (1889) in part. *P. farinosa*, subsp. *mistassinica* (Michx.) Pax & Knuth in Engler, Pflanzenr. iv[237]. 85 (1905), in large part. *P. sibirica*, var. *mistassinica* (Michx.) Kurtz, Engler's Bot. Jahrb. xix. 396 (1894). *P. Maccalliana* Wiegand, Bull. Torr. Bot. Cl. xxvii. 389 (1900); Brown & Schaefer, Alp. Fl. Can. Rocky Mts. 227, t. lxiii. (1907); Rydb. Fl. Rocky Mts. 647 (1917).—Southern Labrador and Newfoundland to southern Yukon, south to central Maine, northern Vermont, northern Michigan, northern Wisconsin, northern Minnesota, southern Alberta and southern British Columbia. The following, selected from about 150 numbers, are representative. LABRADOR: grassy banks, Lake Michikamau, Hamilton River, *A. P. Low*, no. 6035 (Can.). NEWFOUNDLAND: bare wet peat and depressions in limy bog-barrens, Rock Marsh, Flower Cove, *Fernald, Long & Dunbar*, no. 26,958; peaty and turfy pockets in limestone barrens, Brig Bay, *Fernald, Long & Dunbar*, no. 26,959; borders of ponds on the limestone tableland, Table Mt., Port-à-Port Bay, *Fernald & St. John*, no. 10,860; by Grand Codroy River, July 10, 1912, *J. R. Lunt.* QUEBEC: Eskimo Point, June, 1909, *C. W. Townsend, St. John*, no. 90,676 (Can.); Anticosti, June 20, 1861, *Hyatt, Shaler & Verrill;* sur les talus calcaires, Rivière Vaureal, Anticosti, *Victorin, Rolland & Louis-Marie*, no. 21,831; rivage du Lac Salé, Anticosti, *Victorin & Rolland*, no. 25,107; by springs, calcareous summit and northerly slopes of Percé Mt., Percé, *Fernald & Collins*, no. 1145; endroits sourceux, au pied de Montagne Sainte-Anne, Percé, *Victorin, Rolland, Brunel & Rousseau*, no. 17,645; calcareous cliffs, facing north, alt. 900–1125 m., Table-top Mts., *Fernald & Collins*, nos. 707, 708; calcareous slaty cliffs, alt. 300 m., Lac Pleureuse, *Fernald, Dodge & Smith*, no. 25,983; moist rocks and turfy chimneys, alt. 800–1050 m., Pease Basin, between Mts. Logan and Pembroke, *Pease & Smith*, no. 25,982; wet red-sandstone bluffs along Bonaventure River, August, 1904, *Collins, Fernald & Pease* (with stolon nearly 1 dm. long!); wet ledges by Escuminac Brook, Grand Cascapedia River, July 12–15, 1905, *Williams, Collins & Fernald;* Rivière des Goelands, *Michaux*, TYPE in herb. Mus. d'Hist. Nat. Paris ("ad lacus *Mistassins* Canadam inter et fretum *Hudsonis*"—Michx. Fl. Bor.-Am. i. 124);[1] about

[1] Michaux's label reads definitely "Rivière des Goelands," not Lake Mistassini and his *Journal* does not enumerate it from Lake Mistassini. Rivière des Goelands was

Quebec, May 21, 1863, ex herb. *Univ. Laval;* rochers humides, Ile d'Orleans, *Victorin*, no. 16,122. New Brunswick: moist ground, Connor, Madawaska, *Pease*, no. 2248; Grand Falls, *Malte & Watson*, no. 118,333 (Can.); crevices of calcareous rock, Gorge of Aroostook River, July 17, 1902, *Williams, Collins & Fernald;* wet rocks, Woodstock, *J. Macoun*, no. 22,545 (Can.); Kennebecasis River, July, 1880, *Hay;* rocky shore of St. John River, near mouth, 1884, *Hay.* Nova Scotia: wet boggy banks, Truro, *J. Macoun*, no. 15,841 (Can.); Upper Stewiacke, *Miss A. L. Archibald*, no. 69,371 (Can.). Maine: gravelly shores, St. Francis, *Fernald*, no. 2427; seepy gravelly shores, Fort Kent, *Fernald*, no. 2428; ledgy banks of Aroostook River, Masardis, September 8, 1897, *Fernald;* sandy river bank, Fort Fairfield, *Fernald*, no. 82; Houlton, 1881, *Kate Furbish;* limestone rocks, banks of Piscataquis River, Sangerville, *Chamberlain*, no. 298; banks of Piscataquis River, Foxcroft, May 12, 1894, *Mary L. Fernald;* crevices of ledges along river, Dover, May 12, 1895, May 21, 1896, *G. B. Fernald;* springy limy gravel beach, Township ix, Range 17, Somerset Co., *St. John & Nichols*, no. 2444. Vermont: wet calcareous cliffs, Willoughby Mountain, *Pringle et al;* rocky ledges, Mt. Annance, Willoughby Lake, September 20, 1855, *Wm. Boott;* roadside, Willoughby, June 12, 1896, May 21, 1905, *Kennedy;* 4th of July Slide, Willoughby, June 12, 1905, *Kennedy;* bog near Willoughby Lake, June 1, 1909, *Churchill.* Ontario: Lake Nipigon, *J. Macoun*, no. 15,846 in part (Can.); Pic River, Lake Superior, *Loring;* ledges by Lake Superior, Agawa Bay, *Pease*, no. 17,971; calcareous rock, Current River Falls, Port Arthur, *Williamson*, no. 2888 (Penn.); mouth of Albany River, James Bay, *Spreadborough*, no. 62,556 (Can.). Michigan: Marquette Island, Les Chanaux Islands, August 27, 1913, *W. H. Manning;* Isle Royale, August 2, 1865, *A. H. & C. E. Smith* (Penn.), *Cooper*, no. 55; Presque Isle, *Houghton;* rocky shore, Delta

the name used by Michaux for a large river emptying from Lake Mistassini into Hudson Bay. "Le 4 Septemb. [1792] . . . A 10^h ¼ entré dans le Lac Mistassin. . . . Le 5 fait environ 8 à 10 lieues et diné sur la rive des Goelands à 16 lieues de distance du Lac. . . . Le soir campé . . . 22 lieues en totalité. Campé pres la rivièrre Atchouke. (Riv. des Loup-marins)"—Journ. André Michaux, ed. Sargent. 81, 82 (1889). L'Abbé Ovide Brunet gave this account: "Having made his collections, and reached the other side of the lake, Michaux proceeded on his journey; choosing for this purpose, among the discharges of the lake, a large and fine river falling into Hudson's Bay, and known as the Rivière des Goëlands (Gull River), which is very probably that designated in the maps as Rupert's River. He followed this for some distance, and camped on the night of September 5th, near the Atchoukue or Seal River. . . . Along the banks of the Gull River the following plants were collected: —*Xylosteum villosum*, Michx.; *Primula Mistassinica*, Michx." etc.—Brunet, *Michaux and his Journey in Canada*, Can. Nat. ser. 2, i. 336, 337 (1864).

From this evidence it might be inferred that *Primula mistassinica* was not seen by Michaux on the shores of Lake Mistassini; but in the report of his collections from Lake Mistassini, Rupert River and Rupert House, Geol. and Nat. Hist. Surv. Can. n.s. i. 36–44D (1886) the late J. M. Macoun recorded it only from the Lake not from Rupert River, and he subsequently recorded it as "One of the commonest plants at Lake Mistassini"—Macoun, Cat. Can. Pl. i. 564 (1886). The organized portion of the National Herbarium at Ottawa shows, however, no material from Lake Mistassini.

County, August 17, 1901, *M. A. Barber.* WISCONSIN: sand beach near Rowley's Bay, Door County, *Pease,* no. 18,003; moist ledges by St. Croix River, St. Croix Co., *Rosendahl,* no. 4238 (Minn.). MINNESOTA: Encampment, Lake Co., *Sheldon,* no. 4768 (Minn.); moist rocks, Grand Marais, *Rosendahl & Butters,* no. 4643 (Minn.); Two Harbors, *Sandberg* (Minn.); Knife River, *Sheldon,* no. 4948 (Minn.). MANITOBA: Mile 256, Hudson Bay Ry., July 12, 1917, *J. H. Emerton;* Clearwater Lake, July 2, 1917, *J. H. Emerton;* Sewell, *J. Macoun,* no. 12,726 (Can.). SASKATCHEWAN: without locality, 1857–8, *Bourgeau;* north side of Lake Athabasca, *J. W. Tyrrell,* no. 15,840 (Can.). MACKENZIE: Mackenzie River, *Richardson;* west shore of Great Bear Lake, *J. M. Bell,* no. 22,956 (Can.); southwest and north shore of Great Slave Lake, *C. F. Howe,* no. 1019 (Can.). ALBERTA: Red Deer River, *J. Macoun,* no. 15,842 (Can.); Rocky Mountains, *Drummond, Burke;* Junction of North Fork and North Branch of Saskatchewan, *S. Brown,* no. 919; Bear Creek Camp No. 1, *S. Brown* no. 900; Pipestone Creek, *J. Macoun,* no. 68,725; vicinity of Basin, Banff, *S. Brown,* no. 13; moist ground, Banff, alt. 4900 ft., *Butters & Rosendahl,* no. 1327, June 4, 1904, *E. M. Farr* (Penn.); Devil's Head Lake, *Sanson,* no. 22,140 (Can.); Laggan, *J. Macoun,* no. 68,723 (Can.). BRITISH COLUMBIA: near Field, June, 1896, *C. E. Cummings;* river flats, Yoho Valley, alt. 5000 ft., *Butters & Rosendahl,* no. 1434; Torrent Fan, Emerald Lake, *Heacock,* no. 14; Six-Mile Creek, May 18, 1905, *Edith M. Farr* (Penn.). YUKON: Frances River, lat. 61°, *Dawson,* no. 15,844 (Can.).

Forma LEUCANTHA Fernald, RHODORA, xxi. 148 (1919).—With the typical form, often more abundant. NEWFOUNDLAND: Glenwood, *Fernald & Wiegand,* no. 6072; Grand Falls, *Fernald, Wiegand, Bartram & Darlington,* no. 6070; Millerton Junction, *Fernald & Wiegand,* no. 6071; Grand Lake, 1906, *Owen Bryant;* Savage Cove, *Fernald, Wiegand, Pease, Long, Gilbert & Hotchkiss,* no. 28,891; Flower Cove, *Pease, Long & Gilbert,* no. 28,890; Middle Arm, Bay of Islands, *Waghorne,* no. 5; near Frenchman's Cove, Bay of Islands, *Mackenzie & Griscom,* no. 10,405; Birchy Cove (Curling), *Fernald & Wiegand,* no. 3881; Table Mountain, Port-à-Port Bay, *Fernald & St. John,* no. 10,861. QUEBEC: Eskimo Point, Saguenay Co., June, 1909, *C. W. Townsend;* Percé, *J. M. Macoun,* no. 68,948. VERMONT: Willoughby, May 24, 1904, *Kennedy.*

Var. **noveboracensis**, var. nov., foliis obovatis vel late oblanceolatis; corollae limbo 0.8–1 cm. lato, fauce vix flava.—*P. mistassinica* Torr. Fl. N. Y. ii. 7 (1843); Paine, N. Y. State Cat. 18th Ann. Rep. 105 (1865); Clinton, N. Y. State Mus. 24th Rep. 101 (1872); Prentiss, Bull. Torr. Bot. Cl. iv. 15 (1873); Dudley, Cayuga Fl. 60 (1886); Rowlee, Bull. Torr. Bot. Cl. xx. 69 (1893); Peck, N. Y. State Mus. 46th Rep. 48 (1893); House, Wild Fl. N. Y. ii. 211, t. 159B (1918); House, Annot. List Ferns and Fl. Pl. N. Y. 588 (1924); Wiegand & Eames, Fl. Cayuga L. Basin, 338 (1926); not Michx.—Cold or wet

cliffs and ravines northwestern and central New York, southern Ontario, southern Michigan and northern Illinois. NEW YORK: "Penn Yan," *Sartwell* (acc. to House "the specimen in the Sartwell herbarium is labelled 'Hammondsport'"); Annsville, Taberg, June, 1846, *Knieskern & Vasey;* Taberg, *Paine;* wet rocks, Taberg, May 23, 1920, *House*, no. 6911 (Can.); cliffs of Fish Creek, Oneida Co., 1864, *Paine;* Crooked Lake, *Sartwell;* dripping cliff, south side of ravine near Triphammer Falls, Fall Creek, Ithaca, May 27, 1915, *A. J. Eames*, no. 4804 (TYPE in Gray Herb.); wet limy cliffs, Taughannock Ravine and vicinity, Ulysses, *MacDaniels*, no. 3020; other stations cited in Portage and on Salmon River, Oswego Co. ONTARIO: Galt, May 31, 1907, *J .Macoun*, no. 88,032 (Can.). MICHIGAN: Clifton, June, 1883, *F. E. Wood;* rocks, Grand Ledge, 10 miles west of State College, May 3, 1890, *C. F. Wheeler;* face of wet rocks in moss, bank of Grand River, 10 miles west of State College, May 10, 1890, *C. F. Wheeler.* ILLINOIS: limestone cliffs, Jo Davies County, June 15, 1891, *H. S. Pepoon* (Minn.).

Var. *noveboracensis* has smaller flowers than most of the more northern and typical *P. mistassinica*, but occasional northern plants have them as small. In its lack of a well marked orange eye it is most striking, true *P. mistassinica* having the throat bordered by a brilliant yellow or orange ring (as in most of the § *Farinosae*). The leaves of var. *noveboracensis* are somewhat distinctive but similar foliage occasionally occurs in the more northern type with larger corolla and yellow eye.

I have sought in vain for any character upon which to separate *P. Maccalliana* from *P. mistassinica*, but can find absolutely nothing to separate it from the variable plant of eastern Canada, northern New England and Newfoundland. In describing it, Wiegand said: "From the eastern *P. Mistassinica* it differs quite markedly in its stouter habit, broader and more farinose leaves, short-pedicelled flowers, larger acute-lobed calyx, and large bluish, not pink or flesh-colored, corolla with tube scarcely longer than the calyx, and with a very prominent yellow eye." In interpreting the description of *P. Maccalliana* it should be borne in mind that Wiegand knew as *P. mistassinica* the var. *noveboracensis*, which is a very small extreme without "prominent yellow eye." As for the other characters, an abundant series of specimens shows that *P. mistassinica* may have in the same general region either obtuse or acute or even attenuate calyx-lobes, the leaves efarinose or slightly farinose, dentate or entire, and the pedicels and corolla-tube very variable in length. The blue color emphasized by Wiegand is not a constant character.

Professor Butters, who has collected the plant at Banff and elsewhere in the Canadian Rockies, assures me that the fresh flowers are pink or lilac-purple and that he has never seen any decided blue in them except as a post-mortem character in dried specimens. The late Stewardson Brown, who also knew *P. Maccalliana* in the field, says, "Flowers . . . pale pink or bluish" and Mrs. Schäffer's photograph of it looks quite like eastern *P. mistassinica*. In this connection it is not inappropriate to quote the description by the late John A. Paine of the station of *P. mistassinica*, var. *noveboracensis* on Fish Creek, Oneida Co., New York:—

"Near dripping water the plants grow most abundantly and largest, often eight or ten inches in height, and bearing a cluster of as many flowers. These vary in color, from pure white, through different shades of pink, to deep blue. The leaves also vary in form, from round obovate to oblong lanceolate; often entire, commonly more or less toothed; usually smooth beneath, but frequently white mealy. A whole cliff-side scattered over with these variegated Primroses is one of the loveliest sights in all our flora."[1]

If *P. Maccalliana*, originally separated from the plant of New York by "bluish, not pink or flesh-colored, corolla" may have, as described by those who know it in the field, "Flowers . . . pale pink" and if the New York plant may have them "from pure white, through different shades of pink, to deep blue," it is obvious that color of the corolla in these cases is no safer as a specific criterion than it is in most other plants! *P. Maccalliana* more often has the leaves entire or subentire and slightly farinose, but plenty of western specimens have the nonfarinose leaves copiously dentate. Conversely, many eastern plants have some or all of the leaves subentire to entire and occasionally eastern plants show them more strongly farinose than any from the Rocky Mountains.

9. P. PARVIFOLIA Duby. *Leaves efarinose, cuneate-obovate, spatulate or rhombic*, 0.4–3 cm. long, 1.5–7 mm. broad, the lower scarcely petioled, *the upper with winged petioles*, the margin denticulate: scape filiform, 0.4–1.8 dm. high, efarinose: *bracts of involucre* lance- or linear-*subulate, 2–5 mm. long, dilated and thickened but not saccate at base:* umbel 2–9-flowered: pedicels filiform, 6–15 mm. long: *calyx* campanulate, *efarinose*, somewhat gibbous at base, 3–5 mm. long, cleft half-way into lanceolate lobes: *corolla* lilac; the tube rarely exserted; the *limb 7–10 mm. broad*, with the emarginate or obcordate cuneate *lobes 1.5–3 mm. broad:* stigma or summits of anthers exserted: capsule

[1] Paine, N. Y. State Cat. 18th Ann. Rep. 105—Reprint, 53 (1865).

cylindrical, up to once-and-a-half the length of the calyx, 2 mm. in diameter: seeds rounded-obovoid, smooth, about 0.5 mm. long.—Duby in DC. Prodr. viii. 42 (1844). *P. mistassinica* Cham. & Schlechtd. Linnaea, i. 213 (1826), in large part; Eastwood, Bot. Gaz. xxxiii. 212 (1902); not Michx. (1803). *P. tenuis* Small, Bull. Torr. Bot. Cl. xxv. 320 (1898). *P. borealis*, var. *parvifolia* (Duby) Pax in Engler & Prantl, Pflanzenr. iv[237]. 81 (1905). *P. Chamissonis* E. Busch, Fl. Sib. et Orient. Extr. iv. Cem. 65: 28 (1926).—Alaska and adjacent Siberia. ALASKA: several stations cited by Chamisso & Schlechtendal and by Mrs. Busch; Cape Nome, 1900, *Blaisdell*, no. 129, as *P. mistassinica.*

Duby's *P. parvifolia*, described "ad fretum Beering (Fisch.! in herb. cl. Kunth)", is treated by Pax as a small-leaved variety of *P. borealis* Duby; while Mrs. Busch, in her remarkably exhaustive treatment of the Siberian *Primulaceae*, makes no mention of it, even as a synonym. In view of the reduction by Pax of the wholly distinct *P. Loczii* Kanitz of central Asia to *P. borealis* (see discussion under the latter) it need not be surprising that Pax should also include in *P. borealis* the very distinct *P. parvifolia.* Surely, Duby, who published both *P. parvifolia* and *P. borealis*, was too discerning a specialist to separate them if they differ only by a millimeter or two in the length of the leaves and by the slightly different outline of the latter. Duby indicated other differences, notably: in *P. parvifolia* "corollae lobis emarginatis," in *P. borealis* "corollae . . . lobis obcordatis semi-bifidis." The plant of the Bering Straits region and Alaska, described in detail and beautifully illustrated by Mrs. Busch as *P. Chamissonis*, well matches the description of Duby as does the Blaisdell material from Cape Nome. Should it eventually prove that I am in error in identifying these with *P. parvifolia*, the name *P. tenuis* Small (1898) should be used for the plant here described.

10. P. BOREALIS Duby. *Leaves efarinose* or only sparingly farinose, *cuneate-obovate or rhombic-spatulate*, 0.6–4 cm. long, 1.5–10 mm. broad, mostly with *petioles longer than the dentate blade:* scape filiform, efarinose, 2.5–10 cm. high: *bracts of involucre* lance-subulate, often unguiculate, 2–6 mm. long, dilated and *usually slightly saccate-gibbous at base:* umbel 1–12-flowered: pedicels filiform, 0.2–1.4 cm. long: *calyx turbinate-campanulate*, efarinose or barely farinose, somewhat *gibbous at base*, in maturity 5–6 mm. long, cleft one-half its length into lance-ovate acute to obtuse segments: *corolla* lilac; the tube equaling the calyx or slightly exserted; the *limb 1.2–2 cm. broad, its deeply obcordate lobes 5–8 mm. broad:* stigma or tops of anthers protruding from the throat of the wilted corolla: capsule cylindric, only

slightly exserted: seeds less than 0.5 mm. long, smoothish.—Mém. Fam. Prim.,—Mém. Soc. Phys. d'Hist. Nat. Genève, x. t. ii. fig. 2 (1844) and in DC. Prodr. viii. 43 (1844); Ledeb. Fl. Ross. iii. 15 (1847–49); Pax & Knuth in Engler, Pflanzenr. iv[237]. 81 (1905), excl. var. *parvifolia;* Ostenfeld, Vidensk, Selsk. Skrift, i. Math.-Naturv. Kl. no. 8: 60 (1910); J. M. Macoun & Holm. Rep. Can. Arct. Exped. 1913–18, v. pt. A, 18A, t. xi. fig. 4 (1921); E. Busch, Fl. Sib. et Orient. Extr. iv. Cem. 65: 31 (1926). *P. mistassinica* Cham. & Schlecht. Linnaea, i. 213–215 (1826), in part; and other authors on the flora of Bering Sea region; not Michx. (1803). *P. sibirica,* var. *borealis* (Duby) Kurtz, Engl. Bot. Jahrb. xix. 397, 468 (1894). *P. borealis,* var. *Loczii* Pax in Engler & Prantl, Pflanzenr. iv[237]. 81 (1905), not *P. Loczyi* Kanitz (1891).—Arctic Mackenzie and Yukon, arctic and western Alaska and adjacent Siberia. The following American specimens have been examined: MACKENZIE: Warren Point, *Stringer,* no. 62,251 (Can.); Cape Bathurst, *Frits Johansen,* no. 533; Pillage Point, Arctic coast, July 19, 1924, *W. H. B. Hoare* (Can.); mouth of Moose River, Mackenzie Delta, July 18, 1924, *Hoare* (Can.). YUKON: Herschell Island, *Stringer,* no. 14,423 (Can.), *Frits Johansen,* no. 265 (Can.). ALASKA: Collinson Point, Camden Bay, *Frits Johansen,* nos. 50, 119, 119a (Can.); west of Konganovik, Camden Bay, *Frits Johansen,* no. 56; Point Hope, 1884, *Cruise of the Corwin;* Kotzebue Sound, *Fischer, Mertens;* Schismaroff Inlet, *Chamisso,* as *P. mistassinica;* Koyuk River, collector unknown; St. Michaels, Norton Sound, *Bannister* on Western Union Extens. Telegr. Expl. Exped. 1865–66, as *P. stricta;* St. Michaels, 1881, *J. Muir.* Simmons, Phytogeogr. Arct. Am. Archipel. 119 (1913) cites specimens from BANKS LAND.

Primula borealis is a variable species, but not so variable as one would infer from various published accounts of it. From its immediate allies it is distinguished, when in good condition, by the unusually large corolla with very deeply obcordate and broad lobes. From the first it has been often misinterpreted as small-flowered. Duby described it as growing "in Americae occidentali-borealis sinubus Schischmar[e]ff et Sancti Laurentii (Cham.! Bunge!)" and his illustration showed corollas barely 1 cm. broad but with the very characteristic deep notching of the lobes. The material of Chamisso's plant from "Sinus Schischmareff" in the Gray Herbarium has the flowers badly shrunken and shriveled so that they give no adequate impression of the size of the fully expanded corolla. Mertens's material, originally labeled as coming from "Sinus St. Laurentii," but changed in pen to "Sinus Kotzebue," also has badly shriveled flowers as does further material from Kotzebue Sound collected by Fischer. I have not seen the Bunge material from "Sancti Laurentii" (whether from

St. Lawrence Island, Alaska, or from St. Lawrence Bay, Siberia is not clear); but it is evident that these old collections which were available to Duby and his immediate successors failed to display the large corolla which is seen on some of the more modern specimens. Consequently we find Gray, in the *Synoptical Flora of North America*, describing *P. borealis* with "lobes of the purple corolla oblong, barely 2 lines long, deeply notched" and reducing to it *P. egaliksensis*, which has the smallest flowers of any American species, instead of the largest flowers. The specimens in the Gray Herbarium studied by Gray show that he had only poorly prepared material of *P. borealis* and that he confused with it both the typical white-flowered *P. egaliksensis* and its violet-flowered form. Similarly, Mrs. Busch, working with the collections at Leningrad, describes the corolla "lobis 3–5 mm. lg., loco latissimo 3–5 mm. lt."; but Pax & Knuth, more accurately say "limbus 12–14 mm diametiens." The fully expanded flowers of well-prepared specimens before me are 1.2–2 cm. broad and I have seen no well-pressed flowers with corolla-lobes less than 5 mm. broad at summit, while in the largest specimens they are 8 mm. broad.

The largest extreme of *P. borealis*, with leaves from 1–4 cm. long, has been identified by Pax with *P. Loczyi* Kanitz; and making up his *P. borealis*, var. *Loczii* of a collection from Bering Strait and the plant described by Kanitz, he gets the extraordinary range, "Alaska: St. Lorenz . . . Kansu: am Chaji-san . . . " Kansu, in high central Asia would hardly be expected to share a species or variety in so technical a group as *Primula* with the shores of Bering Strait, fully 5500 km. to the northeast; and a glance at the description and the detailed illustration of *P. Loczyi*[1] at once shows that they are not closely related. To be sure, Kanitz spoke of his species as "Ex affinitate *P. borealis* Duby." *P. borealis*, however, has the leaves long-petioled, with the 1–7 pairs of teeth confined to the upper half of the rhombic blade, *P. Loczyi* has the cuneate-obovate leaves scarcely petioled and dentate nearly to base; the involucral bracts of *P. borealis* are lance-subulate and gibbous at base; in *P. Loczyi* linear, flat and tapering at base (consequently not of § *Farinosae*); the calyx of *P. borealis* is gibbous at base and cleft to the middle, the

[1] Kanitz Ágost, A Növénytani Gyüjtések Eredményei Gróf Széchenyi Béla Keletázsiai Utjából (1877–1880),—Plantarum in Expeditione Speculatoria Comitis Béla Széchenyi a Ludovico de Lóczy in Asia Centrali Collectarum Enumeratio, 36, t. III. i (1891); Scechenyi Ostasiat. Reise (Bot.) ii. 713, t. 3, figs. 1–2 (1898).

calyx of *P. Loczyi* non-gibbous and cleft about one-third its length; the anthers of the short-styled form of *P. borealis* are inserted at and slightly protrude from the throat; in *P. Loczyi* they are borne about midway on the corolla-tube. That *P. Loczyi* is neither a variety of *P. borealis* nor closely related to that species should be apparent.

11. P. EGALIKSENSIS Wormskj. *Leaves thin, efarinose, ovate, oblong, obovate or spatulate, entire* or obscurely undulate (very rarely obscurely dentate), *slender-petioled,* 0.5–5 cm. long, 0.2–1.5 cm. wide, the petiole often equaling to exceeding the blade: *scapes strict, efarinose*, pale-green, 0.1–2.4 dm. high, 0.5–2.3 mm. in diameter at summit: *involucral bracts* green, *lanceolate or lance-oblong to lance-subulate*, flat to involute, *dilated and gibbous-saccate at base*, 2.5–7 mm. long: umbel 1–9-flowered: pedicels strict, in anthesis from about equaling to thrice the length of the bracts; in fruit becoming very unequal, the longest 0.5–5 cm. long (in exceptional individuals bearing secondary umbels): *calyx* pale-green, cylindric to slenderly campanulate, often gibbous at base, 3.5–6 mm. long, *cleft one-fourth to one-third its length* into oblong to deltoid round-tipped to acutish *glandular-ciliate lobes:* the yellowish corolla-tube slightly exserted; the *white limb 5–9 mm. broad; the cuneate lobes distinctly shorter than the tube, 1.6–4 mm. broad, cleft one-third to one-half their length:* anthers borne well below the yellow throat: style shorter than or but slightly overtopping the anthers: mature *capsule* stramineous, *slender-cylindric*, tapering at summit, *becoming two to three times as long as the calyx, 7–13 mm. long, 1.8–2.1 mm. in diameter: seeds pale-brown to stramineous, smooth,* 0.5–0.6 mm. long.—Wormskj. in Hornem. Fl. Dan. ix. fasc. xxvi. 2, t. mdxi. (1816); Lange, Consp. Fl. Groenl. 71 (1880), 260 (1887); Fernald, RHODORA, xxviii. 54, 60, 75, 118, 224 (1926). *P. egalliccensis* Lehm. Monogr. Prim. 64, t. vii. (1817); Pax, Engler's Bot. Jahrb. x. 198 (1889); Pax & Knuth in Engler & Prantl, Pflanzenr. iv[237]. 77 (1905). *P. sibirica* Hook. Fl. Bor.-Am. ii. 121 (1838), in part; J. M. Macoun & Holm, Rep. Can. Arct. Exped. v. Pt. A. 18A, t. xi. fig. 5 (1921); not Jacq. (1778). *P. sibirica, γ minor* Duby in DC. Prodr. viii. 43 (1844), as to Greenland plant. *P. borealis* Gray, Syn. Fl. N. A. ii. pt. 1: 58 (1878), in part, not Duby (1844).—Southern Greenland and Labrador to Alaska, south to northern Newfoundland, eastern Quebec, shores of James Bay, Alberta and British Columbia.—GREENLAND: Igaliko (type-locality), July 27, 1888, *Rosenvinge*, August 6, 1925, *A. E. & M. P. Porsild.* LABRADOR: Battle Harbor, *Bowdoin College Exped.* 1891, no. 103; *Waghorne*, no. 15,849 (Can.); damp mossy rocks, Battle Harbor, August, 1911, *C. S. Williamson* (Penn.). NEWFOUNDLAND: mossy brooksides and damp turfy slopes, Sacred Island, *Fernald & Long*, no. 28,899; mossy and turfy trap cliffs and talus, Anse aux Sauvages, *Fernald, Wiegand & Long*, no. 28,900; boggy tundra, Schooner (or Brandy) Island, *Pease & Long*, no. 28,903; moist turfy or peaty depressions in limestone barren, Cook Point, *Fernald*

& Gilbert, no. 28,894; springy swales and turfy shores, Boat Harbor, *Fernald, Wiegand & Long*, no. 28,895; swale near mouth of brook, Watts Bight, *Pease, Griscom, Gilbert & Hotchkiss*, no. 28,897; gravelly barren east of Big Brook, *Pease, Griscom, Gilbert & Hotchkiss*, no. 28,896; wet limestone barrens on the Highlands northeast of Big Brook, *Fernald, Wiegand & Hotchkiss*, no. 28,902; peaty and turfy limestone barrens west of Big Brook, *Long & Gilbert*, no. 28,893; bog, Flower Cove, July 12, 1920, *M. E. Priest*, September 2, 1923, *A. G. Huntsman;* swales and wet peaty limestone barrens, Capstan Point, Flower Cove, *Fernald, Long & Dunbar*, no. 26,960; springy swale south of the Hospital, Flower Cove, *Fernald, Long & Dunbar*, no. 26,961; limy swale bordering the Rock Marsh, Flower Cove, *Fernald Griscom & Gilbert*, no. 28,892; springy peat on limestone gravel near the sea, St. Barbe, *Fernald, Long & Dunbar*, no. 26,962; borders of pools and rills in limestone barrens, St. John Island, *Fernald, Wiegand, Long, Gilbert & Hotchkiss*, no. 28,898. Quebec: Ungava Bay, 1884, *L. M. Turner;* along Noyava River, near Fort Chimo, *Spreadborough*, no. 14,420 (Can.); gravelly patch at head of rocky shore, Middle St. Mary Island, July 22 and 23, 1927, *H. F. Lewis* (Can.); mossy bank, island off Pointe au Maurier, Charnay, *St. John*, no. 90,677 (Can.); sur les plages calcaires, Pointe-aux-Ammonites, Mingan, *Victorin & Rolland*, no. 18,418; sur les plages calcaires, Ile à la Vache Marine, Mingan, *Victorin & Rolland*, no. 18,419; sur les corniches calcaires, Ile Tète à la Baleine, Mingan, *Victorin & Rolland*, no. 21,830; sur le calcaire sourceux, Ile Saint-Charles, Mingan, *Victorin & Rolland*, no. 25,109; Richmond Gulf, *Spreadborough*, no. 34,449 (Can.), as *P. stricta;* north of Cape Jones, Hudson Bay, *Low*, no. 63,243 (Can.), as *P. stricta* altered to *P. sibirica;* damp banks, Charlton Island, James Bay, *J. M. Macoun*, no. 15,847, as *P. mistassinica.* Ontario: mouth of Ekwan River, James Bay, *Dowling*, no. 34,525 (Can.), as *P. stricta*, changed to *P. sibirica.* Manitoba: Churchill, *J. M. Macoun*, no. 79,390, as *P. sibirica.* Mackenzie: Bernard Harbor, *Frits Johansen*, no. 369 (Can.), as *P. sibirica;* west shore of Great Bear Lake, *J. M. Bell*, no. 22,955 (Can.), as *P. sibirica.* Yukon: moist river-banks, near mouth of Lewes River, *Gorman*, no. 1052 in part (Can.), mixed with *P. stricta.* Alaska: wet meadows, Yakutat, *E. P. Walker*, no. 1052; Chignik Bay, Alaska Peninsula, June 19, 1874, *Baker.*

Forma **violacea**, nom. nov. Whole plant darker: scapes and pedicels suffused with violet or purple-black: bracts and calices purple-tinged or spotted, often blackish: corolla violet or deep-lilac. —*P. sibirica* Hook. Fl. Bor.-Am. ii. 121 (1838), in part, not Jacq. (1778). *P. borealis* Gray, Syn. Fl. N. A. ii. pt. 1: 58 (1878), in part, not Duby (1844). *P. stricta*, var. *groenlandica* Warming, Svensk. Vet. Akad. Handl. xii. Afd. iii. no. 2: 21, fig. 7, A-D (1887); Lange, Conspect. Fl. Groenl. 260 (1887). *P. farinosa*, var. *groenlandica* (Warming) Pax, in Engler, Pflanzenr. iv^{237}. 84 (1905), in small part

only, but as to name-bringing synonym. *P. sibirica*, var. *arctica* Fernald, RHODORA, xxviii. 98, 99, 105, 224 (1926), not Pax (1905). *P. farinosa*, subsp. *P. groenlandica* (Warming) W. W. Smith & Forrest, Notes Roy. Bot. Gard. Edinb. xv. no. lxxvi. 24 (1928). *P. groenlandica* (Warm.) W. W. Smith & Forrest, l. c. 49 (1928).—Throughout the range of the species, and sometimes more abundant. GREENLAND: Itivnek, Holsteinsborg Distr., July 13, 1884, *Warming & Holm*, (duplicate TYPE of *P. stricta*, var. *groenlandica*); mixed with typical *P. egaliksensis*, Igaliko, August 6, 1925, *A. E. & M. P. Porsild*. NEWFOUNDLAND: wet hollows in limestone gravel-barrens, Cook Point, *Fernald & Gilbert*, no. 28,917, *Fernald, Gilbert & Hotchkiss*, no. 28,919; wet bank on limestone barrens, Cape Norman, *Wiegand, Griscom, Gilbert & Hotchkiss*, no. 28,918; swale near mouth of brook, Watts Bight, *Pease, Griscom, Gilbert & Hotchkiss*, no. 28,901; peaty limestone barrens back of Big Brook, *Fernald & Long*, no. 28,915; sandy and gravelly margin of Big Brook, *Fernald, Wiegand, Long & Gilbert*, no. 28,916. QUEBEC: River Kovik, Hudson Straits, *Low*, no. 23,026 (Can.); Little Whale River, *Low*, no. 63,245 (Can.). ALBERTA: North Fork of the Saskatchewan, 6 miles above North Branch, *S. Brown*, no. 1024; Upper Maligne Valley, *S. Brown*, no. 1145; Maligne Lake, *S. Brown*, no. 1184; all as *P. borealis;* damp places, Kicking Horse Pass, *Dawson*, no. 15,826 (Can.). BRITISH COLUMBIA: shore of Atlin Lake, *Guilliam*, no. 101,403 (Can.). ALASKA: swamps, Popoff Island, Shumagin Islands, June 28, 1872, *M. W. Harrington*.

The name forma ***violacea*** is here used for *P. stricta*, var. *groenlandica* Warming (discussed in detail under *P. stricta*, p. 67). Forma ***violacea*** is most probably the true philogenetic color-form of *P. egaliksensis*, the white-flowered plant, originally described, being a presumable albino, such as we get in the normally lilac-flowered *P. mistassinica;* and, treated as a mere color-form, the name forma ***violacea*** is more appropriate to it than would be the name originally given by Warming. The plant, changing its rank from variety to forma, does not necessarily have to retain an inappropriate name.

W. W. Smith & Forest, in their *Sections of the Genus Primula* (Notes Roy. Bot. Gard. Edinb. xvi. no. lxxvi. 24), which comes to hand while this is going through the press, treat *P. egaliksensis* (using the later and incorrect spelling *P. egalliccensis*) as a species but under *P. farinosa* enumerate among the subspecies (listed as binomials in violation of general botanical usage and of the International Rules of Botanical Nomenclature) a "*P. groenlandica*, Warming." In the index, however, they definitely give "*P. groenlandica*" as a "Species." Warming, of course, had no such species, nor did he have a subspecies of *P. farinosa*. He published *P. stricta*

var. *groenlandica*, and, as the specimens show, his plant was a violet-flowered *P. egaliksensis*.

P. egaliksensis has many times been confused with *P. sibirica*, to which it is more closely allied than to other species. Like *P. sibirica* it has long-petioled, mostly entire, thin and dilated leaves, broad and often flat involucral bracts, copiously glandular-ciliate calyx-lobes, deeply notched corolla-lobes, and very slender capsules; but in *P. sibirica* the involucral bracts are usually longer and more dilated upward (often slightly obovate) and they have more prolonged and narrower auricles; the calyx is longer (5–8 mm. long); the corolla is much larger (1–1.8 cm. broad) and with broader lobes; and the summits of the stamens or (in the long-styled form) the stigma slightly protrude from the throat. *P. sibirica* is a plant of arctic and alpine Eurasia, reaching America only in the high mountains of Alaska and Yukon; *P. egaliksensis* is strictly American, occurring mostly between latitudes 50° and 60° N., though sometimes reaching the Arctic Coast, and found only slightly north of 60° in southern Greenland.

12. P. SIBIRICA Jacq. *Leaves* green, *efarinose, slender-petioled*, 1–7 cm. long; the thin *blade* suborbicular, ovate or elliptic, *rounded at summit, entire*, or obsoletely dentate, *abruptly contracted at base, shorter than to equaling the petiole*, 0.5–2 cm. broad: scape slender, 0.45–1.5 dm. (–3.8 dm. acc. to Busch) high, efarinose: *involucral bracts oblong or narrowly obovate*, 4–11 mm. long, *obtuse or abruptly contracted at tip*, often prolonged at base into *narrow saccate auricles 1–1.5 mm. long:* umbel 1–4 (–8)-flowered: pedicels filiform, 0.7–4 cm. long: calyx efarinose, slenderly campanulate, in maturity 5–8 mm. long, cleft one-third its length into oblong-ovate fulvous-ciliolate lobes: corolla-tube more or less exserted, very slender; the lilac limb 1–1.8 cm. broad, with obcordate or deeply emarginate broadly cuneate or obovate lobes: stigma or summits of anthers slightly exserted from the throat: capsule slenderly cylindric, somewhat narrowed at summit, from slightly exserted to twice the length of the calyx, about 1.5 mm. in diameter: seeds not seen.—Misc. Austr. i. 161 (1778); Lehm. Monogr. Prim. 60, t. 5 (1817); Hook. Bot. Mag. lix. t. 3167 (1832) and lxii. t. 3445 (1835); Duby in DC. Prodr. viii. 43 (1844); Gray, Syn. Fl. N. A. ii. pt. 1: 58 (1878), in small part only; Pax in Engler's Bot. Jahrb. x. 197 (1889); Pax & Knuth in Engler, Pflanzenr. iv[237]. 76, 77, incl. vars. (1905); E. Busch, Fl. Sib. et Orient. Extr. iv. Cem. 65: 61 (1926). *P. finmarchica* Jacq. Misc. Austr. i. 160 (1778). *P. norvegica* Retz. Fl. Scand. Prodr. ed. 2: 55 (1795). *P. intermedia* Ledeb. Mém. Acad. Pétersb. v. 519 (1815). For further synonymy see Pax & Knuth, l. c. and E. Busch, l. c.—Arctic Europe, Ural

Mountains, arctic and central Asia; Alaska and Yukon. ALASKA: Kuskokwim Valley, 1884, *Weinmann;* cited by Pax & Knuth from Lynn Canal. YUKON: Lake Tahko, near head of Yukon River, June 24, 1883, *Schwatka,* no. 81.

The citation by Hooker, Fl. Bor.-Am. ii. 121 (1838) of *P. sibirica* from "Barren country between lat. 60° and 69°, . . . *Dr Richardson*" can hardly be accepted as unquestionably belonging here. Hooker said "I have carefully compared Dr. Richardson's specimen with authentic ones of the European *P. Norvegica,* the Asiatic *P. Sibirica,* and the *P. Egaliccensis* from Hornemann himself, and there can be no question about the propriety of referring them all to one and the same species." *P. egaliksensis,* however, is now known to be quite distinct from *P. sibirica* and specimens before me show it from several stations between the west shore of Hudson Bay (Churchill, lat. 58° 51′) and Alaska. It is most probable, then, that Hooker's *P. sibirica* was *P. egaliksensis;* for both the white- and purple- or violet-flowered plants of the latter have been repeatedly misidentified as *P. sibirica.* The identity of the violet-flowered *P. egaliksensis* is discussed in the comments upon *P. stricta,* var. *groenlandica* Warm. on p. 67.

The citations "*Pr. integrifolia* Oeder in Fl. Danica t. 188 (1767)" and "*Pr. rotundifolia* Pallas, Reise Prov. russ. Reiches III. (1776) 223" are given by Pax & Knuth in the synonymy; and the first is made the basis of the varietal combination, *P. sibirica,* "Var. β. *integrifolia* (Oeder) Pax." Both these names would, thus, appear to have been published earlier than *P. sibirica,* but examination of the original publications at once shows that they cannot be taken up to displace it.

Oeder did not publish the binomial *P. integrifolia.* Accompanying a recognizable plate of *P. sibirica* was the text:

"TAB. CLXXXVIII.

Auricula ursi IV. Clus. pann. 349. . . .
Primula foliis carnosis glabris integerrimis. Hall. Helv. 485.
Primula, integrifolia, *foliis integerrimis glabris oblongis, calycibus tubulosis obtusis.* Linn. Sp. pl. 205. . . .
Locus. In Finmarkia, . . ."

Only by the Roman type of "integrifolia" did Oeder distinguish that single word of a polynomial derived from the Linnean diagnosis of *P. integrifolia* L. Sp. Pl. i. 144 (1753), a species of southern Europe wholly distinct from *P. sibirica.* Oeder misidentified the Finmark

plant with *P. integrifolia* L. and certainly was not proposing a new species. Incidentally his "*Primula*, integrifolia, *foliis integerrimis*" was the third of a series of names and would technically be "published in synonymy"; and, furthermore, it is not clear that Oeder was at that time following binomial nomenclature. The emphasis by typography on certain adjectives was not uniformly confined to a single "specific" name. Thus, in the same fascicle we find "*Campanula alpina linifolia caerulea* C. B. Prodr. 34" with the synonym "*Campanulae*, rotundifoliae, varietas. Linn. Sp. pl. 232" (Tab. clxxxix); "*Arthritica hiberna*. Gesn." . . . with the synonym "*Primula*, veris, acaulis, *foliis dentatis rugosis*" (Tab. cxciv) and "*Medica echinata minima*. J. B. . . . " with the synonym "*Medicago* polymorpha minima. Linn. Sp. pl." (Tab. ccxi); while in some cases (Tabs. ccxiv, ccxxxii, ccxxxiii) no roman type was used. It is, therefore, very clear that Oeder had in these early fascicles of *Flora Danica* no clear-cut intention to use binomials exclusively and such as crept in in synonymy were merely "accidental" binomials. At any rate, the name *Primula integrifolia*, already validly used by Linnaeus for another species could not be used for a later species and it is unfortunate that in making Oeder's misidentification of *Primula integrifolia* L. the basis of a variety of *P. sibirica* Pax should have excluded perfectly valid varietal combinations. The first unequivocal varietal name for var. *integrifolia* Pax (1905) seems to be var. *kashmiriana* Hook. f. Bot. Mag. cvi. t. 6493 (1880).

The name *Primula rotundifolia* Pallas has no nomenclatorial status. It was used casually and without diagnosis in the running text of his *Reise;* and combinations based upon it should be excluded: such a name as *P. sibirica*, var. *rotundifolia* (Pall.) Pax in Engler's Bot. Jahrb. x. 197 (1889).

IDENTITIES OF NUMBERED EXSICCATAE CITED

1,	*P. stricta*	8,	*P. mistassinica*
2,	*P. laurentiana*	8a,	" forma *leucantha*
2a,	*P.* " forma *chlorophylla*	8b,	*P.* " var. *noveboracensis*
3,	*P. incana*	9,	*P. parvifolia*
4,	*P. decipiens*	10,	*P. borealis*
5,	*P. specuicola*	11,	*P. egaliksensis*
6,	*P. intercedens*	11a,	*P.* " forma *violacea*
7,	*P. ajanensis*	12,	*P. sibirica*

ARCHIBALD, O. L., no. 69,371 (*8*).
BAILEY, L. H., no. 477 (*6*).
BAKER, no. 361 (*3*).
BELL, J. M., no. 22,955 (*11*); 22,956 (*8*).

Bell, Robert, no. 15,829 (*1*).
Bissell, Bean, White & Linder, no. 22,234 (*2*).
Blaisdell, no. 129 (*9*).
Blankinship, no. 727 (*3*).
Bowdoin College Exped., no. 103 (*11*); 104 (*2*).
Brown, S., no. 13 (*8*); 900 (*8*); 919 (*8*); 1024 (*11a*); 1107 (*1*); 1145 (*11a*); 1184 (*11a*).
Butters & Rosendahl, nos. 1327 and 1434 (*8*).
Cairnes, C. E., no. 89,722 (*1*).
Chamberlain, no. 298 (*8*).
Collins, Fernald & Pease, nos. 5319, 5320, 5434, 5435, 5554 (*2*).
Cooper, no. 55 (*8*).
Cox & O'Neill, no. 581 (*1*).
Cushman & Sanford, no. 1515 (*2*).
Dawson, no. 15,826 (*11a*); 15,844 (*8*).
Dodge, C. K., no. 3 (*6*).
Dowling, no. 34, 525 (*11*); 34,526 (*1*).
Eames, A. J., no. 4804 (*8b*).
Eastwood, no. 68 (*5*).
Fernald, nos. 82, 2427, 2428 (*8*).
Fernald, Bartram, Long & Fassett, no. 24,327 (*2*).
Fernald & Collins, no. 246 (*2*); 707 and 708 (*8*); 1145 (*8*); 1147, 1148 and 1149 (*2*).
Fernald, Dodge & Smith, no. 25,983 (*8*).
Fernald & Gilbert, no. 28, 894 (*11*); 28,917 (*11a*).
Fernald, Gilbert & Hotchkiss, no. 28,919 (*11a*).
Fernald, Griscom & Gilbert, no. 28,892 (*11*).
Fernald & Long, no. 28,899 (*11*); 28,911 (*2a*); 28,912 (*2*); 28,915 (*11a*).
Fernald, Long & Dunbar, no. 26,955 (*2a*); 26,956 (*2*); 26,957 (*2a*); 26,958 and 26,959 (*8*); 26,960, 26,961 and 26,962 (*11*).
Fernald, Long & Fogg, no. 375 (*2*).
Fernald & Pease, nos. 25,232 and 25,233 (*2*).
Fernald & St. John, no. 10,681 (*8a*); 10,861 (*8*).
Fernald & Wiegand, no. 3881 (*8a*); 3885–3890 (*2*); 6071 and 6072 (8*a*).
Fernald, Wiegand & Bartram, no. 6068 (*2*).
Fernald, Wiegand, Bartram & Darlington, no. 6070 (*8a*).
Fernald, Wiegand & Darlington, no. 6069 (*2*).
Fernald, Wiegand & Hotchkiss, no. 28,902 (*11*).
Fernald, Wiegand & Long, no. 28,895 (*11*); 28,900 (*11*); 28,914 (*2*).
Fernald, Wiegand, Long & Gilbert, no. 28,916 (*11a*).
Fernald, Wiegand, Long, Gilbert & Hotchkiss, no. 28,898 (*11*); 28,913 (*2a*).
Fernald, Wiegand, Pease, Long, Griscom, Gilbert & Hotchkiss, no. 28,891 (*8a*); 28,905 (*2*).
Gaetz, H. H., no. 7476 (*3*).
Gorman, no. 1052 (*1* and *11*).
Griscom, Mackenzie & Smith, no. 25,981 (*2*).
Guilliam, no. 101,403 (*11a*).
Hall & Harbour, no. 378 (*3*).
Harrington, W. H., no. 644 (*2*).
Heacock, no. 14 (*8*).
House, no. 6911 (*8b*).
Howe, C. F., no. 1019 (*8*).
Hughes, E. L., no. 45 (*3*).
Johansen, Frits, no. 50 (*10*); 56 (*10*); 119 (*10*); 265 (*10*); 347 (*1*); 369 (*1*); 533 (*10*); 103,287 (*2*).
Low, A. P., no. 6035 (*8*); 23,026 (*11a*); 24,529 (*1*); 63,242 (*1*); 63,243 (*11*); 63,244 (*1*); 63,245 (*11a*).
Long & Gilbert, no. 28,893 (*11*).

Lyon, H. L., no. 924 (*6*).
MacDaniels, no. 3020 (*8b*).
Mackenzie & Griscom, no. 10,402 (*2*); 10,405 (*8a*).
Macoun, J., no. 5313 (*3*); 11,776 (*2*); 12,211 (*2*); 12,742 (*2*); 12,726 (*8*); 15,830 (*2*); 15,833 (*2*); 15,837 (*2*); 15,838 (*2*); 15,841 (*8*); 15,842 (*8*); 15,846 (*6* and *8*); 22,545 (*8*); 24,528 (*3*); 54,260 (*6*); 68,725 (*8*); 81,152 (*2*); 88,032 (*8a*); 101,401 (*3*).
Macoun, J. M., no. 15,831 (*1*); 15,847 (*11*); 15,850 (*1*); 68,948 (*8a*); 68,949 (*2*); 79,388 (*1*); 79,390 (*11*).
Malte & Watson, no. 118,331 (*3*), 118,333 (*8*).
Merrill & Wilcox, nos. 749, 990 and 1039 (*3*).
Moodie, no. 942 (*3*).
Nelson, nos. 1871 and 1961 (*3*).
Payson & Payson, nos. 1735 and 2648 (*3*).
Pease, nos. 2248, 17,971 and 18,003 (*8*).
Pease, Griscom, Gilbert & Hotchkiss, nos. 28,896 and 28,897 (*11*); 28,901 (*11a*).
Pease & Long, no. 28,903 (*11*); 28,907 (*2*).
Pease, Long & Gilbert, no. 28,890 (*8a*).
Pease & Smith, no. 25,982 (*8*).
Robinson, Ralph, no. 102 (*2*).
Rosendahl, no. 4238 (*8*).
Rosendahl & Butters, nos. 1327, 1434 and 4643 (*8*).
Sanson, no. 22,140 (*8*).
Schwatka, no. 81 (*12*).
Scribner, no. 143 (*3*).
Sheldon, E. P., no. 4400 (*6*); 4768 (*8*); 4948 (*8*).
Spreadborough, no. 14,420 (*11*); 14,421 (*1*); 19,852 (*3*); 34,449 (*11*); 62,554 (*1*); 62,555 (*1*); 62,556 (*8*).
Stecker, no. 78 (*1*).
St. John, no. 90,674 (*2*); 90,675 (*2*); 90,676 (*8*); 90,677 (*11*).
St. John & Nichols, no. 2444 (*8*).
Stringer, nos. 14,423, 62,251 (*10*).
Taylor, Elizabeth, no. 38 (*3*); 87 (*1*); 110 (*3*).
Tyrrell, no. 15,840 (*8*).
Victorin, nos. 131 and 4188 (*2*); 16,722 (*8*).
Victorin & Rolland, nos. 18,418 and 18,419 (*11*); 18,421 (*2a*); 18,465 and 18,485 (*2*); 21,830 (*11*); 21,832 (*2*); 25,107 (*8*); 25,109 (*11*); 25,139 (*2*).
Victorin, Rolland, Brunel & Rousseau, nos. 17,642 and 17,643 (*2*); 17,645 (*8*).
Victorin, Rolland & Louis-Marie, no. 21,831 (*8*).
Waghorne, no. 5 (*8a*); 15,849 (*11*).
Walker, E. P., no. 1052 (*11*).
Wetmore, no. 103,037 (2).
Wiegand, Gilbert & Hotchkiss, no. 28,908 (*2a*); 28,918 (*11a*).
Wiegand & Hotchkiss, no. 28,904 (*2a*).
Wiegand & Long, no. 28,909 (*2a*).

