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ERAGROSTIS HYPNOIDES AND E. REPTANS.

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IN revising the genus *Eragrostis* as represented in the United States I came in contact with the statement that *Eragrostis