Explanation of Plate 169.

Primula laurentiana × ¾. Photograph taken by *Professor J. F. Collins* at the type-locality, Bic, Quebec.

Plants new to Coos County, N. H.—On 21 July, 1927, while passing through a hay field northeast of Appalachia station in Randolph, I was struck by several clumps of an unfamiliar *Potentilla*, about

two feet high, with large yellow flowers and leaves white and densely tomentose beneath. Specimens were taken for deposit at the Gray Herbarium and the herbarium of the New England Botanical Club, and it later appeared upon comparison, in which I was greatly assisted by Professor M. L. Fernald, that the plant is *P. pulcherrima* Lehm., a species of the Northwest, which has been found as a waif as far east as Hull, Ont. The Randolph locality is in a field adjacent to the railroad, yet so far from the track as to suggest that the appearance of the plant is due to other causes.

On an old and overgrown logging road on the way to Unknown Pond, in the township of Kilkenny, which I was traversing on 22 August, 1927, my attention was attracted by a goldenrod somewhat suggesting *Solidago macrophylla,* yet differing markedly in the shape of its leaves, size of the involucre, and other details. Subsequent analysis and comparison showed that it is *S. calcicola* Fernald, reported in the *Manual* from Aroostook County, Maine, but also represented by specimens collected by Miss Kate Furbish in the Rangeley region. Further search disclosed in the New England Botanical Club herbarium a sheet collected in August, 1910 in rich woods in Carter Notch (Bean Purchase) by Professor T. W. Edmondson, which closely matches the Kilkenny material.—Arthur Stanley Pease, Amherst College.

Tetramerism in Trillium grandiflorum.—In my garden are many clumps of *Trillium grandiflorum,* originally transplanted by me from Shelburne, Vermont. In a group which grows by the doorstep of the house is one completely tetramerous plant. Stigmas and ovary cells are four as well as leaves and floral envelopes, while there are eight good stamens. I first noticed this in 1925, and picked the flower. It did not blossom in 1926, but this year the tetramerous plant reappeared in the clump with the other plants. I have tried to keep conditions similar to the natural ones, with plenty of woods earth, and other woodland plants near, so it does not seem that cultivation is responsible for this form. A similar plant has been reported by Victorin (Nat. Canadien xl. 113), and the whole subject is discussed by C. A. Weatherby in Rhodora xxix. 223.—Clarence Hinckley Knowlton, Hingham, Massachusetts.

ASTER ERICOIDES VAR. PLATYPHYLLUS IN MARYLAND.—*Aster ericoides* L. var. *platyphyllus* Torr. & Gray is an extremely well marked variety, distinguished from the typical form by its densely spreading-pilose stem and comparatively broad, lanceolate stem leaves, these more or less densely pilose or hirsute beneath. In current floras it is assigned a range from Ohio, Michigan, and Illinois southward. The area covered by material in the U. S. National Herbarium extends from Ohio to Missouri, south to Alabama, West Virginia, and south-central North Carolina (Fayetteville). The occurrence of this very distinct variety in Maryland is therefore worthy of record. On 30 Oct. 1927 I found two clumps along the Conduit Road in Montgomery County, Maryland, about 5 miles west of the District of Columbia boundary. The plants were growing in sand which had been used to cover the new conduit recently constructed between Washington and Great Falls. Although this habitat is not a strictly natural one, it is occupied by many native species which have invaded it from surrounding fields, as well as by the usual naturalized weeds. Moreover, the dirt used in making the fill over the conduit was obtained in the immediate vicinity, so that there is no possibility of introduction from a distance in that way. There seems no reason, therefore, to suppose that the aster reached this spot by any but perfectly natural means. One of the periodic floods of the Potomac River may have brought down seeds from the Alleghany Mountains, where it occurs. Specimens have been deposited in the U. S. National Herbarium, the Gray Herbarium, and the herbarium of the New York Botanical Garden.—S. F. BLAKE, Bureau of Plant Industry, Washington, D. C.

THE VARIETIES OF GALIUM BOREALE. *Galium boreale* L. is common in northwestern America, and locally across the continent to the Gaspé Peninsula, New England, New Jersey and Delaware, and it is widely dispersed across Eurasia. It is so highly variable in breadth and degree of ciliation of leaves and in its stature and degree of branching as to baffle most attempts at organization of its vegetative variations. In its fruits, likewise, it is amazingly variable, these ranging all the way from strictly glabrous to densely villous-hirsute. In other groups of *Galium* such differences of the fruits accompany other characters and are found to be good specific differences; in *G. boreale*,

however, they are not associable with other differences and on the fruit characters the North American plants fall into the three varieties long recognized in Eurasia:

Var. TYPICUM Beck von Man. Fl. Nied.-Öst. ii. 1121 (1893). Var. *scabrum* DC. Prodr. 601 (1830).—Fruit villous-hirsute with long hairs.

Var. INTERMEDIUM DC. Prodr. 601 (1830).—Fruit covered with short appressed or incurving hairs.

Var. HYSSOPIFOLIUM (Hoffm.) DC. Prodr. iv. 600 (1830).—Fruit glabrous or glabrate.

In North America, var. TYPICUM is found chiefly in the Northwest, from Manitoba to New Mexico, Oregon, Washington, British Columbia and Alaska. The only specimens in the Gray Herbarium and the herbarium of the New England Botanical Club from east of Manitoba are one each from northern New Hampshire, northern Vermont and northern New York.

Var. INTERMEDIUM is more generally distributed across the continent, represented in the two herbaria by 44 sheets from east of Ontario and Ohio and with us extending eastward to Delaware and eastern New England.

In North America var. HYSSOPIFOLIUM is apparently rare in the cordilleran region, where the other two varieties are generally dispersed. It ranges from the Gaspé Peninsula across southern Quebec and westward to North Dakota and locally to Colorado, southward locally to northern New Jersey, Ohio and Missouri; also on the Pacific slope in Oregon, Washington and Vancouver Island.—M. L. FERNALD, Gray Herbarium.

POTENTILLA INTERMEDIA L. IN THE BOSTON DISTRICT.—This introduced cinquefoil, resembling *Potentilla argentea* but much coarser and with looser dull grayish pubescence, is of rare occurrence in the United States. The only specimen from the United States in the U. S. National Herbarium is one collected in waste places at Port Henry, New York, in 1917 by E. P. Killip, and the only record for the species in the "Reports on the Flora of the Boston District" [1] is based on a specimen collected in 1891 by Prof. M. L. Fernald along a roadside in Cambridge. On 4 Sept. 1926 I collected several specimens from a single vigorous many-stemmed plant growing along a

[1] RHODORA **20**: 55. 1918.

gravelly roadside in Canton, Mass. The occurrence of the plant at that spot is doubtless to be attributed to repairs made in 1924 on this road, which crosses the Neponset River meadows at the station known as Dedham Road. On 18 Aug. 1924 I collected along the same road two other comparatively scarce introduced plants—a solitary specimen of *Erucastrum Pollichii* Schimp. & Spenn., and three of *Rumex maritimus* L. var. *fueginus* (Phil.) Dusén. In the "Reports on the Flora of the Boston District," the former is listed from only one station (Sherborn, 1910) and the latter from two (Charlestown and South Boston flats, 1881 and 1879).—S. F. BLAKE, Bureau of Plant Industry, Washington, D. C.

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TEN NEW AMERICAN SPECIES AND VARIETIES OF ROSA[1]

EILEEN WHITEHEAD ERLANSON

IT is unnecessary to reiterate the fact of the great variability of the species of Rosa. We shall eventually, for the sake of usability, probably be forced to recognize a relatively small number of collective species, which will be characterized both morphologically and cytologically; within these groups there will be lesser elements most of which will be of the nature of geographical or local races or varieties and stable hybrids, important for the most part in regional floras.

In a careful analysis of characteristics used to distinguish species Boulenger[2] has shown how greatly these characters vary among individuals in European Rosa species. Similarly, one can take any of the "key characters" used to determine North American Rosa species and find undoubted cases where each characteristic breaks down when taken by itself. After growing a large number of individuals of many of our native wild roses, and studying them intensively for several seasons, I find that many of the specific characteristics act as though they were independent Mendelian units in that they appear combined in every possible way within each species group. In species having well-developed paired infrastipular prickles, individuals can be found with curved or straight prickles and also unarmed. Pubescence and glands on the foliage vary on different parts of the same plant and also seasonally, as well as among progeny grown from seed of a single plant.

[1] Papers from the Department of Botany of the University of Michigan, no. 274.

[2] Boulenger, G. A. Roses d'Europe, 1924–1925.

It is also true, as Crépin[1] pointed out, that many species are represented by both a tall and a dwarf form; to this I would add that several North American species also have weak-stemmed semi-procumbent forms. These habit forms are very conspicuous in the field but decidedly less so in the herbarium.

In every region on this continent where two or more related species of Rosa grow, there are to be found forms which seem to be due to hybridization between the common local species. Often a series of more or less stable forms intermediate between two local species occurs throughout a definite range. In the Great Lakes region there is such a series of forms apparently intermediate between *Rosa blanda* Ait. and *Rosa palustris* Marsh.; some of these have already been described: *R. blanda nuda* Schuette, *R. blanda subgeminata* Schuette, *Rosa palustris* var. **aculeata** (Schuette) comb. nov. (*R. carolina aculeata* Schuette, Proc. Am. Assn. Adv. Sci. **46**: 279, 1898), *Rosa palustris* var. **sepalorelevata** (Schuette) comb. nov. (*R. carolina sepalorelevata* Schuette, l. c. **46**: 279, 1898), *R. palustriformis* Rydberg; two additional forms belonging to this group have been discovered. These forms are all characterized by a flowering period of about two weeks occurring between the periods of *R. blanda* and *R. palustris*. In western Indiana, Illinois and the eastern parts of Missouri and Iowa are many forms which seem to be intermediate between *Rosa carolina* L. and *R. suffulta* Greene, giving the variable group of *R. rudiuscula* Greene as well as such types as *R. Bushii* Rydb., *R. polyanthema* Lunell, and *R. conjuncta* Rydb. As the writer[2] has stated before it seems best to treat intermediate forms under the species they most nearly resemble rather than to disregard them under the category of unnamed crosses. Any interspecific cross in Rosa is bound to yield a number of different forms, and our knowledge of these is at present negligible.

The following new species and varieties are very distinctive in the field and most of them were picked out by experienced collectors and students of the genus Rosa as being unusual. In each case I have pointed out the distinctive characteristics, but unfortunately most of these characteristics are in themselves variable and individually unreliable in a large series of specimens. But the sum of the characteristics of each plant gives an undoubtedly distinct form.

[1] Crépin, F. Rosae americanae. Bot. Gaz. **22**: 1–34. 1896.

[2] Erlanson, E. W. The wild roses of the Mackinac Region of Michigan. Papers Mich. Acad. **5**: 77–94. 1925.

All the new forms, except *Rosa Housei*, are in cultivation at the Botanical Garden of the University of Michigan and have been grown three or more years. Cytological studies have been made on these forms and it has been found that some of them could not be fitted into any existing species. I am therefore forced to describe them as new. Some have been found to agree in many respects with previously described species, and, although they are very distinctive in the field, these have been described as varieties in the hope that it will prevent unnecessary confusion.

Measurements of leaflets and counts of teeth have all been made on terminal leaflets.

It has been found that the number of stamens, counted in the fresh flower, is a good accessory characteristic in distinguishing some large species groups. Of the species related to the forms here described, *Rosa blanda* has the fewest stamens, 70–120 being characteristic; *R. suffulta* usually has from 90–140; *R. carolina* about the same or a few more (100–150); *R. palustris* has usually 170–200, more than any other species in the Carolinae-Cinnamomeae Section in North America.

When taken in relation to other native species growing in the same latitude and habitat each species group has a characteristic flowering period. The species of some groups have a limited flowering period of, usually, two to three weeks duration; in other groups flowers continue to be produced on new shoots until frost. This seems to be a reliable characteristic.

Rosa **michiganensis**, sp. nov. Caules 7–15 dm. alti, surde fusci, aculeos rectos vel flexos basi dilatatos uberrime gerens. Foliola 5–9, plerumque 7, obovata, apice acuta, basi cuneata, parviserrata, serrulis utrinque 7–28, superne glabra, 1–5 cm. longa, subtus minute pubescentia. Flores solitarii vel corymbosi. Hypanthium glabrum, maturitate pomiforme, 1–1.5 cm. diametro. Sepala externe valde glanduloso-hispida, interne et marginaliter lanata, insigne pinnatifida, sub anthesin erecta vel divergentia, persistentia; apicibus longis. Achaenia basi et parietibus affixa.

A vigorous species spreading by underground stems which send up stout leafy turions 7–15 dm. high; the next season these bear flowers terminally on lateral branches 5–30 cm. long. The stems are dull brown and copiously armed with straight or deflexed, broad-based, somewhat flattened prickles. The branches bear a few small prickles which are occasionally paired beneath the stipules. Stipules 12–15 mm. long, 1–3 mm. wide, glabrous above, puberulent beneath, often red-tinged, the margins glandular-dentate, with large spreading

semi-lunate acute auricles which are sometimes much dilated, to 6 mm. in width. Petiole and rhachis short-tomentose, those on the turions with a few scattered aciculi or hispid-glandular hairs. Leaflets 5–7, occasionally 8 or 9, regularly obovate, acute at the apex, cuneate at the base, 1–5 cm. long by 7–29 mm. wide, very rarely twice as long as broad, dull cerro green (Ridgeway), above glabrous or sparingly appressed-pubescent, paler and densely short-pubescent beneath: teeth simple to bicuspid, acute, ascending, 7–28 on each side, average number 16.6. Floral bracts foliaceous or ovate, pubescent. Inflorescence 1–7-flowered, usually 2 or 3 flowers only. Pedicels glabrous, stout, 8–20 mm. long, usually about one cm. long. Hypanthium smooth, depressed-globose to subglobose, 10–15 mm. in diameter in fruit; orifice 2 mm. in diameter, the disc nearly 1 mm. wide. Sepals lance-ovate, caudate-appendiculate, tomentose on the margins and within, conspicuously glandular-hispid on the backs, entire or with 1–4 slender lateral appendages, after anthesis spreading or reflexed, persistent; the blades 10–12 mm. long by 3–4 mm. wide, the appendage 5–10 mm. long. Petals 2–2.5 cm. long, pale purplish-vinaceous with a darker spot of amaranth pink at the base. Stamens 120–150. Stigmatic head in anthesis purplish-vinaceous (as, frequently, in *R. palustris*). Achenes on the bottom and lower part of the walls of the hypanthium.—MICHIGAN: Sandy shore of Douglas Lake, Cheboygan Co., Aug. 20, 1924, *C. O. and E. W. Erlanson* no. 637, Bot. Gard. Univ. Mich. no. 5890 (TYPE in Herb. and (living) Bot. Gard. Univ. Mich.).

This rose is very distinctive and flowers ten days later than *R. blanda* from which it is chiefly distinguished by the stout prickles, coarse strict habit, fine serrations of the leaflets and the spreading sepals and depressed large fruit.

ROSA **Schuetteana** sp. nov. Caules 3–6 dm. alti, aculeis rectis tenuibus fragilibus infra-stipularibus armati. Stipulae angustae, glabrae. Foliola 5–7, anguste obovata, apice basique acuta, 15–50 mm. longa, glabra vel subtus ad venas sparsim pilosa, parviserrata, serrulis utrinque 12–26. Flores solitarii vel corymbosi, pauci. Hypanthium sparsim glanduloso-hispidum, maturitate pomiforme 10–15 mm. diametro. Sepala externe glanduloso-hispida, sub anthesin divergentia vel reflexa, tarde caduca. Stamina 150–180. Achaenia basilaria et parietalia.

Habit that of a slender *R. palustris*. Stem 3–6 dm. high, bristly, at the base with paired terete infrastipular prickles (only on the branches) 2–5 mm. long, straight or slightly deflexed. Stipules narrow, glabrous except on the margins which are entire or sparsely glandular-dentate. Petiole and rhachis puberulent, eglandular and unarmed or rarely with a few setae. Leaflets 5–7, elliptic to obovate, usually acute at both ends, 15–50 mm. long, usually about half as broad as long, glabrous except on the veins beneath. Serrations

simple, fine and acute, 12–26 on each side of leaflet, average number 19. Inflorescence 1–5-flowered, more than half the flowers being solitary. Flowering branches very slender 10–15 cm. long. Petals 20–23 mm. long, varying from amaranth to pale amaranth-pink. Pedicels slender, smooth and glabrous, 10–15 mm. long. Hypanthium sparingly glandular-hispid, depressed-globose, 10–15 mm. in diameter by 7–12 mm. high; orifice 1.5 mm. in diameter; disc .75 mm. wide. Sepals lanceolate, caudate-appendiculate, 15–20 mm. long, glandular-hispid on the back, sometimes with 1–4 small lateral appendages, after anthesis spreading to erect, tardily deciduous from the ripe fruit. Stamens 150–180, filaments bright yellow. Achenes about 40, on the bottom and lower part of the walls of the hypanthium, 3.4–4 mm. long.—WISCONSIN: shore of Winebago Lake, Neenah, June 16, 1890, *J. H. Schuette*, no. 55 (Field Museum no. 379575). MICHIGAN: moist wooded shore of Douglas Lake, August 18, 1924, *C. O. & E. W. Erlanson* no. 629 (TYPE in Herb. and (living) Bot. Gard. Univ. Mich. no. 5891); Douglas Lake, July 5, 1919, *Mrs. C. C. Deam* no. 28631 (as *R. carolina*). NEW YORK: banks of Hudson River, near "The Glen," Warren Co., July 18, 1927, *H. D. House*, no. 15068.

This species was reported as *R. carolina* L. in 1925 when it was collected near the end of the flowering period. Schuette called his specimen *R. humilis* × *carolina* (i. e. *R. carolina* × *palustris*). It may have been derived from *R. carolina* even though that species has not been found in the Douglas Lake region,—the slender, straight paired prickles, relatively coarse teeth and early flowering period recall that species. In habit it resembles a slender *R. palustris* and since transplantation to Ann Arbor the serrations of the leaflets have become somewhat finer. It is distinguished from *R. palustris* by the straight slender prickles, the small inflorescence, larger fruits; it flowers from ten days to two weeks earlier than that species and is through flowering in about a fortnight. It differs from *R. carolina* in habit, in the finer and more numerous serrations of the leaflets, more numerous stamens and in the important fact that it flowers only on wood of the second season or older, never on unbranched turions, and that it does not continue to produce flowers on new shoots after the main flowering is over.

ROSA BLANDA Ait. var. **Hermanni** n. var. Caules 2–6 dm. alti, rufescentes. Rami graciles inermes vel raro aculeati, aculeis rectis, tenuibus infra-stipularibus. Foliola elliptica vel oblanceolata, parviserrata, serrulis utrinque 12–26. Sepala lanceolata, caudato-appendiculata, insigne pinnatifida, 2–2.5 cm. longa, externe valde glanduloso-hispida, sub anthesin erecta, persistentia. Stamina 110–120.

Stems 2–6 dm. high, red-brown, unarmed except for a few bristles at the base and occasional pairs of weak infrastipular prickles on the branches. Leaflets 5–7, finely puberulent beneath, dull and sometimes with scattered appressed pubescence above, lance-elliptic to oblanceolate or rarely elliptic, more than twice as long as wide, 15–50 mm. long. Serrations rather fine, simple to bicuspid, 12–26 on each side of the leaflet (average number 18). Flowering branches slender and flexuous, 10–30 cm. long. Inflorescence a 2- to 8-flowered corymb, or flowers solitary. Pedicels 1–3 cm. long, slender and glabrous. Hypanthium subglobose or with a slight neck, 8–12 mm. in diameter in fruit, smooth and glabrous; orifice 2 mm. in diameter; disc .75 mm. across. Sepals lanceolate, caudate-attenuate, 20–25 mm. long, some with foliaceous tips, blades 10–12 mm. long and 2.5–3 mm. wide, tips 10–15 mm. long, conspicuously glandular-hispid, often with two or three pinnae; after anthesis erect or spreading, persistent though brittle. Petals 2 cm. long. Stamens 110–120, inner ones with very short filaments as in *R. palustris*. Achenes attached to the bottom and lower part of the walls of the hypanthium, many being abortive in fruit. Flowering period beginning a little later than in *R. blanda* and continuing about four weeks.—MICHIGAN: dry sandy shore of Bear Lake, 7 miles from Laurium, Houghton Co., October, 1922, *F. J. Hermann* (TYPE in Herb. and (living) Bot. Gard. Univ. Mich. no. 2686); Sagitaw Farm, McMillan, Luce Co., October, 1922, *W. Brotherton Jr.* (Bot. Gard. Univ. Mich. no. 2668).

ROSA SUFFULTA Greene var. **valida** n. var. Frutex densus 3–9 dm. altus. Caules setosi, setis tenuibus fragilibus armati. Stipulae amplae dilatatae, majores 4 mm. latae, integrae vel glanduloso-serrulatae, pubescentes. Folia conferta. Foliola 9–11 raro 5 vel 7, ovata vel obovata, vel nonnulla fere orbicularia, obtusa, 10–35 mm. longa, 8–20 mm. lata, utrinque breviter pubescentia, supra mediam argute simpliciter serrata, serrulis utrinque 7–20. Flores corymbosi raro solitarii, in ramis floriferis lateralibus 10–30 cm. longis.

A bushy winter-hardy plant 3–9 dm. high. Stems reddish, densely bristly with weak bristles 2–3 mm. long, branches bristly or nearly unarmed. Stipules adnate, densely pubescent, 15–28 mm. long, often very broad, 2–4 mm. wide, entire or with glandular serrations near the tip. Petiole and rhachis densely pubescent, occasionally with a few glands or fine setae. Leaflets usually 9–11, rarely 5 or 7, broadly ovate or obovate, obtuse at one or both ends, 10–35 mm. long by 8–20 mm. wide, for the most part about 20 mm. long, pale green and appressed-pubescent on both surfaces. Serrations simple, regular, 7 to 20 on each side, average number 11 (the New York material shows 6 to 14 on each side with the average number of 10), lower third of the leaf-margin entire. Inflorescence usually corymbose, typically 1–7-flowered, on vigorous lateral branches 10 to 30 cm. long, or terminally on turions 30 to 50 cm. tall. Flowering time the same as the type of the species, usually over in a month. Pedicels

1–2 cm. long, smooth. Hypanthium subglobose to slightly ellipsoid, 10–13 mm. in diameter in fruit, smooth and glabrous; orifice 3 mm. in diameter; the disc 1 mm. wide. Sepals 1–3 cm. long including the tips, scarcely tapering at the base, entire or with an occasional pinna, glandular-hispid on the back, spreading on the green hips, later erect and persistent. Petals 25–27 mm. long, rosaline pink with darker mottlings. Stamens 140–150. Achenes inserted on the bottom and lower sides of the hypanthium, many of them aborting.—MISSOURI: Rockport, Atchison Co., November 1, 1923, *A. & P. Hamilton* (TYPE in Herb. and (living) Bot. Gard. Univ. Mich., no. 4459). NEW YORK: near Minerva, Essex Co., August 5, 1927, *H. D. House* no. 15169 and August 9, 1927, *H. D. House*, no. 15247 (in Herb. N. Y. State Mus.).

This variety differs from *R. suffulta* chiefly in the tall bushy upright stems which do not die back to any extent. The plant is very leafy and the broad stipules are conspicuous.

ROSA **ratonensis** sp. nov. Frutex; ramis robustis, erectis fusciviridibus, sparse setosis, 0.5–1 m. altis; ramulis setosis vel inermibus. Stipulae adnatae glabrae vel sparse puberulentae, subtus paulum glanduliferae, integrae vel glandulo-serratae; auriculis latis liberis amplis semilunatis. Foliola 9–11, raro 7, elliptica vel obovata, acuta, 1–3 cm. longa, utrinque glabra vel subtus in nervo medio sparsim pubescentia, argute simpliciter vel dupliciter serrata, serrulis utrinque 8–18. Flores corymbosi raro solitarii; ramis floriferis lateralibus robustis 10–30 cm. longis. Hypanthium glabrum, globosum, maturitate 10–15 mm. diametro. Sepala caudato-appendiculata, raro pinnatifida, 2 cm. longa, externe valde glanduloso-hispida, sub anthesin erecta, persistentia. Stamina 90–120. Achaenia basilaria et parietalia.

A stout bush 0.5–1 m. tall, stems erect, greenish brown, armed with weak scattered bristles, branches very leafy, sometimes unarmed. Stipules glabrous or sparingly puberulent and glandular-granuliferous on the back, entire and ciliate or glandular-dentate, auricles broad, semi-lunate, sometimes 6 mm. long. Petiole and rhachis glabrous or sparingly puberulent and glandular. Leaflets 9–11, rarely 7, elliptic to obovate, some nearly orbicular, acute at both ends or rounded at the apex, 1–3 cm. long, usually slightly more than half as wide as long, yellowish green, glabrous on both sides, or slightly pubescent on the mid-vein beneath, glaucous beneath; coarsely serrate, the teeth acute, simple or bidentate, 8–18 on each side, average number 12. Corymbs 1–9-flowered, generally terminal, on vigorous lateral branches 10–30 cm. long and on the season's turions. Pedicels 1–3 cm. long, glabrous and smooth. Hypanthium glabrous and smooth, globose, 10–15 mm. in diameter in fruit, sometimes with a slight neck; orifice 2 mm. in diameter; disc 1 mm. wide. Sepals lanceolate, caudate-appendiculate, 2 cm. long or a little less, 3.5–4 mm. wide,

sometimes with 1–4 small pinnae, densely glandular-hispid on the back, persistent and erect in fruit. Petals obcordate, 20–33 mm. long, in the type plant nearly white and mottled with pink especially on the back, giving pink buds. First flowers large, 6.5 cm. across, later ones only 4.5 cm. across. Stamens 90–120. Achenes basi-parietal.—NEW MEXICO: in sandy clay, top of Raton Pass, Colfax Co., alt. 8,800 ft., June 17, 1925, *C. O. Erlanson* no. 1062 (TYPE in Herb. and (living) Bot. Gard. Univ. Mich., no. 8114).

This plant was at first taken to be the true *R. arkansana* Porter, Raton Mountains being one of the stations given by Porter in his original description, but it is evident that he had the low simple-stemmed form which, as Miss Ensign[1] showed, is difficult to distinguish from the pubescent *R. suffulta* in a series. Although *R. ratonensis* is chiefly distinguished from *R. arkansana* by its tall bushy habit, and by the fact that it does not die back in winter, it might easily be mistaken for a vigorous *R. Woodsii* Lindl. It can be distinguished unfailingly from that species by its ability to flower on the season's turions and by its later flowering time. The leaflets are more numerous than in *R. Woodsii* and the sepals are broader, but that species is sometimes very bristly and in a single culture I have plants that have flowers solitary to three or four together, and others that bear large corymbs. *R. ratonensis* may bear the same relationship to *R. arkansana* that *R. suffulta* var. *valida* bears to *R. suffulta*, but since the specific distinction between *R. arkansana* and *R. suffulta* does not rest on dependable characteristics I am at present inclined to keep it as a separate species.

ROSA **relicta** sp. nov. Caudex subterraneus ramos tenues, debiles foliiferos 5–30 cm. altos virides setosos vel inermes emittens; ramulis inermibus vel raro aculeatis, aculeis minutis rectis, tenuibus infra-stipularibus. Stipulae angustae, glabrae vel subtus pubescentes, integrae ciliatae. Foliola 7–9, raro 5, elliptica vel ovata vel obovata, obtusa, utrinque sparsim breviter pubescentia, 14–31 mm. longa, 7–16 mm. lata, acuta, simpliciter vel dupliciter serrata, serrulis utrinque 8–21. Flores solitarii vel corymbosi, terminales. Pedicelli glabri. Hypanthium glabrum subglobosum, maturitate 8–10 mm. diametro. Sepala lanceolata, 2 cm. longa, extus pilosa plus minusve glanduloso-hispida, sub anthesin reflexa persistentia vel tarde carduca. Stamina 110–120. Achaenia basilaria et parietalia.

Spreading freely by underground stems, sending up small slender aerial branches 5–30 cm. high. Stems slender, greenish, armed with short fine bristles, or nearly naked. Branches chiefly unarmed, or with an occasional pair of small slender infrastipular prickles.

[1] Ensign, E. *Rosa pratincola* Greene, Proc. Iowa Acad. Sci. 26: 303–310, 1919.

Stipules adnate, 1–2 cm. long, narrow, 1–2 mm. wide (rarely 3 mm. wide), auricles small, triangular, glabrous or pubescent on the back, the margins usually ciliate and entire, occasionally glandular-serrate. Petiole and rhachis glabrous to puberulent, often glandular-granuliferous with sometimes a few setae. Leaflets 7–9, sometimes 5, elliptical to oval or obovate, usually obtuse, sparingly short-appressed-pubescent on both surfaces, 14–31 mm. long by 7–16 mm. wide. Teeth simple or bicuspid, ovate, acute and often fine. Leaflets of lowest leaves sometimes with gland-tipped teeth. Teeth 8–21 on each side, average 16. Flowers solitary or 2–5 together, terminally on the season's turions or on slender lateral branches. In poor soil aerial shoots 5–10 cm. high bear a terminal blossom the first season. Inflorescence soon over-topped by leafy laterals, which in turn may produce flowers terminally later in the season. Pedicels 1–2.5 cm. long, slender and smooth. Hypanthium smooth, sub-globose, sometimes with a short neck, 8–10 mm. in diameter in fruit. Sepals lanceolate, 2 cm. long including the caudate appendage, pubescent on the back, sometimes with a few hispid glands near the margin and 1–3 weak pinnae, after anthesis reflexed and persistent or tardily deciduous. Petals 2 cm. long, thulite pink fading to rosaline pink. Stamens 110–120. Achenes basal-parietal.—ILLINOIS: residual prairie in Bliss Woods, Kane Co., July 30, 1925, *C. O. & E. W. Erlanson* no. 1533 (TYPE in Herb. and (living) Bot. Gard. Univ. Mich., no. 8320). INDIANA: on the Indian Prairie, west of Goldsmith, Tipton Co., Sept. 17, 1923, *C. C. Deam* no. 39,819. MISSOURI: dry banks, Wellington, May 29, 1927, *B. F. Bush*, nos. 11336 and 11337. MINNESOTA: roadside, Little Falls, Sept. 16, 1914, *L. R. Moyer* (Herb. Univ. Minn.).

Rosa relicta resembles a weak *R. suffulta;* it is semi-herbaceous, the two-year-old wood being often semi-procumbent. It differs from *R. suffulta* in the narrow stipules, small fruit with reflexed and semi-deciduous sepals, in which characteristics it resembles *R. carolina* L. Mr. Bush placed his specimens from Wellington in *R. Bushii,* which is apparently intermediate between *R. suffulta* and *R. carolina.* Plants sent by Bush from the type clump of *R. Bushii* do not fit Rydberg's description.

R. relicta begins to flower earlier than *R. suffulta,* just after *R. blanda* and continues to flower throughout the summer.

ROSA **Housei** sp. nov. Caules erecti setosi tenues armati, 3–6 dm. alti ramulis inermibus. Stipulae adnatae subtus pubescentes, 1–3 mm. latae. Foliola 5–7, plerumque 7, parva, late ovata vel obovata, obtusa, 1–3 cm. longa, plerumque 2 cm., superne glabra, subtus in nervis sparsim pubescentia, simpliciter vel dupliciter serrata, serrulis utrinque 8–9. Flores solitarii vel gemini. Pedicelli glabri vel sparsim glanduloso-hispidi. Hypanthium subglobosum

glanduloso-hispidum, maturitate 12–13 mm. diametro. Sepala caudato-appendiculata, raro pinnatifida, 15–18 mm. longa, externe glanduloso-hispida, sub anthesin reflexa persistentia. Achaenia basilaria et parietaria.

Stems erect, 3–6 dm. tall, armed with weak bristles, sometimes with glandular bristles intermingled, branches nearly unarmed. Stipules adnate, densely pubescent on the back, 1–3 mm. wide, the margins entire or glandular-dentate. Petiole and rhachis densely pubescent, unarmed. Læaflets 5–9, mostly 7, small, broadly ovate to obovate, often obtuse at both ends, 1 to 3 cm. long, most of them about 2 cm., usually more than one-half as broad as long; glabrous above and sparingly pubescent on the veins beneath. Serrations simple to bicuspid, ovate, ciliate, 6–12 on each side, averaging 8–9. Inflorescence one- or two-flowered, on lateral branches 5–10 cm. long. Pedicels 10–20 mm. long, smooth or sparingly glandular-hispid, especially at the top. Hypanthium subglobose, covered with glandular-hispid hairs, 12–13 mm. in diameter in fruit. Sepals lanceolate, caudate-attenuate, 15–18 mm. long, 4 mm. wide at the base, entire or with an occasional pinna, glandular-hispid on the back; persistent and spreading after anthesis. Petals obcordate, deep rose-red or rose-pink, 20–23 mm. long. Stamens about 100. Achenes chiefly basal.—NEW YORK: shore of Moxham Pond near North Creek, Warren Co., July 13, 1927, *H. D. House* no. 14900 (TYPE in herbarium of N. Y. State Museum) also same place and date, *H. D. House* no. 14901.

This plant, in habit and foliage, is similar to some robust forms of *Rosa suffulta*, and the ends of the branches are slightly cut back by winter. It is easily distinguished from that species by its fewer leaflets, the regularly glandular-hispid hypanthium, and usually 1-flowered inflorescence, at least on the two-year-old wood. Under favorable conditions this species would be expected to produce flowers on the season's turions and these would probably be in small corymbs. No turions are among Dr. House's material.

R. CAROLINA L. var. **sabulosa** var. nov. Caules graciles debiles in anno secundo semi-prostrati, aculeis rectis tenuibus fragilibus infrastipularibus armati, vel inermi. Foliola 5–7, raro 9, lanceolato-elliptica vel ovata, acuta, supra atro-viridia glabra, subtus pallida in nervo medio sparsim pubescentia, 5–30 mm. longa, plerumque vix 20 mm. longa. Flores solitarii vel corymbosi; corymbis paucifloris. Pedicelli hypanthiumque glabri.

Stems slender, weak, 15–30 mm. long, semi-prostrate or trailing after the first year, armed with weak paired infra-stipular prickles, or unarmed, occasionally with weak scattered bristles. Stipules adnate, narrow, glabrous or almost so. Leaflets firm, 5–7, rarely 9, lance-elliptic to ovate, acute at both ends, dark green and glabrous

above, paler with a few hairs on the midrib beneath, 5–30 mm. long, usually less than one-half as wide as long. The leaflets are usually less than 2 cm. long and on the dunes the plants sometimes have uniformly minute leaflets, firm, dark green and numerous, giving a very striking effect. Teeth simple, acute, 7–15 on each side, average 10–11. Flowers solitary to three together; small corymbs are produced terminally on the year's turions. Pedicels 1–2 cm. long, smooth and glabrous. Hypanthium smooth, subglobose, 8–12 mm. in diameter in fruit. Sepals lanceolate, 7–10 mm. long with caudate appendages 5–7 mm. long, occasionally with 1 or 2 small pinnae; after anthesis reflexed and deciduous. Petals 20–23 mm. long. Stamens about 110. Achenes mostly basal.—INDIANA: low dune, Pine (now Clark) Street, Gary, Lake Co., August 11, 1923, *C. C. Deam*, no. 39461 (TYPE in Herb. and (living) Bot. Gard. Univ. Mich. no. 4002); low dune South of Pine St. (now two squares south of Fifth Ave., on Clark St., Gary), Lake Co., September 23, 1923, *C. C. Deam*, no. 39760.

This variety flowers with *R. carolina*, from which it differs in the low and somewhat trailing habit, in the uniformly small leaflets on the old wood and in having the hypanthium and pedicels free from hispid glands.

R. CAROLINA L. var. **litoralis** var. nov. Caules humiles, ramosi, virides, debiles, plus minusve setosi vel raro aculeati, aculeis rectis brevibus infrastipularibus. Foliola 5–7, raro 9, elliptica vel ovata vel late oblanceolata, 10–40 mm. longa. Flores corymbosi, valde conferti. Pedicelli breves, 5–12 mm. longi, glabri. Hypanthium glabrum vel sparsim glanduloso-hispidum, maturitate globosum vel pomiforme, parvum, 6–10 mm. diametro; ostium 3 mm. diametro sub anthesin dilatatum. Achaenia basilaria, maturitate ex hypanthii ostio subexserta.

Stems low, 2–4.5 dm. high, at first erect but becoming semi-procumbent the second year. Plants spreading by underground stems and forming a dense low tangled mass; stems green, armed with weak scattered bristles, the branches sparingly bristly with an occasional pair of short straight infrastipular prickles. Stipules adnate, 1–3 mm. broad, glabrous or slightly pubescent, the margins entire and ciliate or gland-dentate. Leaflets 5–7, occasionally 9, elliptical to ovate or broadly oblanceolate, dull cress-green above, glabrous except for a few hairs on the midrib beneath and on the margins, 10–40 mm. long. Teeth simple or bicuspid, ovate, acute and rather fine, 12–25 on each side, average 16. Inflorescence usually a small crowded corymb of 3–12 flowers, borne terminally on the vigorous laterals and annual turions, solitary flowers occasional on the old wood. After flowering the leafy laterals from immediately below the inflorescence soon over-top it; these may produce more flowers later in the season. Peduncles short, stout, 5–12 mm. long, smooth

or sparsely hispid-glandular at the top. Hypanthium smooth or with a few glandular-hispid hairs, small and globose to depressed-globose, in fruit 6–10 mm. in diameter; the orifice nearly 3 mm. in diameter, becoming noticeably wider after anthesis. Sepals caudate-acuminate, 1.5 cm. long, entire or with 2–3 small pinnae, glandular-hispid on the back, erect after anthesis, later reflexed, early deciduous. Petals pale rose-pink, 15–20 mm. long. Stamens about 100. Achenes basal, becoming squeezed up into, and half extruding from, the wide orifice of the hips. Styles distinct, exserted, 2–3 mm. long.—ILLINOIS: campus of Northwestern University, Evanston, October 3, 1922, *A. H. W. Povah* (TYPE in Herb. and (living) Bot. Gard. Univ. Mich., no. 2654).

This variety is characterized by the weak, much-branched, green bristly stems, short peduncles and small nearly smooth hypanthium with large orifice.

ROSA **Deamii** sp. nov. Caules 3–5 dm. alti, rufescentes, recurvi, plus minusve setosi, aculeati; aculeis robustis rectis vel flexis infrastipularibus. Foliola 5–9, plerumque 7, 1–5 cm. longa, ovata vel obovata, atroviridia, superne lucida subrugosaque subtus pallida pubescentia vel glabra, serrulis argutis utrinque 7–20. Flores ampli solitarii vel corymbosi. Pedicelli valde glanduloso-hispidi. Hypanthium valde glanduloso-hispidum, maturitate 10–18 mm. diametro. Sepala externe glanduloso-hispida, sub anthesin divergentia vel reflexa, tarde caduca vel persistentia. Achaenia ad basin adnata.

Plants low; stems 3–5 dm. long, after the first season becoming recurved or semi-procumbent. Turions stout and erect, leafy or bearing terminal corymbs. Stems armed with well-developed, terete, paired infrastipular prickles, 5–10 mm. long, varying from straight to curved; weak scattered bristles are sometimes present; old wood reddish brown. Stipules adnate, 15–20 mm. long, 1–3 mm. wide, more or less villous on the back and sometimes glandular-dentate. Petiole and rhachis villous, often setose and gland-hispid on the young shoots. Leaflets mostly 7, sometimes 5 or 9, 1–5 cm. long, ovate to obovate, usually less than twice as long as wide, dark shining green and somewhat rugose above, paler and slightly pubescent, at least on the veins, beneath. Teeth simple, coarse, ovate, 7–20 on each side, average 13–14. Flowers solitary or 3 to 8 in a corymb; on the old wood solitary or two together, in small corymbs on the strong lateral branches of the two-year-old shoots and terminally on the turions. Pedicels stout, 5–20 mm. long, with many long glandular-hispid hairs. Hypanthium subglobose to depressed globose, thickly beset with coarse glandular-hispid hairs 1 mm. long, in fruit 10–18 mm. in diameter; orifice 3 mm. in diameter; disc 1 mm. wide. Sepals lanceolate, caudate-appendiculate, 2–2.5 cm. long, 4–5 mm. wide at the base, densely glandular-hispid on the back, entire or with 1–3 pinnae, after anthesis spreading or reflexed, tardily deciduous

or persistent. Petals spinel-pink, 25–28 mm. long, almost entire. Stamens 105–125, with bright yellow filaments. Stigmas and styles free, forming a cushion 3 mm. high, tinged with pink. Achenes mostly basal, 20 to 25, 4–6 mm. long.—INDIANA: 1½ miles west of Goldsmith, along the Nickle Plate Railway, Tipton Co., September, 1923, *C. C. Deam*, no. 39818 (TYPE in Herb. and (living) Bot. Gard. Univ. Mich., no. 3779).

This handsome rose is related to *R. Lyoni* Pursh and *R. obovata* Raf., and like them is perhaps only a variety of *R. carolina*. It is characterized by the recurved stems, long deflexed prickles, thick shining dark green foliage with coarse serrations; large flowers and hips. All parts are coarse and well-developed. Seeds and plants were collected by Mr. Deam in 1923 and the seedlings raised at Ann Arbor are true to the parent type. In naming this rose for the indefatigable student of the Indiana flora, it is a pleasure to acknowledge the numerous obligations under which Mr. Deam has placed the Botanical Garden of the University of Michigan.

UNIVERSITY OF MICHIGAN.

LEMNA TRISULCA AT ISLE AU HAUT, MAINE.—*Utricularia gemmiscapa* Benj., itself accidentally acquired adhering to another water plant, bore fragments just sufficient for identification of *Lemna trisulca* L. I have affixed the date 26 Aug. 1927, though the real discovery should be credited to Professor Fernald, who first saw the *Lemna* in my herbarium. His comment is "known in Maine only from Houlton, Aroostook County and from Rockport" as recorded by C. A. E. Long, RHODORA xxiii. 199 (1921).—NATHANIEL T. KIDDER, Milton, Massachusetts.

A NEW OXYTROPIS FROM THE GASPÉ COAST

M. L. FERNALD and S. L. KELSEY

IN August, 1923, while waiting at Mont Louis, Gaspé County, Quebec, for an over-due steamer the senior author with Mr. Lyman B. Smith drove west toward the mouth of Rivière à Pierre, where the steep cliffs and slaty talus of Mt. St. Pierre, as seen from the Gulf of St. Lawrence, suggested unique botanizing. The time was

very short and the north-facing talus was hastily examined at only one point; but that brief visit was sufficient to establish the occurrence there of *Astragalus aboriginum* Richardson at its only known station east of the Rocky Mountains.[1] With it occurred a pale-flowered *Oxytropis*, then in fruit and with only remnants of faded corollas showing, which on account of its viscid quality was identified[2] as the Rocky Mountain *O. viscida* Nutt.

In late July, 1927, the junior author and his friend, Mr. P. H. Jordan, while making a circuit of the Gaspé coast by Ford, made a brief stop at Rivière à Pierre and ascended the talus of the western slope of Mt. St. Pierre. This ascent, like the earlier visit, was all too brief, for a violent thunder-storm peremptorily shortened it, but the crest was reached and found to be covered by an extensive thicket of *Elaeagnus argentea* Pursh, rare in Quebec (Bonaventure River, Bic, Isle of Orleans, Temascaming) but typical of dry hills of the Rocky Mountain area. *Astragalus aboriginum* was there, though, like the Fernald & Smith material, over-ripe, but the *Oxytropis* was in full flower, with dense spikes of creamy-white flowers with a purple spot on the keel; and with them, also over-ripe but recognizable, the strange *Erigeron compositus* Pursh, var. *trifidus* (Hook.) Gray,[3] a plant of Arctic and

[1] See Fernald, Mem. Am. Acad. xv. 322, 323 (1925).

[2] See Fernald, l. c.

[3] The Arctic plant and that of Gaspé were referred by Fernald, l. c. 271 (1925) to var. *multifidus* (Rydb.) Macbr. & Payson. In light of the new Gaspé collection it seems better to refer all the Arctic and eastern material to var. *trifidus* (*E. trifidus* Hook.). In 1917 Macbride & Payson, Contrib. Gray Herb. n. s. xlix. 72–79 (1917), published a detailed revision of this series (*Multifidi*) of *Erigeron*, recognizing eight varieties of *E. compositus* and basing their primary separations upon the degree of division of the leaves, their secondary separations upon the degree of pubescence and the presence or absence of ligules. Subsequently Payson, Univ. Wyom. Pub. Sci. Bot. i. 172–186 (1926), repudiated the earlier treatment and recognized only three true varieties: var. *typicus* of low altitudes in Idaho and Washington (also Oregon and British Columbia in Herb. Gray); var. *multifidus*, mostly of higher altitudes in the Western States and Canada, and var *trifidus* of arctic-alpine habitats in the Northwestern States and Canada, also Greenland. There are 12 collections before me from arctic America (8 from Greenland, 2 from Ellesmereland, 2 from the arctic coast of Mackenzie). These show either glabrous or hirsute leaves and the latter are either 3-cleft or have the divisions again divided, making 9 divisions. They form a consistent series, the least divided leaves agreeing with those of Hooker's original description and plate of his *E. trifidus*. In one other point, which seems not to have been recently stressed, the arctic series differs from true *E. compositus* and from *E. multifidus* Rydb.: the low scapes are naked or rarely bear only 1 or 2 bracts; while the mostly taller scapes of *E. compositus* and *E. multifidus* mostly have numerous bracts. This arctic extreme, with the leaves only once or twice ternately cleft and with naked or nearly naked scapes, is the Gaspé plant and it extends southward from the Arctic to the Black Hills in South Dakota and to the highest summits—at 8000 to 12,000 ft. (2440 to 3650 m.)—of Colorado and northern California. I have not fathomed the nomenclatorial difficulties of the western plant called *E.*

northwestern America previously known east of the Black Hills and south of Ellesmereland and Greenland only at Cape Rosier, Gaspé, where Brother Victorin got it in 1923.

With younger material available it becomes quite evident that the *Oxytropis* of Mt. St. Pierre is not *O. viscida*, for it has much shorter scapes, denser and shorter spikes and shorter bracts than that species; its foliage, bracts, calyx and pods, although somewhat viscid, have few if any of the glandular or viscid warts, which abound in *O. viscida;* its calyx-lobes are much broader than in that species and its corollas are smaller and creamy-white, those of *O. viscida* being purple.

After a close comparison with other members of the genus we propose it as

OXYTROPIS **gaspensis**, n. sp. Acaulescens; foliis valde adscendentibus, foliolis circa 35 oblongis vel oblongo-lanceolatis plerumque obtusatis 0.8–1.3 cm. longis 2–5 mm. latis tenuibus herbaceis utrinque laxe strigoso-villosis viscidisque; scapo 0.5–1.7 dm. alto foliis breviore vel vix superante sericeo-piloso pilis albidis; spicis densifloris ad anthesin 2–3 cm. longis deinde 3–5 cm. longis; bracteis lanceolatis herbaceis 5–10 mm. longis viscidis rariter minute verrucosis; floribus numerosis adscendentibus; calycibus campanulatis albido-villosis, tubo 4–5 mm. longo, dentibus deltoideis viscidis 1–2 mm. longis; corollis ochroleucis 1–1.2 cm. longis, carina purpureo-maculata; legumine breviter ovoideo 1–1.3 cm. longo abrupte acuminato viscido albido-villosoque chartaceo subbiloculari; seminibus reniformibus 1.6–2 mm. longis.—QUEBEC: dry talus of slaty cliffs, northern face of Mt. St. Pierre, at mouth of Rivière à Pierre, Gaspé Co., August 14, 1923, *Fernald & Smith*, no. 25,874 (TYPE in Gray Herbarium), distributed as *O. viscida* Nutt.; top of talus slope near summit of Mt. St. Pierre, July 29, 1927, *Kelsey & Jordan*, no. 96.

Related to *O. viscida* Nutt. and to *O. gracilis* (A. Nels.) K. Schum. of the Rocky Mountain region. When first collected *O. gaspensis* was identified with the former on account of its viscid quality (staining the sheets yellow) but the flowering material now at hand shows it to have smaller creamy-white corollas and a new study shows that *O. gaspensis* has the scapes shorter than to barely exceeding the leaves, the scapes of *O. viscida* prolonged well above the leaves; the spikes dense and not loosening in maturity, those of *O. viscida* becoming elongate and remotely flowered; the bracts, calyx, etc. only slightly if at all verrucose, those of *O. viscida* strongly so; the calyx-

compositus, var. *multifidus* (Rydb.) Macbr. & Payson (1917). Payson, himself, enumerated in the synonymy at least four varietal names of earlier date, so that is evident that the combination used by him is not the earliest.—M. L. F.

teeth deltoid, in *O. viscida* subulate; corolla cream-color and only 1–1.2 cm. long, in *O. viscida* purple. *O. gracilis* has much firmer leaves, with fewer and longer silky leaflets; scapes 2–4 dm. high, much overtopping the leaves; spikes becoming elongated; calyx often with black hairs and with longer and more slender teeth; corollas longer; and legumes longer and more attenuate.

Gray Herbarium.

Josselyn Botanical Society of Maine: Announcement of the Thirty-third Annual Field Meeting.—The Thirty-third Annual Meeting of the Josselyn Botanical Society of Maine will be held July 17th, 18th and 19th, 1928, at the New Skowhegan House, Skowhegan, Somerset County, Maine. The rates will be $4.00 per day, American plan. Skowhegan can be reached by the Maine Central Railroad or by State Highway No. 201. Skowhegan is situated on the Kennebec River, the valley of which, with nearby lakes, affords rich collecting grounds, well known to the botanists there, who will direct collecting parties. Members and guests planning to attend will do well to notify Mr. L. T. Audet, proprietor of the New Skowhegan House, and engage rooms as early as possible. The usual program of the Society, consisting of daily collecting trips, with an examination of specimens and short talks in the evenings, will be followed. For further information concerning the region, write Miss Dorothy M. Elliot, Vice President, 14 High Street, Skowhegan, Maine, or for information concerning the Society and its purpose, to Miss Abbie F. Minott, *Secretary*, Phippsburgh, Maine.

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EVIDENCE OF THE HYBRID NATURE OF BETULA SANDBERGI

C. O. Rosendahl

(Plate 170)

In a paper published in 1916[1] I called attention to two forms of *Betula* occurring in eastern Minnesota which showed evidence of being natural hybrids between some of the common native species of the region. One of these, already described by Britton[2] as *Betula Sandbergi*, was shown to be almost certainly a hybrid between *B. papyrifera* and *B. pumila* var. *glandulifera*, the other a hybrid between the latter species and *B. lutea*. No name was assigned to this combination as it was thought that it could hardly be identified with *Betula Purpusii* Schneider[3] said to be a hybrid of *B. lutea* × *B. pumila* (not *B. pumila* var. *glandulifera*). However Schneider's *B. Purpusii* was a natural hybrid coming originally from "Clark's Lake," Mich. and typical *B. pumila* now appears not to occur in that state (See below, p. 108), so that Schneider's plant was in truth the hybrid of *B. lutea* × *B. pumila* var. *glandulifera* discussed in my former paper. His very brief description of *B. Purpusii* corresponds well with the Minnesota plant.

During the intervening years since 1916 *B. Sandbergi* has been found in several additional places throughout Hennepin, Ramsey and Anoka Counties and in the summer of 1927 it was collected in

[1] Rosendahl, C. O. Observations on Betula in Minnesota. Minn. Bot. Stud. 4: 443–459, 1916.

[2] Britton, N. L. Four new North American Birches. Bull. Torr. Bot. Club. **21**: 166, 1904.

[3] Schneider, C. K. Ill. Handb. d. Laubholzk. **1**: 102, 1904.

its typical form at two stations in Itasca Park. In the latter case, as in all previous instances of occurrence, both the parent species were present in relative abundance. *B. Purpusii* appears on the contrary to be rather scarce since only two stations have been added to the previous record, one in Ramsey County, the other in southern Pine County.

The assumption that these two birches were of hybrid nature was based on the presence of a number of intermediate characters together with a consistently high percentage of pollen sterility. No other evidence was available but since that time cultural experiments have shown the assumption to be correct in the case of one of the hybrids. In the original publication attention was called to the fact that attempts to grow the seeds of these hybrids were largely unsuccessful, only three seedlings of *B. Sandbergi* having been obtained. Two of these seedlings flourished for a number of years and almost from the beginning showed considerable difference in regard to habit and rate of growth. When about four years old one of them had attained a height of two feet while the other was about twice that size. This difference in rate of growth was nearly maintained until the time of death of the smaller shrub when it had reached a height of about 4½ feet while the other was about 10 feet high. At the present time the latter has produced three stems from the original base which vary in height from 8 to 14 feet. It has essentially the aspect of the parent hybrid, except that the bark is somewhat lighter in color. The leaves of this shrub, however, resemble those of *B. papyrifera* except that they average somewhat smaller in size and have only 5–6 pairs of lateral veins instead of 7–8, the number in *B. papyrifera*. They show the conspicuous tufts of hairs in the axils of the main veins and the doubly serrated margins which characterize most specimens of the latter (text fig. 1, a, b). The fruiting catkins produced this year are slightly longer than in *B. Sandbergi* but the fruiting scales and nutlets are practically identical with the corresponding structures of the parent hybrid. It is interesting to note that all the nutlets examined are without fertile seeds and that the stamens in the catkins for next year contain almost 100% defective pollen.

The smaller one of the two shrubs resembled the local form of the Low Birch in the very slender branches and somewhat strict habit of growth but showed rather mixed leaf characters.

From the accompanying drawings (text fig. 1, c, d, e), made with a camera lucida, it can be seen that in form and size the leaves resemble very closely *B. Sandbergi* but they have the short petioles characteristic of *B. pumila* var. *glandulifera*. Unlike either of these, however, the leaves are permanently pubescent on both surfaces and furthermore the twigs at the end of the season are still quite pubescent.

A portion of the same seed collection from which the above described plants were obtained was sent to Dr. Sargent for cultivation at the Arnold Arboretum. Much better success was had with this lot and a few years later Dr. Sargent sent me five specimens from as many shrubs which are shown in the accompanying illustrations (Plate 170, Fig. 2–6). He also stated that several additional shrubs from the same crop were then (1917) growing in the parks at Rochester, N. Y.

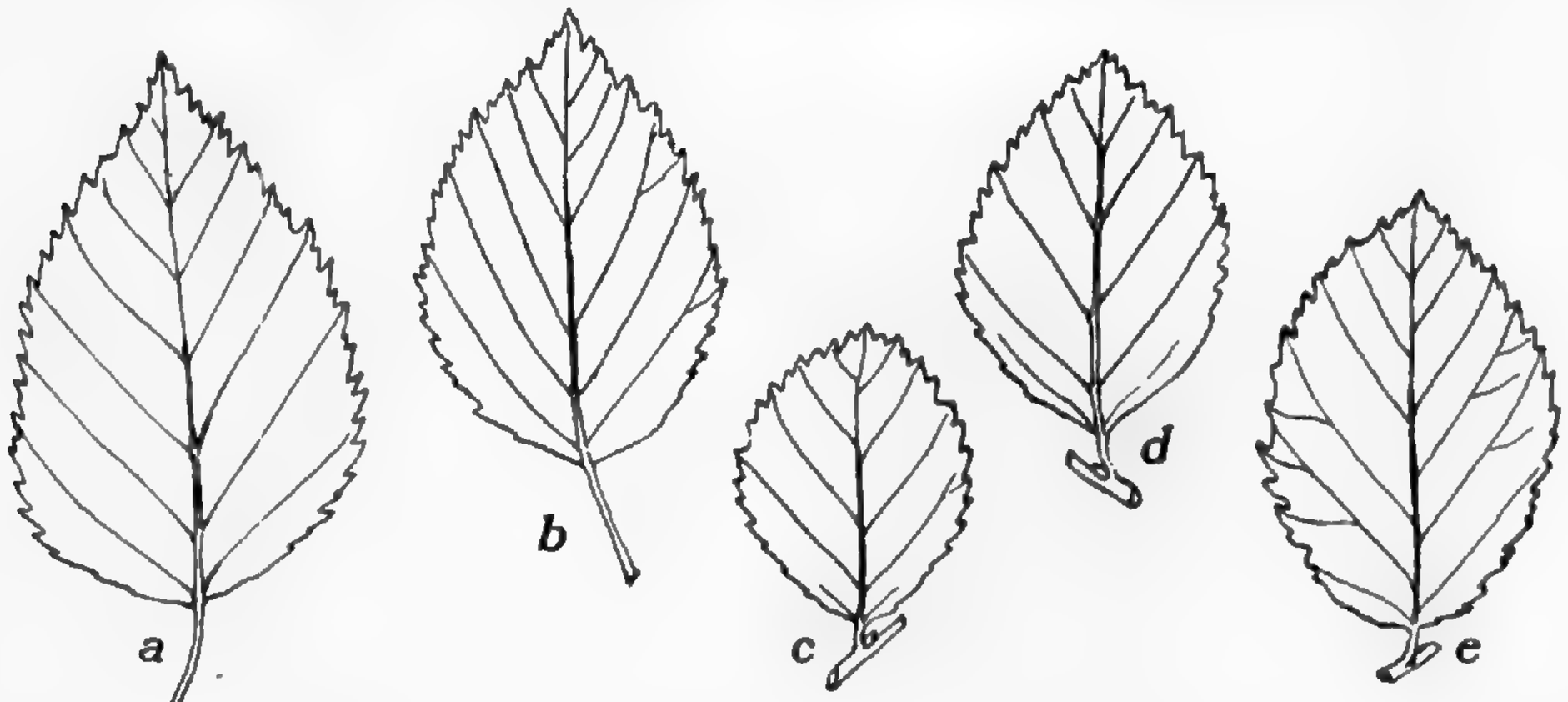

FIG. 1. F_2 segregates of *B. Sandbergi* cultivated at the University of Minnesota (see text).

Figure 1 of the photographic illustration shows a twig of the plant from which the seed was obtained and it represents the typical form of *B. Sandbergi* as it occurs commonly throughout this region. It is designated F_1. Unfortunately there is no definite proof that it is the first generation hybrid but the consistent recurrence of this type in a number of places where the parent species abound would seem to justify the assumption. At any rate it is the seed parent of the plants shown in figures 2–6, Plate 170.

It is fairly obvious that fig. 3 is the only one of the offspring which resembles the parent somewhat closely in leaf-form. The texture, venation and serration are essentially the same and the only perceptible difference is in the smaller size of a number of the leaves, the

average being about 2.5 x 1.5 cm. against 3.5 x 2.8 cm. for the parent. Furthermore there are only 4 pairs of lateral veins to the leaves while the F_1 plants frequently have 5. The young twigs are glandular, finely puberulent, and sparingly pubescent in both. The specimen shown in figure 2 resembles *B. pumila* var. *glandulifera* somewhat closely but with the important exception that the leaves are persistently pubescent on both surfaces, especially along the mid-rib and the main lateral veins. Both leaves and young twigs are abundantly glandular-dotted and the segregation of characters of *B. pumila* var. *glandulifera* is clearly indicated.

In this connection it is worth noting that there are several collections in the University herbarium from different stations in Minnesota which resemble the plant shown in figure 3 very closely both as to form of leaf and pubescence and it is highly probable that they represent natural segregates from *B. Sandbergi*. It is significant that a very high percentage of sterile seeds has been found in all of these collections. The specimens in question had been identified as typical *B. pumila*, but while closely simulating that species they differ in having more slender branches, less orbicular leaves, slightly different serration and in being more or less gland-dotted. The writer is inclined to regard the reported occurrence of typical *B. pumila* in Minnesota, Wisconsin, Michigan and northern Indiana as based on similar segregating forms of *B. Sandbergi*. There are no specimens of typical *B. pumila* from these states in the Minnesota Herbarium and Dr. Butters who recently kindly examined the collections in the Gray Herbarium for me, reports that there also all reputed specimens of typical *B. pumila* from the above noted states appear to be segregates of *B. Sandbergi*.

The specimens illustrated in figures 4, 5 and 6 are clearly of a different type from those in figures 2 and 3. The leaves are distinctly ovate, with cordate or subcordate bases in contrast to the elliptic, rhombic to obovate form and narrowed bases of the others. They are all somewhat gland-dotted on both surfaces, pubescent along the veins and have much longer petioles. The young twigs have conspicuous resinous glands, and are sparingly pubescent.

Although the three specimens show some variation among themselves in regard to form and size of leaf the segregation of *B. papyrifera* characters is nevertheless quite obvious in all three. No opportunity has as yet been offered to check up on the bark, fruiting

catkins, nutlets and pollen of these shrubs in the Arnold Arboretum.

It should be added in conclusion that it has not been possible hitherto to secure any experimental evidence of the hybrid nature of *B. Purpusii* such as presented in the foregoing paragraphs for *B. Sandbergi*. Fruit has been collected from various stations and plantings made under different temperature conditions but no seedlings have been obtained. An examination of numerous nutlets from all the collections available has recently been made and in no cases were they found to contain seed. This, together with the uniform failure to get any germination, indicates a probable complete sterility of the hybrid for the Minnesota region at least. From a comment by Schneider (l. c. p. 102) it can be inferred that a plant in Darmstadt, which he designated as *B. Purpusii* var. *luteoides* was derived from the Michigan hybrid, although it is not expressly stated. If the inference is correct then it follows that the hybrid at least occasionally produces fertile seed and furthermore that segregation also takes place for he adds that the variety is a tree-like shrub resembling *B. lutea* much more closely than the shrubby plant from Clark's Lake which he names var. *typica*.

University of Minnesota.

Explanation of Plate 170.

Fig. 1. *Betula Sandbergi* F_1 from Hennepin County, Minn.; Figs. 2–6 F_2 segregates cultivated at the Arnold Arboretum from seed obtained from plant in Fig. 1 (see text).

AN UNCOMMON ASSOCIATION OF PINES IN NORTHERN NEW YORK

E. W. Littlefield

During the latter part of May, 1925, while engaged in work connected with white pine blister rust control in the town of Chesterfield, Essex County, N. Y., for the New York Conservation Department, I noticed an old field which was growing up to pine. The conspicuous feature here was a dense grove of jack pine (*Pinus Banksiana*, Lamb.) occupying perhaps a tenth of an acre, the trees ranging from four to six inches in diameter and about 25 feet high. Growing in the same field were other groups and individuals of the jack pine, and also of pitch pine (*Pinus rigida*, Mill.), red pine (*P. resinosa*, Ait.) and a very few white pine (*P. Strobus*, L.). The

reproduction on this area was a curious mixture, composed principally of *P. Banksiana* and *P. rigida* in considerable abundance. The former species appeared on the whole to be the more aggressive, occasionally even surrounding a pitch pine seed tree, to the detriment of the latter's offspring. Counts taken later on a few sample milacres indicated the density of the reproduction to be as high as six or seven thousand trees per acre in places, with a general average of probably two or three thousand. About 8 acres were covered by this formation, which was highly variable, with all degrees of stocking, mixture and age classes. To the west, the pitch pine and red pine became increasingly dominant, with an open stand of almost pure red pine in the extreme west end.

This field occupies about 50 acres of a sandy bench on the south side of the Ausable River opposite the village of Clintonville, at the top of a steep highway ascent from the river known as "Clintonville Hill." The present owner, Mr. J. McAuliffe, states that the land has not been mowed for at least 30 years, but has been almost constantly pastured, at times heavily, by cattle and horses.

The intimate association here of *Pinus Banksiana* and *P. rigida* was of considerable interest to me, as I had not seen anything similar before, nor have I since, except for a few less striking examples in the same locality. Although the ranges of these two species overlap to a considerable extent, they are not commonly thought of as associates. It is true that they are to be found in the same locality on Mt. Desert Island, Me.; both, according to Rand[1] occur there on Green Mtn., but in different situations. In northern Maine, for the most part, *Pinus Banksiana* is reported from various scattered stations north of the range of *Pinus rigida.* In New Hampshire, curiously enough, isolated individuals of the latter species have been found at Shelburne[2] some 40 miles north of some equally isolated specimens of jack pine in the town of Thornton.[3] In the Champlain Valley, *Pinus rigida* is abundant on both sides of the lake, occurring near the shore and for some distance up the courses of rivers emptying into the lake. *Pinus Banksiana,* on the other hand, while rare in Vermont,[4] is found more frequently on the New York[5] side, partic-

[1] Rand: RHODORA I. (1899) p. 135.
[2] Deane: RHODORA XI. (1909) p. 21.
Ibid. XII. (1910) p. 99.
[3] Bull. Torrey Bot. Club XVIII. (1891) p. 150.
[4] Clark: Trees of Vermont. Bull. Vt. Agr. Expt. Sta. 73 (1899).
[5] N. Y. State Mus. Vol. V. No. 25 (1898) Rept. State Botanist.

ularly in the Ausable Valley, where it is quite common. According to the writer's own observations, it is to be met with frequently from the vicinity of Clintonville, mentioned above, as far as Upper Jay, a distance along the river of about 15 miles; pitch pine is abundant up to Ausable Forks, 5 miles above Clintonville, but practically disappears between there and Lower Jay. The meeting ground of the two species is thus restricted essentially to a five or ten mile reach along the valley. Even in this section, the species are ordinarily not found together in any abundance on the same site, leading further to the conclusion that the condition described on the Clintonville area is a rather uncommon occurrence.

(The writer is indebted to the late Geo. B. Sudworth of the U. S. Forest Service for some correspondence on the subject, and to the Arnold Arboretum for access to the library and herbarium.)

Conservation Department, Albany, New York.

RORIPA ISLANDICA AND R. HISPIDA

M. L. Fernald

While looking over with Brother Victorin his collection of 1927 from Anticosti I was impressed with the unusual appearance of the material which he had labeled *Roripa palustris* (L.) Bess. The Anticosti plant differed at once from the common American plant which we generally know as *R. palustris* in its more delicate texture and in its uniformly pinnate or deeply pinnatifid leaves, much as in *R. sylvestris* (L.) Bess.; the common American plant being coarser and stiffer, with heavier foliage, the lower leaves merely somewhat pinnatifid or runcinate at base, the upper coarsely toothed to subentire. The latter plant is common across North America and extends into eastern Asia and in America is passing as *R. palustris* (glabrous and with pods usually ellipsoid) and var. *hispida* (Desv.) Rydb. (more or less hirsute and with pods tending to be subglobose). A few sheets from eastern America match the Anticosti plant and upon comparison are found to be unquestionably the European *R. palustris*. Whether this plant is native in eastern America is doubtful, for several of the specimens come from ballast-lands or from ports or roadsides; but others are from river-banks or other natural habitats.

The combination *Roripa palustris* proves, however, not to carry the

oldest specific name for this European species. Although starting with Linnaeus as *Sisymbrium amphibium*, α. *palustre* and δ. *terrestre* and taken up by later authors as *Sisymbrium palustre* Pollich (1777), *S. terrestre* With. (1796), *Nasturtium terrestre* R. Br. (1812), *N. palustre* DC. (1821) and likewise under *Roripa* and *Radicula*, the European plant had its first *specific* name in *Sisymbrium islandicum* Oeder (1768).

Whether our coarser plant is specifically or only varietally separable from *Roripa islandica* (Oeder) Schinz & Thell. may be debatable; but it is certainly as strong a species as many in this group which are universally recognized. Consequently, until we have evidence to the contrary, it may be treated as an American and eastern Asiatic species, for which the first published specific name was *Brachilobus hispidus* Desv. (1814), this name being given to the hirsute plant which we have been calling *Roripa palustris*, var. *hispida*.

The bibliography of the two seems to be as follows:

RORIPA ISLANDICA (Oeder) Schinz & Thellung, Viertelj. Naturf. Ges. Zürich, liii. 538 (1908). *Sisymbrium amphibium*, α *palustre* and δ *terrestre* L. Sp. Pl. ii. 657 (1753). *Sisymbrium islandicum* Oeder, Fl. Dan. iii. fasc. 7: 8, t. ccccix (1768). *S. amphibium* Mill. Gard. Dict. ed. 8, no. 3 (1768), not L. *S. palustre* (L.) Pollich, Hist. Pl. Palat. ii. 230 (1777), not Garsault (1764). *Radicula palustris* (L.) Moench. Meth. 263 (1794). *S. terrestre* (L.) With. Bot. Arr. Brit. Pl. ed. 3: iii. 582 (1796). *Nasturtium terrestre* (L.) R. Br. in Ait. Hort. Kew. ed. 2, iv. 110 (1812). *N. palustre* (L.) DC. Syst. ii. 191 (1821), not Crantz (1769). *Roripa palustris* (L.) Bess. Enum. Pl. Volhyn. 27 (1822).—Eurasia: the following American specimens have been seen. QUEBEC: along railway, 20 miles inland, Anticosti Island, 1917, *Victorin*, no. 4136; dépressions humides dans la platière de l'estuaire, Rivière McKane, Anticosti, *Victorin & Rolland*, no. 27,265. NOVA SCOTIA: on ballast, North Sydney, 1883, *J. Macoun;* river flat [near railroad yard], Truro, 1920, *Bissell, Bean, White & Linder*, no. 21,326. NEW HAMPSHIRE: river-beach, Hanover, 1910, *E. F. Williams*. MASSACHUSETTS: Somerville [in metropolitan area], 1878, *C. E. Perkins;* in dry gravel, railroad track, North Cambridge, 1896, *B. L. Robinson;* dry open roadside, Worthington, 1912, *Robinson*, no. 801. CONNECTICUT: Lakeville, 1902, *O. P. Phelps*. NEW YORK: Penn Yan, *Sartwell*.[1] NEW JERSEY: ballast ground, Camden, 1885, *C. A. Gross*.

[1] Upon Sartwell's label Gray made the manuscript note: "Vera, cf. adn. in Pl. Fendl." In the latter work, in 1849, Gray made the comment, under *Nasturtium palustre:* "The only *characteristic* North American specimens of N. palustre which I possess were collected by Dr. Sartwell in Western New York."—Gray, Pl. Fendl. 6 (1849).

RORIPA HISPIDA (Desv.) Britton, Mem. Torr. Bot. Cl. v. 169 (1894). *Brachilobus hispidus* Desv. Journ. Bot. iii. 183 (1814). *Sisymbrium hispidum* (Desv.) Poir. Encyc. Suppl. v. 161 (1817). *Nasturtium hispidum* (Desv.) DC. Syst. ii. 201 (1821). *N. palustre*, var. *hispidum* (Desv.) Gray, Man. ed. 2: 30 (1856). *Roripa palustris hispida* (Desv.) Rydb. Bot. Surv. Neb. iii. 26 (1894) and Contrib. U. S. Nat. Herb. iii. 149 (1895). *Radicula hispida* (Desv.) Britton, Torreya vi. 30 (1906). *Rad. palustris*, var. *hispida* (Desv.) Robinson, RHODORA, x. 32 (1908).—Widely ranging in North America.

R. HISPIDA, var. GLABRATA Lunelll, Bull. Leeds Herb. no. 2: 6 (1908). *Nasturtium terrestre* of Am. auth., not R. Br. *N. palustre* Am. auth., not DC. *Radicula palustris* Am. auth., not Moench. *Roripa palustris* Am. auth., not Bess.—Widely distributed in North America; Japan.

GRAY HERBARIUM.

A NOTE ON THE GENUS PASPALUM IN NEW ENGLAND

C. A. WEATHERBY

IN the course of continued work on the series of "Preliminary Lists of New England Plants," it has been necessary to examine with some care the species of *Paspalum* found there. The result is the following note, which is published by way of explanation of the classification to be used in the next list and in the hope that it may prove otherwise useful.

There is no New England plant known to me which answers at all obviously to the description of *Paspalum setaceum* in Gray's Manual, "spikelets glandular-spotted and pubescent." There is, however, a slender, small-spikeleted plant known from Nantucket (according to Bicknell), from two stations in Rhode Island and four in Connecticut, in which close examination under a good lens reveals a bit of minute pubescence near the apex of the second glume, at least in a young flower.[1] Under a 40 × binocular, the hairs composing this pubescence are seen to be tipped with tiny glands. Specimens precisely similar have been seen from New Jersey, eastern Pennsylvania, Maryland, and Virginia. Specimens otherwise like them from farther south have glandular-spotted and densely pubescent spikelets. From this southern phase the Manual description was no doubt drawn; but (as Mrs. Agnes Chase very kindly informs me)

[1] The glume is hardly ciliolate, as described by Bicknell (Bull. Torr. Bot. Club xxxv. 182 (1908)); the binocular shows that the hairs are set definitely back from the margin.

Michaux's type, though said to be from "Carolina inferior," is of the glabrate-flowered northern form. And it is so described—"glumis . . . glabris." The name *P. setaceum* is therefore applied to the New England plant with entire correctness.

Of course, nearly all the specimens labelled *P. setaceum* in the older herbaria belong to the species next to be discussed; and a good many recently so determined are merely forms of that species with the spikelets slightly smaller than usual.

I am quite unable to distinguish between the New England plants determined in herbaria as *P. pubescens* and *P. Muhlenbergii*. The principal differentiating character given in the Manual for the former, "culms hirsute below the racemes," surely cannot, by itself, furnish adequate ground for specific separation; and it quite fails to correlate with anything else. There is, indeed, a plant, well represented by specimens collected at Hartford, Conn., by Bissell, Woodward, and Weatherby (no. 2796, Sept. 25, 1909) in which a more or less pubescent culm is associated with leaves more narrowly linear (30–45 times as long as wide) than is usual in this group. But, in New England, at least, one is quite as likely to find narrow leaves associated with glabrous as with pubescent culms; and the same lack of uniformity is present in broad-leaved specimens. Glabrous basal sheaths, a third character adduced by Nash, I have seen in no New England material. Certain specimens from farther south, which were studied by Nash for the North American Flora and which I have had the privilege of examining at the New York Botanical Garden, do indeed have them, and combined with narrow leaves and pubescent culms; but in the New York material, as in that I have seen elsewhere, there is every gradation between this extreme and that with pubescent sheaths, broad leaves and glabrous culms which Nash called *P. Muhlenbergii*. It appears necessary to unite the two under one species; and since *P. pubescens* is by far the earlier name and was (again according to information courteously furnished by Mrs. Chase) correctly interpreted by Nash, it must be used for the resultant group.[1]

Careful comparison shows no difference whatever between the two Connecticut plants reported (in Bull. Conn. State Geol. and Nat. Hist. Survey xiv. 50 (1910)) as *P. plenipilum* and *P. circulare;*

[1] Unless, indeed, Professors Wiegand and Eames are right in their further reduction of the whole to *P. ciliatifolium* Michx. (Cornell Univ. Agric. Exp. Sta. Mem. xcii. 83 (1925)). I am not yet prepared to follow them quite so far.

both are good *P. circulare*. Mr. R. W. Woodward, who collected both, writes to me as follows in answer to an inquiry. "I have never been able to find any difference between the reported *Paspalum plenipilum* and *P. circulare*. I recollect distinctly that the Orange plants were handed over to Mr. Bissell, who in turn referred them to a Paspalum expert . . . The latter named them *P. plenipilum*, Mr. Bissell accepted the determination and so reported it." Evidently the identification of the "Paspalum expert" (whose identity is not now remembered) was taken without question and, in spite of Mr. Woodward's well-grounded doubts, the fact that it was erroneous was not detected in compiling the Connecticut Bulletin and apparently has escaped notice until now. *P. plenipilum* should be excluded from the New England flora.

P. psammophilum is ordinarily a well-marked species. I have seen only a single specimen (Fernald and Long, no. 17889, from Chatham, Mass., Aug. 14, 1919) in which any mixture of characters appears. In it, the leaves are villous, as in *P. pubescens*, but the spikelets pubescent.

We have, then, in New England, three clearly marked and essentially homogeneous species and a fourth, the commonest and most wide-ranging of all, set off cleanly enough from the other three, but within itself subject to considerable fluctuations, so erratic that it seems useless to attempt to organize them into varieties. The four, as here understood, may be keyed out as follows.

A. Sterile lemmas coriaceous, obscurely or not at all nerved; spikelets 1.5–2 mm. long; leaves more or less papillate-ciliate, at least toward the base. B.
  B. Spikelets about 1.5 mm. long, on hispidulous pedicels; second glume with a few minute, deciduous, glandular hairs toward the apex; leaves villous . . . . . *P. setaceum*
  B. Spikelets about 2 mm. long. C.
    C. Spikelets glabrous, on merely scaberulous pedicels; leaves and sheaths villous . . . . . *P. pubescens*
    C. Spikelets glandular-pubescent, on hispidulous pedicels; leaves and sheaths with close, soft pubescence . . *P. psammophilum*
A. Sterile lemmas of comparatively thin texture, with prominent central and marginal nerves; spikelets about 3 mm. long; leaves not ciliate . . . . . *P. circulare*

Gray Herbarium.

Additions to the Flora of Cape Cod.—It may be of interest to record the following plants, apparently new to Cape Cod, which were collected by the writer in 1926: *Lycopodium clavatum*, on a moist

roadside bank close by Wakeby Pond in Sandwich [accompanied by several species rare on Cape Cod but characteristic of rich woodlands of the interior of New England, namely *Polystichum acrostichoides*, *Thelypteris Phegopteris*, *Polypodium virginianum* and *Lycopodium lucidulum*]; *Aster nemoralis*, in a bog at East Falmouth; *Rynchospora inundata*, from a small muddy pond east of John Pond in Mashpee (the only other Massachusetts stations are in Plymouth County); *Najas guadaloupensis*, from Oyster Pond and Salt Pond in Falmouth (known from Martha's Vineyard but not hitherto from the mainland of Massachusetts); a form of *Sericocarpus asteroides* with conspicuously reddish rays. This may be designated as

SERICOCARPUS ASTEROIDES (L.) BSP., forma **roseus** n. f., ligulis roseis.—MASSACHUSETTS: in sandy soil, Falmouth (TYPE in Gray Herb.), Sept. 1, 1926.—H. K. SVENSON, Harvard University.

BETULA SANDBERGI

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CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY,—NO. LXXXII

I. THE GENUS OXYTROPIS IN NORTHEASTERN AMERICA

M. L. Fernald

(Plates 171–175)

Oxytropis is so preëminently a genus of western North America and Eurasia that its occurrence in the northeastern section of North America has been looked upon as exceptional. With us it reaches its southern limit at about latitude 47°, though one species extends (along the St. John River) southward beyond 46°; but the material now accumulated shows that practically one-sixth of the North American species are found east of longitude 85° W. (on Melville Peninsula, Southampton Island, Baffin Island, the Labrador Peninsula, Newfoundland or the Gaspé Peninsula) and, since every recent expedition to an unexplored section of this area has brought back one or more additional species, it is probable that, when the region is better known, the number of species of *Oxytropis* in eastern America will be considerable. The situation in *Oxytropis* (and similarly in *Astragalus*) is quite parallel with that in such genera as *Salix, Epilobium, Antennaria, Arnica* and *Taraxacum.* In 1864 (DeCandolle's Prodromus) Andersson recognized 19 species of *Salix* in this area; we now know more than 40. In 1891 Trelease recognized in the region 7 species of *Epilobium;* we now know 20. In the Synoptical Flora, in 1878, Gray recognized in the area 4 species of *Antennaria,* 2 of *Arnica* and 1 (indigenous) of *Taraxacum;* today we know 23 of *Antennaria,* 10 of *Arnica* and 8 of *Taraxacum.* That the development of our knowledge of *Oxytropis* in northeastern America is parallel

with these cases is indicated by the facts that in 1884, in his *Revision of the North American Species of the Genus Oxytropis*, Gray definitely recognized in the area east of longitude 85° only 2 species but today we know at least 10; and, as stated, every competent expedition into new territory in the region may be counted upon to secure others.

In restudying the eastern American material, much of which is of my own collecting, it has been found necessary, in light of more abundant material, greatly to alter the old interpretations based on inadequate specimens; and during this review, the necessary study of close allies from farther west has shown some cases in which we have misinterpreted the identities. These new interpretations are, consequently, here recorded and several of the new species are illustrated by photographs generously supplied by Professor J. Franklin Collins. Since finishing the work upon the material in the Gray Herbarium I have had the great advantage of seeing the remarkable series of specimens in the National Herbarium at Ottawa,[1] most kindly placed at my disposal by Dr. Malte. In order to bring to date our knowledge of the group the following is offered as

A Synopsis of Oxytropis in Eastern America

a. Stipules nearly free from the petioles: flowers and fruits reflexed, the latter becoming secund: corolla violet, at most 1 cm. long.....1. *O. foliolosa.*

a. Stipules strongly adnate to the petioles: flowers and fruits ascending or spreading, not secund: corolla violet, purple, white or yellow, 1–2 cm. long....*b.*

b. Loosely or densely cespitose, but hardly pulvinate: principal leaves 0.3–3 dm. long, with 11 or more green (but often silky) leaflets: scapes 0.15–3.3 dm. high: spikes (except in obviously dwarfed individuals) 3–many-flowered....*c.*

c. Leaflets opposite, subopposite or alternate, not verticillate (except in aberrant leaves)....*d.*

d. Inflorescences viscid or glutinous; the bracts and legumes often verrucose....*e.*

e. Leaves mostly 1–2 dm. long, with 30–35 thin leaflets: scapes 0.5–1.7 dm. high: spike many-flowered, 2–5 cm. long: flowers and fruits strongly ascending: calyx white-villous: corolla yellowish-white, with a purple spot on the keel.....2. *O. gaspensis.*

e. Leaves 2–6 cm. long, with 19–33 thick leaflets: scapes 1.5–4.5 cm. high: spike subcapitate, 1.5–2.5 cm. long: flowers and fruits spreading: calyx black-villous: corolla purple.....3. *O. hudsonica.*

d. Inflorescences not obviously viscid; bracts and legumes not verrucose....*f.*

[1] In this synopsis specimens seen by me only in the National Herbarium of Canada are designated by "(Can)."

f. Marcescent stipules very bristly-ciliate: pubescence of scapes divergent....*g.*
g. Corolla yellow or yellowish-white: legume ovoid: stipules castaneous, glabrous on the back, with prolonged linear-lanceolate tips.....4. *O. Maydelliana.*
g. Corolla violet: legume oblong-cylindric: stipules whitish, pubescent, abruptly short-acuminate.5. *O. arctica.*
f. Marcescent stipules sparingly if at all ciliate, mostly eciliate or merely with few terminal bristles: pubescence of scapes mostly appressed: corolla purple or violet....*h.*
h. Free blades of stipules 0.6–1.8 cm. long: leaves 0.5–3 dm. long, with leaflets 0.6–3 cm. long: scapes 0.5–3.3 dm. high: spike (except in obviously dwarfed plants) elongating, several–many-flowered, 2–11 cm. long: bracts lanceattenuate, 5–11 mm. long, herbaceous, strongly pubescent on the back: calyx-teeth lanceolate, 1.5–3 mm. long: vexillum 7–10 mm. broad: seeds as high as long.....6. *O. johannensis.*
h. Free blades of stipules 2–7 mm. long: leaves 2–9 cm. long, with leaflets 2–8 mm. long: scapes 0.15–1.2 dm. high: spike subcapitate, few-flowered, 1.5–3 cm. long: bracts lanceolate to elliptic, obtuse or acute, 3–5 mm. long, subchartaceous, glabrous or sparingly pubescent: calyx-teeth deltoid, 0.5–1.5 mm. long: vexillum 5–8 mm. broad: seeds longer than high....7. *O. terrae-novae.*
c. Leaflets (or many of them) verticillate, 2, 3 or 4 together..8. *O. Belli.*
b. Densely cespitose or pulvinate: principal leaves 0.5–3 cm. long, with 5–11 white-pubescent minute leaflets: scapes filiform, 0.5–2 cm. high: flowers 1 or 2, violet....*i.*
i. Foliage white-villous; leaflets oblong or narrowly obovate: legume sessile within the calyx, linear- to oblong-subcylindric, subcoriaceous, 2–3 cm. long, 4–5 mm. in diameter.....9. *O. arctobia.*
i. Foliage white-silky; leaflets linear or linear-lanceolate: legume distinctly stipitate within the calyx, inflated, ovoid, membranaceous, 1.5–2 cm. long, 7–12 mm. in diameter.....10. *O. podocarpa.*

1. O. FOLIOLOSA Hook. Acaulescent, with multicipital caudex: leaves numerous, strongly divergent or subascending, 2–9 cm. long; stipules lanceolate, pilose; petiole and rachis filiform, pilose; leaflets 15–29, in approximate pairs, narrowly ovate, obtuse or subacute, 2–8 mm. long, appressed-pilose: scapes 2–15 cm. high, pilose: spike compact, subglobose to ovoid, 1–3 cm. long, with the 2–10 flowers at first ascending, later divergent and finally reflexed and secund: bracts linear-lanceolate, pilose, short: calyx campanulate, black-pilose; the tube 2.6–3.5 mm. long, truncate at summit, about equaled by the lance-subulate lobes; the sinuses rounded and broad: corolla deep-violet, but whitish at base, 8–10 mm. long; the vexillum 4.5–5 mm. broad; the obtuse keel with a conspicuous straight or recurving cusp: legumes reflexed, stipitate within the calyx, subcylindric, 1–1.5 cm. long, 3–4 mm. in diameter, black-hirsute.—Fl. Bor.-Am. i. 146

(1834); Fernald, Rhodora, xxviii. 103, 105, 106, 216 (1926). *O. foliosa* Torr. & Gray, Fl. N. A. i. 339 (1838). *O. deflexa* Gray, Proc. Am. Acad. vi. 236 (1864), in part, ibid. xx. 1 (1884), in part; Bunge, Mém. Acad. Imp. Sci. St. Pétersb. sér. 7, xxii. 39 (1874), in part; not DC. (1802). *Aragallus foliolosus* (Hook.) Rydb. Mem. N. Y. Bot. Gard. i. 256 (1900).—Rocky Mountains from Yukon to high summits of Colorado; Hudson Strait, Quebec; Pistolet Bay, Straits of Belle Isle, Newfoundland. The following are the collections from eastern America. Ungava District, Quebec: "Northern Labrador," *A. P. Low*, no. 18,668 (Can); gravelly seashore, Wakeham Bay, Hudson Strait, *Malte*, no. 118,334. Newfoundland: dry gravelly limestone barrens, Burnt Cape, *Fernald, Wiegand, Pease, Long, Griscom, Gilbert & Hotchkiss*, no. 28,599; dry limestone gravel, Schooner (or Brandy) Island, *Pease & Long*, no. 28,600; sandy and turfy upper border of limestone beach, Cook Point, *Fernald & Gilbert*, no. 28,601.

O. foliolosa closely simulates the arctic-alpine *O. lapponica* (Wahlenb.) J. Gay of Eurasia but is distinguished at once by its less connate stipules with much narrower and longer free blades. By Gray and by Bunge as well as by many recent authors it has been merged with the Siberian *O. deflexa* (Pall.) DC. and its Rocky Mountain representative, *O. retrorsa*,[1] but it differs from them both in its compact

[1] Oxytropis **retrorsa**, n. sp., *O. deflexam* simulans; calycis dentibus lanceolatis 4–5 mm. longis approximatis sinubus acutis.—Saskatchewan and southern Alberta to New Mexico. Type from Colorado: meadows, vicinity of Como, South Park, August 3, 1895, *Crandall & Cowen*, no. 152, in Gray Herb.

This is the plant regularly passing in America as *Oxytropis deflexa* (Pall.) DC. or as *Aragallus deflexus* (Pall.) Heller. *O. deflexa*, however, was based upon *Astragalus deflexus* Pall. Acta Acad. Petrop. ii. 268, t. 15 (1779). In his Species Astragalorum, 33, t. xxvii. (1800), Pallas changed the name to *A. retroflexus* but made no material alteration and his beautiful plate shows the plant of Transbaikalia with calyx-tube truncate, with broad rectangular sinuses between the short and setaceous teeth. Material of authentic *O. deflexa* from Transbaikalia in the Gray Herbarium exactly coincides with Pallas's descriptions and plates and shows that the America plant with lanceolate, approximate calyx-lobes and acute sinuses has been erroneously referred to it.

Typical *Oxytropis retrorsa*, when well developed, has the stems elongate, with 2–5 internodes, the pubescence sordid and villous, the calyx 7–9 mm. long and fuscous- or black-pubescent, the petals bluish at apex. In more northern or more alpine situations it becomes acaulescent or subacaulescent, with more silvery pubescence, smaller leaves, pale calyx only 3.5–5.5 mm. long and paler corolla, often merely white. This is the plant which was called by Torrey & Gray *O. deflexa*, β *sericea*. In its extreme form it seems abundantly distinct from the larger *O. retrorsa* but so many intermediates occur that it is best treated as

O. retrorsa, var. **sericea** (Torr. & Gray), n. comb. *O. deflexa*, β. *sericea* Torr. & Gray, Fl. N. A. i. 342 (1838). The following are characteristic. Yukon: Carmacks, Yukon River, *Eastwood*, no. 573. Alberta: Laggan, *J. Macoun*, no. 65,069; vicinity of Basin, *S. Brown*, no. 807; gravelly soil, Banff, *Moodie*, no. 1278. Montana: Suksdorf Gulch, northwest of Wilsall, *Suksdorf*, no. 215. Idaho: Wildhorse Creek, Custer Co., *Eggleston*, no. 14,023; moist grassy lands, Mackay, Custer Co., *Nelson & Macbride*, no. 1426. Wyoming: bars of Gros Ventre River, Jacksons Hole, *Merrill & Wilcox*, no. 963. Utah: slope of Aquarius Plateau, *L. F. Ward*, no. 457.

Outside Siberia and North America *Oxutropis deflexa* has been reputed to grow only in arctic Norway (Finmark). It is there very rare, at a single mountain-station

habit, closely aggregated flowers, the spike not elongating as in *O. deflexa* and *O. retrorsa*, and larger and deeper colored corolla, its inflorescence very closely matching that of *O. lapponica*. In its calyx it is closer to the latter species and to the Siberian *O. deflexa* than to the Rocky Mountain *O. retrorsa*.

2. O. GASPENSIS Fern. & Kelsey. PLATE 171. Acaulescent: leaves strongly ascending; leaflets 30–35, oblong or oblong-lanceolate, mostly obtuse, 0.8–1.3 cm. long, 2–5 mm. wide, thin, herbaceous, loosely strigose-villous on both surfaces and somewhat viscid (staining pressing-paper yellow): scapes 0.5–1.7 dm. high, shorter than or scarcely exceeding the leaves, silky-pilose with white hairs: spikes dense, in anthesis 2–3 cm. long, in fruit 3–5 cm. long: bracts lanceolate, herbaceous, 5–10 mm. long, viscid, sometimes verrucose: flowers numerous, ascending: calyx campanulate, white-villous; the tube 4–5 mm. long; the teeth deltoid, viscid, 1–2 mm. long: corollas yellowish-white, 1–1.2 cm. long, purple-maculate on the keel: legume short-ovoid, 1–1.3 cm. long, abruptly acuminate, viscid and white-villous, chartaceous, nearly 2-celled: seeds reniform, 1.6–2 mm. long.—RHODORA, XXX. 123 (1928).—Known only from Gaspé Co , QUEBEC: on exposed cliffs along the Gaspé coast, Mont Louis, August 10, 1882, *J. Macoun*, no. 5343 (Can), distributed as *O. campestris;* talus of slaty cliffs, Mt. St. Pierre, near mouth of Rivière à Pierre, *Fernald & Smith*, no. 25,874, distributed as *O. viscida* Nutt.; same locality, Rivière à Pierre, *Kelsey & Jordan*, no. 96.

An eastern American representative of *O. viscida* Nutt. and *O. viscidula* (Rydb.) Tidestrom; in its viscid quality approaching these violet-flowered species. Also very similar to *O. gracilis* (A. Nels.) K. Schum., but with shorter scapes, denser spikes and characteristic viscidity.

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where it was discovered by Norman in 1883 and misidentified as *O. lapponica*. It was later separated by Dahl in Blytt, Norges Fl. ed. Dahl, 466 (1906) as *O. deflexa*, but said to differ from the Siberian plant in its shorter stem, fewer leaflets, shorter and black-hairy calyx and white-hairy young pods ("Vor form adskiller sig fra sibiriske eksamplarer isaer ved kortere stengel, faerre smaablade, mere kort- og sorthaaret baeger og de unge belges hvide haar-beklaedning, men stemmer i disse karakterer med Bunges beskrivelse af nord-amerikanske former."). Subsequently, in 1926, Carl Th. Mörner (Svensk Bot. Tisdkrift, xx. 344), reviewing the discovery of the Finmark plant, emphasized that all the earlier collections, by Norman in late August, 1883 and by Dahl in August, 1903, when the plant was first identified as *O. deflexa*, and again in 1913 and 1915, showed fruit and that Dahl's description of the corolla as violet was an assumption. Mörner, visiting the station earlier, in July, found the plant in flower, the corollas white, not violet, and thus departing from the violet or bluish flowers usually described from Siberia and western America. I have seen no Finmark specimens but its short stem, shorter calyx, white corollas and white-pubescent legumes suggest *O. retrorsa*, var. *sericea;* but the black-hairy calyx is not characteristic for the latter plant.

3. O. **hudsonica** (Greene), n. comb. PLATE 172. Acaulescent: stipules broadly ovate, acuminate, glutinous, bristly-ciliate and hirsute: leaves 2–8 cm. long; leaflets 19–33, thick, oblong, 2–4 mm. long, with strongly elevated ciliate margins, glabrous above, pilose to glabrate beneath: scapes 1.5–4.5 cm. high, viscid-villous: spike subcapitate, 1.5–2.5 cm. long, of 6–16 spreading flowers: bracts oblong-lanceolate, 4–10 mm. long, firm, glutinous and commonly verrucose, more or less black-hairy: calyx campanulate, black- (or white-) hairy; the tube 4–6 mm. long; the teeth deltoid, 1–2 mm. long: corollas purple (drying bluish), 1.2–1.7 cm. long; the vexillum about 6 mm. broad: legume slenderly ovoid; the body 1.5 cm. long, tapering to a long straight beak, pilose and glandular-verrucose.—*Aragallus Hudsonicus* Greene, Proc Biol. Soc. Wash. xviii. 17 (1905).—About Hudson Bay and westward to Mackenzie District. QUEBEC: along the east coast of Hudson Bay, Great Whale River, *A. P. Low*, no. 14,272 (TYPE no.);[1] north of Cape Jones, *Low*, no. 63,166. KEEWATIN: Chesterfield Inlet, *J. W. Tyrrell*, no. 101,050, Nat. Herb. Can. (Can); Rankin Inlet, *J. M. Macoun*, no. 79,104. ONTARIO: sandy soil, Fort Severn, *J. M. Macoun*, no. 5344, as *O campestris* (Can). MACKENZIE DISTR.: Artillery Lake, *J. W. Tyrrell*, no. 23,150 as *O. campestris*, var. *caerulea* (Can); west shore, Great Bear Lake, *J M. Bell*, no. 22,895 as *O campestris*, var. *caerulea* (Can).

4. O. MAYDELLIANA Trautv. Acaulescent: stipules marcescent, castaneous or fulvous; the free blades glabrous, ovate, tapering to elongate linear-lanceolate bristly-ciliate or finally glabrate tips: leaves 3–10 cm. long, strongly ascending; the 11–17 elliptical to lanceolate obtuse to acute leaflets 3–12 mm. long, sericeous or glabrate beneath (and rugulose upon drying), commonly somewhat sericeous above: scapes 0.3–1.5 dm. high, villous and more or less appressed-pilose: spike subcapitate, 1.5–3.5 cm. long: bracts lanceolate, 4.5–7 mm. long, black-hairy, sometimes with pale hairs intermixed: calyx campanulate, densely black-villous (or sometimes with longer pale hairs); the tube 4–5 mm. long, with lance-deltoid black-hairy teeth 0.5–2 mm. long: corolla yellow or yellowish-white, 1–1.4 cm. long; the vexillum 4–5 mm. broad: legume ovoid, with the distended body about 1.3 cm. long and narrowed abruptly to a long straight beak.—Acta Horti Petrop. vi. 16 (1879); Kjellman, Vega Exped. Betensk, Arb. i. 523(1882). *O. campestris* var. ξ. *melanocephala* Hook. Fl. Bor. Am. i. 147 (1834); Torr. & Gray, Fl. N. A. i. 341 (1838); Ostenfeld, Vasc. Pl. Arct. N. Am. Gjöa Exped. 20, t. ii. fig. 12 (1910); Fernald, RHODORA, XXV. 113 (1923). *O. leucantha* Gray, Proc. Am. Acad. xx. 5 (1884), in part; Macoun, Cat. Can. Pl. i. 510 (1886);

[1] Greene originally cited no. 14,272, distributed from the Geol. Surv. of Canada, as collected by *A. P. Low*, and such a sheet, with *Low* given as collector, is in the Gray Herbarium. In the National Herbarium of Canada the specimen of same locality, date and number bears a label in the handwriting of the late John Macoun, but the collector is given as *Spreadborough*.

not *Astragalus leucanthus* Pall. Sp. Astrag. 59, t. 47 (1800). *O. campestris*, var. *sordida* Macoun & Holm, Can. Arct. Exped. v. Bot. Pt. A. 16a (1921), in part, not Willd.—Arctic and subarctic America and Chukches Land in adjacent northeastern Asia. The following are definitely referable here. BAFFIN ISLAND: gravel beaches above tundra, Arctic Bay, Admiralty Inlet, *Malte*, no. 118,340; gravelly hill above tundra, Pond Inlet, Eclipse Sound, *Malte*, no. 118,337; rocky knolls by seashore, Lake Harbor, *Malte*, no. 118,338; Bowdoin Harbor, *Ralph Robinson*, no. 14; *Soper*, no. 837 (Can); Cape Dorset, *Soper*, nos. 745, 783 (Can). UNGAVA DISTRICT, QUEBEC: Erick Cove, Hudson Strait, *A. P. Low*, no. 22,991; crevices of rock, Digges Island, Hudson Strait, September 15, 1884, *Robt. Bell.* KEEWATIN DISTRICT: Wager Inlet, *J. M. Macoun*, no. 79,103. KING WILLIAM LAND: Gjöa Harbor, July, 1904, *Godfred Hansen* (Can). MACKENZIE DISTRICT: Bathurst Inlet, *R. M. Anderson*, no. 592 (Can); south coast of Coronation Gulf, *Cox & O'Neil*, nos. 399 and 399[a] (Can); old specimen in Gray Herb., received from Herb. Hooker, labeled "Drummond, *Ox. campestris*, Polar Sea," with the pertinent note added by Gray: "If 'Polar Sea,' then not 'Drummond'"; "Parry's Voyage," material mixed with *O. arctica*, sent to Asa Gray from Herb. Benth. as *O. arctica* R. Br.; an identical specimen sent the Gray Herbarium, without name, from the British Museum as coll. on Parry's 2d voyage. YUKON: Herschell Island, *Frits Johansen*, no. 234[a] (Can). ALASKA: Cape Nome, 1900, *Blaisdell.*

It is impossible, without seeing the actual specimens, to accept as positively belonging to *O. Maydelliana* all the Arctic American material cited by different authors as *O. campestris*, *O. campestris*, var. *sordida*, *O. campestris*, var. *melanocephala* and *O. leucantha.* This difficulty is due to the fact that there is another plant with yellow flowers in Arctic America which has been passing as *O. campestris*, vars. *sordida* and *melanocephala.* This is shown by *Frits Johansen's* no. 332 (Herb. Geol. Surv. Can. no. 98,415) from Bernard Harbor, by *Girling*, nos. 690 and 691 (Can) from Clifton Point (west end of Dolphin and Union Strait) and by *Jenness*, no. 368 (Can) from Wollaston Land. This plant has yellow and comparatively small corollas and small calyx with short teeth, thus closely simulating *O. Maydelliana;* but its stipules are pale, thin and densely pubescent, instead of castaneous, chartaceous and glabrous. The firm and castaneous old stipules are very conspicuous in all the specimens above cited as *O. Maydelliana* and these characters have been emphasized by all who have studied it. Thus, in the original description and discussion of *O. Maydelliana*, Trautvetter said: "stipulis . . . glabris, longe setoso-ciliatis, rigidulis, herbaceis, demum fuscis et pergameneis"; Macoun,

calling the common plant *O. leucantha*, said: "Specimens very distinct; stipules chestnut colored and conspicuous" and Ostenfeld, treating it as *O. campestris*, var. *melanocephala*, "a very remarkable form of *O. campestris*" which "merits perhaps to be reckoned as a separate species," said "It differs from *O. campestris* . . . in . . . old stipules 'chestnut coloured and conspicuous' . . . —this is a very distinct character." Ostenfeld further states that the plants of Chuckches Land brought back by Kjellman "agree exactly both with the description of *O. Maydelliana* TRAUTV. (they have been so named by KJELLMAN . . .) and with the authentic specimens of *O. campestris*, var. *melanocephala* Hook., and I feel sure therefore that the two names are merely synonyms."

The Johansen, Girling and Jenness material with whitish and densely pubescent scarious stipules probably belongs to *Oxytropis borealis* DC. Prodr. ii. 275 (1825), described, like *O. Maydelliana*, also from Chuckches Land ("terra Tschuktschorum") and regularly taken by Asa Gray to be identical with his "*O. leucantha*." De Candolle's description was brief but hardly applicable to *O. Maydelliana*, for it had the diagnostic character "Stipulae pallidae."

5. O. ARCTICA R. Br. PLATE 172. Acaulescent: stipules membranaceous or scarious, whitish-villous, persistent; the free blades deltoid, tapering to lanceolate tips: leaves 2–7 cm. long, with 11–17 oval or oblong villous-sericeous or finally glabrate leaflets 2–6 mm. long: scapes 2.5–7 cm. high, villous with variously mixed black, sordid or pale hairs: spike subcapitate, 2–5-flowered: bracts linear-lanceolate, black-villous: calyx slenderly campanulate, densely black-hairy; the tube 5–6 mm. long; the linear teeth broadened at base, erect or divergent, black-hairy, 1.5–2.5 mm. long: corolla violet, 1.6–2 cm. long; the vexillum 4–7 mm. broad: legume oblong-cylindric, incompletely 2-celled.—App. Parry 1st Voy. 278 (1823); Gray, Proc. Am. Acad. xx. 4 (1884) in part; Simmons, Phytogeogr. Arct. Am. Archipel. 112 (1913). *O. arctica*, α *subumbellata* Hook. Fl. Bor.-Am. i. 146 (1834). *Spiesia arctica* (R. Br.) Kuntze, Rev. Gen. 206 (1891). *Aragallus arcticus* (R. Br.) Greene. Pittonia, iii. 211 (1897).—MELVILLE ISLAND, *Sabine, Edwards, Ross*. MACKENZIE DISTRICT: between Coppermine River and Cape Alexander, *Rae*.

Oxytropis arctica has been reported from several stations within our area, but I have seen no material from the Hudson Bay area, the Labrador Peninsula or the region of the Gulf of St. Lawrence. Macoun (Cat. Can. Pl. i. 115, 509) recorded it first as *O. uralensis*, var. *pumila* Ledeb., later as *O. arctica*, from St. Paul's Island, Nova Scotia (*McKay*), and from Digges Island, Hudson Strait (*Bell*); Britton &

OXYTROPIS JOHANNENSIS × 3/8

OXYTROPIS TERRAE-NOVAE × 1

OXYTROPIS CORONAMINIS × 1

Nain, *J. D. Sornborger*, no. 33; Indian Harbor, *Ralph Robinson*, no. 98; Battle Harbor, *Bowdoin College Exped.* no. 91; barren hill-top, Square Island, *J. A. Allen*, no. 37; Red Bay, *Bowdoin College Exped.* no. 23. UNGAVA DISTR., QUEBEC: Port Burwell, *Soper*, no. 946 (Can); Ungava Bay, 1884, *L. M. Turner;* Fort Chimo, *A. P. Low*, no. 16,300; sand, Cape Prince of Wales, August 21, 1884, *R. Bell.*

Oxytropis terrae-novae is the little plant with crimson or purple-violet flowers which has been generally passing as *O. campestris*, var. *caerulea* Koch. This misidentification seems to have started when Bunge, with only scanty material, suggested that the Labrador plant might belong to *O. sordida* (close to if not quite identical with Koch's *O. campestris*, var. *caerulea*). But that Bunge was not wholly satisfied with such disposition of it is indicated by his discussion. Correctly defining *O. sordida* as a large-flowered plant of the Arctic, with "floribus leucophaeis," vexillum "saepe 5′′′ lata" etc. he added a comment on the Labrador plant:

"Huc etiam trahenda videtur planta labradorica, quamvis pluribus notis abhorrens; gracilior et omnibus partibus minor. Bracteae breviores vix calycis tubum dimidium attingentes. Flores violacei. Calyx 3–4′′′ longus dentibus brevibus triangularibus. Vexillum 6–7′′′ longum, lamina obcordata 2½–3′′′ lata. Alae 5′′′ parum excedentes. Carinae mucro brevissimus. Ovarium 17–23-ovulatum. Legumen oblongum ovatumve, tumidum, breviter cuspidatum, 7′′′ tantum longum, interdum vix semipollicare, rectiusculum, nigro-pilosissimum. Caetera congruunt. An nihilominus species proprii juris? An forsan sequenti [*O. Lamberti*] adjungenda?"—Bunge, l. c. 83.

Bunge's distinctions prove constant and there is no doubt that *O. terrae-novae* is quite distinct from *O. sordida*. Gray, in 1864, had called the Labrador plant *O. campestris* but there is no material in the Gray Herbarium of such early date. In 1884, with a single collection before him (whereas we now have 39 collections and much field-experience with the plant), he called it (along with *O. johannensis*) *O. campestris*, var. *caerulea:* "These are the only American stations I can cite for *O. campestris*, taking that species to comprise *O. sordida*. And as our specimens have clear violet or blue corollas, when not pure white . . . , I adopt Koch's name given to the quite similar form in Europe." The flowers are crimson or purple-violet (blue only after drying) but *O. campestris*, var. *caerulea* Koch, Syn. 181 (1838) is merely a form of the normally yellow-flowered continental European *O. campestris* in which the flowers have some blue colora-

tion. In no other character does it seem to differ from *O. campestris* (see discussion under *O. johannensis*) and it is surely not the plant so characteristic of Newfoundland and Newfoundland Labrador.

8. O. BELLI (Britton) Palibine. Acaulescent, with many crowns: stipules membranaceous, whitish; the free portions ovate, acuminate, whitish-villous or in age glabrate: leaves 0.3–1.7 dm. long, loosely ascending, the petiole and rachis loosely white-villous; leaflets in verticils of 2, 3 or 4 or sometimes opposite or subopposite, oblong to lanceolate, 3–10 mm. long, loosely villous: scapes 0.3–1.7 dm. high, villous: spike subcapitate, 3–10-flowered, 1.5–4 cm. long: bracts herbaceous, lanceolate, black-hairy, 5–10 mm. long, divergent: calyx campanulate, black-villous and often with longer white hairs; the tube in anthesis 8–10 mm. long; the black-hairy lanceolate teeth 1.5–3 mm. long: corolla violet, 2–2.3 cm. long; the vexillum 6–8 mm. broad: legume lance-cylindric, rather thin-walled, pubescent with black hairs or with longer white ones, nearly or quite 2-celled, the body 1.2–2 cm. long below the straight and recurved beak: seeds round-reniform to cordate-ovate, olivaceous, 1.5–1.9 mm. broad.—Bull. Soc. Bot. Genève, sér. 2, ii 19 (1910) as *O. Bellii;* as *O. Bellii* (Britton) J. M. Macoun in Low, Cruise of Neptune, 1903–04: 320 (1906), name without proper bibliographic citation; as *O. Bellii* (Britton) J. M. Macoun in Bernier, Rep. Dom. Can. Govt. Exped. D. G. S. 'Arctic,' 1908–09, App. B, 489, 490, with plate (1910); as *O. Bellii* Simmons, Phytogeogr. Arct. Am. Archipel. 111 (1913); Britton in Britton & Brown, Ill. Fl. ed. 2, ii. 391, fig. 2568 (1913). *Spiesia Belli* Britton in J. M. Macoun, Can. Rec. Sci. vi. 148 (1894), as "*Spiesia Oxytropis Belli*"; Britton in Britton & Brown, Ill. Fl. ii. 309, fig. 2162 (1897). *Aragallus Belli* (Britton) Greene, Pittonia, iii. 212 (1897).—Shores of northern Hudson Bay; perhaps farther west. UNGAVA DISTRICT, QUEBEC: rocky places, Digges Island, *R. Bell*, no. 1164 (TYPE of *Spiesia Belli*), distributed as *O. podocarpa*, changed to *O. arctica* (Can); KEEWATIN DISTRICT: Fullerton, *L. E. Borden*, no. 62,933, *J. M. Macoun*, no. 79,105; Depot Island, 1894, *Geo. Comer;* Chesterfield Inlet, *J. W. Tyrrell*, no. 62,543 (Can), *L. T. Burwash*, nos. 119,028, 119,029, 119,031, 119,032 (Can); Rankin Inlet, *J. M. Macoun*, no. 79,106.

For a remarkably distinct species *Oxytropis Belli* had a most unconventional introduction to botanical recognition. Originally published by the late J. M. Macoun as "*Spiesia Oxytropis Belli*, Britton, n. sp." (1894), it later appeared without discussion or bibliographical citation in a list by J. M. Macoun (1906) as "*Oxytropis Beltii*, (Britt.)," this constituting its first, but quite unsatisfactory enumeration under *Oxytropis*, with the spelling of the specific name altered. In 1897 Britton himself had taken it up as *Spiesia Belli* and in the same year

Greene correctly retained the same (original) spelling of the specific name in *Aragallus Belli* Greene. The first proper transfer to *Oxytropis* was by Palibine under date of February 28, 1910. This was followed later in the year (letter of transmittal dated April 5, 1910) by the listing by J. M. Macoun of "*Oxytropis Bellii* (Britton), Macoun" and the publication of a beautiful plate of the plant (drawn obviously from Borden's flowering material from Fullerton, with fruit from the type, collected on Digges Island by Bell). This plate in Macoun's Appendix to the Bernier Report bears the simple inscription at bottom "*Oxytropis Bellii*, (Britton.)" but loose copies of the plate, intended for use in another but never published work, have been distributed with the printed heading "Geological Survey of Canada Plate XI" and the name at the bottom "*Oxytropis Bellii*, Britton"; while on some of the herbarium specimens the author of the combination is given as Holm. From these notes it is apparent that the real authorship of the combination has been doubtful; but, in view of his properly making the transfer, it should be ascribed to Palibine.

The Appendix to Bernier's Report is entitled: "List of Plants Collected by Mr. J. G. McMillan on Melville Island, in the Autumn of 1908 and Early Summer of 1909";[1] and Macoun there speaks of McMillan's finding on Melville Island "*Oxytropis Bellii*, described from specimens collected on Mansfield Island by Dr. Bell;" and Simmons, accordingly, cites it as occurring on these two islands. The original material came, of course, not from Mansfield Island, but from Digges Island, as correctly stated in the original description published by Macoun; and the McMillan plant from Melville Island preserved in the National Herbarium at Ottawa belongs to a characteristic species[2] of western Arctic America with non-verticillate leaflets

[1] The Report and the Appendix are very rare in American libraries and I am indebted to the kidness of Dr. Malte and of the Geological Survey of Canada for the temporary loan of a copy.

[2] OXYTROPIS **coronaminis**, n. sp. (PLATE 175), acaulis laxe caespitosa pubescens virescens; stipulis petiolaribus alte connatis, laminis liberis membranaceis deltoideis acuminatis dense longeque sericeo-villosis villis flavescentibus; foliis 2–9 cm. longis, petiolis rhachibusque flavido-villosis, foliolis 5–9-jugis anguste oblongis vel lanceolatis 3–10 mm. longis sericeo-villosis; scapis 1–9 cm. altis pilosis; spicis subcapitatis 2–4-floris, floribus divergentibus; bracteis lanceolatis, divergentibus 5–9 mm. longis nigro-pilosis; calycibus campanulatis membranaceis nigro-pilosis parciusque albo-villosis, tubo 7–9 mm. longo, dentibus lanceolato-linearibus 3–6 mm. longis; corollis purpureis vel violaceis 2–2.7 cm. longis, vexilli lamina rotundata obovata valde obcordata 1.2–1.7 mm. lata.—Region of Coronation Gulf, Mackenzie District, Victoria Island and (much smaller) on Melville Island. MACKENZIE DISTRICT: Arctic seacoast, *Richardson* (TYPE in Gray Herb.); Kent Peninsula, August 13, 1926, *W. H. B. Hoare* in Nat. Herb. Can. no. 119, 027a, as *O. arctica;* Epworth Harbour, south coast of Coronation Gulf, July 4, 1915, *Cox & O'Neil*, no. 393 (Can) (no. 98,407 Herb. Geol. Surv. Can.), July 15, 1915, *Cox & O'Neil*, no. 395 (Can) (no. 98,408 Herb. Geol. Surv. Can.); Bernard Harbour, July 19, 1915, *Frits Johansen*, nos. 321*a*, 321*b* (Can) (nos. 98,405 and 98,406 Herb. Geol. Surv. Can.), July, 1915, *R. M. Anderson*,

and other characters which at once remove it from *O. Belli* of the Hudson Bay area.

9. O. ARCTOBIA Bunge. Densely cespitose or pulvinate, very densely white-villous: stipules adnate high on the petioles, the free tips subherbaceous, deltoid, silky-villous: leaves with 3–4 pairs of crowded often folded oblong to obovate white leaflets 1–3 mm. long: scapes scarcely exceeding the leaves, 1–2-flowered, white- or black-villous or with mixed hairs: bracts solitary or paired, herbaceous, villous, about 1 mm. long: calyx densely black-villous, often with some white hairs admixed; the tube in anthesis 5–6 mm. long; the lanceolate blunt teeth 2–3 mm. long: corolla purple or violet; the obcordate vexillum 8–10 mm. long, 6–8 mm. wide: legume sessile, subcylindric, 2.5–3 cm. long, short-acuminate, subcoriaceous, softly white-pubescent with an admixture of black appressed hairs, nearly 2-celled.—Mém. Acad. Imp. Sci. St. Pétersb. ser. 7, xxii. no. 1: 114 (1874); Ostenfeld, Vasc. Pl. Coll. Arct. N. Am. Gjöa Exped. 19, t. 2, fig. 14 (1910); Simmons, Surv. Phytogeogr. Arct. Am. Archip. 112 (1913); Macoun & Holm, Can. Arct. Exped. 1913–18, V. pt. A, 17A, tt. ii. fig. 2 and ix. figs. 4 and 5 (1921); Fernald, RHODORA, xxv. 113 (1923). *O. arctica*, var. *uniflora* Hook. App. Parry 2d Voy. 396 (1825). *O. arctica*, *β. minor* Hook., Fl. Bor.-Am. i. 146 (1834). *O. nigrescens*, var. *arctobia* (Bunge) Gray, Proc Am. Acad. xx. 3 (1884); Macoun, Cat. Can. Pl. i. 509 (1886).—Subarctic and Arctic America from Hudson Strait, Baffin Island to Melville Island, Victoria Island and Mackenzie. BAFFIN ISLAND: Bowdoin Harbor, *Ralph Robinson*, no. 114,022 (Can). VICTORIA ISLAND: Wollaston Land, August, 1915, *D. Jenness*, no. 387 (Can) (no. 98,404 Herb. Geol. Surv. Can.). MELVILLE ISLAND: Winter Harbour, July 6, 1909, *J. G. McMillan*, no. 77,294 (Can) as *O. Belli*.

Oxytropis coronaminis has been confused with *O. Belli*, *O. arctica* and *O. Roaldi* Ostenf. The McMillan plant from Melville Island formed the basis for Macoun's report of *O. Belli* from there; the Richardson material has been cited as *O. arctica* and Hoare's plant taken for it; the others, of recent collection, form the bases of the records of *O. Roaldi* in the Report of the Canadian Arctic Exped. V. Pt. A. 17A where (t. viii. fig. 2) the species was illustrated (with 5-flowered spikes, although the specimens in the National Herbarium of Canada show only 2–4) as *O. Roaldi*, Ostenf. Vasc. Pl. Arct. N. Am. Gjöa Exped. 54, t. iii. fig. 16 (1910). The latter is known, however, only from Hershell Island, Yukon. The type was collected by the Gjöa Expedition and the Canadian Arctic Expedition of 1913–16 secured an excellent collection of it, *Frits Johansen*, no. 234 (Can), which was included in the Report of the Canadian Arctic Exped. (p. 16A) under *O. campestris*, var. *sordida*. *O. Roaldi* has less pubescent stipules than in *O. coronaminis*, appressed pubescence of leaves and scapes, 5–10-flowered spikes, calyx with tube about 5 mm. long and with short triangular teeth, corolla 12–15 mm. long, and vexillum less than 1 cm. broad. From *Oxytropis Belli*, *O. coronaminis* is at once separated by its non-verticillate leaflets, more pubescent stipules with yellowish pubescence, fewer flowers, longer calyx-teeth, and much broader vexillum; from *O. arctica* by its much larger flowers, longer calyx-tube and -teeth and very large corolla with vexillum fully twice as broad as in true *O. arctica*. In its long calyx-teeth *O. coronaminis* strongly suggests the Arctic European *O. sordida* (Willd.) Pers. or *O. campestris*, var. *sordida* Koch, but it is at once separated by its deep purple corolla and especially by its very large vexillum.

12; Fox Island, Gordon Bay, *Soper*, nos. 716, 717 (Can. nos. 119,022, 119,023); Cape Dorset, *Ralph Robinson*, no. 59; *Burwash* (Can. no. 119,033), *Soper*, nos. 744, 678 (Can. nos. 119,021, 119,024). MELVILLE PENINSULA: south shore of Fury and Hecla Strait, *Parry* KING WILLIAM ISLAND: Gjöa Harbour, *Godfred Hansen* (Can). MELVILLE ISLAND: 1820, *Edwards*. VICTORIA ISLAND: Minto Inlet, *Anderson*. MACKENZIE DISTRICT: Kent Peninsula, *W. H. B. Hoare* (Can. no. 119,027); Epworth Harbour, south coast of Coronation Gulf, *Cox & O'Neill*, nos. 393[a], 398 (Can. nos. 98,421, 98,422); Bernard Harbour, *R. M. Anderson* (Can. no. 114,021), *Frits Johansen*, no. 294 (Can. no. 98,423).

Ostenfeld, l. c., has pointed out the characters which separate *Oxytropis arctobia* from the plant of western Arctic America and the Bering Straits region of Siberia which passes as *O. nigrescens* (Pall.) Fischer. In the latter the free tips of the stipules are narrower, the pubescence of the leaves less silky and more scattered and the teeth of the calyx about as long as the tube. This plant, however, which occurs from Chuckches Land, Siberia eastward to Herschel Island at the mouth of the Yukon, is not very satisfactorily placed with *O. nigrescens*. The latter was based upon *Astragalus nigrescens* Pallas, Sp. Astrag. 65, t. liii. (1800), a loosely cespitose plant, collected by Merk in the region between the Aldan River and Okhotsk Sea. Pallas's beautiful plate shows conspicuously attenuate narrowly lanceolate and black-hairy stipule-tips and his description repeatedly emphasizes these characters: "stipulis calycibusque nigro-villosis;" "stipulisque petiolorum nigro-villosis hirtae" and "Folia . . . rhachi utrinque *stipula* acuminata seu semisagittata." The plant of Arctic Yukon, Arctic Alaska and extreme northeastern Chuckches Land, however, is densely cespitose, almost pulvinate, and its stipules have short deltoid and obtuse free tips which are at first white-villous or white-ciliate but soon become quite glabrate. It is the species described by Pallas immediately following *Astragalus nigrescens*, Pallas's *A. pygmaeus*, which Merk got "in terris arcticis Siberiae ad orientem ultimae, Tschucktschis habitatae," probably 2300 km. northeast and 10° north of the area in which *A. nigrescens* was found. Pallas gave a fine plate of *A. pygmaeus* and this is surely the plant of Bering Straits and arctic Alaska which is passing in America as *Oxytropis nigrescens*. It should be called *O. pygmaea*.[1]

[1] **OXYTROPIS pygmaea** (Pall.), n. comb. *Astragalus pygmaeus* Pallas, Sp. Astrag. 66, t. liv. (1800).—Illustrated as *O. nigrescens* by Ostenfeld, Vasc. Pl. Coll. Arct. N. Am. Gjöa Exped. t. ii, fig. 13 (1910) and Macoun & Holm, Rep. Can. Arct. Exped. V. pt. A. t. ix. figs. 1–3 (1921).

10. O. PODOCARPA Gray. Densely cespitose or pulvinate, strigose-silky with white hairs: stipules chartaceous; the deltoid-ovate free tips white-hispid and long-ciliate, finally glabrate: leaves 1–2.5 cm. long; the delicate petiole and rachis subsericeous; leaflets 2–5 pairs, linear to linear-lanceolate, subfalcate, often involute, 2–5 mm. long, loosely appressed-pubescent: scapes only slightly exceeding the leaves, very slender, 1–2-flowered: bracts oblong, glabrous on the surfaces, black-ciliate: calyx tubular-campanulate, membranaceous, black-hairy or with white hairs intermixed; the tube in anthesis 6–7 mm. long; the triangular-lanceolate teeth 2–4 mm. long: corolla violet; the obovate emarginate vexillum 1.5 cm. long, 6–8 mm. broad: legume distinctly stipitate within the calyx, membranaceous, inflated, ovoid; the body 1–2 cm. long, 7–12 mm. in diameter, minutely white-hairy: seeds reddish or brown, obliquely cordate-ovate, rounded, 2.2–2.5 mm. broad.—Proc. Am. Acad. vi. 234 (1864); Bunge, Mém. Acad. Imp. Sci. St. Pétersb. Ser. 7, xxii. no. 1: 117 (1874); Gray, Proc. Am. Acad. xx. 3 (1884), excluding *O. Hallii;* Macoun, Cat. Can. Pl. i. 115 (1883), 509 (1886); Britton in Britt. & Br Ill. Fl. ed. 2, ii. 389, in part, excluding fig. 2562 (1913). *O. arctica, δ. inflata* Hook. Fl. Bor.-Am i. 146 (1834). *Astragalus biflorus* Schweinitz ex Gray, Proc. Am. Acad. vi. 234 (1864). *Spiesia podocarpa* (Gray) Kuntze, Rev. Gen. 207 (1891). *S. inflata* (Hook.) Britton, Mem. Torr. Bot. Cl. v. 201 (1894) and in Britt. & Br. Ill. Fl. ii. 307, in part, excluding fig. 2156 (1897). *Aragallus inflatus* (Hook.) A. Nels. Erythea, vii. 59 (1899). *A. podocarpus* (Gray) A. Nels. in Coult. & Nels. Man. Bot. Rocky Mts. 294 (1909), at least as to name-bringing synonym.—A rare species, not often collected, southern Baffin Island and northern Labrador; Yukon and Alaska to southern Alberta. The following specimens have been examined. BAFFIN ISLAND: Amadjuok Bay, *Soper* (Nat. Herb. Can., no. 119,020). LABRADOR: without statement of locality, ex herb. *Schweinitz* (TYPE of species, in Gray Herb.); Ramah, *Stecker*, no. 153; Hebron to Nachvak, *Delabarre*, no. 49. YUKON: longitude 141° W., lat. 67° N., *Cairnes* (Can, Geol. Surv. Can. no. 83,048). ALBERTA: "highest summits of the Rocky Mts.," *Drummond* (co-type of *O. arctica, δ. inflata* Hook.); high Rocky Mountains, *Burke;* Brazeau, south of Brazeau Lake, *S. Brown*, no. 1067; Mt. Paget, *J. Macoun*, no. 65,066; Pipestone Pass, *J. Macoun*, no. 65,067. BRITISH COLUMBIA: summit of McCallum Mt., South Atlin, *Guilliam* (Can., Geol. Surv. Can. no. 101,938). ALASKA: vicinity of Karluk, Kadiak Island, *Rutter*, no. 181; Chiachi Island, June 28, 1874, *Dall;* rocks, Popoff Island, Shumagin Islands, June 19, 1872, *Harrington*.

Gray's original material was a mixture. The first material discussed was the Labrador plant: "The specimens before me are from Labrador, good flowering specimens in the herbarium of Schweinitz," which are quite like *O. artica, δ. inflata* Hook. and were the unpub-

lished *Astragalus biflorus* Schweinitz. Besides the Labrador plant, which is the type, Gray cited, as supplementary, material "from Arctic America . . . ticketed '*O. campestris*' by Sir William Hooker (which may perhaps be his *O. campestris*, var. *melanocephala*), and one from Richardson named by him *O. arctica;* from the Rocky Mountains, Sir William Hooker's *O. arctica* δ, of Drummond's collection; . . . ; and finally, a fruiting specimen of the latter from Bourgeau's collection." The Arctic American plants referred to by Gray I have not seen, but they are very likely not identical with the others. The Drummond material of *O. arctica,* δ. *inflata* Hook. is, as stated, identical with the Labrador plant, but the Bourgeau plant is *O. Hallii* Bunge, a much coarser species with longer lanceolate free stipule-tips, longer leaves with more numerous and coarser leaflets, and capsules firmer, less stipitate and larger than in *O. podocarpa.* The Colorado plant commonly referred to the latter species is *O. Hallii* and some other Alberta specimens besides those of Bourgeau belong to it.

Explanation of Plates 171 to 175

(Photographs by *J. F. Collins*)

171, Oxytropis gaspensis × 3/8, type specimen, *Fernald & Smith*, no. 25,874. 172 (lower), O. hudsonica × 1, duplicate type, *Low*, no. 14,272; (upper), O. arctica × 1, duplicate type from Melville Island, *Parry's* Voyage, 1820. 173, O. johannensis × 3/8, type specimen, *Fernald*, no. 2289. 174, O. terrae-novae × 1, *Wiegand, Gilbert & Hotchkiss*, no. 28,607. 175, O. coronaminis × 1, type specimen, Arctic sea-coast (Coronation Gulf), *Richardson.*

(*To be continued*)

ERAGROSTIS PEREGRINA VERSUS E. DAMIENSIANA

M. L. Fernald

A weed of roadsides and railroads, which has been spreading rapidly in recent years, was described in 1917 as *Eragrostis peregrina* Wiegand, Rhodora, xix. 95 (1917). Since Wiegand called attention to it this ruderal grass has become generally known, but now, in Repertorium Specierum Novarum Regni Vegetabilis, xxiv. 323 (1928), Thellung takes up for it *Eragrostis Damiensiana* Bonnet, Le Naturaliste, 3e anné, no. 5 (15 mai 1881), 412 and cites two pages of references in

European literature dating back to 1821. The name *E. inconspicua* Hort. Paris, Coss, & Balansa, Actes du Congr. Internat. Bot. Paris (1867) 118 is excluded because published in synonymy. But it would certainly seem that *E. Damiensiana* Bonnet was also published in synonymy. Bonnet's paper was entitled "NOTE SUR L'ERAGROSTIS PILOSA P. B. VARIÉTÉ DAMIENSIANA." After an introductory paragraph about the plant having been called to the attention of Balansa by M. Ch. Damiens as growing in the pavement of the courtyard of the Ministry of War in Paris, Bonnet, in a careless manner spoke of "l'E. Damiensiana Mihi (olim)" and throughout his discussion he continued to use the binomial, until the closing paragraph, where, acting up to the conviction expressed in the title of the article, he said:

"En résumé, l'Eragrostis découvert par M. Damiens dans la cour du Ministère de la Guerre et signalé pour la première fois par M. Balansa dans le Congrés de botanique (1867) constitue une forme affine à l'E. pilosa P. B., mais qu'il était cependant utile de distinguer; je propose donc de lui donner le nom de son inventeur et de l'appeler désormais *Eragrostis pilosa* P. B., variété *Damiensiana.*"

It should be noted, further, that Bonnet had no thought of treating the plant as a species. In the paragraph where he first used the binomial he explicitly stated that it was not a species: "Je ne veux cependant pas proposer comme espèce la plante du Ministère de la Guerre, ses affinités avec l'E. pilosa P. B. me paraissent trop évidentes et son origine est trop obscure pour qu'on puisse assurer qu'elle constitue bien un type légitime dans ce genre Eragrostis où les espèces ont été déjà bien multipliées et basées souvent sur de bien faibles caractères." Until the very recent publication by Thellung (1928), the binomial *E. Damiensiana* has been regularly treated as published in synonymy and not as a legitimate specific name. In fact, Thellung himself has so considered it. In 1907, elevating the plant from varietal to subspecific rank as *E. pilosa* "ssp. **Damiensiana** (Bonnet) Thell. comb. nov." [1] he gave as part of the synonymy "E. pilosa var., Cosson et Balansa! Congr. intern. bot. (1867), 117; E. inconspicua hort. Paris ex Coss. et Bal. l. c. 118 [in syn.]; . . . E. pilosa var. Damiensiana E. Bonnet! . . .; E. Damiensiana E. Bonnet ibid, in textu [pro syn.]." Again in Fedde, Repert. Nov. Sp. v. 360 (1908), he repeated his treatment of *E. Damiensiana* as published in synon-

[1] Thellung, Vierteljahrsschr. d. Naturf. Ges. Zürich, lii. 438 (1907).

ymy. To be sure, Thellung after calling the plant *E. pilosa*, subsp. *Damiensiana* and publishing a variety of it, referred to it in a footnote as *E. Damiensiana* and indicated that this was the name to be taken up if the plant should prove to be a species; and in his latest work (1928), treating the plant as a species, "**Eragrostis Damiensiana** Ed. Bonnet", he justifies the use of this name, originally published as a synonym, because, prior to the unequivocal publication of *E. peregrina* Wiegand (1917), he (Thellung) had indicated *E. Damiensiana* in a "not. (in textu, nomen eventuale)" as the name to take up should the plant prove to be a species.

Whether such an equivocal name as *Eragrostis Damiensiana* should be taken up to displace an unequivocal name of later date seems very doubtful. If, in 1907, Thellung had whole-heartedly and unequivocally taken up *E. Damiensiana* and treated it as the name of a true species, thereby validating it, there would be no question. But in view of the facts, that the binomial was first published as a synonym for a variety and by Thellung, in 1917, only as a "nomen eventuale" for a plant which he then treated as a subspecies, it would seem that its first *unequivocal* publication as a specific name must date from 1928 and, therefore, that it cannot rightly displace *E. peregrina* Wiegand (1917).

GRAY HERBARIUM

SOLIDAGO CALCICOLA IN MATANE CO., QUEBEC. On Aug. 18, 1926, while botanizing in the vicinity of Metis Beach, the writer gathered the interesting Northern golden-rod *Solidago calcicola* Fernald, which was found growing sparingly, along with *Solidago macrophylla* Pursh, at the edge of a wood on the lower road from Metis Beach to Mont Joli. The determination has been confirmed by Professor M. L. Fernald, to whom I am also indebted for the identification of an earlier gathering of the same plant, made on Aug. 12, on the shore road between Metis Beach and Leggatt's Point. Professor Fernald informs me that this record extends the range of the plant into Quebec, the previous records from the limestone mountains of Gaspé Co. having been based on the Alpine species now known as *S. mensalis* Fern. A specimen has been deposited in the Gray Herbarium.—T. W. EDMONDSON, New York University.

Chenopodium carinatum and other unusual Weeds.—There appeared in my garden at Milton, Mass., late in the summer of 1927 a single plant which much resembled *Chenopodium Botrys*. I cherished it as there was hope of its being another species, which later proved to be the case. Professor Fernald, who kindly identified it, found it was *Chenopodium carinatum* R. Br. and commented "long established on Cape Cod, apparently not previously noted north of there." And further: "see F. S. Collins, Rhodora xiii. 22 (1911)."

This should be diligently sought amongst our weeds in dry places. The Flora of The Boston District may be somewhat expanded by such procedure.

I also found in my garden last summer a single plant of *Salsola Kali* L., var. *tenuifolia* G. F. Meyer, perhaps worthy of passing mention, and several plants of *Oxalis europaea* Jord., forma *villicaulis* Wiegand, Rhodora xxvii. 135 (1925), with creamy white flowers.—Nathaniel T. Kidder, Milton, Massachusetts.

FIFTH INTERNATIONAL BOTANICAL CONGRESS, CAMBRIDGE, 1930

Chairman of Executive Committee: Prof. A. C. Seward, F.R.S.
Hon. Treasurer: Dr. A. B. Rendle, F.R.S.
British Museum (Natural History), London, S.W. 7.
Hon. Secretaries: F. T. Brooks, *31 Tenison Avenue, Cambridge, England.*
T. F. Chipp, *Royal Botanic Gardens, Kew, England.*

February 1, 1928.

PRELIMINARY NOTICE

Dear Sir or Madam,

At the Fourth International Botanical Congress held at Ithaca, United States of America, in 1926, an invitation from British botanists to hold the next International Botanical Congress in England was accepted. It has since been decided that the Fifth International Congress shall be held at Cambridge from August 16th to August 23rd, 1930, with excursions during the following week.

An Executive Committee of British botanists has been appointed to make the necessary arrangements for the Congress. The members of this Executive Committee are Dr. F. F. Blackman, Professor V. H. Blackman, Dr. E. J. Butler, Professor Sir John Farmer, Professor F. E. Fritsch, Professor Dame Helen Gwynne-Vaughan, Dr. A. W.

Hill, Professor Neilson Jones, Sir David Prain, Dr. A. B. Rendle (Treasurer), Professor A. C. Seward (Chairman), Professor W. Stiles, Professor A. G. Tansley, together with Mr. F. T. Brooks and Dr. T. F. Chipp (Secretaries).

On behalf of the Executive Committee we write to express the hope that you will be able to attend the Congress, and the Executive Committee request that you will be so good as to extend this invitation to any of your colleagues who may not receive a copy of this letter.

The subscription for membership of the Congress will be One Pound (£1), which should be paid to the Treasurer, Dr. A. B. Rendle, British Museum (Natural History), London, S.W. 7, before January 1st, 1930, if possible, or, at the latest, by April 1st, 1930. Early notification to the Treasurer of your intention to attend the Congress is particularly requested.

As at present arranged the Congress will be organized in the following Sections: PALAEOBOTANY, MORPHOLOGY (including ANATOMY), TAXONOMY and NOMENCLATURE, PLANT GEOGRAPHY and ECOLOGY, GENETICS and CYTOLOGY, PLANT PHYSIOLOGY, MYCOLOGY and PLANT PATHOLOGY.

For each of these Sections a British Sub-committee has been appointed, by which the programme for each Section will be arranged. The Chairmen of these Sub-committees and their addresses are as follows:

PALAEOBOTANY: Professor A. C. Seward, Botany School, Cambridge.

MORPHOLOGY (including ANATOMY): Professor F. E. Fritsch, Danesmount, Tower Hill, Dorking, Surrey.

TAXONOMY and NOMENCLATURE: Dr. A. W. Hill, Royal Botanic Gardens, Kew, Surrey.

PLANT GEOGRAPHY and ECOLOGY: Professor A. G. Tansley, Department of Botany, The University, Oxford.

GENETICS and CYTOLOGY: Professor Sir John Farmer, Imperial College of Science and Technology, London, S.W. 7.

PLANT PHYSIOLOGY: Dr. F. F. Blackman, Botany School, Cambridge.

MYCOLOGY and PLANT PATHOLOGY: Dr. E. J. Butler, Imperial Bureau of Mycology, 17, Kew Green, Kew, Surrey.

As far as possible the programme for each Section will consist of papers given at the invitation of the Sectional Sub-committee; arrangements for general discussions will also probably be made by the Sectional Sub-committees.

Communications made to the Congress by means of papers or by participation in the general discussions will be permissible in English, French or German.

Further information will be sent in due course. Correspondence of a general nature about the Congress should be addressed to one or other of the Secretaries.

We are,

Yours very truly,

A. C. SEWARD (*Chairman of Executive Committee*).
A. B. RENDLE (*Treasurer*).
F. T. BROOKS, T. F. CHIPP } (*Secretaries*).

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ASTER LATERIFLORUS AND SOME OF ITS RELATIVES.

K. M. Wiegand.

Several years ago when the writer was engaged in a special study of the flora of Central New York, great difficulty was found in the identification of many of the specimens of Aster. Particularly was this true of the species passing as *A. lateriflorus* and *A. paniculatus*. In an attempt to reach a better understanding of these forms, special attention was finally given to them, and the study was continued at the Gray Herbarium. The material in the Gray Herbarium, therefore, has served as the basis for the study, but this has been supplemented by the material in the herbarium of the New England Botanical Club and the herbarium of Cornell University. In all about 1200 specimens have been examined. The work has extended over several years, and many provisional treatments have been tried. The one presented below has met with little change during the later stages of the study, and probably represents very nearly the true situation regarding the taxonomy of this group of species. The difficulties encountered have led the writer to appreciate Dr. Gray's comment on the genus Aster as a whole. He says:[1] "Aster is far the most difficult of our genera [in the Compositae], both for the settlement of the names of the species and for their limitation, in respect to which little satisfaction has been attained as the result of prolonged and repeated studies."

At first no evidence that hybridization could be a factor in the confusion was apparent, and it was concluded that hybridization did not occur, or at least but rarely. Gradually, however, the conviction

[1] Synopt. Fl. i. pt. 2. 172.

grew that crossing between the species in the wild did occur, and was indeed one of the principal causes of the existing confusion This fact once understood, the group speedily became much clearer. Circumstantial evidence points more and more toward the frequent occurrence of hybridization in Aster, at least in certain groups, and a few artificial hybrids have been produced in other groups than the present one. These hybrids strongly resemble forms occurring in nature. Indeed the number of specimens in any herbarium that under this hypothesis must be interpreted as of probable hybrid origin is rather large. But it must be remembered that in the case of common species, like *A. lateriflorus* and *A. paniculatus*, collectors are much more likely to bring in unusual or abnormal specimens that are difficult to identify than the ordinary and easily recognized forms of the species. The percentage of specimens of hybrid origin occurring in herbaria is, therefore, much higher than it is likely to be in nature.

Another cause of great structural variations in these species is their ready response to fluctuations in environment. Changes in soil water, soil composition, and light intensity, as well as the operation of mechanical or pathological injury, often produce results which suggest specific or at least varietal difference. This is all so complicated that in the case of herbarium specimens, where the exact environment of the living plant is unknown, only approximate accuracy in interpretation can be secured.

In the course of this study certain characters have been found of value which have not been heretofore generally employed, as for instance the exact length of the involucre and the inner involucral bracts, the number of rays, and the shape of the limb in the disk-corolla as well as the length and character of its lobes. These characters of the disk-corollas are particularly interesting, as three of the species here treated, *A. lateriflorus*, *A. vimineus* and *A. dumosus*, are quite unlike in these respects.

The nomenclature of this group of asters is, as Dr. Gray has noted, extremely unsatisfactory. The writer has had no opportunity to inspect types in European herbaria, but has accepted provisionally the interpretation of other authors, particularly Dr. Gray. In many cases the older names were based on plants growing over a long period of time in European gardens. Specimens from some of these old races are in the Gray Herbarium. Unfortunately, neither

these specimens nor the original descriptions fit exactly any known asters in the wild state. These garden plants have either become modified through cultivation, or have become hybridized, or have been propagated from accidental collections of natural hybrids. In every case where definable, these older names have been given their proper place in nomenclature, but many of them must apparently be laid aside. Another difficulty lies in the fact that several specific names and a number of varietal names have been based on ecological responses, or on hybrids, and do not represent real races.

a. Leaves pubescent only on the midrib beneath or glabrous (often scabrous above). . . . *b.*
  b. Lobes of the disk-corollas 0.4–0.8 mm. long, 21–41(–43) % of total length of limb, erect, or spreading; the limb usually funnel-form: midrib beneath glabrous: rays 9–30 . . . *c.*
    c. Heads of medium size or large for the group, usually on long minutely bracted peduncles, scarcely racemose or unilaterally disposed: involucre 4–7.8 mm. high; bracts often with rhombic somewhat dilated tips; inner 3–6 mm. long: ray-corollas 5.2–9 mm. long: rameal leaves only moderately unequal, often uniform . . . *d.*
      d. Rameal leaves mostly spreading or reflexed, except toward ends of peduncles, oblong or linear-oblong, obtuse or barely acute at each end, more rarely abruptly mucronulate. . . . *e.*
        e. Rays 19–26: cauline leaves 3–5 cm. long; rameal rather thin (except in some Cape Cod to Long Island plants) . . . . . 1. *A. dumosus*
        e. Rays 9–17(–19): cauline leaves usually narrower and longer, (3–)4–9 cm. long, often very narrow; rameal rather thick, often extremely so: rays often broader . . . . . var. *coridifolius.*
      d. Rameal leaves mostly ascending or appressed, sometimes spreading, linear or linear-subulate, acute, soft or firm.
        e. Branches few: peduncles long and divaricate: involucral bracts mostly broad: rays 14–17(–20): cauline leaves linear or elliptic-linear, 3–7 cm. long . . var. *gracilipes.*
        e. Branches abundant (confined to upper part of plant in var. *strictior*), ascending or spreading: leaves usually narrow, up to 15 cm. long: involucral bracts rather narrower and less imbricated in some varieties. . . . *f.*
          f. Peduncles usually all long and slender: plant open, twiggy and wiry, much branched: rameal leaves short, rather uniform, ascending or spreading: stems and branchlets glabrate: (rays 15–25) . . . . . var. *pergracilis.*
          f. Peduncles, or many of them, short or even wanting: plant more dense: rameal leaves more unequal, many of them longer and proportionally narrower. . . . *g*

g. Rays 13–16(–20): stems sparsely and very finely puberulent: inflorescence rather small and terminal.....var. *strictior*.

g. Rays 20–25: stems glabrate or scabrous-puberulent or strigose with coarser hairs: plant and inflorescence diffuse.....var. *subulaefolius*.

c. Heads very small, often subracemose and frequently unilaterally disposed: involucre 3–3.6 mm. high; bracts usually narrowly linear, the inner 2.1–3.3 mm. long: ray-corollas (3–)4–5.8 mm. long: rameal leaves very unequal, irregularly spreading or ascending. . . . *d*

d. Heads scarcely solitary on the branchlets; most peduncles short: branches rather few, spreading-arching, decreasing upward: rameal leaves scarcely subulate, elliptic-linear: rays 15–22(–25) . . . *e*.

e. Rameal leaves rather soft, barely acute, mostly spreading.....2. *A. vimineus*.

e. Rameal leaves firmer, more acute, more ascending: (branches densely flowered, usually more ascending).....var. *dubius*.

d. Heads tending to be solitary and on slender more uniformly bracted peduncles: branches longer, more spreading: rameal leaves narrower, often linear-subulate, more acute: rays somewhat more numerous, 17–30.....var. *subdumosus*.

b. Lobes of the disk corollas (1–)1.1–1.6 mm. long, 50 to 75 % of total length of limb, at length usually revolute; limb goblet-shaped: rays (7–)9–14: midrib usually pubescent beneath. . . . *c*.

c. Heads rather conspicuously subracemose or paniculate on the usually long, spreading branches. . . . *d*.

d. Leaves lanceolate to broadly lanceolate, more than 8.3 times as long as wide. . . . *e*.

e. Branches in well developed plants rather numerous: the rameal leaves not conspicuously uniform in size and position nor abruptly reduced.....3. *A. lateriflorus*.

e. Branches fewer, when well developed long and slender, spreading or recurved: rameal leaves rather abruptly smaller than the cauline, rather uniform, tending to stand parallel, mostly narrowly elliptical; cauline usually rather short and broad, tapering somewhat equally both ways from middle.....var. *pendulus*.

d. Leaves linear or linear-lanceolate, 8.3 times as long as wide or narrower: habit as in the typical form..var. *angustifolius*.

c. Heads more paniculate at top of plant, the inflorescence with shorter more ascending branches and usually appearing more terminal: peduncles long, slender: stems rather slender, nearly glabrous: northeastern.....var. *tenuipes*.

a. Leaves finely and rather evenly pubescent over both surfaces, but the hairs varying greatly in size and density on different plants: (rays numerous, 15–26). . . . *b*.

b. Involucre 5–6 mm. high; bracts with somewhat deltoid tips, the inner 4–4.8 mm. long: lobes of the disk-corollas 0.4–0.8 mm. long, 21–36 % of total length of limb...*A. dumosus* var. *Dodgei*.

b. Involucre 3–4.6 mm. high; bracts scarcely at all deltoid at tip, usually narrow, inner 2.8–4 mm. long: lobes of the disk-corollas (0.7–)0.8–1.2 mm. long, (41–)45–66 % of total length of limb. . . *c*.

c. Heads subracemose: pappus copious, soon exserted: stem rather stout: leaves 10–30 mm. wide. . . *d.*
d. Inner bracts of the involucre 3.2–4.6 mm. long: lobes of the disk-corollas (0.8–)1.0–1.2 mm. long. . . 4. *A. missouriensis.*
d. Inner bracts 2.8–3 mm. long: lobes of the disk-corollas 0.7–1.0 mm. long: plant more strict, with more abundant small ascending rameal leaves and smaller more densely racemose heads. . . . . var. *thyrsoideus.*
c. Heads paniculate: pappus scarcely exserted: stem more slender: leaves narrower, 8–15 mm. wide: plant more like *A. Tradescanti* in habit. . . . . 5. *A. ontarionis.*

1. A. DUMOSUS L. Sp. Pl. ii. 873 (1753); T. & G. Fl. N. A. ii. 128 (1841), in part var. *coridifolius;* Gray, Synopt. Fl. i. pt. 2. 185 (1884), in part other varieties. ? *A. fragilis* Lindl. Bot. Reg. t. 1537 (1832).—Stems purplish, obscurely or not at all striate, finely and mostly evenly puberulent: branches usually of medium length or short, spreading or ascending: leaves linear, linear-lanceolate or narrowly elliptic, rarely slightly oblanceolate, ascending, spreading or sometimes reflexed, rather small, the cauline 3–5 cm. long or rarely longer, 4–7(–8) mm. wide, all firm, glabrous beneath, more or less scabrous above, entire, or occasionally with a very few low teeth, acute at each end or often subtruncate at base; rameal leaves small, rather uniform in size, linear-oblong, obtusish, thin, more rarely firm, sometimes abruptly mucronate, spreading or reflexed or those on the peduncles ascending, much reduced on the branchlets and peduncles and then more oblong or quadrate (5–6 mm. long) with broad base and apex: heads scarcely unilaterally disposed, mostly on long ascending peduncles, 12–15 mm. wide including the rays: involucre 4.5–5.5 mm. high; the bracts in several series, much imbricated, with conspicuous green usually rhombic tips, the inner 3.0–4.6 mm. long, mostly oblanceolate and rhombic-acute, erose at tip or ciliate, outer chiefly oblong, passing into the rameal leaves: ray-corollas 19–26, 5.2–8(–9) mm. long, 0.7–1.2(–1.4) mm. wide, pale lavender or bluish, rarely white: disk-corollas 15–30, pale yellowish or brownish, 3–4 mm. long; limb funnel-form; lobes erect or somewhat spreading, very short, 0.4–0.8 mm. in length, only 21 to 36% of total length of limb:[1] achenes nearly glabrous.—Thickets and scrubby fields, chiefly in dry sandy soils: York County, Maine (not typical), along the coast to New Jersey and Lancaster County, Pennsylvania. Two specimens from the mountain region of North Carolina seem to belong here (Waynesville, 1897, *T. G. Harbison, E. E. Magee*). Many specimens from Cape Cod, Long Island and New Jersey have somewhat thicker and more ascending rameal leaves, but possess the larger number of rays and generally crisp-puberulent stems and branches of the typical form. They have been mistaken for var. *strictior* T. & G.

Var. CORIDIFOLIUS (Michx.) T. & G. Fl. N. A. ii. 128 (1841). *A. coridifolius* Michx. Fl. Bor.-Am. ii. 112 (1803); Gray, Synopt. Fl. i.

[1] The corollas of the disk florets in Aster are composed of a slender tube and more swollen limb. The latter consists of throat and lobes.

pt. 2. 186. *A. sparsiflorus* Michx. l. c. 112. *A. dumosus* T. & G. l. c., in part the typical form. *A. dumosus* var. *gracilentus* T. & G. l. c., according to Gates specimen.—Often more diffuse: stems more or less puberulent as in the typical form: cauline leaves, except the lowermost, narrower and longer (3–) 4–9 cm. long, often narrowly linear, usually reflexed; rameal generally very small, oblong and spreading as in the typical form but thicker, often very coriaceous at least when dry: rays fewer, 9–17(–19), up to 9 mm. long and 1.8 mm. wide.—Perhaps in slightly more moist situations than the typical form: occurring rarely on Long Island and in southeastern Pennsylvania, and more commonly from the District of Columbia to southeastern Kentucky, southward to Georgia and Mississippi; apparently infrequent on the Coastal Plain. A few of the specimens examined: Pennsylvania: Chester County, 1910, *E. B. Bartram*, no. 1341, possibly. District of Columbia: Takoma Park, 1897, *T. A. Williams;* Riverdale, 1916, *E. S. Steele.* Virginia: Norfolk County, 1892, *A. A. Heller*, no. 736. North Carolina: Poney Mt., Polk County, 1897, *E. C. Townsend;* Salisbury, 1908 and 1909, *W. W. Eggleston*, nos. 4257, 5603. South Carolina: *Ravenel.* Georgia: Middle Georgia, 1846, *T. C. Porter.* Florida: Apalachicola, *A. W. Chapman.* Tennessee: Higdon, 1898, *A. Ruth.* Kentucky: Bell County, 1893, *T. H. Kearney Jr.*, no. 522. Alabama: *Buckley.* Mississippi: Ora, 1903, *S. M. Tracy*, no. 8581; Beauvois, 1898, *Tracy.*

Var. **gracilipes**, var. nov. Ramis paucis elongatis tenuibus divaricatis subunicapitatis, ramulorum foliis parvulis subrigidis linearisubulatis acutis subadpressis.

Stems puberulent or glabrate: branches few, long, slender and divaricate, each terminated by a head, usually glabrate: cauline leaves nearly as in the typical form, linear or elliptic-linear, ascending, 3–7 cm. long; rameal small, firm, linear-subulate, acute, ascending or appressed: involucre about as in the typical form or slightly longer; the bracts often broad: rays 14–17(–20).—Pine barrens: Florida and Louisiana. Specimens examined: Florida: *Leavenworth;* 1883, *A. H. Curtiss;* Pine barrens near Jacksonville, 1894, *A. H. Curtiss*, no. 5345 (Type in Cornell University Herb.); 1898, *Curtiss;* Duval County, *A. H. Curtiss*, no. 1239; Brevard County, 1902, 1903, *A. Fredholm*, nos. 5617 and 6160; Orange City, 1913, *S. C. Hood.* Louisiana: *Hale* (apparently this variety).

Var. **pergracilis** var. nov. ? *A. sparsiflorus* Michx. Fl. Bor.-Am. ii. 112 (1803); Elliott, Bot. S. C. & Ga. ii. 346 (1824).—Diffusissima glabra vel sparse minuteque pubescens, ramis copiosis elongatis rectis tenuibus, foliis anguste linearibus erectis vel inferioribus reflexis, ramorum copiosissimis parvis subaequalibus oblongolinearibus vel subulatis acutis saepe adscendentibus, ligulis 15–25.

Very diffuse, essentially glabrous: branchlets abundant, angular, long, straight, slender, spreading, twiggy and glabrate: leaves nar-

rowly linear, erect or the lower reflexed; rameal leaves very abundant, small, uniform, oblong-linear or subulate, acute, chiefly ascending: heads terminating the long branchlets, small or of medium size: involucral bracts generally less imbricated and tips often less rhombic: rays 15–25.—Dry (or damp?) soil: coastal plain of North and South Carolina, possibly extending to the mountains. Specimens examined: NORTH CAROLINA: Beaufort, 1922, *L. F. & F. R. Randolph,* no. 833; ?Polk County, 1897, *E. C. Townsend.* SOUTH CAROLINA: Santee Canal, *Ravenel* (TYPE in Gray Herb.); Marion, 1927, *Manning & Wiegand* (Cornell Herb.); Moncks Corners, 1927, *Manning & Wiegand;* Early Branch, 1927, *Manning & Wiegand.*

This variety is related to var. *subulaefolius,* but is more diffusely branched, with more regular rameal leaves and more regularly long-peduncled heads. Herbarium specimens have a marked twiggy heath-like appearance. The rays vary in number more than in the other varieties. The rameal leaves in this variety are less gradually acute than in var. *subulaefolius.*

Var. STRICTIOR T. & G. Fl. N. A. ii. 128 (1841).—Stems rather strict, sparingly and rather finely puberulent or glabrate: branches mostly confined to the upper part of the stem, rather short, ascending: leaves narrowly linear, 7–11 cm. long, 5–7.6 mm. wide, glabrous, sparingly scabrous above and on the margin; rameal leaves often large for the species, (4–)5–7.4 mm. long, linear or linear-elliptic, acute, ascending, not thick: involucral bracts in fewer series, the tips broad: rays few, 13–16 (–20).—Apparently in dry sandy soil: Western New York and Western Ontario to Michigan and Illinois. Specimens examined: NEW YORK: near Buffalo, 1864, *Clinton.* MICHIGAN: Fort Gratiot, *Dr. Pitcher.* ONTARIO: Sandwich, 1890, *J. Macoun,* no. 9; Windsor, 1884, *J. M. Macoun,* no. 1. INDIANA: near Ft. Wayne, 1914, *C. C. Deam,* no. 15555.

This variety has the aspect of the peculiar Cape Cod specimens of *A. dumosus* mentioned above, but the leaves are larger and narrower, the bracts longer and more acute, and the rays fewer. It is unlike var. *subulaefolius* in the number of rays, frequently puberulent stem, and general appearance of the inflorescence. In the rather fewer series of involucral bracts it tends to differ from all other varieties of this species.

Var. DODGEI Fernald, RHODORA, xi. 31 (1909).—Resembling the last named variety, but stem more pubescent, often strongly so, and with longer hairs: leaves broader and shorter, scabrous and often strigose or more densely pubescent on one or both surfaces: bracts more ciliate, in some cases more acute: rays more numerous, 18–24.—Damp or marshy ground: islands at the mouth of the St. Clair River, Michigan, and possibly the same form from Oxford, Ohio. Specimens

examined: MICHIGAN: Hersen's Island, St. Clair County, 1907, *C. K. Dodge*, nos. 16 and 17; 1908, *Dodge*, nos. 84 and 85. OHIO: Oxford, Erie County, 1902, *E. L. Moseley* (apparently this variety).

Whether this variety is a true race or of local hybrid origin is uncertain. Its very limited distribution throws suspicion on its autonomy; but if a hybrid, no other species can be readily interpreted as its other parent. It should be studied further in the field.

Var. SUBULAEFOLIUS T. & G. Fl. N. A. ii. 128 (1841). *A. foliolosus* Ell. Bot. S. C. and Ga. ii. 345 (1824), probably.—Stems much branched often to below the middle, glabrous, or sometimes pubescent, if so with coarser and more strigose hairs than in the other forms of the species, angular above: branches ascending: leaves narrowly linear, 2–5 mm. wide, sometimes 12 cm. long, ascending or the lower and older reflexed: heads very numerous, more racemose or paniculate than in the typical form, on peduncles of irregular length, often subsessile; rameal leaves longer, up to 15 or 18 mm. long, more variable in length, rather soft, linear or linear-subulate, acute, mostly ascending: involucre up to 7.8 mm. long, the bracts rather narrow (except in some southern specimens) and the green tips less rhombic, usually less conspicuously imbricated than in the typical form: rays in well developed heads 20–25.—Damp or wet, rarely dry, sandy soils on the Coastal Plain and adjacent areas: Plymouth, Barnstable and Bristol Counties, Massachusetts; Newport and Kent Counties, Rhode Island; and from South Carolina to Florida; also in Louisiana and Texas. Some specimens examined: MASSACHUSETTS: Plymouth, 1913, *Fernald, Hunnewell & Long*, nos. 10588, 10589, 10594; Harwich, 1918, *Fernald & Long*, no. 17536; Barnstable, 1916, *Bean, Bird & Knowlton;* Chatham, 1918, *Fernald & Long*, no. 17534. RHODE ISLAND: Warwick, 1914, *Collins, Fernald & York*, no. 11448. SOUTH CAROLINA: Santee Canal, *Ravenel.* GEORGIA: Okefinokee Swamp, 1921, *A. H. Wright*, nos. 1102, 1103. FLORIDA: *Chapman;* Hillsborough County, 1904, *A. Fredholm*, no. 6484; Ft. Lauderdale, 1903, *A. A. Eaton*, no. 807; Lake County, 1894, *G. V. Nash*, no. 747. LOUISIANA: *Leavenworth.* TEXAS: Austin, 1835, *Drummond;* Prairies near Houston, 1842, *Lindheimer* (several specimens).

This variety is apparently common on Cape Cod, being represented by about twenty numbers in the collections studied. In the Southeastern States it seems also to be common. A majority of the specimens seen from Florida and farther west are of the older collectors, and bear Dr. Gray's identification as var. *subulaefolius*. Certain specimens collected by F. L. Harvey near Fayetteville in northwestern Arkansas were labelled by Dr. Gray var. *subulaefolius*, but they are unlike other specimens of this variety. In this case some crossing of species in the immediate vicinity is suspected.

A. dumosus presents many perplexing lines of variation the exact significance of which is often difficult to make out. This difficulty is increased by abundant hybridization with other species. The variants that seem to represent races or important trends have here been separated as named varieties. Nomenclature within this species is very difficult. For the name *A. dumosus* L. Dr. Gray's interpretation has been accepted. The identity of *A. coridifolius* Michx. is fairly certain. A fragment in the Gray Herbarium, thus labelled and coming from the Michaux Herbarium, is clearly the form here called var. *coridifolius*. Michaux's *A. sparsiflorus* of "Carolina inferiore" is poorly defined and its interpretation difficult. Dr. Gray makes it a synonym of *A. dumosus*, while Nuttall, judging from a specimen in the Gray Herbarium, interpreted it as the form here called var. *coridifolius*. It may be our var. *pergracilis*.

The peculiar race, found in Florida, with few long scattered slender branches and rather short ascending leaves is apparently without a name. It is not the var. *gracilentus* T. & G., as the only specimen in the Gray Herbarium so labelled (the Gates specimen cited by T. & G.) is an abnormal specimen of var. *coridifolius*.

The var. *strictior* T. & G. was not recognized by Dr. Gray in the Synoptical Flora. The range was given by Torrey and Gray as: "Vermont! and Michigan! to New Jersey! & c., usually in moist soil." The only specimen in the Gray Herbarium bearing the name var. *strictior* in Dr. Gray's handwriting is from Michigan (Ft. Gratiot, *Dr. Pitcher*). This specimen has been taken to define the var. *strictior* of the present paper. Our conception of the variety must differ from that of Torrey and Gray, however, judging from the range given. On the other hand their conception can scarcely apply to any form confined to the eastern sea coast.

The identity of var. *subulaefolius* T. & G. is well established by numerous specimens so labelled by Dr. Gray and in the Gray Herbarium, including Leavenworth's Louisiana specimen cited by Torrey and Gray. They are, however, all from the Gulf coast. Repeated examination has failed to show any difference between these southern specimens and those from eastern Massachusetts and Rhode Island, though the variety is at present not definitely known from the intervening area. The specimens from Massachusetts have recently passed under the name var. *strictior* T. & G.

2. A. VIMINEUS Lam. Dict. i. 306 (1783). *A. secundiflorus* Desf.

Tab. ed. 2, 268 (1815). *A. Tradescanti* T. & G. Fl. N. A. ii. 129 (1841), not L. *A. Tradescanti* var. *fragilis* T. & G. l. c.—Stems 4–15 dm. high, slender, generally purple, smooth or puberulent in lines above, usually inconspicuously striate, arching: branches many, spreading or ascending, short or moderately long, straight or arching, often crowded, gradually reduced in length upward: branchlets more or less angled: leaves linear-lanceolate or linear, tapering and acute at both ends, sparingly low-toothed or entire, when well developed 8(–11) cm. long, 6(–10) mm. wide, glabrous beneath, glabrous or very sparingly scabrous above, rough-margined: rameal leaves unequal, very numerous, irregularly spreading in all directions, oblong, oblong-linear or linear, acute or obtusish, mostly 3–7 mm. long, rather soft, more or less tortulose when dry, inconspicuously or not at all ciliolate-scabrous: heads small and often crowded, generally short-pedicelled or subsessile and more or less unilaterally subracemose: involucre 3–3.6 mm. high, the bracts generally narrowly linear, acute, soft, with narrow green midrib, glabrous or slightly ciliolate; the inner 2.1–3.3 mm. long: rays 15–22(–25), with corollas (3–)4–5.8 mm. long, 0.5–0.9 mm. wide, usually spreading, white or rarely purplish: disk-corollas 2.5–3.3 mm. long, pinkish purple; limb funnel-form, the lobes 0.6–0.8 mm. long, 38–41% of total length of limb, erect or ascending: achenes small, sparingly hairy.—Dry or somewhat damp shores and fields, in light, chiefly acid soils: along the coast from Androscoggin County, Maine to Virginia; also extending inland in southern New Hampshire and southern Vermont. Not seen from the Berkshire region of New England, nor from New York State except near New York City. No specimens have been seen by the writer from south of Virginia.

Var. **dubius**, var. nov. Strictior, capitulis confertis saepe majoribus, foliis caulinis sublanceolatis, foliis ramulorum rigidioribus adscendentioribus.

More strict, with more arching-ascending branches, and more subspicately racemose crowded heads: cauline leaves more often lanceolate: rameal leaves more rigid and acute, more ascending, and more scabrous-ciliate: heads often slightly larger.—Dry or damp ground: southern Maine, New Hampshire and Vermont to Connecticut, eastern Pennsylvania and Maryland. Some specimens examined: MAINE: North Berwick, 1894, *J. C. Parlin.* NEW HAMPSHIRE: Hinsdale, 1919, *C. F. Batchelder;* Jaffrey, 1887, *B. L. Robinson*, no. 386 (TYPE in Gray Herb.). VERMONT: Wallingford, 1898, *W. W. Eggleston*, no. 626. MASSACHUSETTS: Andover, 1903, *A. S. Pease;* Essex, 1913, *Fernald, Hunnewell & Long*, no. 10598; Framingham, 1911, *A. J. Eames;* Lake Massapoag, Sharon, 1899, *E. F. Williams;* Brookline, 1887, *E. & C. E. Faxon*, no. 23; Middleboro, 1921, *C. H. Knowlton;* Mt. Warren, Hampshire County, 1873, *W. H. Blanchard.* RHODE ISLAND: Cumberland, 1903, *E. F. Williams.* CONNECTICUT: Glastonbury, 1903, *A. W. Driggs*, no. 2199; Bolton, 1907, *A. W. Driggs;* Middletown, *J.*

Barratt. NEW JERSEY: Freehold, 1852, *Hexamer & Maier.* PENNSYLVANIA: Easton, 1878, *T. C. Porter;* Harrisburg, 1888, *Porter,* MARYLAND: Hyattsville, 1914, *E. S. Steele.*

Var. **subdumosus,** var. nov. Diffusa, ramis patentibus, capitulis subsolitariis, pedunculis tenuibus bracteatis saepe elongatis, foliis ramulorum auguste linearibus vel elliptico-linearibus acutis plerumque divaricatis.

Diffusely branched, with wide-spreading branches: heads tending to be solitary on slender, bracted, often elongated branchlets or peduncles: rameal leaves narrowly linear or narrowly elliptic-linear or linear-subulate, acute, mostly spreading: involucral bracts usually very narrow: rays 17–30.—Low ground: Alabama, Missouri and Illinois, and possibly elsewhere in the lower Mississippi Valley. Specimens examined: ALABAMA: Auburn, 1891, *G. F. Atkinson.* MISSOURI: St. Louis, 1886, *H. Eggert;* Dunklin County, 1892, *B. F. Bush,* no. 35. ILLINOIS: 1881, *J. Wolf;* near St. Louis, 1874, *H. Eggert;* Olney, 1914, *R. Ridgway,* no. 68 (TYPE in Gray Herb.).

Dr. Gray's interpretation of the name *A. vimineus* Lam. as applying to this species has been accepted The original description agrees well with our plants but Lamarck gave the source of his specimen as Canada.

The typical form of *A. vimineus* is rather uniform as to structural characteristics, and fairly easy of recognition. However, many specimens ordinarily referred to this species appear aberrant and are probably of hybrid origin. They have, in different cases, broader leaves, more diffuse straggling branches, more striate or angular branches and branchlets, more subulate and more ascending rameal leaves, larger heads, broader involucral bracts, as well as variations in rays and in disk corollas. Apparent hybrids with *A. ericoides, A. novi-belgii, A. undulatus, A. lateriflorus, A. dumosus, A. missouriensis* and *A. paniculatus* have been noted, those with the latter species being much the most common. A certain series of rather uniform specmens, having the appearance of hybrids with *A. lateriflorus* or *A. paniculatus* and its relatives, but needing further study, have been segregated provisionally as var. *dubius,* owing to the uncertainty as to whether they may not after all represent a real race.

The var. *subdumosus* seems worthy of recognition. Heretofore plants of this variety have been variously identified. Two of the four specimens that bear Dr. Gray's handwriting were named by him *A. vimineus* var. *foliolosus.* One other bears the name *A. vimineus* (?), and the fourth *A. dumosus.* Other later specimens have been mostly named *A. vimineus* or *A. dumosus.*

The status of the name var. *foliolosus* Gray (*A. dumosus* var. *subracemosus* T. & G. in part, according to Gray) is not entirely clear. The range given in the Synoptical Flora is, "New England to Illinois." The two eastern specimens so named by Gray are, one, *A. vimineus*, and the other apparently *A. dumosus* × *vimineus;* while the seven western are distributed among *A. vimineus* var. *subdumosus*, *A. ericoides* × *A. vimineus* var. *subdumosus*, and *A. missouriensis* var. *thyrsoideus* × *A. vimineus* var. *subdumosus*. The original *A. foliolosus* Ait., on which Dr. Gray's name was based, apparently was a garden form doubtfully referable to any wild type. In the interest of clarity the name may be laid aside.

A. vimineus var. *saxatilis* Fernald (RHODORA i. 188, 1899. *A. saxatilis* Blanchard, Amer. Bot. vii. 26, 1904) more properly belongs to the *paniculatus-Tradescanti* group, and is not included here.

A. racemosus Ell., of the southeastern United States, superficially resembles *A. vimineus*, but is in reality a relative of *A. ericoides*, The involucral bracts have thick, more or less pointed tips, and the leaves are scabrous-puberulent on both faces.

3. A. LATERIFLORUS (L.) Britton. *Solidago lateriflorus* L. Sp. Pl. ii. 879 (1753). *A. lateriflorus* Britton, Trans. N. Y. Acad. Sci. ix. 10 (1889). ? *A. diffusus* Ait. Hort. Kew. iii. 205 (1789); Gray, Synopt. Flora (largely var. *pendulus*). ? *A. recurvatus* Willd. Sp. Pl. iii. 2047 (1803). ? *A. Tradescanti* Michx. Fl. Bor. Am. ii. 115 (1803), not L. *A. miser* Nutt. Gen. N. A. Plants, ii. 158 (1818); T. & G. Fl. N. A. (largely var. *pendulus*). *A. hirsuticaulis* Lindl. in D. C. Prod. v. 242 (1836). *A. miser* var. *diffusus* T. & G. Fl. N. A. ii. 130 (1841), largely var. *pendulus*. *A. miser* var. *hirsuticaulis* T. & G. l. c. *A. miser* var. *glomerellus* T. & G. l. c. in part at least. *A. diffusus* var. *hirsuticaulis* Gray, Synopt. Fl. i. pt. 2. 187 (1884). *A. lateriflorus* var. *hirsuticaulis* Porter, Mem. Torr. Bot. Club, v. 324 (1894). ? *A. lateriflorus* var. *glomerellus* Burgess, in Brit. & Brown, Ill. Fl. ed. 1, iii. 380 (1898).—Stems purplish (green in shade), 6–12 dm. high, slightly arching, branched to below the middle, varying from glabrous to curly-villous: branches subsimple, ascending-arching to wide-spreading, usually decreasing in length upward: leaves lanceolate to elliptic-lanceolate or oval-lanceolate, 5–8(–15) cm. long, 1–2(–2.9) cm. wide, 8.3 times as long as wide or less, rather thin, sparingly serrate or subentire, tapering to the base and acute apex, glabrous beneath except usually the villous midrib, more or less scabrous above: rameal leaves linear-lanceolate to elliptic-lanceolate, acute, soft, usually with smooth margins, the primary 7–30 mm. long: heads more or less racemosely or spicately or subpaniculately arranged on the primary branches, usually more or less unilaterally disposed,

about 1 cm. in diam.: involucre 4–5.5 mm. long, the bracts glabrous, in few series, usually rather firm and broad, pale toward the base, greener and often slightly dilated toward the apex, rather gradually acute from the middle; midrib rarely rhomboidally dilated; inner bracts 3.5–4.5(–5) mm. long: rays (9–)11–12(–14), white, rarely purple-tinged, with corollas (4.5–)5–6(–6.5) mm. long, 0.7–1.2(–1.5) mm. wide, usually more or less reflexed and relatively inconspicuous: disk florets at length deep purple, the corollas 3.0–4.3(–4.8) mm. long, with limb open-campanulate (goblet-shaped) and deeply lobed in full anthesis; lobes (1.0–)1.1–1.6 mm. long, 50 to 75 per cent of the length of the whole limb, recurved: achenes 1.6–2.3 mm. long, generally somewhat hairy.—Banks, thickets, open woods and shores usually in rather dry, but also in damp or even wet, sandy or gravelly soil: Magdalen Islands and Prince Edward Island, southward through Nova Scotia and Quebec to western Massachusetts, Connecticut and northern Pennsylvania, infrequently and also less typically in the mountains to North Carolina: found also in Ontario and northern Michigan. The typical form is apparently rare or absent along the coast south of Maine. In general the cauline pubescence seems to be better developed in the north.

Var. PENDULUS (Ait.) Burgess. *A. pendulus* Ait. Hort. Kew. iii. 205 (1789). *A. lateriflorus* var. *pendulus* Burgess, in Brit. & Brown, Ill. Flora No. States and Canada iii. 380 (1898), as to name bearing synonym, scarcely as to plant. ? *A. divergens* Ait. l. c. 205. ? *A. horizontalis* Desf. Cat. ed. 3, 402 (1829).—Stems less frequently villous, often glabrous; branches more slender and spreading, often horizontal or occasionally recurved, frequently long and straggling: cauline leaves rather short and broad, usually rather cuneately narrowed from the middle toward both ends: rameal leaves usually elliptical, rather uniform in size, often rather distant, much smaller than the adjacent cauline and thus conspicuous and often giving the branches in herbarium specimens an interrupted or moniliform appearance: heads averaging slightly smaller.—Damp or rather dry thickets or fields: south-central Maine along the coast to Florida, westward through southern Pennsylvania and Ohio, southern Michigan, Illinois and Missouri to Alabama, Mississippi and possibly Texas: less characteristic northeast of Connecticut. Some specimens examined: MAINE: Gilead, 1897, *K. Furbish;* Woolwich, 1916, *Fernald & Long,* no. 14729. NEW HAMPSHIRE: Hinsdale, 1919, *C. F. Batchelder.* MASSACHUSETTS: Concord-Waltham road, 1857, *E. S. Hoar;* Brookline *C. E. Faxon, F. F. Forbes;* Medfield, 1921, *C. H. Knowlton;* Milton, 1893, *E. F. Williams;* Stony Brook Reservation, 1922, *N. T. Kidder;* Framingham, 1909, 1914, *A. J. Eames.* CONNECTICUT: Southington, 1898, *C. H. Bissell,* no. 273; Franklin, 1906, *R. W. Woodward.* NEW JERSEY: Saccosunna, 1867, *Austin.* PENNSYLVANIA: Mt. Hope and Stoneroads Mill, Lancaster County, 1901, A. *A. Heller;* Bradford Hills, Chester County, 1910, *E. B. Bartram,* no.

1285. DELAWARE: Faulkland, 1884, *A. Commons*. MARYLAND: Lanham, 1912, *W. R. Maxon*, no. 5934. VIRGINIA: Norfolk, *Royce*. NORTH CAROLINA: Waynesville, 1897, *E. E. Magee;* Biltmore, 1897, *Bilt. Herb.* no. 40c. GEORGIA: Chattahooche River, 1902, *R. M. Harper*, no. 1754. FLORIDA: Aspalaga, 1897, *Chapman*, no. 40a (distributed by Biltmore Herb.). ALABAMA: Washington County, 1908, *R. M. Harper*, no. 133. MISSISSIPPI: Saratoga, 1903, *S. M. Tracy*, no. 8580. OHIO: Columbus, 1839, *W. S. Sullivant*. KENTUCKY: Bell County, 1893, *T. H. Kearney*, no. 356. TENNESSEE: Knoxville, 1900, *A. Ruth*. ILLINOIS: Canton, 1893, *J. Wolf;* Carlinville, 1890, *W. E. Andrews;* Peoria, 1904, *F. E. McDonald*. MISSOURI: St. Francois County, 1893, *B. F. Bush*, no. 56.

Var. **angustifolius**, var. nov. Foliis anguste lanceolatis vel linearibus.

Leaves narrowly lanceolate or linear, 8.3 times as long as wide or more, the plant otherwise as in the typical form.—Perhaps more often in damp soil and swamps: northern and western New England, northern New Jersey, westward through Ontario and New York to Michigan and Wisconsin; very abundant in central New York. TYPE specimen: Cheshire, Massachusetts, 1915, *J. R. Churchill* (in herb. N. Eng. Bot. Club).

Var. **tenuipes**, var. nov. Gracile, foliis lanceolatis saepe magnis, capitulis tenuipedunculatis paniculatis non unilaterale subspicatis submagnis, ligulis magnis radiatis.

Stems slender somewhat zigzag: branches medium or short, ascending or spreading, mostly above middle of stems, forming a delicate open panicle: leaves lanceolate, rather large, the rameal much smaller, elliptic-lanceolate, thin, conspicuous: heads averaging larger than in the typical form (involucre up to 6.6 mm. high), on long, slender few-bracted peduncles, not on one-sided, subspicate branches: rays up to 15 in number, rather conspicuous, up to 7.5 mm. long and 1.9 mm. wide, spreading.—Damp thickets and swamps: Prince Edward Island, New Brunswick and Nova Scotia. Specimens examined: PRINCE EDWARD ISLAND: Dundee, 1912, *Fernald, Long & St. John*, nos. 8138 and 8140 (latter the TYPE, in Gray Herb.). NEW BRUNSWICK: Victoria County, 1901, *E. F. Williams*. NOVA SCOTIA: Baddeck, 1920, *Fernald & Long*, no. 22770; Ingonish, Cape Breton Island, 1914, *G. E. Nichols*, no. 751.

Variation in this widespread and abundant species is very great, and has given rise to endless confusion in the naming of specimens. A large part of this variation, it cannot be said at present how much, is due to the effect of environment. Fluctuations in composition and wetness of the soil and in light intensity undoubtedly affect the breadth of leaf, hairiness, openness of inflorescence, size of rameal leaves, size of heads, and possibly also the width of involucral bracts.

Also, the size of heads and width of involucral bracts seem to increase slightly, in many cases, as the heads grow older. Hybridity is also a factor in the confusing wealth of form, but it is often very difficult to decide whether a particular variation is due to this cause or to the environment. Apparent hybrids with *A. cordifolius*, *A. dumosus*, *A. ericoides*, *A. ontarionis*, *A. missouriensis*, *A. multiflorus*, *A. paniculatus*, *A. puniceus*, *A. saxatilis*, *A. undulatus* and *A. vimineus* have been noted.

Three of the more distinct types of variation are here recognized as named varieties. The var. *angustifolius* may be nothing more than a separation of the narrow leaved individuals of the typical form. The special abundance of the variety in New York State, and its frequent confusion with *A. vimineus*, which name the specimens often bear, have influenced the writer in recognizing it nomenclatorily. In appearance, too, it has a certain distinctness. The var. *pendulus* is a southern geographical variant, and well worthy of recognition as a variety. The var. *tenuipes*, on further study in the region where it occurs, may prove to be merely a hybrid of *A. lateriflorus* with some member of the *A. paniculatus* group. It certainly has that aspect.

Nomenclature relating to this species is very unsatisfactory. It has not seemed possible to determine definitely the application of the various names of Aiton, Willdenow, Lindley and Desfontanes, most of which were based on garden plants. Even with the aid of specimens bearing these names, made from plants growing in European botanical gardens, and obtained there by Dr. Gray several decades ago, little progress is possible. These specimens and the original descriptions do not clearly accord with any American wild forms. Most of these names have, therefore, been laid aside. The var. *horizontalis* Gray, based on *A. horizontalis* Desf., is one of these garden forms. The specimens bear a slight resemblance in abundance and shape of the rameal leaves to our var. *pendulus*, but the differences are equally great. The var. *bifrons* of Gray is discussed under *A. missouriensis*. Gray's var. *thyrsoideus* is apparently also to be referred to *A. missouriensis*. The var. *glomerellus* T. & G. was apparently a habit form, based partly on eastern and partly on western material, the western plants being very probably *A. missouriensis*. The writer has seen no Torrey & Gray specimens bearing this varietal name. The var. *glomerellus* Burgess is also to

be interpreted as a habit form as far as the description is concerned. *A. diffusus* var. *variifolius* Peck[1] was apparently based on certain ecological variants, and is doubtless not a distinct race.

Of his var. *hirsuticaulis* (*A. hirsuticaulis* Lindl., *A. miser* var. *hirsuticaulis* T. & G.) Dr. Gray says: "founded only on specimens from Albany, N. Y., *Beck* in herb. Torr. & Lindl., is a singular form, probably growing in much shade, with long and narrow leaves, as of *A. vimineus*, the midrib of these beneath and the stem very hirsute. Other forms in Torr. & Gray, Fl., are ambiguous between this and *A. vimineus*."[2] In his description of typical *A. diffusus* Dr. Gray says further: "either pubescent or almost glabrous." In recent years the name var. *hirsuticaulis* has sometimes been erroneously applied to the hairy forms of *A. lateriflorus* in distinction to the "typical" or glabrous type, while at other times it has been applied to narrow-leaved plants, with little reference to the degree of pubescence. The gradation in pubescence is so gradual, however, and the occurrence of wholly glabrous plants so infrequent, that no varieties based on pubescence can well be made. Also our narrow leaved var. *angustifolius* may be either hairy or glabrous. Certainly if applied to either narrow-leaved forms of *A. lateriflorus*, or to hairy-stemmed forms, it becomes a source of constant confusion, as these characters are neither independent in occurrence nor coexistent. The name var. *hirsuticaulis* may be restricted, therefore, to the original specimens, and dropped from general use.

The *A. pendulus* Ait., judging from the original description and from a specimen so labelled and obtained by Dr. Gray many years ago from plants grown in Europe, accords fairly well with our var. *pendulus*. It has seemed wise, therefore, to retain this name; but the var. *pendulus* of Burgess, based nomenclatorily on *A. pendulus* Ait., does not agree in its description with any form known to the writer. The branches "long, slender, and often pendulous," suggest our var. *pendulus*, but "leaves . . . conspicuously drooping . . . ; heads long-peduncled; rays and bracts often purple-tinged" suggest some form of *A. dumosus*. These characters do not occur in any of the southern specimens of *A. lateriflorus* seen by the writer.

Concerning the *Solidago lateriflorus* of Linneus, it may be noted

[1] Rep. N. Y. State Bot., in Rep. N. Y. State Mus. Nat. Hist. No. 46 (1893).
[2] Synopt. Fl. N. A. i. pt. 2. 187.

that it was based on a Kalm specimen and therefore is applicable to the northern rather than the southern variants of the species. Whether the leaves of this specimen were narrow or broad is not stated in the description.

A. lateriflorus as a species can best be recognized by the size and character of the corolla lobes, the number and length of rays, the length texture and shape of the involucral bracts, the curly pubescence when present on stems and branches, and the generally pubescent midrib of the rather thin (as compared with *A. paniculatus*) leaves.

4. A. MISSOURIENSIS Britton, in Brit. & Brown's Ill. Flora N. States and Can., ed. 1. iii. 378 (1898).—Stem stout and much branched, 8–18 dm. high, green, rarely purplish, coarsely few striate, villous: branches usually strongly ascending, scarcely arcuate, irregular and not conspicuously decreasing in size upward: leaves lanceolate or ovate-lanceolate, tapering toward both ends, 5–11 cm. long, 12–30 mm. wide, rather thin, grayish-green, serrate in the middle, finely and evenly strigose-scabrous or cinereous-puberulent above, evenly and finely pubescent beneath: rameal leaves ascending-spreading, very unequal, lanceolate or linear, acute, puberulent on both faces, the primary about 15 mm. long: heads very numerous, subracemose or subspicate, scarcely secund, about 12 mm. in diam.: involucre short for size of head, 3.2–4.6 mm. long; bracts rather narrow, occasionally oblanceolate, acute, rather soft, more or less puberulent or ciliate at tip, midrib little dilated, margins narrow; inner bracts 3–4 mm. long: rays 15–26, the ray-corollas about 6.5 mm. long, 0.8–1.0 mm. wide, spreading: disk corollas about 12–18, pale yellow or purple, 3–4.3 mm. long; lobes (0.8–)1.0–1.2 mm. long, (41–)55–66% of the length of the whole funnel form limb, spreading: pappus copious, exserted: achenes about 1.8 mm. long, pubescent.—Chiefly in low grounds and bottomlands, in heavy soil (?): Tennessee, Kentucky and southern Michigan to South Dakota, Kansas and Missouri. Specimens examined: TENNESSEE: Mill Creek near Nashville, 1884, *A. Gattinger*. ILLINOIS: Canton, 1893, *J. Wolf*, nos. 15, 16, 17, 20 and 27. IOWA: Clinton, 1896, *L. H. Pammel*, no. 50. MISSOURI: Jackson County, 1893, *B. F. Bush*, no. 145; Courtney, 1902, *Bush*, no. 1786. SOUTH DAKOTA: near Brookings, 1895, *T. A. Williams*. KANSAS: 1887, *J. H. Oyster*.

Var. **thyrsoideus** (Gray), comb. nov. *A. diffusus* var. *thyrsoideus* Gray (in large part), Synopt. Fl. N. A. i., pt. 2. 187 (1884). *A. miser* var. *glomerellus* T. & G. (as to western plants according to Gray), Fl. N. A. ii. 130 (1841), not *A. lateriflorus* var. *glomerellus* Burgess, in Brit. and Br. Ill. Fl., ed. 1. *A. lateriflorus* var. *thyrsoideus* Sheldon, Bull. Torr. Bot. Club, xx. 286 (1893), direct synonym of var. *thyrsoideus* Gray.—More strict, with numerous straight ascending branches, abundant smaller ascending rameal leaves, and very

abundant smaller slightly more densely racemose heads: inner involucral bracts 2.8–3 mm. long: disk corollas and their lobes shorter (lobes 0.7–1.0 mm. long, 50–60% of length of whole limb).—Tennessee, Illinois, and possibly Missouri. Specimens examined: TENNESSEE: Hyds Ferry near Nashville, 1884, *A. Gattinger*. ILLINOIS: vicinity of Canton, 1881 and 1888, *J. Wolf* (4 specimens); Carlinville, 1890, *W. E. Andrews*, no. 15.

Specimens here referred to *A. missouriensis* and its variety have passed under various names. Dr. Gray seems to have had only one specimen of the typical form of the species, and that he labelled "*A. diffusus.*" Other specimens since added to the Gray Herbarium have been called *A. diffusus*, *A diffusus* var. *bifrons*, *A. paniculatus*, *A. Tradescanti* and *A. missouriensis*. The plant does not seem to be closely related to *A. lateriflorus* (*diffusus*) however. The form of the involucral bracts and the disposition of the heads suggest rather an intermediate position between *A. lateriflorus* and the *A. paniculatus* group.

The var. *thyrsoideus* is retained provisionally, as no other disposition can be made of the six or more specimens referred to this variety, though they come from only three distinct localities. Of the four specimens of this variety in the Gray Herbarium known to Dr. Gray, all bear the name var. *thyrsoideus*, while most of the other Gray specimens thus labelled by him have at least some *A. missouriensis* blood. The inclusion of New York in the range given by Dr. Gray for var. *thyrsoideus* seems to have been based on a Clinton specimen from Buffalo. This specimen could be interpreted as a hybrid of *A. missouriensis* with *A. lateriflorus* if the former species grew there, which is not known to be the case. This specimen cannot now be interpreted. In recent years the name var. *thyrsoideus* has been also incorrectly applied to habit forms of *A. lateriflorus*. Apparent hybrids have been noted of *A. missouriensis* and the var. *thyrsoideus* with *A. lateriflorus*, *A. paniculatus*, and *A. vimineus* var. *subdumosus*.

A specimen in the Gray Herbarium labelled "Hb. Lindl. *A. bifrons* Lindl." from Kentucky (Short), and another specimen, apparently a duplicate of this but from Short himself, may be taken to represent *A. bifrons* Lindl.[1] These are unlike any other specimens seen, and, in large heads, long rays and open inflorescence, suggest a cross

[1] *A. bifrons* Lindl. in D. C. Prod., v. 243 (1836). *A. diffusus* var. *bifrons* Gray, Synopt. Fl. i., pt. 2, 187 (1884). *A. lateriflorus* var. *bifrons* Fernald, RHODORA, x. 94 (1908). *A. lateriflorus* var. *grandis* Porter, Mem. Torr. Bot. Club, v. 324 (1894).

between *A. missouriensis* and *A. paniculatus*. *A. bifrons*, therefore, may be interpreted as a hybrid.

5. **A. ontarionis**, sp. nov. Caulibus diffusis crispopuberulentibus, ramis adscendentibus vel divaricatis, foliis lanceolatis utrinque acutis obscure et sparse serratis, submembranaceis utrinque toteque villosis, foliis ramorum valde inequalibus ellipticolanceolatis, capitulis copiosissimis (10–)13(–15) mm. diam. paniculatis, involucris 3–3.5(–4) mm. longis, bracteis firmis acutis subciliatis stria media elongata apice leviter dilatata, ligulis (18–)20–25 angustis albidis elatis, corollis florum discorum 2.6–4.3 mm. longis albidopurpureis vel albidis, lobis corollorum adscendentibus (0.7–)0.8–1.2 mm. longis (41–)45–60% totius limbi.

Stems 5–15 dm. high, diffusely branched to the middle, crisp-puberulent with whitish hairs: branches mostly ascending: leaves lanceolate, 6–10 cm. long, 8–15 mm. wide, acute at each end and obscurely few toothed, rather thin, short-pubescent above and villous pubescent beneath over the whole surface, passing gradually into the very unequal lance-elliptic rameal leaves; heads very numerous (10–)13(–15) mm. in diam., paniculate (not unilateral nor subracemose): involucre 3–3.5(–4) mm. high, the bracts firm, acute, sparingly ciliate, the narrow midrib green and slightly dilated toward apex; inner bracts (2.6–)3–3.6(–3.9) mm. long: rays (18–)20–25, (4.8–)6–7 mm. long, narrow, 0.6–1.0 mm. wide, white or nearly so, spreading: disk corollas about 3.5 mm. long, pale purple or creamy white; lobes erect or spreading (0.7–)0.8–1.2 mm. long, about (41–)45–60 % of the total length of limb: mature achenes not seen.—Low ground in clay or silty soils, in limestone districts: apparently limited to the upper St. Lawrence Valley not far from Lake Ontario. Specimens examined: NEW YORK: De Kalb, 1914, 1915, *O. P. Phelps*, nos. 947, 1253 and 1709; Potsdam, 1914, 1915, *Phelps*, nos. 950 and 1250 (latter, TYPE in Gray Herb.); Waddington, 1914, *Phelps*, no. 960; Crystal Lake, Redwood, 1922, *Fernald, Wiegand, & Eames*, nos. 14476 and 14477; Black River, Dexter, 1922, *Fernald, Wiegand & Eames*, no. 14478. ONTARIO: Belleville, 1873, *Macoun*, no. 10.

This species resembles the *paniculatus-Tradescanti-saxatilis* group in habit and inflorescence, but the small heads have caused it to appear in herbaria under *A. lateriflorus*, *A. vimineus* and *A. Tradescanti*. From the above group it differs primarily in the deeper corolla lobes. It seems to be a well marked species, though of unusually local distribution. From its closest relative, *A. missouriensis*, it differs in the more slender paniculate diffuse habit, resembling, therefore, *A. Tradescanti*, rather than *A. lateriflorus*.

CORNELL UNIVERSITY.

CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY,—NO. LXXXII.

(*Continued from page 155.*)

II. THE NORTH AMERICAN SPECIES OF ANEMONE § ANEMONANTHEA

M. L. FERNALD

IN North America the species of *Anemone* § *Anemonanthea* DC. were for many years treated as identical with the Eurasian *A. nemorosa* L. or at most as an American variety, *A. nemorosa*, var. *quinquefolia* (L.) Pursh. Gradually, however, it has been recognized that we have no true *A. nemorosa* native in America, that *A. quinquefolia* L. is an endemic American species and that the members of the section on the Pacific slope are not identical with those of the Atlantic slope. All the species known in America have been properly described, but their characters have not been well worked out, and in such a current work as Piper's *Flora of the State of Washington* (1906) *A. Piperi* Britton, a plant with coarse ascending and usually forking rootstock, usually tufted flowering stems accompanied by one or more basal leaves and broad and short-beaked achenes, is reduced without comment to the eastern *A. quinquefolia*, which has slender horizontal and simple rootstock, solitary flowering stem usually without basal leaf and fusiform long-beaked achenes. Or in a later work, Jepson's *Manual of the Flowering Plants of California*, *A. quinquefolia* is made to include (as a variety) the endemic Californian *A. Grayi* Behr & Kell., a very distinct plant, differing from *A. quinquefolia* in having a thick and nodulose rootstock, with strong constrictions (in *A. quinquefolia* slender, cylindric and not nodulose), leaflets crenate and strongly pilose (in *A. quinquefolia* sharply toothed and essentially glabrous), sepals white or blue, rarely more than 1 cm. long, with the branches of the veins evanescent toward the tip (in *A. quinquefolia* the sepals white or pink, mostly 1–2.5 cm. long, with the branches of the veins extending to the margin) and achenes much smaller than in *A. quinquefolia*, with a beak about 0.5 mm. long (in *A. quinquefolia* 1–2 mm. long).

In eastern America, likewise, the group has not been satisfactorily understood. The late C. V. Piper had collected in the Virginia mountains a beautiful little plant of the section *Anemonanthea* which certainly finds no place in the two eastern species commonly recog-

nized; and the plant of the Alleghenies which was described by Pursh as *A. lancifolia,* but which all recent authors have identified with the continental European *A. trifolia* L., shows, when the series is laid beside a good display of the European plant, striking departures which seem not to have been recorded.

It seemed desirable, therefore, that our members of *Anemone* § *Anemonanthea* should be studied anew; and in the spring of 1921, having a keen student in Miss Helen Benedict (now Mrs. Frederick I. Daniels), I suggested that she attempt this study. The result was most gratifying but, unfortunately for the complete solution of the problem, the work did not reach finality, and Miss Benedict's change of plans made it out of the question for her to renew the study. She had, however, worked out many constant and hitherto undetected specific characters and prepared a clear key, and her work had definitely brought out the fact, long suspected, that the Alleghenian *A. lancifolia* is well distinguished from the European *A. trifolia.* She, furthermore, was able to identify the little plant found by Piper in the Virginia mountains with *A. minima* DC. (1817), a species apparently "lost" for almost a full century. Since Mrs. Daniels's results contain so much that is new and helpful, I have felt it important to bring them out. The main outline of the treatment is hers and only because of her modesty about presenting the results do I assume their authorship.[1] In this study Mrs. Daniels (and I) had the great advantage of examining the full series of western species in the herbarium of the State College of Washington, kindly loaned by Professor Harold St. John, a series of *A. lancifolia* generously loaned by Mr. E. B. Bartram and the material of this species in the herbarium of the Academy of Natural Sciences of Philadelphia sent by Mr. Long. These collections supplemented those of the Gray Herbarium.

[1] The great Linnaeus once issued a series of theses by his students under the title *Amoenitates Academicae* and Presl published the results of the great collecting expeditions of Haenke as *Reliquiae Haenkeanae.* In the pigeon-holes in my laboratory I find the partially completed revisions left by many temporary investigators. I have completed and published some of these studies and hope from time to time to bring others to conclusion and publication. It has been suggested that I call the series, in weak imitation of Linnaeus, "*Amoenitates Academicae*"; but, in addition to the undesirable duplication of title, it must be admitted that not all such "housecleaning" work is an amenity. It would, therefore, be more appropriate, if it should ever be desirable to reprint these papers as a separate work, to borrow a cue from Presl and call the series *Reliquiae Academicae*!

KEY TO AMERICAN SPECIES OF ANEMONE § ANEMONANTHEA

a. Leaves of involucre petioled, each 3–5-foliolate: rootstock thickened: achenes fusiform, ellipsoid or ovoid, at most 2 mm. thick....*b.*

b. Veins and veinlets of the sepals strongly anastomosing below the usually free tips[1]....*c.*

c. Rootstock subligneous, continuous, without scaly teeth: leaflets of involucral leaves deeply incised or cleft; the lateral ones often cleft nearly or quite to base: sepals commonly 6 (5–9): filaments elongating to 2 or 3 times the length of the carpels.....1. *A. nemorosa.*

c. Rootstock fleshy, scaly-toothed: leaflets of involucral leaves not at all or only rarely and but slightly incised; lateral ones simple, merely serrate-dentate: sepals commonly 5 (4–7): filaments shorter than to less than twice as long as the carpels.....2. *A. lancifolia.*

b. Veins and veinlets of the sepals free or only very slightly anastomosing....*d.*

d. Flowering stems solitary from a simple horizontal rootstock....*e.*

e. Stamens in 2 or more series, mostly 30 or more: sepals (except in poorly developed individuals) 0.6–2.5 cm. long, 3–11 mm. wide: rootstock elongate, 1–7 mm. thick....*f.*

f. Rootstock slenderly cylindrical, 1–5 mm. thick: leaves glabrous to more or less pubescent....*g.*

g. Middle leaflet of involucral leaves (except in weak individuals) commonly with 2–7 sharp teeth on each margin; lateral leaflets commonly cleft nearly or quite to base, with 4–12 teeth or segments on the outer margin: sepals white or roseate: filaments whitish, rarely twice as long as the carpels: beak of mature achene falcate 4. *A. quinquefolia*

g. Middle leaflet of involucral leaves entire or with 1–4 blunt teeth on each margin; lateral leaflets entire or but slightly cleft, with at most 7 blunt marginal teeth: sepals blue: filaments blue or bluish, becoming 2 or 3 times as long as the carpels: beak of mature achene straight.....5. *A. oregana.*

f. Rootstock nodulose, with strong constrictions, 2–7 mm. thick: leaflets blunt, scarcely cleft, with numerous crenate teeth and strongly pilose surfaces.....6. *A. Grayi.*

e. Stamens in a single series, 10–20 (rarely –30): sepals 0.35–1.6 cm. long, 1.7–6 mm. wide: rootstock short, slender, 1–4 mm. thick.....7. *A. Lyallii.*

d. Flowering stems 1–several from the usually forking summits of an erect or ascending rootstock.....8. *A. Piperi.*

a. Leaves of involucre sessile or subsessile, simple: rootstock filiform or flagelliform: achenes compressed-pyriform, 3–4 mm. broad.....9. *A. deltoidea.*

[1] In the absence of flowering material of (3) *A. minima* it is quite impossible to say whether the veins of the sepals are anastomosing or free, and, consequently, to assign it a proper place in the key. *A. minima* is a very rare plant of the Virginia mountains, with almost filiform stems; closely pubescent foliage, the hairs of the upper leaf-surfaces pustulate at base; leaflets very small and sharply dentate-serrate; sepals described as about 8 mm. long and 4 mm. wide; and softly villous or almost lanuginous small achenes.

1. A. NEMOROSA L. Sp. Pl. i. 541 (1753); for fuller synonymy see Gürke in Richter, Pl. Eu. ii. 473 (1897).—A Eurasian plant, sometimes cultivated in America; rarely spreading or persisting after cultivation. The only American specimens seen are from MASSACHUSETTS: persistent and spreading about old S. P. Fowler garden, Danvers, May 20, 1903 and May 6, 1904, *J. H. Sears* (station now reported to be destroyed).

2. A. LANCIFOLIA Pursh. Rootstock stoutish, 2–5 mm. thick, crisp, whitish when fresh, horizontal, covered with tooth-like scales: flowering stems solitary, glabrous or nearly so, stoutish, 1.4-3.5 dm. high: radical leaves solitary, long-petioled, with 3 sessile leaflets; the 2 lateral deeply cleft: involucre toward the summit of the stem, with 3 short-petioled leaves; the 3 rhombic to narrowly ovate leaflets dentate, 2–8.7 cm. long, the lateral often deeply cleft: sepals commonly 5 (4–7), whitish, 1.3–2 cm. long, their veins numerous, freely forking, subparallel, strongly anastomosing: stamens very numerous; the filaments shorter than to less than twice the length of the carpels: achenes minutely hirsute, fusiform, 3.5–3.8 mm. long, tipped by a straight or slightly curved obliquely thick-subulate beak 1–1.5 mm. long.—Fl. Am. Sept. 386 (1814). *A. nemorosa* Torr. & Gr. Fl. N. A. i. 12 (1838), in part, not L. (1753). *A. nemorosa* or *A. trifolia* Gray, Am. Nat. vii. 422 (1873), not L. (1753). *A. trifolia* Britton, Ann. N. Y. Acad. Sci. vi. 226 (1891); Robinson in Gray, Synop. Fl. i. pt. 1: 13 (1895); Small, Fl. Se. U. S. 436 (1903); Ulbrich, Engler's Bot. Jahrb. xxxvii. 219 (1905); not L. (1753). *A. cuneifolia* Schweinitz acc. to Britton, Ann. N. Y. Acad. Sci. vi. 226 (1891), not Juss. (1804). —Damp woods and thickets of the Alleghenies, southern Pennsylvania to Georgia. Fl. April–early June.

It has required more than a full century for *Anemone lancifolia* to establish its identity as a species. As indicated in the bibliography, Torrey & Gray placed it unequivocally in the European *A. nemorosa* and in 1873, when he received material from Virginia, Asa Gray reaffirmed his conviction that it is *A. nemorosa* but suggested also that it might be *A. trifolia*, saying:

"*Anemone nemorosa*, or *trifolia*. From the Peaks of Otter, at altitude of about three thousand feet, Mr. A. H. Curtiss sends an anemone of a form new to this country (although there is some approach to it in Oregon), which may be called *A. nemorosa* with undivided leaflets or *A. trifolia* L., according to the botanists' fancy. It is fully as large as the latter, having the stem a foot high up to the leaves, and the leaflets two and one-half inches long; the deepness of the teeth of these, and a slight tendency to trilobation, should rather refer it to *A. nemorosa*, which not rarely exhibits this state in Europe. This European form, as Mr. Curtiss remarks, appears to have kept company with *Convallaria majalis*,[1] being here associated with it in one of the most

[1] The idea that the native plant of the Alleghenies is identical with *Convallaria majalis* of Europe is as strongly entrenched as has been the conviction that the Alleghenian *Anemone lancifolia* is either *A. nemorosa* or *A. trifolia* of Europe. In the spring of 1921, while Mrs. Daniels was studying *Anemone*, Miss Marion E. Allen

northern stations of this plant, which in America is restricted to the Alleghenies." [1]

In 1891 Britton, without stating his reasons, identified *A. lancifolia* with *A. trifolia* of continental Europe; in 1895 Robinson, calling it *A. trifolia*, said: "The American plant does not differ by any constant or satisfactory character from the European, which is regarded as a good species"; [2] and in 1905 Ulbrich affirmed the *complete identity* of the two, saying "Im atlantischen Nordamerika findet sich *A. trifolia* L. in Formen, die mit den europäischen völlig identisch! sind." [3] In the light of such positive and authoritative assertions of the identity of the Alleghenian and the European plants it might seem that further comparisons of the two would be futile. Nevertheless, the species of the Alleghenian flora are, in general, so thoroughly distinct from those of southern Europe that it would be a remarkable exception if *A. trifolia* of the region from Portugal to the Apennines and the Carpathians were to reappear in the mountains from southern Pennsylvania to Georgia. It is therefore, reassuring that, in making comparison of all characters of the two, Mrs. Daniels should have found that the European plant differs from the American in frequently having 2 flowers (in the American only 1), the stamens fewer and with filaments more than twice the length of the carpels (in the American the more numerous stamens with filaments shorter than to less than twice the length of the carpels), the sepals commonly 6 or 7 (in the American commonly 5), with the few veins faint, their branches running free to the tip (in the American the numerous veins more obvious, undertook a similar study of *Convallaria majalis*. Her study was, likewise, interrupted, chiefly through need of further material, but it became evident that the plant of the southern Alleghenies is not identical with that of Europe but that in habit it more nearly resembles the plant of eastern Asia (Japan and Manschuria). In the European plant the scape is elongate, so that the flowers are borne opposite the middles or the upper halves of the leaves. In the native plant of the Alleghenies the scape is shorter, the raceme well overtopped by the leaves. In this character the eastern Asiatic and the indigenous Alleghenian plants are similar but, judging from a small representation, the Asiatic has the leaves shorter and broader than in the American and the European. The scanty material at hand shows the anthers of the European and the Alleghenian plants much longer than in the Asiatic and overtopping the ovary; the shorter anthers of the eastern Asiatic plant barely equaling or scarcely reaching the summit of the ovary. In scanty fruit of the Alleghenian and the Japanese plants the seeds are different from each other and from the European: in *C. majalis* of Europe nearly round in outline; in the Alleghenian oblate, distinctly broader than high; in the Japanese obliquely obovoid, higher than broad. Should these characters be found constant when a fuller series can be compared, the eastern Asiatic plant would be called, apparently, C. KEISKEI Miquel, Ann. Mus. Bot. Lugd. Bat. iii. 148 (1867); the Alleghenian plant C. MAJUSCULA Greene in Fedde, Rep. Nov. Spec. v. 46 (1908).

[1] Gray, Am. Nat. vii. 422 (1873).

[2] Robinson, in Gray, Synop. Fl. i. pt. 1. 13 (1895).

[3] Ulbrich, Engler's Bot. Jahrb. xxxvii. 219 (1905).

their branches strongly anastomosing). These characters, reinforced by those of the foliage, are certainly significant: in *A. trifolia* the middle leaflet of the involucral leaf is commonly lanceolate, broadest below the middle, ranging from one-third to one-half as broad as long, long-acuminate and with 5–17 (av. 10) sharp teeth on each margin. In *A. lancifolia* (unfortunately named) the middle leaflet is more oblong to rhombic, broadest at or slightly above the middle, one-third to three-fourths as broad as long, blunter and less acuminate and with 3–13 (av. 7) mostly appressed or rounded teeth. That the two plants are not identical should be apparent and in view of the probability that Pursh, whose type-specimen is presumably lost, had the Alleghenian plant it is here taken up as *A. lancifolia*.

3. A. MINIMA DC. Rootstock short, slender, horizontal, white and brittle: basal leaves with filiform petiole, rhombic-ovate leaflets 2–3 cm. long, sharply dentate above, entire and cuneate below, pilose upon both surfaces: flowering stem filiform, glabrous, or pilose above, 1–1.5 dm. high: involucral leaves 3, slender-petioled; leaflets 1–2 cm. long, pilose on both surfaces, rhombic, sharply dentate-serrate above the middle: sepals 5, white, oblong, about 8 mm. long and 4 mm. wide: achenes few, ellipsoid, 2.5–3 mm. long, softly villous or almost lanuginous; the recurving beak about 1 mm. long.—Syst. i. 206 (1817).—VIRGINIA: "Hab. in Virginia ad montes Alleghanis. *Palisot de Beauvois*"—DC. l. c.; Craig's Creek, May 21, 1916, *C. V. Piper*.

A very neat little species, apparently highly localized, as indicated by the fact that it remained unrecognized for practically a century after its description by DeCandolle.

4. A. QUINQUEFOLIA L. Rootstock horizontal, comparatively slender, 1–4 mm. thick, crisp, whitish when fresh, covered with tooth-like scales: radical leaves solitary, long-petioled, with 3 or by division of the lateral leaflets seemingly 5 rhombic leaflets: flowering stem solitary, glabrous or sparsely hairy, slender, 0.5–3 dm. high, bearing 3 (rarely 2 or 4) long-petioled glabrous or nearly glabrous involucral leaves toward the summit; the 3–5 cuneate-obovate to rhombic or lanceolate leaflets acuminate, incised, 1–5 cm. long; the lateral often deeply cleft: sepals commonly 5 (4–9), whitish, ordinarily tinged outside with pink to crimson, or colored throughout, oblong to oval, 0.6–2.5 cm. long; veins simple or subsimple, nearly parallel, slightly forking above the middle, the branches free to the tip or very rarely slightly anastomosing: stamens numerous, in several series; the longer whitish filaments rarely twice as long as the carpels: anthers 0.5–0.8 mm. long: achenes densely short-hirsute, fusiform, 3.5–4.5 mm. long, tipped by a curved subulate beak 1–2 mm. long.—Sp. Pl. 541 (1753); Bart. Fl. N. A. ii. 10, t. 39, fig. 2 (1822); Britton, Ann.

N. Y. Acad. Sci. vi. 225 (1891); Robinson in Gray, Syn. Fl. N. A. i. 13, as to eastern plant (1895); Mathews, Field Bk. Am. Wild Fl. 134 (1902); House, Wild. Fl. N. Y. i. 106, t. 68A (1918). *A. nemorosa* of eastern Am. auth., not L.; Meehan, Nat. Fl. and Ferns, i. 21, t. 6 (1878). *A. pedata* Raf. Med. Rep. Hex. 2, v. 361 (1808) *A. nemorosa*, β. *quinquefolia* (L.) Pursh, Fl. Am. Sept. ii. 283 (1814); DC. Syst. Nat. i. 204 (1817). *A. nemorosa*, forma *quinquefolia* (L.) Britton, Bull. Torr. Bot. Cl. xvii. 123 (1890). *A. nemorosa*, subsp. *americana*,[1] var. γ *quinquefolia* (L.) Ulbrich, Engler's Bot. Jahrb. xxxvii. 226 (1905). *Anemonanthea quinquefolia* (L.) Nieuwl.[2] Am. Midl. Nat. iii. 174 (1914). *Nemorosa quinquefolia* (L.) Nieuwl. l. c. 322 (1914).—Open woods, damp thickets and clearings, Gaspé County, Quebec[3] to southern Manitoba, south to Georgia, Tennessee and Iowa. Fl. April–June.

5. A. OREGANA Gray. Rootstock slender, 1.5–4 mm. thick, horizontal, whitish, simple: basal leaves rarely present on the flowering plant: flowering stem solitary, very slender, glabrous or nearly so: involucral leaves very thin; the middle leaflet oblanceolate to narrowly rhombic-obovate, subcuneate and entire below the middle, entire or with 1–4 coarse blunt teeth or rarely incised above, 2–8 cm. long; lateral leaflets obliquely lanceolate to narrowly ovate, subentire to incised: sepals blue-purple, 1–2 cm. long; their veins mostly forking, with the branches free to the tip: stamens numerous; the longer twice or thrice the length of the carpels; the filaments pink or bluish: achenes lance-fusiform, hirsute, 4–5 mm. long, with a straight oblique thick-subulate beak 1–1.5 mm. long.—Proc. Am. Acad. xxii. 308 (1897); Piper, Contrib. U. S. Nat. Herb. xi. 267 (1906); Piper & Beattie, Fl. N. W. Coast, 154 (1915). *A. cyanea* Freyn. Deutsche Bot. Monatzchr. viii. 176 (1890), not Risso (1844). *A. Grayi* Britton, Ann. N. Y. Acad. Sci. vi. 226 (1891), in part, not Behr. & Kell. (1884). *A. quinquefolia*, var. *oregana* (Gray) Robinson in Gray, Syn. Fl. i. 131 (1895). *A. nemorosa*, subsp. *americana*, var. *oregana* (Gray) Ulbrich, Engler's Bot. Jahrb. xxxvii. 227 (1905).—Woods and damp thickets, Washington and Oregon, locally eastward to northeastern Idaho. Fl. April–August.

6. A. GRAYI Behr & Kell. Rootstock nodose, 2–7 mm. thick, horizontal, whitish when fresh: flowering stem solitary, glabrous or

[1] Ulbrich, with Germanic disregard of exact bibliography, cites "Subsp. 3 **americana** L. Spec. plant, ed. 1 (1753) p. 541 p. sp."; but Linnaeus published no *A. americana*, the only American species on p. 541 being *A. quinquefolia*.

[2] Nieuwland gives as the basis for this combination: "*Anemonenthea quinquefolia* Linn. l. c. Sp. Pl. p. 541"; but Linnaeus had no genus *Anemonanthea*.

[3] The only basis for *A. quinquefolia* in Gaspé County, Quebec is a specimen brought back, with other characteristic plants of Grand River, by the late George H. Richards in 1903, and recorded by me at that time in a manuscript note-book. Slightly later, not then appreciating the interest of the station, I made a manuscript record of seeing the plant at Bic, Rimouski County. In view of the rarity of the plant north of the St. John valley in Maine and New Brunswick, material to serve as vouchers for its occurrence in eastern Quebec is much needed.

sparsely hairy, slender, 1–4 dm. high: radical leaves solitary, long-petioled, with 3 blunt leaflets; the lateral leaflets deeply cleft and, on the outer border, crenate nearly to base: involucre toward the summit of the stem, with 3 (rarely 2) slender-petioled leaves; the narrowly rhombic blunt leaflets crenate, strongly pilose on both surfaces, 1–3.5 cm. long; lateral leaflets scarcely cleft: sepals commonly 5 or 6, white or blue, oval, 0.7–1.3 cm. long, with the branches of the freely forking veins evanescent: stamens numerous; the longer filaments fully twice as long as the carpels: achenes densely short-hirsute except at the glabrous tip, fusiform-ellipsoid (the young 1.5 mm. long), tipped by a curved style (the young 0.6 mm. long).—Bull. Cal. Acad. i. 5 (1884); Greene, Bot. San Franc. Bay Reg. 2 (1894). *A. nemorosa*, subsp. *americana*, var. *oregana* Ulbrich, Engler's Bot. Jahrb. xxxvii. 227 (1905), in part, not *A. oregana* Gray (1887). *A. quinquefolia*, var. *Grayi* (Behr & Kell.) Jepson, Fl. W. Mid. Cal. 168 (1911).—Woods and thickets on the mountains of western California. Fl. March–June.

7. A. Lyallii Britton. Dwarf: rootstock horizontal, only 0.6–1.6 cm. long, 1–4 mm. thick, whitish when fresh: flowering stem solitary, glabrous or nearly so, filiform, 0.5–2.8 dm. high: radical leaves rarely on the flowering plant, long-petioled, with 3 leaflets: involucre with 3 slender-petioled leaves, the 3 narrowly obovate to elliptic-ovate leaflets crenate or incised, especially near the tip, 1–3 cm. long; the lateral leaflets scarcely cleft: sepals commonly 5, white or blue, 0.35–1.6 cm. long, 1.7–6 mm. wide, with few simply forking veins running free to the margin: stamens in a single series, 10–20 (–30); the filaments exceeding the carpels: achenes ellipsoid, plump, 4 mm. long, finely appressed-pubescent up to the base of the very short subulate beak.—Ann. N. Y. Acad. Sci. vi. 227 (1891); Piper, Contrib. U. S. Nat. Herb. xi. 267 (1906); Piper & Beattie, Fl. N. W. Coast, 153 (1915). *A. quinquefolia*, var. *Lyallii* (Britton) Robinson in Gray, Syn. Fl. N. A. i. 13 (1895). *A nemorosa*, subsp. *americana*, var. *Lyallii* (Britton) Ulbrich, Engler's Bot. Jahrb. xxxvii. 227 (1905).—Damp woods near the coast, Vancouver Island to Siskiyou County, California, locally eastward into the Cascade Mts. Fl. April–July.

8. A. Piperi Britton. Rootstock coarse, blackish (at least when dry), only slightly scaly, often forking, commonly oblique or ascending: basal leaf commonly present at flowering time: flowering stems stiffish, 1–6 from a rootstock, 1–3.5 dm. high: leaflets of the involucre 1.5–6 cm. long, usually appressed-pubescent at least when young; the middle one rhombic-obovate to -ovate, cuneate and entire below the middle, coarsely toothed and cleft above; the lateral leaflets obliquely ovate, with the rounded outer margin toothed nearly to base: sepals elliptic-ovate to oblong, white, 0.6–2 cm. long, with the branches of the mostly forking veins free to the tip: stamens very numerous; the filaments much exceeding the carpels: achenes obliquely ovoid, hirsute to the tip, 3–4 mm. long, with a straight or

barely curved beak 0.5–1 mm. long.—Britton in Rydberg, Bull. Torr. Bot. Cl. xxix. 153 (1902). *A. quinquefolia* of western Am. botanists, not L.—Woods and damp thickets, northwestern Idaho to the Cascade Mts. of Washington and the Wallowa Mts. of Oregon. Fl. April–July.

Anemone Piperi is generally passing in the Northwest as *A. quinquefolia.* It is, however, at once distinguished by its heavier and more ascending dark rootstock which is commonly forking at summit; by the strong tendency to produce two or more flowering stems; by the very frequent basal leaves at the bases of the flowering stems; by the thicker and broader, usually less cleft leaflets and by the broader achenes with much shorter beak. In its dark rootstock and its achenes *A. Piperi* suggests the Eurasian *A. nemorosa,* but that species has a simple horizontal rootstock without scales, the flowering stem solitary, the leaflets of the involucre dissected and the veins of the sepals very freely anastomosing.

The original number of *Anemone Piperi,* Piper, no. 1469, from Latah County, Idaho, seems to consist of two species. None of the specimens seen show rootstocks but the material of this number in the Gray Herbarium shows young fruit and is the plant so characteristic of northwestern Idaho above described. Sandberg, MacDougal & Heller's no. 194, also cited by Britton in the original description, is the plant above described; but Piper's material preserved at the State College of Washington has the very thin leaves and longer and more fusiform achenes of *A. oregana.*

9. A. DELTOIDEA Hook. Fl. Bor.-Am. i. 6 (1829); Torr. & Gray, Fl. N. A. i. 13 (1838); Britton,[1] Ann. N. Y. Acad. Sci. vi. 225 (1891); Robinson in Gray, Syn. Fl. N. A. i. 12 (1895); Ulbrich, Engler's Bot. Jahrb. xxxvii. 218 (1905).—Woods of the coast region, Washington to California.

A VARIETY OF HYPERICUM CANADENSE

C. A. WEATHERBY

HYPERICUM CANADENSE, var. **magninsulare**, n. var., petalis ovatis vel ovato-lanceolatis ad apicem obtusum vel subacutum angustatis, in anthesi mox reflexis, pallide citrinis, nervillis evidentibus et apicem

[1] Britton and, following him, Ulbrich ascribes the species *A. deltoidea* to Douglas in Hook. But examination of the original description fails to reveal the ground for treating it as Douglas's species. It was clearly published by Hooker as a new species and Douglas's only connection with it was as collector of some of the original specimens.

versus superficie pallide rubro-tinctis, caetera formae typicae simillimum.

Petals ovate or ovate-lanceolate, tapering to an obtuse or acutish apex, soon reflexed, pale lemon-yellow, the evident nerves and near the apex the surface also somewhat tinged with pale red: otherwise like the typical form.—In moist ground in a pastured clearing and in an open swamp, Grand Manan, New Brunswick, Aug. 6, 1926, *C. A. and Una F. Weatherby*, no. 5545, TYPE in the Gray Herbarium.

In typical *Hypericum canadense* the petals are oblong with a broadly rounded or subtruncate apex, reflexed only toward the end of the flowering period, orange-yellow without any tinge of red and with the nerves, in fresh material, scarcely discernible.

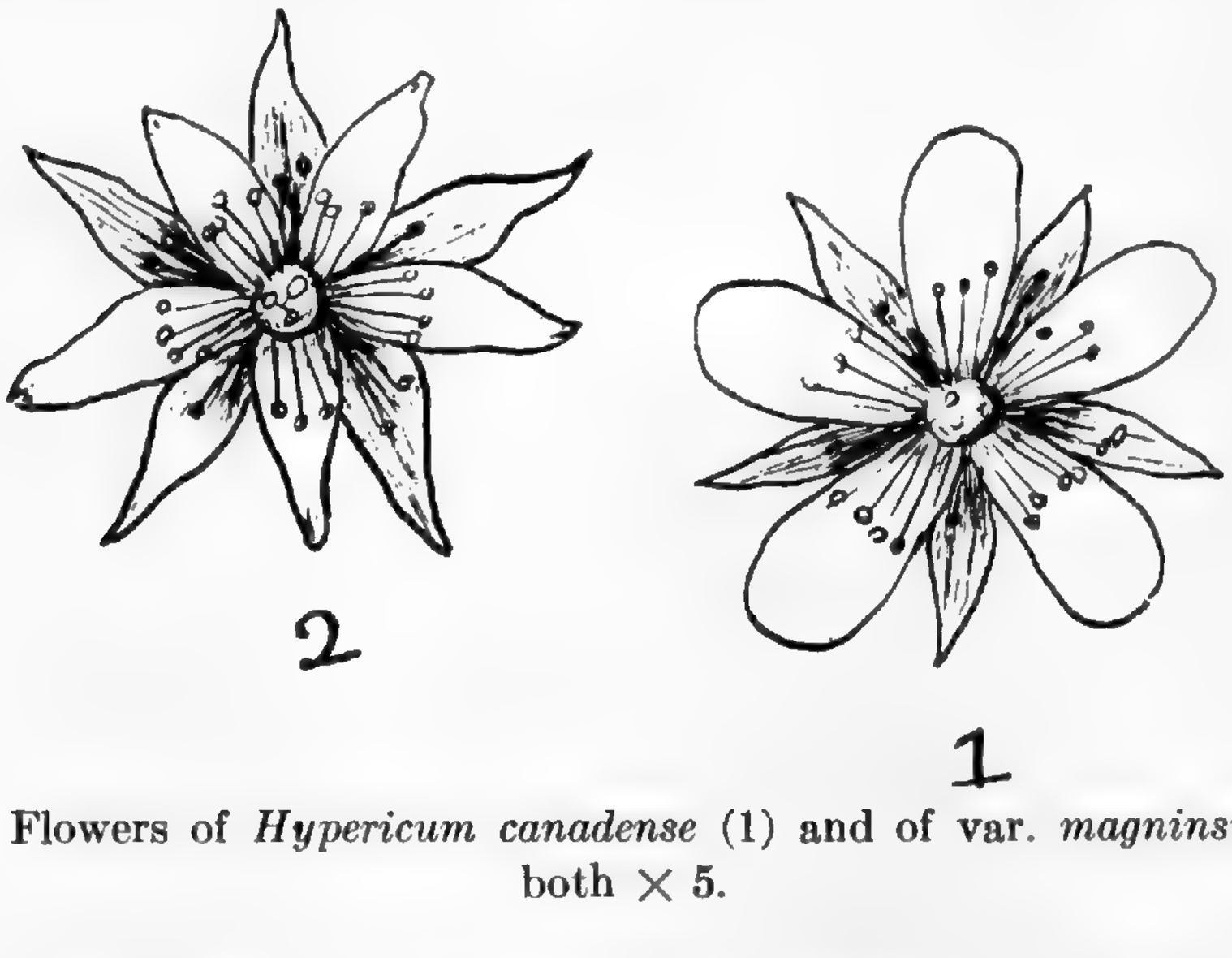

Fig. 1. Flowers of *Hypericum canadense* (1) and of var. *magninsulare* (2), both × 5.

As indicated above, var. *magninsulare* seems to be distinctly more than a mere color-form. Rare individuals of typical *H. canadense* are to be found (e. g., *C. A. and U. F. Weatherby*, no. 5747, from a bog on White Head Island, N. B., Aug. 4, 1927) in which the petals are as pale or even paler in color; but they retain the characteristic shape and texture of those of the typical form, and do not early become reflexed. On Grand Manan, where both occur in considerable quantity and hold their characters very constantly, var. *magninsulare* can be distinguished at a glance from *H. canadense*. The two forms show, moreover, a rather marked segregation in habitat. The former occurs mainly in moist or wet open places on the basalt ridge which occupies the central and western portions of the island; the latter is found chiefly in wetter situations in the lower land and on the small outlying islands to the east. Only occasionally do they grow together.

The variety is, however, one of those discouraging plants which are readily recognized in the field but almost impossible to make out in the herbarium. In all forms of *H. canadense*, the petals completely lose their color and are usually more or less contorted in drying. The reflexing may be either simulated or masked in pressing and, moreover, the sepals become erect around the young fruit after anthesis and carry up with them the persistent remains of the petals. And though dissection might solve these difficulties, in most of the material I have seen good flowers are too few to admit of it; the species seems to have attracted attention chiefly by its red capsules. Finally, the variety shows no differences in habit, foliage, capsules, or seeds.

Under these circumstances, I have found no other collections than that above cited certainly referable to the variety. And, since anything so obvious in the field as it is, at least when occurring in the same region with true *H. canadense*, must, seemingly, have been noted by some other collector if actually seen, it may be endemic on Grand Manan. It is here described in the belief that it is a real, if somewhat slightly differentiated, entity, and in the hope that others may be able to gather additional information as to its status and range.

There is nothing in Linnaeus's description of *H. canadense*, which was founded wholly on a specimen of Kalm's, to show which form he had; I feel justified in assuming, however, that it could not have been the apparently very local var. *magninsulare*.

I am indebted to the care and kindness of Miss Kate Coney and Mr. Alfred Z. Reed in collecting ripe seeds of the variety for me, and to the latter also for suggesting the name here applied to it—a latinization of Grand Manan, which is reputed to be made up of the French "grand" and a Passamaquoddy word meaning "island."

GRAY HERBARIUM

PANICUM LONGIFOLIUM IN MASSACHUSETTS.—On August 9, 1928, I joined Messrs. Ludlow Griscom, John M. Fogg, Jr. and Paul W. Bowman in a search of some of the bogs and swales of southern Bristol and adjacent southwestern Plymouth Counties, Massachusetts, with the hope of rediscovering Hervey's station or stations in South Dartmouth of *Habenaria cristata* (Michx.) R. Br.[1] Hervey's collections, in 1905 and 1908, were made on Smiths' Neck and at Nonquit, near the base of the Neck but, although we searched a number of

[1] See Fernald, RHODORA, XXV. 48 (1923).

favorable habitats, we were quite unsuccessful; the tremendous expansion and "improvement" of summer places has presumably obliterated the *Habenaria*.

In driving through the township of Marion where most of the depressions have been converted into cultivated cranberry bogs, we were attracted to one such bog which had a "weedy" border. The dominant "weed" proved to be *Panicum longifolium* Torr., abundant on the cultivated bog and at its dryish peaty and sandy undisturbed border. This is apparently the first station known in the Northern States for the species from east of western Rhode Island[2] and another species is thus added to the list of characteristic coastal plain plants which reach Plymouth County. A peculiar isolated representative of the species, *P. longifolium*, var. *tusketense* Fernald, RHODORA, xxiii. 192 (1921), occurs in the Tusket Valley, Nova Scotia.—M. L. FERNALD, Gray Herbarium.

[2] See RHODORA, xxi. 143 (1919).

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Fariow Bot Lab—

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JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 30. October, 1928. No. 358.

NOTES FROM THE WOODS HOLE LABORATORY—1928.

I. F. Lewis and W. R. Taylor.

(Plate 176).

Oedogonium Reinschii Roy sec. Hirn. For several seasons past many collections from the ice pond (Sheep Pond) on the northwest shore of Cuttyhunk Island have contained scattered specimens of an *Oedogonium*, the species of which apparently could not be determined, since the material was never found in fruiting condition. While examining a collection containing this material during the summer of 1927 the author was struck by the resemblance of this plant to the illustration of *Oe. Reinschii* shown by W. Heering[1] (fig. 342), with a description (p. 226) as follows:

> 135. *Oedogonium Reinschii* Roy sec. Hirn. (Fig. 342)—Vegetative Zellen meist fast sechseckig oder fast ellipsoidisch, nur einige zylindrisch oder fast zylindrisch. Basalzelle fast halbkugelig, Endzelle stumpf. Vegetative Zellen 6–9(–11) μ dick, 1¼–2¼ mal so lang, Basalzelle 8–9 μ dick, 5–6 μ hoch. Fruktifikationsorgane gänzlich unbekannt.

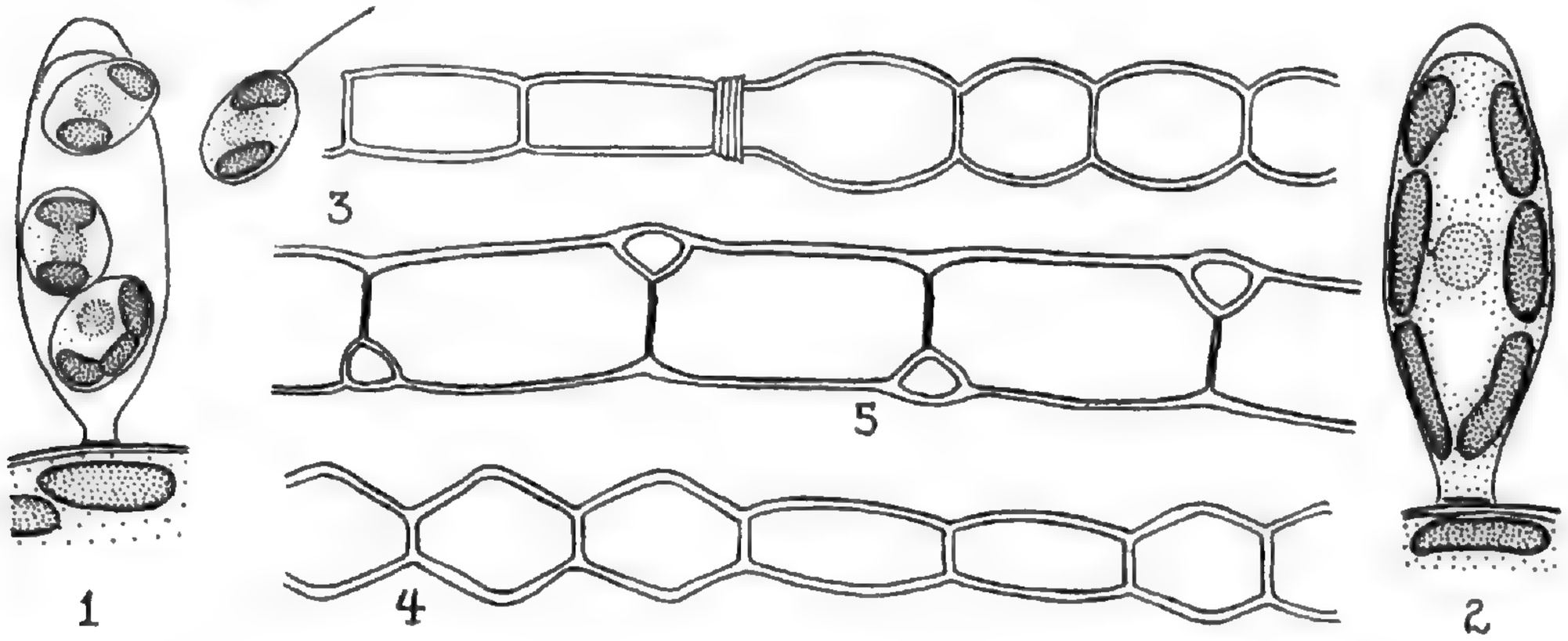
Material showing the basal cell or the terminal cell of a filament was not found, but measurements of the vegetative cells correspond very closely to those given by Heering and a comparison of the accompanying sketches (Text-figs. 3, 4) with the description and with Heering's illustration will suggest that in all probability this plant from Cuttyhunk should be recognized as *Oe. Reinschii*. Comparison with the more complete description given by Hirn[2] tends to confirm the determination. The illustrations of this species in this

[1] Heering, W., in A. Pascher, Die Süsswasserflora Deutschlands, Oesterreichs und der Schweiz, Heft **6**: 1914.

[2] Hirn, K. Monographie und Iconographie der Oedogoniaceen. Acta Soc. Sci. Fennicae, Vol. **7**. 1900

work (Pl. 50) are too inadequate to serve as a certain basis for comparison. Hirn lists the plant as occurring in many parts of continental Europe and in Scotland, in Paraguay, but gives no record for North America. Collins[1] gives a station for it in Florida. The present note, therefore, lists it for a new station on Cuttyhunk Island, Barnstable County, Massachusetts.—James P. Poole.

Characiopsis **pileata** Copeland, n. sp. Plant ovoid, attached; chromatophores six, in definite positions: two in the basal third of the cell, two at the middle, and two near the apex, each pair forming a band around the cell, and the six lining the cell wall except at the apex; nucleus at or near the center of the cell; two vacuoles present, one above and one below the nucleus; cell wall thickened at the apex, forming a conspicuous hemispherical cap; stalk short, not expanded into a basal disk; cell 14 to 19 μ by 6 to 7 μ (Text-fig. 2.).



The apex of the cell is never pointed, but always rounded. The apical thickening of the wall distinguishes this species and *C. crassiapex* Prinz from all other members of the genus. From *C. crassiapex* it differs in the rounded rather than pointed cell apex, the absence of a basal disk and the definite number and arrangement of the chromatophores. Reproduction is by zoospores with one visible flagellum, of which four are produced in a cell (Text-fig. 1). These are freed through an irregular pore in the cell wall near the apex. After swimming about for a short time, they become attached and developed directly into the stalked plants. This species is found on filamentous algae, espeeially on *Tribonema* and *Microspora*, in freshwater ponds. It has been found on Nashawena Island and in ponds in Falmouth, Massachusetts.—Joseph J. Copeland.

Gongrosira Debaryana Rabenh., newly reported for the state,

[1] Collins, F. S. Green algae of North America, Second Supplement. Tufts College Studies, Vol. **4.** 1918.

was secured from the back of a snapping turtle in Sheep Pond, Cuttyhunk, Massachusetts.

MERISMOPEDIA TENUISSIMA Lemm., M. ELEGANS A. Br., COELOSPHAERIUM NAEGELIANUM Ung., CHROOCOCCUS MINUTUS (Kg.) Naeg., and APHANOCAPSA PULCHRA (Kg.) Rabenh., were secured from Oyster Pond, Falmouth, Massachusetts, growing among filamentous algae upon *Chara*, July 31, 1927. These are new records for the state.

LAMINARIA PLATYMERIS De la Pyl., ordinarily a northern species, was secured from the pilings of the wharf at Penikese Island, Massachusetts, during July in 1923, 1924, and 1925.

ACROTHRIX sp.—A large and interesting alga of this genus, not previously recorded from New England, has appeared at several stations and will be described in detail elsewhere.[1]

DUMONTIA FILIFORMIS (O. F. Müller) Grev. was some time ago reported as having appeared on the New England coast. It has, apparently of recent years, reached the Buzzards Bay area, and has been found in abundance: at first at Cuttyhunk Island near the Life Saving Station, and later at Grassy and Pine Islands, off Woods Hole, Penikese Island, and on a small peninsula projecting from Sconticut Point near New Bedford, Massachusetts.

SEIROSPORA GRIFFITHSIANA Harv. Although rare in the early summer months, this species is quite abundant around Woods Hole by August, thus agreeing with Farlow's[2] statement that it is one of the commonest of the Callithamnieae south of Cape Cod. *S. Griffithsiana* is characterized by the presence of seirospores, which are borne in crowded branched chains at the end of the filaments. Tetraspores and bispores also occur on European specimens, both on the same individuals as seirospores as well as on separate plants. The sexual organs, although described, occur but rarely. While specimens bearing seirospores commonly occur in the vicinity of Woods Hole, Farlow's statement (loc. cit.) that "no form of tetraspore or bispore has been observed on American specimens" has hitherto held true. However, among material dredged in 4–6 feet of water off the Coal Wharf at Woods Hole and in 50 feet off West Chop, Marthas Vineyard, during August, 1927, there were several specimens bearing both tetraspores and bispores. Judging from the measurements

[1] Taylor, W. R., *in* Amer. Jour. Bot., 1928.

[2] Farlow, W. G. The marine algae of New England. Rept. U. S. Comm. Fish and Fisheries for 1879, Appendix A-1. 1881.

given by Farlow (loc. cit.) these plants had not yet attained their maximum size and although bearing seirospores in large numbers, tetrasporangia and bisporangia were not uncommon. In some cases they were quite abundant, but no tetrasporic or bisporic specimens without seirospores have been observed. Since the tetrasporangium does not divide by successive bipartitions it is an easy matter to distinguish the developing tetrasporangium from a mature bisporangium. It is interesting to note that on the Woods Hole material there occur abnormal tetrasporangia and bisporangia, produced by irregularities in the lines of division and closely resembling those recorded by Rosenvinge[1] (p. 349, fig. 278) as occuring on the Danish specimens.—K. M. Drew.

Trailiella intricata Batters. This species was found in considerable abundance at Nobska Point near Woods Hole and Black Rock near New Bedford, Massachusetts during the summer of 1927 [and 1928] occurring most commonly in the tidal wash. It has been found only occasionally on attached specimens of the host plants—*Chondrus crispus, Phyllophora membranifolia* and *Ahnfeldtia plicata.* The early records of this extremely interesting species were confined to European waters, but recently Kylin[2] (p. 44, fig. 25a) has recorded its occurrence at Friday Harbor, Washington in 1924. It was first reported by Batters[3] (p. 10) as occurring on the south coast of England in 1890. The next record came from Limfjord, Denmark in 1901, and then from the Kattegat near Frederikshavn in 1909 (Rosenvinge,[5] p. 305–308, figs. 213–215 bis.). Meanwhile it had been found by Kylin[4] (p. 83–92, fig. 2) on the west coast of Sweden between 1902 and 1906, and by Rosenvinge in 1907 on the southeast coast of Norway and later, in 1916, on the west coast. It was also reported by Kuckuck[5] (p. 135) from Helgoland in 1915. The New England specimens agree closely with Batters' original description of the type. The plant forms dense rose-red tufts often reaching a diameter of 3.5 cm. In June the tufts consist almost entirely of basal creeping fila-

[1] Rosenvinge, L. K. The marine algae of Denmark, Pt. 3. Kgl. Danske Vidensk. Selsk. Skrifter, 7. Raekke, Natur. Math. Afd., **7** (3). 1923–1924.

[2] Kylin, H. The marine red algae in the vicinity of the Biological Station at Friday Harbor, Wash. Lunds Univ. Årsskr., N. F. Avd. 2, **21** (9). 1925.

[3] Batters, E. A. L. Some new British marine algae. Journal of Botany, **34.** 1896.

[4] Kylin, H. Ueber *Spermothamnion roseolum* (C. Ag.) Pringsh. und *Trailiella intricata* Batters. Bot. Notiser. **1916.**

[5] Kuckuck, P. (Ref.: H. Kylin. Ueber die Blazenzellen einiger Florideen und ihre Beziehung zur Abspaltung von Jod. Ark. Bot. **14:** 1–13. 1915.) Zeit. Bot. **8:** 135–136. 1916.

ments, but as the season progresses the erect filaments become both longer and more numerous. In the New England specimens the cells of the creeping filaments measure 30–42 μ diam., and are 1–2 times as long. They give rise to discoid multicellular hapteres at irregular intervals, and also to the diffusely and sparsely branched erect filaments. The branches of these erect filaments are markedly divaricate, and arise near the center of the cell. The cells of the erect filaments are slightly barrel shaped, averaging 26 μ (25–30 μ) in diameter, and 1½–2½ times (rarely to 3 times) as long. Towards the apex the cells decrease considerably in length, but only slightly in diameter. The filaments are distinguished by the presence of abundant refractive gland cells, 10–15 μ in diameter (text-fig. 5), borne sub-distichously at the upper ends of the parent cells. Macroscopically this species closely resembles *Spermothamnion Turneri* (Mert.) Aresch., with which it has been confused, but differs from that species in the much shorter, uninucleate, barrel shaped cells, the branched, multicellular holdfasts, the abundant gland cells as well as the complex mode of origin of the tetrasporangium so unlike that of *Spermothamnion* and other genera of the Ceramiaceae. So far no fertile material has been found in this region, as might be expected, since the European records show that tetrasporic specimens have not been found there before September. For a fuller description and figures of *Trailliella intricata* see Rosenvinge (loc. cit.).—K. M. Drew and A. C. Hof.

Asparagopsis hamifera (Hariot) Okam. This very striking plant appeared July 18–19, 1927 for the first time on record upon Nobska Point near Woods Hole, Massachusetts, the first specimen being detected by Miss Irene Fort. The material was all drifted ashore, the pieces small but mostly in very good condition. The plants were rather dense of aspect, with relatively few crozier tips on most individuals (Plate 176). All were carposporic, some quite richly fruiting. This appears to be the first occurrence of the genus and the family (Bonnemaisoniaceae) on the eastern coast of North America. In 1928 the plant was more frequent, pieces being secured from the original locality on several occasions. One of these reached a length of 11 cm., the main axis was 1.5 mm. in diameter with numerous lateral branches to 3.5 cm. long, the ultimate ramuli 1.5 mm. long and the plant of bushy, virgate habit and rather stiff. This is quite different from the habit of the European (French)

material and would tempt one to describe it as new were it not for the similarity of microscopic details and for the fact that two large pieces (one 11 cm.) collected at Cuttyhunk Island by Miss Mary L. Rollins were very soft. These had a main axis to 2 mm. diameter, the longest lateral branch was 4.5 cm., and one piece bore crozier tips to 3 mm. across their curve. The ultimate ramuli were soft and somewhat penicillate-tufted, measuring 3 mm. long. These plants were apparently sterile. *Asparagopsis* was also secured in considerable quantities at Black Rock near New Bedford. In addition to the drifted specimens it was found sparsely in a dwarfed condition upon *Chondrus* within reach by wading along the edge of the islet. This species is not abundantly represented in the algal herbarium of the New York Botanical Garden, and since a microscopical study of the specimens there failed to give definite characters to separate the present material it seems best to report it under the name applied to the European plant. The $^{5}/_{6}$-size illustration (Plate 176) is of portions of a cystocarpic plant of moderately stiff habit and the kind most generally secured. Two crozier-tips, shrunken in drying, are marked with arrows in the lower row of specimens.—WM. R. TAYLOR.

CAREX MITCHELLIANA AND OTHER RARE PLANTS NEAR COHASSET, MASSACHUSETTS.—Two or three miles south of Cohasset is the little village of Beechwood. In this vicinity are extensive areas of deep woods, where beech is noticeably frequent, and *Ilex opaca* reaches a trunk diameter exceeding six inches. In the midst of them are small cedar swamps, some at least unmarked on the topographic survey maps. On July 22nd one of these small swamps and its surroundings were carefully investigated. The border of the swamp was broken by little rocky cliffs. In the cooler hollows hemlocks and yellow birch grew with *Ilex opaca* and *Ilex glabra*. We were interested to find *Lycopodium clavatum* and *L. lucidulum*, and were astonished to stumble upon an excellent station of *Lycopodium annotinum*, previously known in the local flora only from points north and west of Boston. In several wet little hollows *Corallorhiza trifrida* was frequent, and growing with it in sphagnum were rather small specimens of *Botrychium ramosum*, and some minute little ferns which on the basis of the size and shape of the sterile frond would have to be called *B. simplex*, an association which occurs with

suspicious frequency. In the swamp itself a single plant of the locally very rare *Malaxis unifolia* was found in the first five minutes, an hour's search yielding only two more.

But the best find was a large clump of a *Carex* obviously close to *C. crinita*, but suspiciously different, which proves on critical examination to be *Carex Mitchelliana* M. A. Curtis. Weatherby (Rhodora, 1923, p. 17) showed that this little known species, described from South Carolina, ranged north along the coastal plain to New Jersey and Cape Cod. A study of the increased material now in the Gray Herbarium enables us to add a little to his excellent critique. The smooth, unconstricted achene is, of course, the most important technical character. The nervation of the perigynia is, however, a tendency rather than an absolute character, and is well developed only in overripe examples. There are three other characters in the spike, which aid readily in field recognition. First the scales are shorter and project less beyond the perigynia than in either *Carex crinita* or *C. gynandra*, giving the spike a far less bristly appearance. The greatest care must be used here in correctly estimating the maturity of the spike, as immature perigynia of *C. Mitchelliana* are greatly exceeded by their subtending scales. The same caution must be used with the second character, which is the relatively thicker spike in *C. Mitchelliana*. The color of a fully ripe spike is grayish green, the scales remaining hyaline, while spikes of fully mature *C. crinita* or *gynandra* are, as is well known, yellowish, brownish, or even rusty, after the perigynia have begun to fall. To sum up, mature plants of *Carex Mitchelliana* are readily recognizable in the field, but immature specimens, whether in the field or herbarium, would require a most critical examination to be determined correctly.

The occurrence of *Carex Mitchelliana* near Cohasset constitutes a northward extension of its range, and adds a new species to the Flora of the Boston District.—Ludlow Griscom and H. K. Svenson, Cambridge, Massachusetts.

TWO NEW VARIETIES OF EARLY SPRING PLANTS—A RANUNCULUS FROM MISSOURI AND A HETEROTHECA FROM TEXAS

H. C. Benke.

For a number of years the writer has been interested in the calendar of the earliest spring flora, more especially that of a zone across the country from Green Bay, Wisconsin, on the north to the Gulf Coast of Texas about Galveston. The past season a trip was made from Galveston to Chicago with many stop-overs, proceeding northward as the earliest flora would warrant when specimens of interest were taken with many field notes.

Two of the specimens secured do not agree exactly with any described hitherto so it seems necessary to propose new names for them.

The species Ranunculus Harveyi (Gray) Britton was obtained as far north and west as Rolla, Phelps County, Missouri but plants collected there were found to differ from the typical form particularly in their pronounced hairiness. Upon looking over the specimens on file in the herbarium of the Field Museum, Chicago there were found but two true collections of this species of buttercup: near St. Louis, Mo., *H. Eggert* and Allentown, Mo., *Lettermann*—others so named were errors in determination. Both are from St. Louis County and probably present the extreme northeastern limit of the species' range. As there is no specimen in the Illinois Herbarium of the Field Museum the plant has, perhaps, not crossed the Mississippi River. Both these specimens agree well with the original descriptions —sparsely pubescent (Gray) or glabrous (Britton)—that is, nearly or quite glabrous and the achenes beaked very much like those of *R. abortivus* L.

But the specimens from Rolla are very strongly pilose even as to most of the leaves and the axils of the upper ones. There is also more or less pubescence on the sepals. And the achene-beaks are plainly recurved rather than "straight or straightish" as are those of *R. Harveyi.* Therefore I am proposing for this pubescent plant the name

Ranunculus Harveyi (Gray) Britton, var. **pilosus,** var. nov., ubique plus minusve pilosis imprimis petiolis caulibusque; foliis sepalisque etiam mediocriter pilosis vel subglabris; stylo aliquid brevi recurvato.

With the species as to roots, leaf-forms, inflorescence and petals but

strongly pilose with long soft hairs (1-2 mm. long) especially on lower stems, petioles and axils of upper leaves. Leaves sparsely to densely hairy especially on upper surface and sepals more or less so. Styles recurved, almost from the first, mostly very much so but varying in this character and quite resembling those of *R. alleghaniensis* Britton, in cases.—The TYPE is from Rolla, Mo., April 18, 1928, *H. C. Benke 4575* in Field Museum.

HETEROTHECA was found to be quite common about Galveston, Texas, where it formed strikingly beautiful patches in the landscape. The specimens noted were branched at the base, decumbent or strongly ascending in habit, and their leaf-form, as noted on closer inspection later, was most unusual. The casual aspect of the plant in the field reminded one of Chrysopsis species.

Specimens of *Heterotheca* in the Field Museum as well as literature on the subject indicate this to be a difficult genus, the species not being sharply defined but the larger number on file can be referred to *H. subaxillaris* (Lam.) Britton & Rusby. My specimens under consideration being conspicuously differentiated (even by aspect in the field), a variety to include them is, therefore, named and described as follows:

HETEROTHECA SUBAXILLARIS (Lam.) Britton & Rusby, var. **petiolaris**, var. nov., *H. subaxillari* peraffinis; caulibus plus minusve adscendentibus; foliis plerumque petiolatis solum supremis sessilibus; basi petiolorum haud vel vix dilatata; pedicellis parce glandulosis.

With the species, lower and mostly decumbent, subdecumbent or ascending. Leaves nearly all petioled—except those in and near the inflorescence; petioles obscurely or not at all dilated at base—the few sessile leaves not clasping, at most slightly winged. Pedicels but sparingly provided with short glands.—The TYPE is from Galveston, Texas, March 12, 1928, *H. C. Benke 4585* in Field Museum.

A plant from Houston, Texas, March 16, 1872, *E. Hall 312* is exactly of the same description; so is another from Belknap, Texas, March 30, 1858, *Sutton Hayes 399* but this latter is a weak plant and nearly strict in its growth.

In the Field Museum are two further specimens which though somewhat similar do not quite agree with the type. They are subdecumbent in habit but the petioles are auricled or winged at base and more of the upper cauline leaves are sessile—even clasping—which would classify them with the species rather than with the variety. They are: Huntsville, Texas, June 3–12, 1908, *Royal A. Dixon 71* and Riverside, Texas, June 19, 1908, by the same collector, being his number *217*.

CHICAGO, ILLINOIS.

AN AMERICAN REPRESENTATIVE OF CALAMAGROSTIS EPIGEJOS.

M. L. Fernald.

Early in September last, Professor W. H. Sheldon, the distinguished philosopher of Yale University and a keen amateur botanist, brought me for identification a grass which he had found in sandy open woods by Long Pond in Harwich, on Cape Cod, not far from our summer homes. The grass, apparently of the genus *Calamagrostis*, was obviously not any species recognized in temperate eastern America, having very prolonged linear- to lance-cylindric strict panicles 2.3–3.3 dm. long, with the callus-hairs of the spikelets as long as the linear-lanceolate long-attenuate glumes, thus making the panicles suggest small inflorescences of *Phragmites* or of *Arundo*. On September 10 I visited the station, a flat area in dry sandy woods close to the small *Ammophila*-covered sand hills bordering Long Pond. The plant was in fruit, closely occupying an area perhaps 25 ft. (7 m.) square, and in the late afternoon light its slender erect panicles had a silvery sheen due to the long and abundant white hairs of the callus. The culms were solitary or few, 1.3–1.5 m. high, springing from long wiry rootstocks and stolons, and the stiff and harsh basal leaves were broad enough to be passed with ease as those of *Ammophila breviligulata* Fern.[1]

Upon unpacking my summer's collections I showed the strange grass to my student Mr. George Ledyard Stebbins, Jr., who is engaged in a detailed study of some boreal species of *Calamagrostis*, and he instantly recognized it as belonging with the Eurasian § *Epigeios* Koch., a very characteristic group of species heretofore apparently unknown in North America. Several European plants of this section have been put forward as species, but by Ascherson & Graebner they are reduced to two primary species: *C. epigejos* (L.) Roth and *C. Pseudophragmites* (Haller f.) Baumg. The plant of Cape Cod sands so closely simulates the silicolous *C. epigejos* of Europe that, upon casual examination, no differences are apparent; and the habitat of the Cape Cod plant is almost uncannily like that of the European, as stated by Ascherson & Graebner: "In dry woods, especially on sandy flat places, on sunny hills, on sandy banks often forming extensive stands."[2]

[1] Fernald, Rhodora, xxii. 71 (1920).

[2] "In trockenen Wäldern, besonders an sandigen flachen Stellen, auf sonnigen

In view, however, of the fact that the species of amphigenous genera and sections are so rarely identical on the sands of temperate eastern America and of continental Europe, it seemed worth while to study the *Calamagrostis* with special care; and at once minute, but highly significant differences appear. In *C. epigejos* the panicle is broader than in the Long Pond plant, in outline strongly suggesting large and fully expanded panicles of *C. cinnoides* (Muhl.) Barton, while the panicle of the new American plant has the slender outline of very long inflorescences of *Ammophila breviligulata*. In *C. epigejos* the glumes are 5–8 mm. long, in our plant narrower and only 4–5 mm. long. In *C. epigejos* the lemma is about 3 mm. long, with thin and translucent long teeth, in our plant about 2 mm. long and with opaque teeth; but, most important, the awn of the European plant is borne on the upper half of the lemma, just below the teeth, and projects straight forward; in the American plant the awn comes off from near the base of the lemma and is more arched or slightly divergent at base. It is thus apparent that, although simulating the Eurasian *C. epigejos*, the Cape Cod plant is a fundamentally distinct species, which is proposed as

CALAMAGROSTIS **arenicola**, n. sp., *C. epigejum* simulans; planta valde stolonifera, rhizomate stolonibusque subrigidis gracilibus; foliis basilaribus subrigidis valde elongatis griseis scabris 4–6 mm. latis; culmis solitariis vel binis erectis 1.3–1.5 m. altis; foliis caulinis 4 divergentibus, laminis superioribus 1.5–2 dm. longis deinde involutis; ligulis chartaceis ovatis obtusis 1.5–5 mm. longis; paniculis erectis valde exsertis lineari- vel lanceolato-cylindricis 2.3–3.3 dm. longis 1.5–4 cm. diametro, radiis confertis coarctatis 1–6 cm. longis scabris; spiculis stramineis confertis 4–5 mm. longis; glumis subaequalibus angustissime lanceolato-attenuatis 3-costatis, costa media scabra; lemmate lanceolato-ovato 2–2.3 mm. longo acuminato valde bifido apice opaco supra basin aristato; pilis glumas subaequantibus.—MASSACHUSETTS: forming a dense stand in a flat opening in sandy woods of *Robinia Pseudacacia*, western end of long Pond, Harwich, September 10, 1928, *Fernald*, no. 757 (TYPE in Gray Herbarium); station discovered by *W. H. Sheldon*.

For several reasons *Calamagrostis arenicola* is of very great interest. As the first known representative in eastern North America of a characteristic Eurasian section of the genus it is noteworthy and its occurrence in a habitat so similar to that of European *C. epigejos* is

Hügeln, an sandigen Ufern oft grosse Bestände bildend"—Aschers. & Graebn. Syn. ii.[1] 214 (1899).

significant. As an eastern American representative of a plant of European sands it takes a place with *Ammophila breviligulata*, *Polygonum glaucum* Nutt.[1] and *Cakile edentula* (Bigel.) Hook.,[2] all long confused with, but wholly distinct from the European *Ammophila arenaria* (L.) Link, *Polygonum maritimum* L. and *Cakile maritima* Scop.; or with *Corema Conradii* Torr. of the sands from New Jersey to Newfoundland as contrasted with *C. alba* (L.) Don. of Portugal and the Azores. But *Calamagrostis arenicola* is obviously a very rare plant; if it were not highly localized its handsome silvery panicles would long ago have been detected. In this extreme rarity it is certainly not comparable with *Ammophila breviligulata* and *Cakile edentula*, both common and dominant species of their habitats, nor with *Polygonum glaucum* and *Corema Conradii*, which, though not everywhere dominant, have many centers of abundance scattered over wide areas. In its excessive localization *Calamagrostis arenicola* is better compared with another Cape Cod endemic, *Juncus pervetus* Fern.[3] or with the Cape Cod colony of the two European heaths, *Calluna vulgaris* (L.) Hull and *Erica Tetralix* L. In 1926 the two latter were discovered by Professor Sheldon closely occupying a small area of damp but hardly wet *Polytrichum*-carpeted sand at the border of a pond in Chatham. The original colony had been seriously injured by the making of an artificial cranberry-bog, but, although many specimens (including 100 full sheets of each for the *Plantae Exsiccatae Grayanae*) have been taken from the colony, both species have increased phenomenally in two years and hundreds of seedlings are annually increasing the area covered.

The situation with *Juncus pervetus* is very different. This plant, one of the eastern American representatives of widely dispersed or highly localized species of Eurasia, Africa, Australia and western North and South America, was discovered in 1909. When I visited the plant in 1916 "it was in only one very limited station, a few rods long and perhaps a rod wide . . . . In this very restricted station, however, the plant was so prolific as quite to exclude all other species from the limited area." That was the condition of the colony in 1916. In October, 1927, there were scarcely a dozen culms and the species seemed on the very verge of extinction; but in August, 1928, Messrs. Ludlow Griscom and Henry K. Svenson

[1] See Fernald, Rhodora, xv. 69–71 (1913).
[2] See Fernald, Rhodora, xxiv. 23 (1922).
[3] Fernald, Rhodora, xix. 17 (1917).

found that it had not only held its own but considerably increased. Whether it will ever get back to the vigorous condition of 1916 it is too soon to predict. It is also impossible to guess whether the equally small Cape Cod colony of *Calamagrostis arenicola* will maintain itself and spread, like the Chatham colony of *Calluna vulgaris* and *Erica Tetralix*, or whether, like its other near neighbor, *Juncus pervetus*, it will quickly yield to the changes brought about by man and in a few years die out or barely maintain an existence. The one known colony of it is now vigorous and very dense but it is in precarious surroundings, with the railroad to Provincetown bounding one side, a wagon-road bounding another, and two summer cottages casting their shade upon it; and, it is not improbable, that in years to come garages will cover the space the rare plant now occupies. It is certainly to be hoped that more extensive and better protected colonies may be discovered, and, with attention now called to it, that it may be found to share with *Ammophila breviligulata* a wide range in open sandy woods of eastern America.

Gray Herbarium.

NOTES FROM THE HERBARIUM OF THE UNIVERSITY OF WISCONSIN—III.

Norman C. Fassett.

Talinum teretifolium and T. rugospermum. Ever since the description of *T. rugospermum*[1] there has been confusion between this species and *T. teretifolium*, as evidenced by misidentified specimens in herbaria, and by the range assigned to the latter species in Gray's Manual. Originally separated on characters in stigma and anthers, they may be distinguished by differences more readily seen.

a. Inflorescence branched 3–4, rarely only 2, times; branches bearing only bracts with branches or developed flowers in their axils; leaves, when pressed, flattened, 1–2 mm. broad, acute or rounded at tip, rarely mucronate.....*T. teretifolium* Pursh.

a. Inflorescence branched 2–3, rarely 4, times; branches with usually 1–4 pairs of bracts which apparently bear in their axils hidden aborted flowers; leaves, when pressed, terete, 0.5–1 mm., rarely 1.5 mm., broad, with an abrupt curved mucronate tip.....*T. rugospermum* Holzinger.

The sterile bracts of *T. rugospermum* are shown in the illustration[2] of this species in Britton and Brown's Illustrated Flora.

[1] Holzinger, Asa Gray Bull. vii. 117 (1899).

[2] Britton and Brown, Illustrated Flora, ed. 2, ii. fig. 1737 (1913).

As here distinguished, *T. rugospermum* is a plant of dry sand plains and sandstone ledges, from Duluth, Minnesota, to central Illinois, and east to the head of Lake Michigan. Its range in Wisconsin is a definite one: in the valley of the St. Croix River north to Polk County; in the Chippewa River valley from Eau Claire County to its mouth; up the Black River to southern Clark County; and in the valley of the Wisconsin River from the broad sand plains of Juneau and Adams Counties down to Grant County, and probably to the Mississippi River.

T. teretifolium is absent from the Middle West, ranging, not from "Pa. to Ind., Minn., and southw."[1] but, as Holzinger has recorded, from "Pennsylvania through North Carolina to Alabama."[2]

Geum triflorum and G. ciliatum. These two species, described in 1814 by Pursh, have been united by such authors as Torrey and Gray,[3] Coulter and Nelson,[4] and Jepson.[5] On the other hand, Greene,[6] C. P. Smith,[7] Rydberg,[8] and Tidestrom[9] have recognized in this group from three to fourteen species, based mainly on leaf characters. The cutting of the leaflets is very variable, but two general groups may be recognized. The plant of the Middle West (*G. triflorum*) has comparatively shallow dentation toward the tip of the larger leaflets, while the plant of the Far West (*G. ciliatum*) has the corresponding parts *usually* deeply divided or pinnately cleft. Herbarium material may be readily sorted into two groups on this tendency, although an occasional specimen (*Clements* 168, and Middle Park, Colorado, July 25, 1875, *W. A. Henry*, for example) shows both types of leaves. The number of possible subdivisions of each of these groups is limited only by the number of specimens an author might have before him.

C. P. Smith (*l. c.*) points out a style character to separate these two groups, and describes in some detail the nature of the styles in 85 fruiting specimens. The general conclusion to be drawn from his data, and borne out by a study of the 34 fruiting specimens in the Herbarium of the University of Wisconsin, as well as fresh material

[1] Gray's Manual of Botany, ed. 7: 388 (1908).
[2] Asa Gray Bull., viii. 38 (1900).
[3] Fl. N. Am. i. 423 (1840).
[4] New Manual of Botany of the Central Rocky Mts., 262 (1909).
[5] Manual of the Flowering Plants of Calif. 497 (1925).
[6] Leaflets i. 175–179 (1906).
[7] Muhlenbergia vii. 1–17 (1912).
[8] N. Am. Fl. xxii. 409–410 (1913) and Fl. Rocky Mts. ed. 2: 432–433 (1922).
[9] Contrib. U. S. Nat. Herb. xxv. 279 (1925).

at hand, is that the style-tip of the Far Western plant is generally jointed or deciduous, while that of the plant of the Middle West is generally not jointed and is more persistent.

Regarding this style character Smith says: " . . . the plumose styles were positively, tho inconspicuously, bent and jointed, much after the manner of *Geum* proper. As this character would seemingly disqualify my plant as a member of the genus *Sieversia*, of authors. I concluded that it was unknown to science, in fact, a worthy connecting link between *Sieversia* species and typical *Geum*." Accordingly, a third genus, *Erythrocoma* Greene, was accepted. To the conservative botanist, the character of this group would seem to warrant the reuniting of *Sieversia* with *Geum*, rather than the establishment of a third genus.

GEUM TRIFLORUM Pursh, Fl. Am. Sept. 736 (1814). *G. ciliatum* Riddell, Syn. Fl. Western States 20 (1835), not Pursh.—Style-tips rarely jointed, persistent; longer leaflets of the basal rosette-leaves toothed or shallowly cleft only toward the tip, oblong, subcuneate, or slightly falcate, usually with nearly straight sides; calyx purplish.—New York;[1] Ohio;[2] Illinois to South Dakota and Alberta.

G. TRIFLORUM, f. **pallidum**, n. f., calycibus stramineis.—Calyx yellowish.—ILLINOIS: prairies, West Chicago, June 26, 1897, *W. S. Moffatt* (TYPE in Herb. Univ. Wisc.).

G. TRIFLORUM, var. **ciliatum** (Pursh), n. comb. *G. ciliatum* Pursh, Fl. Am. Sept. 352 (1814). *Sieversia ciliata* G. Don, Gen. Hist. Dichlamydeous Plants ii. 528 (1832).—Style-tips mostly jointed or deciduous; longer leaflets of the basal rosette-leaves usually pinnatifid or deeply cleft into linear divisions; calyx purplish.—The name *G. ciliatum* holds a position of page priority over *G. triflorum*, but the two were first united by Torrey and Gray under the name *G. triflorum*.

G. TRIFLORUM, var. CILIATUM, f. **flavulum** (Greene), n. comb. *Erythrocoma flavula* Greene, Leaflets i. 177 (1906). *E. brevifolia* Greene, *l. c.* 176.—Sepals yellowish.

G. TRIFLORUM, var. CILIATUM, f. **ornatum** (Greene), n. comb. *Erythrocoma ciliata*, var. *ornata* Greene, *l. c.* 178.—Floral bracts pinnately cleft and divided.

MADISON, WISCONSIN.

THE PRESENT STATUS OF MAGNOLIA VIRGINIANA IN MASSACHUSETTS.—Curious to learn whether the famous Gloucester station for *Magnolia virginiana* L. had actually survived the depredations of thoughtless nurserymen and local gardeners, I recently (July 28) investigated a

[1] House, N. Y. State Mus. Bull. ccliv. 397 (1924).
[2] Riddell, *l. c.*

swamp in which Dr. J. B. May had collected it over twenty years ago. This swamp is now a part of Ravenswood Park and has been made accessible by numerous paths built along and across it. Without leaving the paths I was able to count a dozen specimens, some of which were perhaps four meters high. Although the flowering season was about over, the fragrance of a few late blossoms was distinctly noticeable in their vicinity. It is to be hoped that the Park authorities have effectually prevented further inroads on this interesting outpost of a southern species.—R. J. Eaton, Cambridge Massachusetts.

Vol. 30, no. 357, including pages 161 to 191, was issued 25 September, 1928.

ASPARAGOPSIS HAMIFERA × 5/6

RHODORA

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JOURNAL OF

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THE GENUS TRISETUM IN AMERICA.[1]

Father Louis-Marie O. C.

In the present article, the writer has only in view a brief sketch of a more comprehensive work which will soon be published as a contribution from the Dept. of Botany of the University of Montreal; just enough to validate the publication of certain changes in the systematic treatment of our American species of the genus Trisetum.

In a short "Introduction," the writer declares he is following the rules of the International Congress of Vienna. In the First Part, he discusses briefly the following topics:

Chapter I. General discussions.
- Art. 1.—Organographic description of the spikelet, and terminology of its component parts: glumes, lemma, palea, lodicules.
- Art. 2.—On the occurrence of cleistogamous spikelets.
- Art. 3.—A recommendation on the use of histotaxy.

Chapter II. The geographical distribution of the genus in America.
- Art. 1–7.—Terra del Fuego. Chili. Argentina. Peru. Brasil. Bolivia. Ecuador. Mexico. United States. Canada. Alaska.

Chapter III. Evolution of the conception of the genus Trisetum.
- Art. 1.—History of the genus Trisetum.
- Art. 2.—Actual definition and divisions of the genus.

Under this article, is given the author's description of the genus Trisetum taking in account the relations of Trisetum with the neighboring genera; it is worthy to be reproduced here in extenso:

[1] A thesis submitted by the writer to the Division of Biology (Dept. of Botany) of Harvard University, in partial fulfillment of the requirements for Ph.D.

Trisetum Persoon.

Spikelets 2–12-flowered, mostly 3; in a loose, more or less spike-like panicle, narrowly cylindrical, sparsely-flowered to subglobose-compact, erect or cernuous; flowers perfect, larger at base, becoming gradually smaller, the terminal one rudimentary, often reduced to a hairy bristle. Glumes 2, awnless, herbaceous, glabrous, rarely chartaceous, pilose, sometimes isomorphous (of the same length, breadth, equally nerved), mostly heteromorphous: I 1-nerved, rarely 3-nerved, II 3-nerved, rarely 1-nerved; linear-lanceolate to broad-ovate, longer or shorter than the spikelet, often equal, dorsally keeled, scabrous, ciliate or glabrous. Lemma narrow-lanceolate to broad-ovate, subulate or keeled, 5-nerved, rarely 3- or 7-nerved, mostly chartaceous, punctate-scabrous, villous, pubescent, puberulent or glabrous, rarely herbaceous, entire, scarious, 2-dentate, 2-lobed or 2-fid at the apex: segments sharp or acuminate, sometimes ending with two bristles, sometimes subdivided laterally, awnless or dorsally awned: awn (1–12 mm. long.) not reduced to a beak, mostly long, straight or more or less twisted, divaricate or flexuous, geniculate or bent. Palea hyaline, shorter than lemma, sometimes its equal, rarely longer, 2-keeled: keel glabrous or ciliate, smooth or scabrous, more or less (0.3–1 mm.) distant; 2-fid, 2-toothed or scarious at the apex, inclosing with the lemma the caryopsis. Lodicules 2, ovate, entire or differently divided. Stamens 3, anthers (0.2–3.2 mm. long) ovoid to narrow-cylindrical. Ovary glabrous, rarely hairy at the apex; styles 2, terminal or nearly so; stigmata 2, plumose, sessile or subsessile. Caryopsis completely sheathed, free, fusiform, sometimes compressed laterally, rarely grooved on the inside; scar of hilum punctiform to linear-elliptic. Rachis, callus, rachilla and its prolongation differently pilose. Rachilla usually articulated above the glumes.[1]

[1] Trisetum Persoon. Spiculis sesqui- usque multifloris, lateraliter compressis, in paniculam aut amplam, plus minusve contractam vel apertam, aut spiciformem, cylindrico-angustam, paucifloram vel globoso-compactam, cum intermediis formis multis, erectam vel cernuam; floribus hermaphroditis, superioribus tabescentibus ultimo in pedicellum plerumque villosum, saepe rudimento terminatum. Glumis 2, muticis, herbaceis, glabris, chartaceis, raro pilosis; aliquando perfecte isomorphis (i. e. aequilongis, aequilatis, parinerviis), generaliter heteromorphis: I 1-nervia, lineari-lanceolata (raro 3-nervia), II 3-nervia; lineari-lanceolata usque ovata-lata; longiores vel breviores quam spicula, saepe spiculam aequantes; carinatae, scabrae, ciliatae vel glabrae in carina media. Lemmate lanceolato-angusto usque ovato-lato, subulato vel carinato, 5-nervio (raro 3- vel 7-), plerumque chartaceo, punctato-scabro, villoso, pubescente vel puberulente, raro herbaceo, glabro; apice subintegro, scarioso, bidentato, bilobo vel bifido: segmentis acutis, acuminatis vel setulatis, lateraliter aliquando subdivisis; mutico vel dorsaliter aristato: arista (1–12 mm. longa) in mucronem reducta vel longa, recta vel plus minusve tortili, divaricata vel flexuosa, geniculata vel recurvata. Palea hyalina, lemmati breviore, aliquando aequali, raro longiore; bicarinata: carinis glabris vel ciliatis, laevibus vel scabris, plus minusve (0.3–1 mm.) distantibus; apice bifida, bidentata vel scariosa; laterales partes extracarinales caryopsim amplectantes. Lodiculae 2, ovales, subintegrae vel diverso-incisae. Stamina 3, antheris (0.2–3.2 mm. long.) linearibus plus minusve crassis usque ovalibus. Ovarium glabrum vel apice comosum; styli 2, terminales vel subterminales;

Systematic Treatment of the Species.

In the redaction of this second part of his work, by far the most important, the writer was dominated by a double care. First, not to eliminate a single specific type or variety that was valid, under the pretext of simplifying or relieving the classification of entities based upon herbarium specimens not accessible to the layman or the identification of which remains problematic.

Second, he has refrained from the tendency to multiply without necessity new groups. In most cases, the species, varieties or forms proposed as new, are the natural outcome of the recasting of genera already existing.

Key to Sub-genera, Sections and Sub-sections.

A. Glumes heteromorphous: their nerves not equally numerous; the upper glume mostly longer and broader...B.
Sub-genus I. Heterolytrum Nob.
B. Caryopsis cylindrical, fusiform, sometimes laterally compressed, never grooved longitudinally on the inside, but convex; scar of hilum punctiform to oval...C.
C. Lemma acute to acuminate at the 2-toothed or 2-fid tip, the sharp segments sometimes laterally subdivided...D.....Section 1. Anaulacoa Nob.
D. Lemma with awn diversely bent, often twisted in the lower half, longer than the glumes...E.
E. Upper glume lanceolate to ovate; spikelets not articulated under the glumes
Sub-section 1. Eutriseta (E. Desv.) Nob.
E. Upper glume oblanceolate to obovate; spikelets articulated under the glumes
Sub-sect. 2. Sphenopholidea Nob.
D. Lemma awnless or with a short, straight awn, never twisted in the lower half, rarely longer than the glumes...F.
F. Panicle loose, more or less opened; lemma mostly awnless..Sub-sect. 3. Graphephorum (E. Desv.) Nob.
F. Panicle spike-like; lemma with a straight short awn.....Sub-sect. 4. Koeleriformia Nob.
C. Lemma 2-lobed, broad-acute to mucronate-obtuse, multifid or scarious at the tip
Sub-sect. 5. Deschampsioidea Nob.
B. Caryopsis cylindrical, fusiform, dorsiventrally compressed, ventrally grooved; scar of hilum elliptic to linear
Section 2. Aulacoa Nob.
A. Glumes isomorphous, of equal length and breadth; their nerves being equally numerous.....Sub-genus II. Isolytrum Nob.

stigmata 2, laxe plumosa, sessilia vel subsessilia. Caryopsis lemmate et palea tecta, libera, longo-fusiformis; aliquando lateraliter compressa; raro dorsaliter convexa, ventraliter subsulcata; macula hilaris punctiformis usque lineari-elliptica. Rachis, callus, rachilla et prolongatio pedicelliformis diverso-pilosis; florum desarticulatio plerumque supra glumas, ad immediatam basim flosculi.

In the following enumeration, the American valid species, varieties and forms are given with citations, descriptions and discussions when necessary; the species are loosely grouped by a key emphasizing the most important characters.

For more details, readers are referred to the original paper actually in the Widener Library at Harvard. The whole matter will be published in the Contributions of the Université de Montréal in the near future.

Sub-genus I. **HETEROLYTRUM** Louis-Marie.

Section 1. ANAULACOA Louis-Marie.

Sub-section 1. EUTRISETA (E. Desv.) Louis-Marie. Ut sectio ab E. Desvaux apud C. Gay, Flora Chilena **6**: 346. 1853; Asch. & Graebn., Syn. **2**: 263. 1899.

A. *Panicle terminal; culm simple*. . . B.

B. *Panicle loose, more or less opened, long-branched*. . . C.

C. *Culm reed-like, strong (1–3 m. high)*.

1. TRISETUM VIRLETII Fourn., Mex. Pl. Enum., Gram. 108. 1886.
2. TRISETUM BAMBUSIFORME Fourn., Mex. Pl. Enum., Gram. 108. 1886.
3. TRISETUM PANICULATUM Fourn., Mex. Pl. Enum., Gram. 109. 1886.
4. TRISETUM SPLENDIDULUM Steud., Syn. Pl. Gram. 229. 1854.
5. TRISETUM IRAZUENSE (Kuntze) Hitch., Proc. Biol. Soc. Wash. **40**: 82. 1927.

C. *Culm not reed-like; herb (0.3–1.2 m. high) less strong*. . . D.

D. *Ovary glabrous at the tip.*

6. TRISETUM FRAUDULENTUM Steud., Syn., Pl., Gram. 424. 1854.
7. TRISETUM MALACOPHYLLUM Steud., Syn., Pl. Gram., 229. 1854.
   Calamagrostis Cumingii Nees, Steud., Syn. Pl. Gram. 1854.
   Calamagrostis Lechleri Steud., Syn. Pl. Gram. 1854.
8. TRISETUM FLAVESCENS (L.) Beauv., Agrost., 88, t. 18, f. 1. 1812.
9. TRISETUM MONTANUM Vasey. Bull. Torr. Bot. Club. **13**: 118. 1886.

   TRISETUM MONTANUM Vasey, var. **pilosum**, var. n. A typo differt vaginis conspicue pubescentibus, rachillae flexiore villositate, longiore articulo terminali sparse villoso, non glabro, et praecipue lemmate inferius plus minusve pubescente.

   Differing from the type by the conspicuous pubescent sheaths, the soft villosity of the rachilla, the longer terminal pedicel sparsely villous, not glabrous, and especially by the lemma more or less pubescent at the base.

   Distribution. NEW MEXICO: near Caroles, Alt. 3200 ft. July 26, 1908, *P. C. Standley*, No. 4536 (TYPE at the Gray Herbarium); Windsor Creek, Alt. 8500 ft. July 28, 1908, *P. C. Standley* No. 4576.

TRISETUM MONTANUM Vasey, var. **Shearii** (Scribn.), comb. n.—*Trisetum Shearii* Scribn. Circ. U. S. Div. Agrost. **30**: 8. 1901. *Trisetum argenteum* Scribn. Bull. U. S. Dept. Agr. Div. Agrost. **11**: 49, fig. 8. July 20, 1898; non *T. argenteum* R. & S., 1817; non Schur, 1860. *Graphephorum Shearii* Rydb., Bull. Torrey Bot. Club **32**: 62. 1905.

D. *Ovary hairy at the tip.*

10. TRISETUM CERNUUM Trin., Mém. Acad. St. Pétersb. (Sér. VI) **1**: 61. Jan. 1830.

The type from Sitka is perfectly glabrous; blades 4–5 mm. wide; glumes very unequal: the superior short-acuminate; spikelets mostly with 2 perfect flowers. This type occupies the northern part of the range only: Alaska, British-Columbia, Washington.

Going South, we meet two variations important enough to be thus systematically distinguished:—

TRISETUM CERNUUM Trin., var. **luxurians**, var. n. Culmo valido (fere 1 m. alto), glabro vel glabrato, laminis foliorum (lat. 8–10 mm.) latissimis; spiculis habitualiter 3-floris, saepe 4-floris, rachillae articulis longioribus, gluma inferiore valde reducta (long. 1 mm.).

Culm almost 1 meter high, glabrous or nearly so; blades very (8–10 mm.) broad; spikelets 3–4-flowered; nodes of rachilla more distant; inferior glume very reduced, often 1–2 mm. long.

Distribution. WASHINGTON: Upper Valley of the Nesqualley, 8 Sept. 1893, *O. D. Allen*, No. 42. IDAHO: Hills, July 25, 1898, *C. V. Piper*, No. 2814. OREGON: Shaded rocks below falls, Silver Creek Falls, June 19, 1918, *J. C. Nelson*, No. 2244; *Shear & Scribner* (1705), TYPE at U. S. Nat. Herb. No. 86797. CALIFORNIA: Cloverdale, Sonoma Co., June 1867, State Survey, No. 6465b; Big Trees, Yosemite, 1866, *H. N. Bolander*, No. 6172.

TRISETUM CERNUUM Trin., var. LUXURIANS Louis-Marie, forma **pubescens** forma n. A varietate differt plus minusve densa vaginarum pubescentia.

Differing from the variety by its pubescent sheaths.

Distribution. OREGON: St. Helen, May 1880, *T. J. Howell*, No. 350; Gearhart, Aug. 1901, *A. S. Hitchcock;* Bridal Veil, Multnomah Co. 1910, *H. H. Smith*, No. 3048. CALIFORNIA: Eureka, Humboldt Co., May 30, 1920 (TYPE), Herb. Univ. Calif. No. 212883; Woodland, Mendecino Co., May 1866, No. 6122; Humboldt Bay, Alt. 100 ft. May, 1901, *H. P. Chandler*, No. 1176.

Discussion. The second variation is the transformation of the superior glume which, from broad-oval and short-acuminate in the typical *T. cernuum*, has a tendency to become rather narrow-oval

and long-acuminate. One would think that, in the section where the two geographic areas of *T. cernuum* and *T. canescens* meet, certain intermediates appear which explain, in a certain way, why botanists have tried to make of *T. canescens* Buckl. a variety of *T. cernuum*. The following variety, based upon the type of a species placed as a synonym under *T. cernuum*, would group around it the major part of the intermediate plants, "ratione glumae secundae," between two species which, starting from two poles, run in opposite ways.

TRISETUM CERNUUM Trin., var. **Sandbergii**, comb. n. *T. Sandbergii* Beal, Grasses N. Amer. **2**: 378. 1896. A typo differt panicula angustiore, lineari; spiculis dorsaliter magis cylindraceis, saepius purpureo flavoque variegatis, gluma inferiore oval-lanceata, nunquam reducta, floribus majoribus.

Differing from the type by its narrower linear panicle; by its spikelets less keeled and less dorsally compressed, almost purple; by its inferior glume oval-lanceolate, never reduced; by its larger flowers.

Distribution. WASHINGTON: Mount Stuart, alt. 7000–8000 ft., *Sandberg et Leiberg*, No. 823 (TYPE). OREGON: Mountain Stream Banks, alt. 13,000 ft., June 28, 1900, *W. C. Cusick*, No. 2426.

11. TRISETUM CANESCENS Buckl. Proc. Acad. Sci. Phila., 100. 1862.

Discussion. In December 1861, and January and February 1862, appeared, under the signature of S. B. Buckley, an important contribution to the flora of Texas: 160 new plants were described, 57 belonging to the Gramineae family. I will not undertake to appraise the value, even in a general way, of such a work which certainly has some merit. It is impossible, however, in publishing an historical sketch of *T. canescens*, not to point out to what degree natural aversion may vitiate the critical judgment of otherwise very competent minds.

Asa Gray did not like Buckley; it seems even that he hated him conscientiously. At all events, he lost no time in answering to the three insufferable memoirs. After opposing a "reductio ad nihilum" to the two first publications of Buckley's work, he concludes thus:

"It will be perceived that all the new genera of Mr. Buckley's two papers, and nearly all the new species, are either oversights or mistakes, which might have been avoided . . . However excellent the author's intentions, we can only regret a publication which entails upon our science a hundred worse than useless synonyms,

(a regret which I have reason to believe Mr. Buckley now shares), and we should endeavor to prevent future calamities of the kind. In this regard, understanding that a third paper of the sort, upon a peculiarly difficult order of plants, has been printed in the Academy's Proceedings, but yet not issued, I am confident that my motives will not be misunderstood when I venture to suggest, that the credit both of the Academy and of the author of the paper, no less than the interests of science, would be most subserved by the cancelling of the sheets."

Buckley published in February his "Description of Plants, No. 3 Gramineae." Gray immediately responded: "I hold myself responsible for the statements herewith presented. If some of my comments be thought severe, it should be understood that Mr. Buckley was duly warned of the injury he was about to inflict upon science . . "

And here is how Asa Gray scores the new species of Buckley! Suffice it to quote a few examples:

"Glyceria *leptostachya* and G. *microtheca* are both alike, and both Nuttall's MSS. names, which Mr. Buckley has appropriated in the coolest manner writing 'Buckl.' after the name upon Nuttall's autograph tickets."

"Glyceria *montana*. Another appropriation of a MSS. name of Nuttall. Could Nuttall complain, however, he should transpose the words of the poet and say, 'He that filches my *good name* steals trash'; for the species is 'poor indeed.'"

"Poa *tenuifolia*—still another of Nuttall's unblushingly appropriated—."

"Trisetum *canescens* is the more hairy-leaved and striate form of *T. cernuum*, Trin., described from the specimen of '*T. elatum*' Nutt., which name Mr. Buckley has erased from the ticket, for no obvious reason (as the name is a good one), except to give some variety in form to his depredations."

"Happily Mr. Buckley has spared the *Paniceae* and the *Andropogineae;* for which, in the interest of all American botanists, I tender him my sincere thanks."

These outbursts, too passionate to be always fair, sometimes, missed the point: they place the great compilers in a complex attitude, prejudice the judgment of monographers yet insufficiently familiar with the plants they describe. The authors of Kew Index[1] placed

[1] Index Kewensis, **2**: 1123. 1895.

T. canescens in the synonymy. Beal[1] made it a variety of *T. cernuum* Trin.

It is somewhat baffling to one who looks into the material of the large herbariums, to find under the same cover specimens with sheaths really canescent, others quite glabrous, and it seems a little ridiculous to be forced to add to the species *T. canescens* a forma *toneum*.

Buckley's type has been consulted at the Academy of Sciences of Philadelphia[2]; it consists actually of a strong panicle (25 cm. long, 4–5 cm. wide); glumes unequal: I 6 mm. long, 1–1.5 mm. wide, II 7 mm. long, 2 mm. wide; lemma (7–8 mm. long, 2 mm. wide) awned dorsally about ¼ from the top; awn 7–8 mm. long; palea 6 mm. long; rachilla (3–4 mm.) very long; anthers 1.6–1.8 mm. long.

Taking into account the existing laws of nomenclature, the name given by Buckley is to be maintained, even if it is not a proper one. Since 1862, it has been accepted as valid by a number of eminent botanists.

The typical *T. canescens* is nearer *T. flavescens* than *T. cernuum*. It is different by its more rigid habit, by its panicle not flavescent, by the hairy tip of its ovary, by its ligule 2 or 3 times longer. In certain specimens where this last character alone is clearly visible, the affinity becomes more obvious, and one may question if there are really two different species. The ovary hairy at the tip of *T. canescens* forbids any reduction.

T. CANESCENS Buckl., forma **tonsum**, forma n. A typo differt glabrietate perfecta partium omnium.

Differing from the type by being completely glabrous.

Distribution. CALIFORNIA: "*Trisetum elatum* Nutt." Sierra Nevada, alt. 5000 ft. *Bolander & Kellogg*, 1872; Rush Creek, Trinity Co., June 10, 1914, *Harry S. Yates*, collector's No. 411; Davis Creek, July 5, 1894, *Davy;* Buckeye Mt., Trinity Co., July 15, 1914, *Harry S. Yates*, collector's No. 522 (TYPE in U. of California) "an unusually glabrous form."

T. CANESCENS Buckl., forma **velutinum**, forma n. A typo differt vaginis tantum vel vaginis laminisque dense velutinis.

Differing from the type by its leaves densely velvety.

[1] Beal, Grasses of North America, **2**: 380. 1896.

[2] Gray's following remark: "T. canescens is the more hairy leaved and striate form of T. cernuum . . . " leaves one under the impression that when he studied that type, the specimen was a complete one. This mutilation of the type is to be regretted; now one cannot appreciate to what extent the sheaths of the present species ought to be canescent. There is left, to judge of the nature of the pilosity, but the original description.

Distribution. CALIFORNIA: "Trisetum elatum" Lassen's Peak, July 1879, *Mrs. R. M. Austin* (TYPE at the Gray Herbarium). The *Trisetum cernuum* Trin., Woods, Foot-Hills of Olympia Range, June 27, 1902, *J. M. Grant* is very velvety, but with flexuous branches. *J. B. Davy & W. C. Blasdale's* No. 5965 is nearly glabrous.

B. *Panicle contracted with appressed, more or less short branches*. . . E.
E. *Blades filiform; panicle linear-lanceolate.*

12. TRISETUM FILIFOLIUM Scribn., Beal, Grasses N. Amer. **2**: 375. 1896.
TRISETUM FILIFOLIUM Scribn., var. ARISTATUM Scribn., Beal, Grasses N. Amer. **2**: 375. 1896.

E. *Blades plane or folded; not filiform*. . . F.
F. *Panicle cylindrical, subinterrupted.*

13. TRISETUM HETERONYMUM Steud., Syn. Pl. Gram. 229. 1854.

F. *Panicle not cylindrical*. . . G.
G. *Ovary hairy at the tip.*

14. TRISETUM HIRTUM Trin., Linnaea **10**: 300. 1836.

G. *Ovary not hairy at the tip.*

15. TRISETUM **projectum**, sp. n. Culmis caespitosis (30–90 cm. alt.), subfragilibus, infra strictis, supra cernuis; foliis albo-velutinis; vaginis inferioribus dense velutinis, superioribus glabratis, laxis, caulinis saepius 3; ligula 1.5–2 mm. long. pubescente, denticulata, iterum fimbriata; foliorum laminis magis velutinis ad paginam inferiorem (4–10 cm. long., 2–2.5 mm. lat.), planis vel involutis; panicula exserta (10-15 cm. long., 1–2 cm. lat.), disjuncta saltem inferius, inflorescentiae segmentis projectis, viride pallido vel albescente, nitida; radiis simplicibus vel divisis, perbrevibus vel 1.5-3 cm. longis, a basi floriferis; spiculis bifloris, lateraliter compressis, tempore antheseos apertis (6–7 mm. long.); glumis inequalibus, ovato-lanceolatis, in carina ciliatis, spiculam fere aequantibus: I angustiore (5–5.2 mm. long., 1–1.2 mm. lat.), uninervia, II (6–6.5 mm. long., lat. 1.6–1.8 mm.) trinervia; lemmate glabro-laevi, non punctato-scabro, lanceolato (6 mm. circ. long., 1–1.2 mm. lat.), 5-nervio, bifido, bisetulato, in tertia parte circiter superiore aristato; arista divaricata (5–6 mm. long.), vix tortili inferius, scabra; palea hyalina (5 mm. long., 1.2 mm. circ. lat.); apice denticulata, nervis carinalibus 0.5–0.8 mm. distantibus; rachillae articulo inter flores longo-piloso, articulo supra florem superiorem glabrato, saepius rudimento plus minusve abortivae floris terminato; antheris (1.4–1.6 mm. long.) linearibus; ovarii glabri stylis distinctis.

Distribution. CALIFORNIA: In the Sierra Nevada, Dinkey Creek, Fresno County, alt. 5300 ft. June 25, 1900, *H. M. Hall and H. P. Chandler*, No. 359 (TYPE in the Herb. of University of California; isotypes in the Herbarium of N. Y. Bot. Garden and at Gray Herbarium); near Donner Lake, Sierra Nevada, 1865, *J. Torrey*, No. 584; on trail to Campbell Lake, alt. 6000 ft. Cisco, Placer Co. July 29, 1908, *H. A. Walker*, No. 1500; "*Trisetum canescens*," Eldorado Co. alt. 9000 ft. Aug. 6, 1915.

Culm (30–90 cm. high) cespitose, erect at the base, bent at the tip; *leaves* velvety-downy: lower *sheaths* downy, the superior glabrate, loose; ligule (1.5–2 mm. long) pubescent, serrate-fimbriate; *blades* (4–10 mm. long, 2–2.5 mm. wide) plane or involute; panicle exserted (10–15 cm. long, 1–2 cm. wide), pale whitish green, shining, interrupted, at least at lower part, secondary branches ascending, projected, densely flowered from the base upwards; spikelets (6–7 mm. long) 2-flowered, laterally compressed; glumes unequal, ovate-lanceolate, ciliate on the keel, subequal to spikelet: I (5–5.2 mm. long, 1–1.2 mm. wide) 1-nerved, II (6–6.5 mm. long, 1.6–1.8 mm. wide) 3-nerved; *lemma* (about 6 mm. long, 1–1.2 mm. wide) glabrous, smooth, lanceolate, 5-nerved, 2-fid, with two bristles at the apex, awned dorsally on the upper ⅓: *awn* divaricate (5–6 mm. long), scarcely twisted at the inferior half, scabrous; *palea* hyaline (5 mm. long, about 1.2 mm. wide), denticulate at the apex; keels (0.5–0.8 mm.) distant; *rachilla* long-pilose, terminal pedicel glabrate, often terminated by a rudimentary flower; *anthers* (1.4–1.6 mm. long) linear; *styles* distinct; *ovary* glabrous at the tip.

Discussion. It is impossible for the present to define with accuracy the geographical area of this Californian species, mistaken until recently for *T. canescens*, from which it is separated obviously by the interrupted panicle, shining, very pale, with short branches, dense; by the lemma, smooth, not scabrous; by the velvety sheen of the leaves and the ovary glabrous at the tip, and by the non-sessile stigmata. This plant, collected for the first time in 1865 by J. Torrey, was brought to the attention of Burt Davy, twenty years ago, who recognized it as a valid species, and gave to it an herbarium name.

16. TRISETUM **disjunctum**, nom. n. *T. interruptum* Fourn., Mex. Pl. Enum., Gram. 108. 1886; not Buckley, Proc. Acad. Sci. Phila. 100, Febr. 1862.
17. TRISETUM **mollifolium**, nom. n. *T. malacophyllum* Phil., Anal. Univ. Chil. 566. 1873; not Steudel, Syn. Pl. Gram. 229. 1854.

B. *Panicle spike-like, globose to narrow-cylindrical; branches very short; spikelets subsessile*. . . H.

H. *Glumes equal in length and in breadth.*

18. TRISETUM SESQUIFLORUM Trin., Bull. Sci. Acad. St. Pétersb. **1**: 66. 1836.

Discussion. E. Hultén[1] places conditionally *T. sesquiflorum* Trin. as a synonym of *T. spicatum* (L.) Richt. with the following remark: "Quite glabrous specimens I have never seen and not one agrees completely with the description of *T. sesquiflorum* by TRINIUS, which acc. to him, should differ in having glabrous culm and leaves, one-flowered spikelets, equal glumes and awn attached below the middle of the lemma. The American specimens referred by TRINIUS to this species and preserved in Herb. TRIN. I consider to be *T. spicatum*. All Kamtchatka specimens I have seen labelled *T. sesquiflorum* belong to *Calamagrostis purpurascens* . . . As, however, none of them are labelled by TRINIUS, I do not know on what specimen TRINIUS founded his quotation of *T. sesquiflorum* from Kamtchatka."

The U. S. National Herbarium of Washington has a specimen from the Trinius herbarium, bearing on the label: "Ex herb. Trinii—Unalaska Mertens." Professor A. S. Hitchcock had the kindness to send to the Gray Herbarium, on our request, a few spikelets of this type, with the following description:—

"In *Trisetum sesquiflorum*, the ligule is long and the awn of the lemma is attached near the base. I found only one other specimen among our Alaskan material that corresponds with the type of *T. sesquiflorum*. This is Eagle, Alaska, *A. J. Collier* 64, June 29, 1902."

It is just as hard to confuse the spikelets of *T. sesquiflorum* with those of *T. spicatum* or *T. cernuum* as to confuse them with those of *T. Congdoni*.

But here is the difficulty. The Gray Herbarium has in its possession a plant from Unalaska labelled: "Trisetum sesquiflorum" with Bongard's autograph.[2] This last plant is specifically different from the type of the U. S. Nat. Herb. of Washington, coming directly from the Trinius Herbarium. Here are the differences noted in a comparison between both plants:—

[1] Hultén, E., Flora of Kamtchatka and the adjacent Islands **1**: 116. 1927.

[2] Bongard's plants are those of Mertens. Cf. "Observations sur la végétation de l'Ile de Sitcha." 1833.

TRISETUM of the U. S. Nat. Herb. (Mertens):	TRISETUM of the Gray Herbarium (Bongard):
1. Lemma, 5 distinct nerves, prominent.	1. Lemma, 5 distinct nerves, but not prominent.
2. Awn attached "near the base," on the lower 1/4–1/3.	2. Awn attached on the upper 1/2–1/3.
3. Anthers 2–2.5 mm. long.	3. Anthers 1.5–1.8 mm. long.
4. Nerves of palea 0.3 mm. distant.	4. Nerves of palea 0.5 mm. distant.
5. Panicle shining; rachis glabrous.	5. Panicle not shining; rachis pubescent.
6. Ligule 3 mm. long.	6. Ligule 1.5–2 mm. long.

Here is the original description of Trinius:[1]

Trisetum sesquiflorum. Panicula thyrsode, densa; spiculis sesquifloris; glumis aequalibus; calli rhacheosque pilis brevibus; flosculo 4-aciculato, "medio 1" "paulo infra medium" genicutato-aristato; ovario nudo. Kamtch. Unal.

Trinius in describing his *T. sesquiflorum* had, no doubt, under his eyes more than one collection. Ledebour, in his Flora Rossica,[2] mentions, in fact, under *T. sesquiflorum*, the following collections: Hab. in Kamtchatka (Trin.) et in insula Unalaska (Trin., Bong.)! Ledebour seems to have seen only, like us, the material from Unalaska. So also E. Hultén, as we may deduct from the last line of the quotation just made. Is the type from Kamtchatka different from the two we know? If not, is it similar to the specimen of the U. S. Nat. Herb. or to that in the Gray Herbarium? Has it its awn attached near the middle of the lemma or "near its base"? To avoid all confusion, the writer adopts as the type of *T. sesquiflorum* Trin. the specimen in the U. S. Nat. Herbarium, as more conforming to Trinius' diagnosis. He proposes *Trisetum Bongardii* sp. nov. for the plant of the Gray Herbarium, and describes it thus temporarily:—

19. TRISETUM **Bongardii**, sp. n. A *T. sesquifloro* Trin. differt lemmate ad mediam vel ad tertiam superiorem partem aristato; paleae nervis carinalibus magis (0.5 mm.) distantibus; antheris (long. 1.5–1.8 mm.) brevioribus; ligula 1.5-2 mm. long.

Differing mainly from the typical *T. sesquiflorum* Trin. by the lemma awned at ½–⅓ superior; by the nerves of the palea more (0.5 mm.) distant; by the anthers (1.5–1.8 mm. long) shorter; by the ligule 1.5–2 mm. long.

Distribution. ALASKA: Unalaska (*Bongard*), TYPE at the Gray Herbarium; *M. W. Harrington*, Oct. 2, 1871.

[1] Bull. Sci. Acad. St. Pétersb. **1**: 66. 1836.
[2] Ledebour, Flora Rossica **4**: 419. 1853.

20. Trisetum **Williamsii**, sp. n. Culmo (30–40 cm. alt.) erecto, glaberrimo; vaginis laevibus; ligula 2.5–3 mm. long.; foliorum laminis rigidis, in nervis scabris, plus minusve involutis: laminis sterilium fasciculorum (15–20 cm. long., 2.5–3.5 lat.), his caulinis (6–10 cm., long., 3–3.5 mm., lat.); panicula dense spiciformi, angusta, cylindracea (5–6 cm. long., 5 mm. lat.); spiculis bifloris, opacis; glumis aequalibus, lanceolatis-ovatis (5.5–6 mm. long.), albidis, siccatis hyalinis, nervis flavis pallidis, non aurantiacis: I uninervia, II trinervia; lemmate (4.6–5 mm. long.) ovato, lato, paleam totaliter amplectante, apice bifido, subulato, 7-nervio, extremis duobus lateralibus nervis tantum infra distinctis, aliis breviter excurrentibus; arista (5–6 mm. long.) ad ⅓–¼ inferiorem inserta, infra tortili, supra divaricata vel geniculata; palea (4–4.5 mm. long.) bidentata; carinis glabratis; rachilla, callo et rachillae prolongatione lateraliter abundantius villosis; antheris 2.8–3.2 mm. long.

Culm (30–45 cm. high) erect, glabrous; sheaths smooth; *ligule* 2.5–3 mm. long; *blades* rigid, scabrous, more or less involute; *panicle* spike-like, narrow-cylindrical (5–6 cm. long, 5 mm. wide); *spikelets* 2-flowered; glumes equal, ovate-lanceolate (5.5–6 mm. long), whitish, hyaline when dry, nerves pale yellow, not glossy; *lemma* (4.6–5 mm. long) broad-oval, enveloping, 2-fid, subulate, 7-nerved: nerves excurrent, except for the two outer extreme ones, which do not reach the margin of the lemma; *awn* (5–6 mm. long) inserted on the lower ⅓–¼, twisted in its inferior half, geniculate or divaricate; *palea* (4–4.5 mm. long) 2-dentate, glabrate; *callus*, *rachilla* and its terminal pedicel laterally dense-villous; *anthers* 2.8–3.2 mm. long.

Discussion. The above description is based on normal flowers, not parasitized.

Here are the essential differences between:

T. alaskanum Nash.	T. Williamsii Louis-Marie.
spikelets shining, red-orange nerved;	spikelets non glossy, pale-yellow nerved;
lemma 5-nerved;	lemma 7-nerved;
palea with scabrous keels;	palea with keels slightly ciliate;
awn not or but slightly twisted on its lower part, inserted on the upper ⅓–¼ of the lemma;	awn very twisted on its lower part, inserted on the lower ⅓–¼ of the lemma;
terminal pedicel with very rare hairs;	terminal pedicel with abundant and long hairs;
anthers 0.8–1 mm. long.	anthers 2.8–3.2 mm. long.

H. *Glumes subequal in length, markedly unequal in breadth.*

21. Trisetum **oreophilum**, sp. n. Robustum (50–80 cm. altum),

inferius decumbens; vaginis inferioribus pubescentibus, superioribus glabriusculis, in margine superposita sparse longo-pilosis; ligula (3–4 mm. longa) laciniata; laminis foliorum (10–16 cm. long., 2–4 mm. lat.) scabris, glabris vel pilosis, praecipue juxta basim in margine; panicula 8–15 cm. long., 1.5–2 cm. circ. lat.) cylindracea, lobata vel inferius interrupta, viridi, purpureo et argenteo plerumque variegata; spiculis 2–3-floris, lateraliter compressis (4 mm. circ. long.), eorum pedunculis arachnoideis-pilosis; glumis subaequalibus: I (2.6–3.6 mm. long., 0.8–1.2 mm. lat.), II (3.6–4.2 mm. long., 1.2–1.8 mm. lat.) acutis, scabris dorsaliter, saltem superius, non subulatis neque setulatis; lemmate (5 mm. long., 0.8–1 mm. lat.) lanceolato-angusto, densa, alba pilositate vestito, nervis indistinctis, aristato ad ⅓ superiorem; arista (3 mm. circ. long.) saepius non recta, non inferius tortili neque geniculata, sed diverso modo recurvata; palea (4 mm. long.) lemma aequante, apice dentata, carinis 0.6 mm. distantibus, dense ciliolatis; rachilla, callo et prolongatione pedicelliformi sparse et breve pilosis; antheris 1.2–1.6 mm. longis.

Vigorous plant (50–80 cm. high) decumbent; the inferior sheaths pubescent, the superior ones more or less scabrous, the over-lapping margin ciliate; ligule (3–4 mm. long) laciniate; blades (10–16 cm. long, 2–4 mm. wide) scabrous, glabrous, pilose at the base on the margin; panicle (8–15 cm. long, 1.5–2 cm. wide) cylindrical, lobed or interrupted at the base, silvery-green, ordinarily purplish; spikelets 2–3-flowered, laterally compressed, on peduncles arachnoid-pilose; glumes subequal: I (2.6–3.6 mm. long, 0.8–1.2 mm. wide), II (3.6–4.2 mm. long, 1.2–1.8 mm. wide) acute, dorsally scabrous towards the apex, neither subulate nor setulate; lemma (5 mm. long, 0.8–1 mm. wide) narrow-lanceolate, densely pilose, indistinctly nerved, awned at its superior ⅓: awn (about 3 mm. long) not twisted, not geniculate but diversely bent; palea (4 mm. long) equal to the lemma, 2-dentate; keels 0.6 mm. distant, densely ciliolate; rachilla, its pedicel and callus lightly pilose; anthers 1.2–1.6 mm. long.

Distribution. ECUADOR: Turubamba near Quito, *Sodiro*, s. j. 1890, 1893; Pichincha, *Sodiro*, 1893. The material from Ecuador is not very typical. PERU: Cuzco, moist grassland, high up ravine above Olloutaytambo, Alt. 3600 m. Dec. 5, 1923, *Hitchcock* 22535 (TYPE at the U. S. Nat. Herb.), *Hitchc.* 22471; Palca, La Paz, *Hitchc.* 22563, 22294, 22323, *E. W. D. & Mary M. Holway* 478; Goyllarisquisca, Cerro de Pasco (Junin) *Hitchc.* 22271, 22254 (alt. 4200 m.), 22269. Hitchc. 22199 has a subglabrous lemma. BOLIVIA: *Buchtien* 6468; *Asplund* 6497 (alt. 4600 m.), 6476.

Remark. Very homogenous species, contains nearly all of the

collections of "*T. spicatum*" of Ecuador, Peru and Bolivia of the U. S. Nat. Herbarium of Washington. *T. oreophilum* is more closely related (by its villous lemma and its habit) to *T. Rosei* than to *T. spicatum*, as the writer sees them after a careful study of the type (Cf. discussion of the type of *T. spicatum*).

(To be continued)

SOLIDAGO FLEXICAULIS AND SOLIDAGO LATIFOLIA

Kenneth K. Mackenzie

In 1753 (Sp. Pl. **2**: 879) Linnaeus published his *Solidago flexicaulis* and immediately following on the same page his *Solidago latifolia*.

His description of *Solidago flexicaulis* is as follows:

"7. SOLIDAGO caule flexuoso, foliis ovatis acuminatis serratis, racemis lateralibus simplicibus. *Roy. lugdb.* 161.

"Virga aurea montana, scrophulariae folio. *Pluk. alm.* 390. *t.* 235. *f.* 3.

"Virga aurea canadensis, asterisci folio. *Herm. par.* 244. *t.* 244.

"*Habitat in* Canada."

Both plates cited illustrate the plant treated by Britton & Brown (Ill. Fl. (ed. 2) **3**: 383 f. 4216) as *Solidago flexicaulis*, and the Royen reference refers to the same plant. Notwithstanding that Linnaeus in no way referred to or cited any herbarium specimen of his own, Gray (Proc. Am. Acad. **17**: 178–9. 1882) insisted on dropping the name, merely because he found a specimen of *Solidago caesia* L. labeled as *S. flexicaulis* in the Linnaean herbarium. And this although the Linnaean herbarium is full of incorrectly labeled material. Since Gray's time it has developed that the specimen seen by him was not in the Linnaean herbarium in 1753 (Jackson, Proc. Linnaean Soc. 1912, Supplement 139) and hence it has no claim at all for consideration in dealing with *Solidago flexicaulis*. The name then is properly used as by Britton & Brown and the species represents no mixture at all.

The original description of *Solidago latifolia* is as follows:

"8. SOLIDAGO caule erecto, foliis ovatis acuminatis serratis, racemis lateralibus simplicibus.

"Virga aurea, latissimo folio, canadensis glabra. *Pluk. alm.* 389. *t.* 235. *f.* 4.

"*Habitat in* Canada. ♃

"*Nimis affinis S. flexicauli.* Caulis *rectus acute angulatus.* Folia *ovata, utrinque mucronata, serrata, supra laevia, subtus scabra.* Racemi *ex alis, folio plerumque breviores.*"

This is a real mixture. The specimen in the Linnaean herbarium (labeled *lateriflora* by Linnaeus and corrected to *latifolia* by Smith) is a cultivated non-typical form of the plant treated as *S. latifolia* in the seventh edition of Gray's Manual (p. 789). The Linnaean description also applies to this. The Plukenet reference however applies to something entirely different (Gray, Proc. Am. Acad. **17**: 178–9. 1882).

From the above it follows that the names *Solidago flexicaulis* and *Solidago latifolia* both apply to the same plant. Under the American code of nomenclature *Solidago flexicaulis* having place priority should be used. The Vienna code (Art. 46) provides "when two or more groups of the same nature are united * * * if the names are of the same date, the author chooses, and his choice cannot be modified by subsequent authors."[1]

In the present case the earliest author to combine the two names so far found by me was Aiton (Hort. Kew. **3**: 217. 1789), who united them under the name *Solidago flexicaulis.* Later on Willdenow (Sp. Pl. **3**: 2064. 1800) did the same thing, treating *Solidago latifolia* as a variety of *Solidago flexicaulis.*

Solidago flexicaulis then is the name which should be applied to this species. It is happily a highly appropriate name, and is much to be preferred to a name based on cultivated non-typical material.

MAPLEWOOD, NEW JERSEY.

SOME EASTERN AMERICAN FORMS OF SENECIO

M. L. FERNALD

IN 1924 I noted[2] the fact that practically all our native species of *Senecio* in northeastern America have both radiate and discoid forms. It was not then considered worth while to give the exceptional

[1] This is as troublesome a rule to apply as could possibly be devised. Its application requires hunting through all the authors whose names may occur to one, in order to find out who first united the groups. One may very easily overlook some author, or some works may not be accessible for examination. Libraries where such investigation can be carried on are very few in number, and the requisite knowledge of what books to look through in each case belongs to very few. The simple rule of the American code is infinitely the best in cases like the present where only two specific names are involved and there is no reason for a different course.

[2] Fernald, RHODORA, XXVI. 117, in note (1924).

forms distinctive names, but so many recent collections of them have come to hand with requests for names that it seems desirable to have definite formal designations for them. Colonies of discoid plants of ordinarily radiate species or of radiate plants of ordinarily discoid species are conspicuous and should they be brought into cultivation would need definite names. The following such forms are known to me.

S. RESEDIFOLIUS Less., forma **columbiensis**(Gray), n. comb. *S. resedifolius,* var. *columbiensis* Gray, Syn. Fl. N. A. i.[2] 390 (1884). *S. hyperborealis,* var. *columbiensis* (Gray) Greenm. Monogr. Senecio 1 Teil, 24 (1901). *S. Fernaldii* Greenm. Ann. Mo. Bot. Gard. iii. 90 (1916).

The type of *S. resedifolius,* var. *columbiensis* Gray was a lax and green shade-state, that of *S. Fernaldii* a compact purplish plant from exposed gravel. Otherwise they seem inseparable. For detailed discussion see Fernald, RHODORA, xxvi. 114, 115 (1924).

S. PAUCIFLORUS Pursh, forma **fallax** (Greenm.), n. comb. *S. pauciflorus fallax* Greenm. in Piper, Contrib. U. S. Nat. Herb. xi. 597 (1906).

S. INDECORUS Greene, forma **Burkei** (Greenm.), n. comb. *S. Burkei* Greenm. Ott. Nat. xxv. 114 (1911), Ann. Mo. Bot. Gard. ii. 626, t. 20, fig. 1 (1915), ibid. iii. 136 (1916).

For discussion see Fernald, RHODORA, xxvi. 117, 118 (1924). Some of the material (including all that from Ontario and Michigan) cited by Greenman in Ann. Mo. Bot. Gard. iii. 95 (1916) as *S. pauciflorus,* var. *fallax* belongs here.

S. OBOVATUS Muhl., forma **elongatus** (Pursh), n. comb. *S. elongatus* Pursh, Fl. Am. Sept. ii. 529 (1814). *S. obovatus,* var. *elongatus* (Pursh) Britt. in Britt. & Br. Ill. Fl. iii. 478 (1898).

S. ROBBINSII Oakes, forma **invenustus**, n. f., capitulus eradiatis.—TYPE: meadow, Ayer's Junction, Pembroke, Maine, July 12, 1909, *Fernald,* no. 2206 (Herb. N. E. Bot. Club).

S. PSEUDAUREUS Rydb., forma **ecoronatus,** n. f., capitulis eradiatis.—TYPE: springy meadow in woods at about 600 m. altitude, North Fork of Madeleine River, Gaspé Co., Quebec, July 31, 1923, *Fernald, Dodge & Smith,* no. 26,097 (Gray Herb.), distributed as *S. aureus* L., "discoid form."

Much of the material from western Newfoundland, Anticosti Island and the Gaspé Peninsula, which has passed as *Senecio aureus,* is apparently inseparable from the cordilleran *S. pseudaureus.* The discoid form was abundant at the type-station.

S. PAUPERCULUS Michx., forma **verecundus** n. f., capitulis eradi-

atis.—TYPE: dans la tourbière, Rivière la Loutre, Ile d'Anticosti, Quebec, 5 août, 1926, *Victorin & Rolland*, no. 25,167 (Gray Herb.).

This is the discoid form of typical *S. pauperculus* which, as pointed out by me[1] in 1921, is the northern extreme of the species, with very narrow basal and cauline leaves. The coarser and usually more southern variety also has a rayless form. This is

S. PAUPERCULUS, var. BALSAMITAE (Muhl.) Fernald, forma **inchoatus** n. f., capitulis eradiatis.—TYPE: talus of calcareous cliffs near Cape Rosier, Gaspé Co., Quebec, July 18, 1928, *A. S. Pease*, no. 20,918 (Gray Herb.).

GRAY HERBARIUM.

NOTES ON ASTER

S. F. BLAKE

THE notes on *Aster* here brought together relate principally to species of the northwest coast which have been studied by the writer in the preparation of the treatment of the family *Asteraceae* for Prof. L. R. Abrams's "Illustrated Flora of the Pacific States." A new variety of *Aster spectabilis* from North Carolina is also described.

ASTER SPECTABILIS Ait. var. **cinerascens**, var. nov. Stems glabrate below; branches and peduncles densely cinereous-hirsute with several-celled spreading hairs, essentially without short glandular hairs; leaves more or less densely hirsute or hirsutulous on both sides, the hairs with small tuberculate bases; outer phyllaries hirsute-ciliate, on back hirsutulous, the middle and inner less pubescent or nearly glabrous except for the stipitate-glandular tips.—NORTH CAROLINA: In pure sand of road embankment, Kellum, Onslow Co., 17 Oct. 1927, *E. T. Wherry* (type no. 1,420,092, U. S. Nat. Herb.; duplicates in Gray Herb. and my own herbarium).

In typical *Aster spectabilis* Ait., as represented in the National Herbarium by a series of specimens ranging from Massachusetts to Maryland (Vienna, Wicomico Co., 1906, *Forrest Shreve & W. R. Jones* 1311a) and western North Carolina, the stem is densely stipitate-glandular and also sometimes sparsely hirsute, the peduncles very densely stipitate-glandular and often rather densely hirsute, the leaves ciliolate but otherwise usually glabrous or merely glandular and sparsely hirsutulous beneath, and the involucre densely stipitate-glandular with some of the outer phyllaries often piloseciliate. The specimens collected by Dr. Wherry represent the south-

[1] Fernald, RHODORA, xxiii. 299 (1921).

ernmost coastal locality definitely known for any form of the species and appear to constitute a well-marked variety which may prove to be of definite geographic range. They are remotely approached by a few specimens from farther north. In all Dr. Wherry's specimens the stems had been cut off not far above the ground and have been replaced by erect branches about a foot high.

ASTER MULTIFLORUS Ait. var. **pansus**, var. nov.—*Aster exiguus* Rydb. Bull. Torr. Club **28:** 505. 1901, as to descr., not as to name-bringing synonym.—Habit and abundant small heads, racemosely arranged along the branches, of *A. multiflorus;* stem and leaves densely spreading-hirsute or -hirsutulous; rays white.—Dry ground, Massachusetts to Washington and Oregon, south to Colorado, Texas and Missouri. Type from WASHINGTON: Along banks and in copses, Ellensburg, 23 Aug. 1898, *Kirk Whited* 853 (type no. 366,606, U. S. Nat. Herb.).

This is the commonest form of *Aster multiflorus* in Washington and Oregon, and is the plant that has passed for a number of years as *A. exiguus* (Fernald) Rydb. The only specimen of the typical form of *A. multiflorus* with appressed pubescence from the Pacific Coast States examined by the writer is *Elmer* 615, from meadows of the Sinlahekin Basin, Okanogan County, Washington. This specimen, kindly sent for examination by Dr. P. A. Rydberg from the herbarium of the New York Botanical Garden, is the basis of Dr. Rydberg's record of *A. stricticaulis* (T. & G.) Rydb. from Washington. *Aster stricticaulis* appears to me to be a mere phase, unworthy of specific or even varietal separation. It makes some approach to the true *A. multiflorus* var. *exiguus* of Fernald.[1] Examination of three sheets of the latter, kindly sent for study by Prof. Fernald (Prides Crossing, Mass., *Miss Jackson;* the cultivated plant from Nees; and Dedham, Mass., *C. E. Faxon,* the last marked "type" by Prof. Fernald) from the five mentioned in the original description, shows that the name *exiguus* was misapplied by Rydberg to the plant with spreading pubescence. In all three specimens the stem and leaves are strigose or strigillose, and the heads solitary or sometimes few and racemose at the tips of spreading somewhat flexuous branches. Var. *exiguus* seems to the writer a mere form or state of *A. multiflorus*, not requiring nomenclatorial distinction.

ASTER MULTIFLORUS var. **columbianus** (Piper).—*A. columbianus* Piper, Contr. U. S. Nat. Herb. **16:** 210. 1913.—Except in its violet

[1] RHODORA **1:** 187. 1899.

rays, this plant of Oregon and Washington does not differ notably from *A. multiflorus* Ait. I have seen only one (*Horner* 627) of the specimens cited by Piper. The type, *Horner* 559, said to be in the National Herbarium, has not been found.

Aster **glaucescens** (Gray).—*Aster engelmannii* var. *glaucescens* Gray, Syn. Fl. **1**[2]: 200. 1884. *Eucephalus glaucescens* Greene, Pittonia **3:** 56. 1896. *Eucephalus glaucophyllus* Piper, Contr. U. S. Nat. Herb. **11:** 570. 1906. *Aster glaucophyllus* Frye & Rigg, Northw. Fl. 385. 1912.—This plant of high elevations in the mountains of western Washington and Oregon is quite distinct specifically from *A. engelmannii* (D. C. Eaton) Gray. Piper's name *E. glaucophyllus* was given on the supposition that Gray's name was preoccupied by *Aster glaucescens* Wenderoth, but the latter occurs as a synonym only (of *Aster cyaneus* Hoffm. α *glaucus* (Hoffm.) Nees, Gen. & Sp. Asterac. 132. 1832) and so does not invalidate further use of the name. Gray (Syn. Fl. l. c. 183) cited "*Aster glaucescens*, Nees, Syn. 23. [1818]" as a synonym of *A. laevis* L., but this was an error, the species there published being *A. glaucus* Nees.

Aster **gormani** (Piper).—*Eucephalus gormani* Piper, Proc. Biol. Soc. Washington **29:** 101. 1916.—This species, related to *A. paucicapitatus* Robinson but distinct in its lower stature, merely stipitate-glandular stem and leaves, much broader (mainly ovate or oblong-ovate) phyllaries, and short rays, is known only from the type locality, Hanging Valley, Mt. Jefferson, Cascade Mountains, Oregon, altitude 1585 meters. A photograph and portions of the type are in the United States National Herbarium.

Aster **vialis** (Bradshaw).—*Eucephalus vialis* Bradshaw, Torreya **20:** 122. 1921.—Related to *Aster ledophyllus* Gray, but distinguished by its discoid heads, linear or linear-lanceolate phyllaries, and stipitate-glandular, only sparsely pilose stem and lower leaf surface. The species is known only from rocky hillsides in the Willamette Valley, Oregon.

Bureau of Plant Industry, Washington, D. C.

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NOTES ON CERTAIN SPECIES OF PANICUM OCCURRING IN OR NEAR RHODE ISLAND

J. Franklin Collins

In February, 1928, Mr. C. A. Weatherby examined the specimens of Panicum in my herbarium, and also others which were unnamed and unmounted. He was kind enough to revise the names of a few of the species and identify all of the unnamed ones, except in the case of a few immature specimens. Somewhat later I became interested in checking up the available published records of distribution of the different species, particularly records of their occurrence in Rhode Island and adjacent Massachusetts and Connecticut. This was followed by a check-up of specimens in the herbarium of the New England Botanical Club and the Gray Herbarium. The results were unexpectedly interesting from the point of view of the presence or absence of certain species in Rhode Island. These results are here briefly summarized as it is thought probable that they may be of interest to other readers of Rhodora, especially to those who collect in southern New England. The lists of species enumerated below include more particularly those in the herbaria mentioned which have been reported or collected recently in Rhode Island. They also include such as are known to occur in adjacent states and might reasonably be expected in Rhode Island. The asterisk (*) indicates species that are recorded in manuals in a general way as occurring in Rhode Island, but are not specifically included from the state in Hitchcock & Chase, "North American Species of Panicum" (1910). Specimens in the Gray Herbarium are indicated by (G), those in the herbarium of the New England Botanical Club by (NE), and those in the herbarium of the writer by (C).

(1) Reported from Connecticut and Long Island but not from Rhode Island. *P. amarum* Ell., *P. Boscii* var. *molle* (Vasey) H. & C.

(2) Reported from Long Island, Connecticut and Massachusetts but not from Rhode Island. *P. Addisonii* Nash., *P. Commonsianum* Ashe, *P. lucidum* Ashe.

(3) Reported from Long Island and Massachusetts but not Rhode Island. *P. Wrightianum* Scribn. (*P. minutulum* Desv.).

(4) Reported from Connecticut and Massachusetts but not Rhode Island. *P. Bicknellii* Nash., **P. Boscii* Poir., **P. xanthophysum* Gray.

(5) Reported from Connecticut but not Rhode Island. *P. pseudopubescens* Nash, *P. stipatatum* Nash.

(6) Reported from Massachusetts but not Rhode Island. *P. callophyllum* Ashe, *P. commutatum* Schultes, *P. Clutei* Nash.

The following notes refer primarily to specimens seen in one or more of the herbaria mentioned above.

P. ALBEMARLENSE Ashe. First reported from Rhode Island by Fernald (RHOD. **24**: 98) in 1922. It is now known from the towns of Warwick, Portsmouth (Prudence Island), Westerly, New Shoreham (Block Island), and Little Compton (NE)—all towns bordering on salt water.

P. ANNULUM Ashe. Reported from New Jersey southward and westward. It has been collected by Fernald in Harwich, Mass. (NE. G).

P. AUBURNE Ashe. Reported from Virginia southward. It has been collected on Cape Cod, Mass. (NE. G).

P. BARBULATUM Mx. Reported from Mass. and Conn. It has been collected in Johnston, Warwick (NE), and Westerly, R. I. (C).

*P. CAPILLARE L. Collected in Warwick and Westerly, R. I. (NE).

P. CAPILLARE var. OCCIDENTALE Rydb. (*P. barbipulvinatum* Nash). Reported from Illinois westward. Probably naturalized eastward (RHOD. **21**: 110). Reported by Bicknell (RHOD. **16**: 82) in 1914 from Marthas Vineyard, Mass., and Long Island, N. Y. Since then specimens have been identified as this variety from Prince Edward Island, New Brunswick, and Nova Scotia, and practically across the country to the Pacific coast (G). In Rhode Island it has been collected in East Providence (*Williams*, 1903) and Block Island (*Fernald, Long and Torrey*, 1913) (G).

*P. COLUMBIANUM Scribn. Collected in Warwick, Little Compton (C), and Charlestown, R. I. (NE).

P. COLUMBIANUM var. THINIUM H. & C. Reported from Massachusetts, New Jersey, and southward. It has been collected in Connecticut (NE), and in Hopkinton, R. I. (C).

P. DEPAUPERATUM var. PSILOPHYLLUM Fernald. Described as a *n. var.* in 1921 (RHOD. **23**: 193). It has been collected in Johnston, Smithfield, Glocester (C), Providence, Warwick (NE. G), Cumberland, East Providence, Coventry, Hopkinton, Westerly, and Middletown, R. I. (NE).

*P. DICHOTOMIFLORUM MX. Collected in Providence (NE. C), Warwick, Westerly, and Block Island, R. I. (NE).

P. DICHOTOMIFLORUM var. PURITANORUM Svenson. Described as a *n. var.* in 1920 (RHOD. **22**: 154) from Cape Cod, Mass. Collected in South Kingstown, R. I., in 1914 by Collins and Fernald (NE).

*P. DICHOTOMUM L. Reported from Warwick, R. I., in 1908 (RHOD. **12**: 216). It is widely distributed in Rhode Island, e. g., in Providence, Lincoln, Johnston (C), Hopkinton (NE. C), Warwick, South Kingstown, Westerly (NE).

P. LANUGINOSUM Ell. Reported from New Jersey southward. It was collected on Block Island, R. I., in 1913 by Fernald, Long and Torrey (NE).

*P. LINEARIFOLIUM Scribn. Collected in Cumberland in 1917 by Knowlton, and in Foster, R. I., in 1922 by Eaton and Fassett (NE).

*P. LINEARIFOLIUM var. WERNERI (Scribn.) Fernald. Collected in Glocester (NE), Wickford (G), and Block Island, R. I. (NE. G).

P. LONGIFOLIUM Torr. Reported by H. & C. (p. 106) from "Shannock, R. I." This village is situated partly in Richmond and partly in Charlestown. In addition to this station it is known from Hopkinton (NE. C), Westerly and Richmond, R. I. (NE).

P. MATTAMUSKEETENSE Ashe. Reported from Long Island southward. Erroneously reported from Massachusetts in 1901 (RHOD. **3**: 114 and **15**: 57). It has been collected in Massachusetts (NE. G) and by the writer in South Kingstown, R. I., in 1927 (NE. G. C).

*P. MILIACEUM L. To be expected on any dumping ground. Collected in Little Compton, East Providence (C), and Providence, R. I. (NE. C).

P. OLIGOSANTHES Schultes. Reported from New Jersey to Texas, and in Massachusetts in 1913 (RHOD. **15**: 58 and 64). Collected on Block Island, R. I., in 1913 by Fernald and Long (NE. G).

P. PHILADELPHICUM Bernh., as redefined by Fernald (RHOD. **21**: 112). Reported from Connecticut. Collected in Hopkinton, R. I., in 1919 by Ware, Woodward and Harger (NE).

P. SCOPARIOIDES Ashe. Reported from Connecticut (H. & C., p. 239, and RHOD. **15**: 66). It has been collected at Sharon, Mass. (NE).

P. SCOPARIUM Lam. Reported from Cape Cod (H. & C., p. 295) and Marthas Vineyard (RHOD. **16**: 82), Mass., and from New Jersey southward. Collected on Block Island, R. I., in 1916 by Collins, Gravatt and Spaulding (NE).

P. SUBVILLOSUM Ashe. Reported from Massachusetts and Con-

necticut. Collected by Fernald, Long and Torrey on Block Island, R. I., in 1913 (G).

*P. VILLOSISSIMUM Nash. Collected in Hopkinton, R. I., in 1919 by Fernald, Woodward and Collins (NE).

BROWN UNIVERSITY.

CONCERNING THE PROPER IDENTIFICATION OF LINNAEAN SPECIES, ESPECIALLY THOSE BASED ON MATERIAL COLLECTED BY CLAYTON

KENNETH K. MACKENZIE

ONE of the great basic collections of American plants is the collection made by Clayton in Virginia. This is preserved in the British Museum. Of it Gray (Scientific Papers of Asa Gray **2:** 9–10) says: "But still more important is the herbarium of Clayton, from whose notes and specimens Gronovius edited the 'Flora Virginica.' Many Linnaean species are founded on the plants here described for which this herbarium is alone authentic; for Linnaeus, as we have already remarked, possessed very few of Clayton's plants. The collection is nearly complete, but the specimens were not well prepared, and are not therefore always in perfect preservation." "From Gronovius, Linnaeus had received a very small number of Clayton's plants, previous to the publication of the 'Species Plantarum'; but most of the species of the 'Flora Virginica' were adopted or referred to other plants on the authority of the descriptions alone." (l. c. 6.)

We must also bear in mind that Linnaeus had actively assisted Gronovius in the Flora Virginica, which was published in 1739–1743. "Other work of Linnaeus in Leyden consisted * * * . He also helped Gronovius with his 'Flora Virginica' in which Linnaeus's principles were embodied." (Jackson, Linnaeus 165; Pulteney, Linnaeus 49.) Gronovius in the preface to his work (p. 3) acknowledged the assistance of Linnaeus as follows:

"Nullus igitur dubitavi specimina plantarum cum perspicacissimo Linnaeo examinare; utinam reliqua etiam cum doctissimo viro ad examen revocare mihi licuisset."

So when we find Linnaeus in 1753 in his Species Plantarum constantly referring to Gronovius' Flora Virginica, these references are to a work in which he had assisted and to a collection with which he was personally thoroughly familiar. And these references are of

the most definite nature, because they are to the specific specimens with which Gronovius and Linnaeus worked.

The situation with respect to the Linnaean herbarium on the other hand is very unsatisfactory and very exasperating. Its condition is fully discussed by the late Dr. B. D. Jackson (Proc. Linnean Society, 1912 Appendix). Information as to collector, place and time of receipt of a specimen is very often absent, and only arbitrary signs or such abbreviations as "K" for Kalm usually appear. Sometimes there are no data at all. The name and the number in the first edition of the Species Plantarum usually are given, additions made afterwards being given letters.

From three lists (not entirely accurate apparently) which are preserved we know what species Linnaeus had represented in his herbarium in 1753, in 1755 and in 1767. However, we cannot be sure that the specimens he had in those years are the specimens existing now, for he was constantly adding to his herbarium and it also suffered severe losses.

"The younger Linné complained of the terrible damage done by mice, moulds and insects * * * [he] must have withdrawn the damaged sheets." (Jackson l. c. 21.) And we further learn from the son that Linnaeus himself destroyed many of his specimens. "My late father weeded out his herbarium, while he was able to work, and seems to have burned all the duplicates; why, no one knows." (Fries, Linné **2:** 416, note.)

In short, in dealing with specimens now in the Linnaean herbarium, we are very frequently indeed dealing with specimens which were not specifically referred to by him in his works and which we cannot feel sure were in his possession at any particular date. All we can feel sure from his naming is that he referred a particular specimen to some particular species of his own. And unfortunately his knowledge of his own species was very frequently vague and unreliable. He was engaged in the herculean task of putting into usable form the works of his predecessors, and neither he nor anyone else under the circumstances could have been expected to have anything but the most general knowledge of the great mass of material with which he dealt.

Not infrequently, in dealing with one of the American species of Linnaeus we are confronted with the choice of applying a name given by him either (1) to a specimen of Clayton's collecting

which is definitely cited by Linnaeus and which we know he studied but which was not preserved in his own herbarium; or (2) to a specimen in the herbarium of Linnaeus but not cited by him, frequently without data and the history of which is entirely unknown, but one which bears his naming.

To test this matter let us suppose that an American author a number of years ago in a descriptive list of some collection not in his own herbarium, referred some particular specimen to some previously described species; then after a space of years let us suppose that in another work he gave a specific reference to his earlier publication and in this second work assigned a binomial name to such plant; let us further suppose that in his own herbarium at the time of the publication of his second work he had a sheet containing a specimen without data of any kind on which he wrote the binomial name given in his second work, but that he did not refer to such specimen in such second work; let us further suppose that this specimen represented a species other than the plant described in the first work. On such a state of facts I believe that all will agree that the binomial name in the author's second work should be applied to the plant described in the author's first work and should not be applied to the plant represented in his herbarium.

The above suppositious case represents a condition which is of frequent occurrence in dealing with Linnaean species of American plants, where he cites material collected by Clayton, and writers sadly led astray by the glamour of the Linnaean herbarium have reached results in identifying his species which would never have been thought of in other connections.

In such cases it seems to me that we should apply the Linnaean names to the specimens collected by Clayton; that we should follow certainly rather than uncertainly, definitely cited specimens rather than specimens merely named in an author's herbarium.

Let us apply the above to the following concrete cases:

(1) PRUNUS VIRGINIANA L. Sp. Pl. 473. 1753.

The original publication by Linnaeus reads as follows:

"2. PRUNUS floribus racemosis, foliis deciduis basi antice glandulosis.

Cerasus sylvestris, fructu nigricante in racemis longis pendulis phytolaccae instar congestis. *Gron. virg.* 54. *Roy. lugdb.* 537.

Cerasi similis arbuscula mariana, padi folio, flore albo parvo racemoso. *Pluk. mant.* 43. *t.* 339. *Catesb. car.* 1. *p.* 28. *t.* 28.

Habitat in Virginia."

The Clayton specimen cited from Gronovius is *Prunus serotina* Ehrh.

The only specimen in the Linnaean herbarium is *Prunus nana* DuRoi. A specimen was in the Linnaean herbarium in 1753. According to information furnished me by the late Dr. B. D. Jackson, there are no data of any kind whatsoever in connection with this specimen (a flowering one of which I have a photograph) to show who collected it or from where it came. It is entirely probable that it came from a cultivated plant in the Upsala Garden, because *Prunus virginiana* was listed as cultivated there in 1753 (Hojer, Dem. Pl. in Hort. Ups., 13), but this is only a supposition on my part.

The citation from Plukenet refers to *Itea virginica* L. and the citation from Catesby to *Prunus caroliniana* (Mill.) Ait. These references were cancelled by Linnaeus (Sp. Pl. Ed. 2) and can be disregarded. (See Torrey & Gray, Fl. N. Am. **1:** 410.)

It will be noted that the Linnaean specific name was taken from the Clayton specimen, it being the only one cited from Virginia. It will be noted also that Linnaeus gave no description of his own, except such as is contained in his polynomial name. This applies to either *Prunus serotina* Ehrh. or to *Prunus nana* DuRoi; and as a matter of fact merely followed a system he adopted for naming various species of *Prunus*, his names running (1) "Prunus floribus racemosis, foliis deciduis basi subtus biglandulosis"; (2) "Prunus floribus racemosis, foliis deciduis basi antice glandulosis"; (3) "Prunus floribus racemosis, foliis sempervirentibus eglandulosis," etc.

Under these circumstances it seems to me that Miller, DuRoi, Wangenheim, Marshall, Aiton, Walter, Poiret, Pursh, Bigelow, Elliott and numerous more recent writers have been correct in applying the Linnaean name to the black cherry (*Prunus serotina* Ehrh.) and I cannot follow Prof. Fernald's contrary course based on partial information. (Rhodora **18:** 140.)[1]

(2) Aster novae-angliae L. Sp. Pl. 875. 1753.

The original publication by Linnaeus is as follows:

[1] It may be here noted that a strikingly similar problem is involved in *Quercus rubra* L. (Sp. Pl. 996). The specimens in the Linnaean Herbarium so named by Linnaeus are specimens of *Quercus coccinea* Wang. (Sargent in Rhodora **18:** 45–6), and the Linnaean polynomial name applies to them as well as to other related species. However, they are not cited or referred to by him, altho they were apparently in his herbarium in 1753. Under these circumstances Sargent disregarded these specimens and applied the Linnaean name to the Clayton material which was directly cited by Linnaeus. It seems to me that in so doing he was quite correct. (See Rhodora **17:** 39–40 and **18:** 45–8.)

"15. ASTER foliis lanceolatis alternis integerrimis semiamplexicaulibus, floribus terminalibus. *Hort. cliff.* 408. *Gron. virg.* 100. *Roy. lugdb.* 166.

Aster novae angliae altissimus hirsutus, floribus amplis purpuro-violaceis. *Herm. par.* 98. *t.* 98.

Aster novae angliae altissimus hirsutus, floribus omnium maximis purpuro-violaceis. *Tournef. inst.* 482.

Habitat in Nova Anglia. ♃

Caulis *fuscus.* Pedunculi *imbricati foliolis.* Corollae *radius caeruleus.*"

The earlier citations given by Linnaeus refer to the plant commonly passing as *Aster novae-angliae* L.

The specimen in the Linnaean herbarium is of *Aster grandiflorus* L. (Gray, Proc. Am. Acad. **17**: 165. 1882). A specimen (probably this) was in the Linnaean herbarium in 1753.

The eight words of description by Linnaeus apply to *Aster grandiflorus* L. and not to *Aster novae-angliae* L. as ordinarily understood.

Here we would undoubtedly have applied the Linnaean name to the plant which is represented in his herbarium and to which his few words of original description apply, were it not for the fact that he took his specific name from the plant of earlier authors, in fact one which he himself had dealt with in the Hortus Cliffortianus. But as far as I can see the case is much stronger for applying the name *Aster novae-angliae* to *Aster grandiflorus* than is the case for applying the name *Prunus virginiana* to the choke-cherry.

(3) ACALYPHA VIRGINICA L. Sp. Pl. 1003. 1753.

The original publication by Linnaeus reads as follows:

"1. ACALYPHA involucris femineis cordatis incisis, foliis ovato-lanceolatis petiolo longioribus. *Hort. ups.* 290. *Fl. zeyl.* 342.

"Acalypha foliis ovato-lanceolatis, involucris femineis obtusis. *Hort. cliff.* 495. *Gron. virg.* 116.

"Mercurialis tricoccos hermaphroditica s. ad foliorum juncturas e foliolis cristatis julifera simul & fructum gerens. *Burm. zeyl.* 248. *t.* 99. *f.* 4. (Should be *Pluk. phyt.*)

"*Habitat in* Zeylona, Virginia. ⊙"

Investigation has shown that the only specimen of this species in the Linnaean herbarium is without data of any kind. Of this specimen I have received photographs. It is highly probable that it was taken from the Upsala Garden, but this is at best only a guess. Mueller's definite statement that it came from the Upsala Garden referred to by Mr. Weatherby in his very thoughtful study of this species and its allies (RHODORA **29**: 197) was not justified as far as

I have been able to find out. According to Weatherby (l. c. 196–7) this specimen represents one species, and the Clayton specimen from Virginia cited by Linnaeus represents another. Had we an authentic specimen from the Upsala Garden we would be confronted with the choice of applying the name of Linnaeus either to such specimen or to the specimen collected by Clayton from which he took his specific name. In that case it seems to me that the latter course would have been the correct one. But when in addition we find that there is no authentic material preserved from the Upsala Garden, it seems to me very plain that we must apply the Linnaean name to the Clayton specimen.

(4) SCIRPUS CAPITATUS L. Sp. Pl. 48. 1753.

The original publication by Linnaeus reads as follows:

"5. SCIRPUS culmo tereti nudo setiformi, spica subglobosa. Scirpus culmo setaceo nudo, spica subglobosa. *Gron. virg.* 12. *Habitat in* Virginia."

The Clayton specimen cited from Gronovius is *Eleocharis tenuis* (Willd.) Schultes.

The only specimen in the Linnaean herbarium is one of *Eleocharis obtusa* (Willd.) Schultes. This was one of those specimens "obtained after 1767, or * * by some accident not recorded by Linné" (Jackson).

Dr. Blake (RHODORA **20**: 24) ignored the specimen in the Linnaean herbarium and applied the Linnaean name to the Clayton material. In this it seems to me that he was entirely correct.

MAPLEWOOD, NEW JERSEY.

THE GENUS TRISETUM IN AMERICA

FATHER LOUIS-MARIE O. C.

(Continued from page 222)

TRISETUM OREOPHILUM Louis-Marie, var. **Johnstonii**, var. n. A typo differt panicula cylindrica (3 cm. long., 1 cm. lat.), exserta; spiculis 3-floris; arista maxime variabili: a mucrone vix 1 mm. long. ad normalem 4 mm. long. divaricatam aristam; pallida canescentia laminarum vaginarumque.

Differing from the type by panicle (3 cm. long, 1 cm. wide) cylindrical, exserted; spikelets 3-flowered; awn very variable: from a short (less than 1 mm. long.) beak to a normal (4 mm. long) divaricate one; by the canescent pilosity of the blades and sheaths.

Distribution. North ARGENTINA: Andes of N. W. San Juan, Arroyo Tambillos, 4300 m. alt. Jan. 10, 1926, *Ivan M. Johnston*. TYPE at the Gray Herbarium; isotype at the U. S. Nat. Herbarium of Washington.

22. TRISETUM LASIOLEPIS E. Desv., C. Gay, Flor. Chil. **6**: 346. 1853.

23. TRISETUM PRESLEI (Kunth) E. Desv. C. Gay, Flor. Chil. **6**: 347. 1853.

TRISETUM PRESLEI (Kunth) E. Desv., var. **lasiantha** (Phil.), comb. n. *Deschampsia lasiantha* Phil., Linnaea **33**: 290. 1864–65.

TRISETUM PRESLEI (Kunth) E. Desv., var. **Buchtienii** (Hack.) comb. n. *Trisetum Buchtienii* Hack. Oesterr. botan. Zeitschr. **54**: 290. 1904.

24. TRISETUM SPICATUM (L.) Richt. Pl. Eur. **1**: 59. 1890. *Aira spicata* L. Sp. Plant. n. 7, 64, non n. 1. 63, 1753. *Aira sub-spicata* L. Syst. Nat. **2**: 873. 1759. *Trisetum subspicatum* Beauv., Nouv. Agrost. 88. 1812. *Avena subspicata* Clairville, Man. Suisse, 17. 1811. *Avena airoides* Koeler, Descr. gram. 205. 1902. *Trisetum airoides* Roemer & Schultes, Syst. Veg. **2**: 666. 1817. *Melica triflora* Bigel, New Engl. Journ. Med. et Surg. **5**: 334. 1816. White Mts. (fide Piper). *T. tolucense* Kunth, Rev. Gram. **1**: 101 & 297, t. 60. 1830 (1829). *T. andinum* Phil. Linnaea **29**: 93. 1857–58. non Bentham 1846. *T. labradoricum* Steud. Syn. Pl., Gram. 228. 1854. *T. groenlandicum* Steud. Syn. Pl., Gram. 228. 1854. *T. subspicatum* var. *breviglume* Hack. Wiss. Ergbn. Südpolar-Exp. **4**, pt. 4: 6. 1906. *T. subspicatum* var. *glabrifolium* Hackel, Rep. Princeton Univ. Exped. Patagonia, **8**, Suppl. 49. 1915.

One must go back to Scheuchzer,[1] quoted by Linnaeus in his original diagnosis of Aira spicata,[2] to reconstitute the type of *T. spicatum*, where the latter species is fully described and illustrated.

The plant (17–30 cm. high) is described as having glabrous, striate leaves; ligule (about 1 mm. long) obtuse; culm densely tomentose; panicle spike-like (about 1.5 cm. long, 0.7–1 cm. wide), purplish, shining; spikelets (about 4 mm. long) 2-flowered; glumes unequal (I shorter and narrower, II about 2 mm. wide and 4 mm. long), glabrous; lemma (4 mm. long) awned dorsally on the upper ¼; awn (about 4 mm. long) reflexed; palea equal or subequal to the lemma; rachilla densely villous; anthers 0.6–1 mm. long.

In the present state of our knowledge, the following variations departing from Scheuchzer's type seem to deserve mention:

[1] Scheuchzer, Johan., Agrostographia, 221. 1719.
[2] Species Plantarum, n. 7, 64, non n. 1, 63. 1753.

1. T. SPICATUM var. **hirsutum** (Phil.), comb. n. *T. hirsutum* Phil. Anal. Univers. Chil. 565. July 1873.
2. T. SPICATUM var. PHLEOIDES (Kunth) Macloskie, Rep. Princeton Univers. Exped. Patagonia **8**: 206. 1904.
3. T. SPICATUM var. **fuegianum** (Hack.), comb. n. *T. subspicatum* var. *fuegianum* Hack. Wiss. Ergebn. Schwed. Südpolar-Exped. **4**, pt. 4: 1906.
4. T. SPICATUM var. **dianthemum**, nom. n. *T. biflorum* Phil. Anal. Univ. Chil. 568. Jul. 1873; non Hochst. Flora **38**: 275. 1852.
5. T. SPICATUM var. **andinum** (Benth.), comb. n. *T. andinum* Benth. Pl. Hartw. 261. 1847. *T. subspicatum* var. *compactum* Lange, Consp. Fl. Groenland, **3**: 164. 1880.
6. T. SPICATUM var. **laxius** (Lange), comb. n. *T. subspicatum* var. *laxius* Lange, Consp. Fl. Groenl. **3**: 164. 1880.
7. T. SPICATUM var. **nivosum** (Fourn.), comb. n. *T. nivosum* Fourn., Mex. Pl. Enum., Gram. 107. 1886.
8. T. SPICATUM var. MAJUS Farwell. Rep. Mich. Acad. Sci. **21**: 352. 1920.
9. T. SPICATUM var. MOLLE (Michx.) Piper, Contr. U. S. Nat. Herb. 11: 125. 1906.
10. T. SPICATUM var. **Brittonii** (Nash), comb. n. *T. Brittonii* Nash, Bull. N. Y. Gard. **1**: 437. 1900.
11. T. SPICATUM var. PILOSIGLUME Fern. RHODORA **18**: 195. 1916.
12. T. SPICATUM var. MAIDENII (Gand.) Fern. RHOD. **18**: 196. 1916.
13. T. SPICATUM var. **alaskanum** (Nash) Malte ined. *T. alaskanum* Nash Bull. N. Y. Botan. Garden **2**: 155. 1901.
14. T. SPICATUM var. **villosissimum** (Lange), comb. n. *T. subspicatum* var. *villosissimum* Lange, Consp. Fl. Groenl. **3**: 164. 1880.

H. *Glumes very unequal*. . . I.

I. *Culm pubescent or puberulent under the panicle; palea 2-toothed.*

25. TRISETUM FOURNIERANUM Hitchc. Contr. U. S. Nat. Herb. **17**: 326. 1913.
26. TRISETUM ROSEI Scribn. & Merrill, Contr. U. S. Nat. Herb. **8**: 289. 1905.

TRISETUM ROSEI Scribn. forma **tenerum** (Scribn. & Merrill), comb. n. *T. Rosei* var. *tenerum* Scribn. & Merrill, Contr. U. S. Nat. Herb. **8**: 289. 1905.

27. TRISETUM CONGDONI Scribn. & Merrill, Bull. Torr. Bot. Club **29**: 470. 1902.

Trisetum Congdoni is easily distinguished from *T. spicatum* by its spikelets longer, silvery shining, with glumes (6 and 8 mm. long in the type) narrow and long-attenuated at the tip, with lemma (7–8 mm.) long-awned; by its leaves more erect and glabrous.

This species is neither to be confused with *T. sesquiflorum* Trin., as

pointed out elsewhere; the latter being of boreal distribution, with more narrow-lanceolate glumes, with awn attached dorsally near the base of the lemma.[1]

28. TRISETUM BARBINODE Trin. Linnaea **10**: 300. 1836.
    TRISETUM BARBINODE var. **hirtiflorum** (Hack.), comb. n. *T. hirtiflorum* Hack. Fedde Rep. Spec. Nov. **10**: 169. 1911.

I. *Culm glabrous under the panicle; palea 2-fid. . .* J.

J. *Anthers 0.6-1 mm. long.*

29. TRISETUM CAUDULATUM Trin. Linnaea **10**: 300. 1836. *T. chromostachyum* E. Desv., C. Gay Fl. Chil. **6**: 350. 1853.
30. TRISETUM VARIABILE E. Desv., C. Gay. Fl. Chil. **6**: 351. 1853.
    1. T. VARIABILE var. a) FLAVESCENS E. Desv. *T. ochrostachyum* Phil. Linnaea **33**: 290. 1864–65.
    2. T. VARIABILE var. b) VIRESCENS E. Desv.
    3. T. VARIABILE var. **intonsum** nom. n. *T. variabile* var. *virescens* (Nees) Mackloskie, not E. Desv.
    4. T. VARIABILE var. **chiloense** (Phil.), comb. n. *T. chiloënse* Phil. Linnaea **29**: 93. 1857–58.
    5. T. VARIABILE var. **Vidali** (Phil.), comb. n. *T. Vidali* Phil. Anal. Univ. Chil. **94**: 26. 1896.
31. TRISETUM ERECTUM Phil. Anal. Univ. Chil. **94**: 26. 1896.

J. *Anthers 1-2 mm. long.*

32. TRISETUM MONTICOLA Phil. Linnaea **33**: 291. 1864–65.
33. TRISETUM ANTARCTICUM Trin. Mém. Acad. St. Pétersb. Sér. 6. **1**: 61. 1830.

A. *Panicles axillary; culm branching at each node.*

34. TRISETUM PARADOXUM Phil., Anal. Univ. Chil. **94**: 28. 1896.

Sub-section 2. SPHENOPHOIDEA Louis-Marie.

35. TRISETUM PENNSYLVANICUM Beauv. in R. & S. Syst. **2**: 658. 1817.
36. TRISETUM INTERRUPTUM Buckl. Proc. Acad. Sci. Phila. 100. 1862.
    TRISETUM INTERRUPTUM Buckl., var. **californicum** (Vasey), comb. n. *T. californicum* Vasey, U. S. Dept. Agr. Div. Bot. Bull. **12**: Pl. 46. 1892.
37. TRISETUM HALLII Scribn. Bull. Torr. Bot. Club **2**: 6. 1884.

Sub-section 3. GRAPHEPHORUM (Desv.) Louis-Marie.

38. TRISETUM MELICOIDES (Michx.) Vasey, Bot. Gaz. **9**: 169. 1884.
39. TRISETUM WOLFII Vasey, Monthly Report U. S. Dept. Agr. Mar. 156. 1874.

[1] Abrams, Flora of the Pacific States **1**: 168 (1923) by error gives *T. Congdoni* as a synonym to *T. sesquiflorum*. Prof. A. S. Hitchcock wrote us to this effect.

TRISETUM WOLFII Vasey, var. **Brandegei** (Scribn.), comb. n. *T. Brandegei* Scribn. Bull. Torr. Club. **10**: 64. 1883. *Graphephorum Brandegei* (Scribn.) Rydb. Rocky Mount. Fl. 61. 1917.

TRISETUM WOLFII Vasey, var. BRANDEGEI (Scribn.) Louis-Marie, forma **muticum** (Boland.), comb. n. *T. subspicatum* var. *muticum* Boland. in S. Watson, Bot. Calif. **2**: 296. 1880. *Trisetum muticum* Scribn. U. S. Dept. Agr. Div. Agrost. Bull. **11**: 50 f. 10. 1898. *T. Wolfii* Vasey, var. *muticum* Scribn. RHODORA **8**: 88. 1906.

40. TRISETUM ALTIJUGUM (Fourn.) Scribn. RHODORA **8**: 89. 1906.

41. TRISETUM PRINGLEI (Scribn.) Hitchc. Proc. Biol. Soc. Wash. **40**: 82. 1927.

Sub-section 4. KOELERIFORMIA Louis-Marie.

Discussion. In 1805, Persoon published, side by side, in his Synopsis, Trisetum and Koeleria;[1] he thus characterized the latter one: "173. KOELERIA. *Cal.* multiflorus, 2-valvis, compresso-carinatus. *Cor.* 2-valvis, brevi-aristata: glumis nervosis. (Spica composita ex spiculis compressis, saepius pubescentibus subsessilibus.)" "173. KOELERIA *Cal.* many flowered, 2 valved, compressed-keeled. *Cor.* 2-valved, short-awned: glumes nerved (spike composed of compressed spikelets, more often pubescent, sub-sessile)."

The distinction, really weak, between the two genera, is reduced to " . . . Cor. short-awned (*Cor.* brevi-aristata)." The capricious historical development, fickle and unsteady, of the conception of the two genera in question, weakening still the line of demarcation, makes today the classification of the extreme species neighboring *Koeleria* and *Trisetum* very hard, often very subjective.

"Le genre *Koeleria,*" says E. Cosson, "ne se distingue du genre *Trisetum* que par le caryopse muni d'un sillon et velu, et non pas dépourvu de sillon et glabre. Malgré le peu de valeur de ces caractères différentiels, nous avons été amenés à séparer génériquement les *Trisetum* des *Avena*, car, ainsi que M. Émile Desvaux (*Gramineae Chilenses*) l'a très bien reconnu, les *Trisetum* sont encore plus distincts des *Avena* qu'ils ne le sont des *Koeleria.*" [2]

"It is difficult," says Beal,[3] "to assign to *Koeleria* any positive character. The glumes are more scarious and have fainter nerves than in the others of the subtribe."

The difficulty met in separating the two genera in question is

[1] Persoon, C., Synopsis Plantarum **1**: 97. 1805.
[2] Cosson, E., Bull. Soc. Bot. France **1**: 12. may. 1854.
[3] Beal, W. J., Grasses of N. Amer. **2**: 495. 1896.

not such as should surprise us too much. The *Aveneae* and *Festuceae* groups, whose extreme types are so clean cut, just blend into one another by numerous intermediary species; their principal characteristics, taken from the length of the glumes, the insertion of the awn and its form, are far from always being sufficiently distinctive. Such is, for example, the genus *Koeleria* which is hardly separated from the genus *Trisetum* and by that very fact belongs to the tribe of the *Aveneae*, and which may be equally referred to the tribe *Festuceae*, where most authors class it.[1]

42. TRISETUM LAXIFLORUM Phil. Anal. Univ. Chil., 567. Jul. 1873.
43. TRISETUM ARAEANTHUM Phil. Anal. Univ. Chil., **94**: 26. 1896.
44. TRISETUM BRACHYATHERUM Phil. Anal. Univ. Chil., 567. Jul. 1873.
45. TRISETUM DEPAUPERATUM Phil. Linnaea **33**: 291. 1864–65.
46. TRISETUM MICRATHERUM E. Desv., C. Gay, Flora Chil. **6**: 352. 1853.
47. TRISETUM NEMOROSUM Phil. Anal. Univ. Chil. **94**: 26. 1896.
48. TRISETUM LAXUM Phil. Anal. Univ. Chil. 568. 1873.

Sub-section 5. DESCHAMPSIOIDEA Louis-Marie.

49. TRISETUM PALMERI Hitchc. Contrib. U. S. Nat. Herb. **17**: 325. 1913.
50. TRISETUM **brasiliense**, sp. n. Rigidum, dense caespitosum (35–50 cm. altum), laeve et glabrum; culmis strictis, filiformibus; vaginis striatis, brevibus, marcescentibus; ligula (minor 1 mm.) bilateraliter producta in dua auricula, laminam lateraliter excedentia, centrali parte depressa; laminis foliorum angustioribus quam vaginae, involuto-filiformibus: his fasciculorum sterilium facile 25 cm. longis, his caulinis brevioribus, saepe ad oram vaginae fractis; panicula (5–8 cm. long., 1 cm. lat.) pauciflora, straminea-flava; spiculis bifloris: floribus plus minusve caducis; glumis aequilongis, 3-nerviis saltem inferius, navicularibus, glabris, moderate acuminatis, spiculam aequantibus: I (1.5 mm. lat.), II (2 mm. lat.) magis amplectante; lemmate (4.5 mm. long., 2 mm. lat.) apice bifido (1 mm.) segmentis latis, acutis, 5-nervio, nervis crassis, supra (0.5 mm.) basim aristato; arista (5–6 mm. long.) dimidia parte inferiore tortili vel rarissime recta, superius geniculata vel diverso recurvata; interfloris articulis rachillae et ejus prolongatione (0.5–0.7 mm. long.) perbrevibus; callo albo-piloso; palea lemma subaequante, carinis (0.6 mm. distantibus) dense pilosis; antheris (2 mm. long.) linearibus.

Culm rigid, densely cespitose (35–50 cm. high), smooth and glabrous, filiform; sheaths striate, short, marcescent; ligule (less than 1 mm. long) reduced in the centre, auriculate

[1] Cosson, E., loc. cit. 1854.

laterally; blades narrower than the sheaths, involute-filiform: the sterile shoots of blades easily 25 cm. long, the cauline ones shorter, breaking up easily at the base; panicle (5–8 cm. long, 1 cm. wide) few-flowered, stramineous-yellow; spikelets 2-flowered; glumes equally long, 3-nerved, navicular, glabrous, acuminate, equal to the spikelet: I (1.5 mm. wide), II (2 mm. wide) more inclosing; lemma 4.5 mm. long., 2 mm. wide) 2-fid (1 mm. long) at the apex, 5-nerved, awned near the base; awn (5–6 mm. long) strongly twisted at the inferior half, geniculate or diversely bent at the superior half; rachilla and callus covered with white hair; palea subequal to the lemma; keels (0.6 mm. distant) densely pilose; anthers (2 mm. long) linear.

Distribution. BRAZIL: dense tufts in peaty soil among rocks above timberland, Itatiaia, Rio de Janeiro, Alt. 2200–2400 m., Jan. 17, 1925, *Agnes Chase*. 8304. TYPE in the U. S. Nat. Herb. Co-types at the Gray Herbarium and the Oka Agricultural Institute Herbarium. The Herbariums of Vienna and Brazil will receive each a share of the type.

Remark. We are indebted to Mrs. Agnes Chase's kindness for the above new species, which clearly belongs to the subsection *Deschampsioidea.* In fact, it was first classified under *Aira.*

51. TRISETUM JUNGENSII Hack. Verhandl. Zool. Bot. Gesellsch. Wien **65:** 75. 1915.

Section 2. AULACOA Louis-Marie.

52. TRISETUM **Trinii** (Desv.), comb. n. *Bromus Trinii* Desv., C. Gay, Flora Chilena **6:** 441. 1853. *Trisetum barbatum* Steud. Syn. Pl., Gram. 229. 1854. *Bromus barbatoides* Beal, Grasses N. Amer. **2:** 615. 1896; Vasey. Illust. N. Amer. Grasses II. **2:** Plate 60. 1893.
   1. Var. **pallidiflorum** (Desv.), comb. n. *Bromus Trinii*, var. α *pallidiflora* Desv. in C. Gay, Fl. Chil. **6:** 441. 1853.
   2. Var. **micrantherum** (Desv.), comb. n. *Bromus Trinii*, var. β *micranthera* Desv. l. c. 1853.
   3. Var. **manicatum** (Desv.), comb. n. *Bromus Trinii*, var. γ *manicata* Desv. l. c. 1853.
   4. Var. **effusum** (Desv.), comb. n. *Bromus Trinii*, var. δ *effusa* Desv. l. c. 442. 1853.
   5. Var. **strictum** (Desv.), comb. n. *Bromus Trinii*, var. ε *stricta* Desv. l. c. 1853.
   6. Var. **majus** (Vasey), comb. n. *T. barbatum* var. *major* Vasey, Illust. N. Amer. Grasses II. **2:** 1893. *Bromus barbatoides* var. *sulcatus* Beal, Grasses N. Amer. **2:** 615. 1896.
   7. Var. **litorale** (Phil.), comb. n. *T. litorale* Phil. Linnaea **29:** 92. 1857–58.

53. TRISETUM FLORIBUNDUM Pilger, Bot. Jahrb. Engler, **37:** 505. 1906.

TRISETUM FLORIBUNDUM var. **Weberbaueri**, comb. n. *T. Weberbaueri* Pilger, Bot. Jahrb. Engler. **37:** 506. 1906. (*Weberbauer* 3078).

Sub-genus II. **ISOLYTRUM** Louis-Marie.

Deyeuxia Clar. (a Fourn. emend. Bull. Soc. Bot. Fr. **24:** 181. 1877) ut genus, in part.

54. TRISETUM **humile**, nom. n. *Deyeuxia gracilis* Fourn. Mex. Pl. Enum. Gram. 106. 1886; non H. A. Weddell, Bull. Soc. Bot. France. **22:** 179. mai 1875.
55. TRISETUM DEYEUXIOIDES (H. B. K.) Kunth. Rev. Gram. **1:** 102. 1829.
56. TRISETUM VIRIDE (H. B. K.) Kunth. Rev. Gram. **1:** 101. 1829.
57. TRISETUM LONGIGLUME Hack. Fedde. Rep. Nov. Spec. **7:** 319. 1909.
58. TRISETUM **andicola**, sp. n. Planta (20–30 cm. alta) robusta, caespitosa; ligula (1.5–2 mm. long.) lacerata; foliorum laminis (8–10 cm. long., 1.5–2 cm. lat.) glabris, dorsaliter subscabris; panicula (5 cm. long, 1.7 cm. lat.) spiciformi-densa, ovali-lanceolata, ascendentibus ramis; spiculis bifloris; glumis 3-nerviis saltem inferius, aequilongis (8–9 mm. long.), subaequilatis: I (1.5 mm. lat.), II (1.6 mm. lat.), glabris, spiculam aequantibus; lemma (5–6 mm. circ. long., 1.8–2.2 mm. lat.) apice (1 mm.) bilobo, bisetulato, lobis duobus lateraliter scarioso-laciniatis; ad 2.5 mm. e basi aristato; arista tenui (8 mm. circ. long.) recta vel saepius geniculata, infra genu distans 2.5–3 mm. ab insertionis loco, vix torta; rachilla et ejus pedicelliformi prolongatione longissime (3–4 mm.) albo-villosis, flores aequantibus; palea (5–5.5 mm. long.) carinis 0.3 mm. circ. distantibus; antheris (0.8–1 mm. long.) crassis.

Culm strong (20–30 cm. high) cespitose; ligule lacerated (1.5–2 mm. long.); blades glabrous (8–10 cm. long, 1.5–2 cm. wide) lightly scabrous on the ventral side; panicle (5 cm. long, 1.7 cm. wide) spiciform-dense, ovoid-elongate, with ascending branches; spikelets 2-flowered; glumes nearly isomorphous, 3-nerved at least at the base: I (1.5 mm. wide), II (1.6 mm. wide) glabrous, equal in size to the spikelets; lemma (5–6 mm. long, 1.8–2.2 mm. wide) very 2-lobed: lobes 2-setulate, scarious-laciniate on the sides; awn (8 mm. long) inserted at 2.5 mm. from the base, straight or more often geniculate at 2.5–3 mm. from the insertion point, lightly twisted under the bend; rachilla and the pedicelliform extension very (3–4 mm.) villous: white hairs equalling the glumes; palea (5–5.5 mm. long) equalling the lemma in size, 2-keeled: keels about 0.3 mm. distant; anthers (0.8–1 mm. long) broad.

Distribution. CHILI: Laguna Negro, 2700–4000 m. alt. Martio 1873. *Fr. Vidal Gorus* 265.

Discussion. Philippi never knew just where to place the plant. *Arundo? Danthonia?* The names he gave it—we are relieving the synonymy of such—prove the case. On examination its place is not dubious. On an herbarium sheet of Hackel, I find a manuscript note where the present combination is already proposed.

59. TRISETUM EVOLUTUM (Fourn.) Hitchc. Contrib. U. S. Nat. Herb. **17:** 325. 1913.

60. TRISETUM MACBRIDEI Hitchc. Contrib. U. S. Nat. Herb. **24:** 8. 359. 1927.

Before concluding, the writer takes great pleasure in thanking Prof. M. L. Fernald, under whose highly qualified guidance the work was accomplished, and the competent personnel of the Gray Herbarium. He acknowledges thanks also to the curators of the U. S. Nat. Herb. of Washington, of the N. Y. Bot. Garden, of the University of California Herbarium and of the National Herbarium of Canada. For the loan of material belonging to private collections, he thanks especially the RR. Brothers Marie-Victorin and Rolland-Germain and Prof. Lorenzo Parodi. He finally acknowledges thankfully the interest shown by Prof. A. S. Hitchcock and Mrs. Agnes Chase during his stay in Washington.

OKA AGRICULTURAL COLLEGE,
La Trappe, Quebec.

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ERRATA

Page 3, line 26, for RUBRA read RUBRUM
" 4, " 8, for GROELANDICUM read GROENLANDICUM
" 4, last line, for GYMNOSTOMUN read GYMNOSTOMUM
" 5, line 32, for FASICULARE read FASCICULARE
" 8, " 13, for SUBGLOSUM read SUBGLOBOSUM
" 10, " 18, for PLUMULOSUM read PLUMULOSUS
" 16, " 10, for *Miss* read *Mrs.*
" 48, " 13, for *gaspensis* read *gaspense*
" 85, " 14, for *78* read *77*
" 99, " 27, *for* philogenetic *read* phylogenetic
" 108, lines 3–4, *for* road, which crosses the Neponset River meadows at the station known as Dedham Road, *read* road (Neponset Street)
" 121, line 19, for *gemmiscapa* read *geminiscapa*
" 133, " 10, *for* Lunelll *read* Lunell
" 136, " 8, for *guadaloupensis* read *guadalupensis*
" 171, " 33, *for* specmen *read* specimen
" 172, " 19, for *lateriflorus* read *lateriflora*
" 176, last line, for " " "
" 186, line 34, *for* northeastern *read* northwestern
" 198, " 35, for *trifrida* read *trifida*

INDEX TO VOLUME 30.

New scientific names are printed in full-face type.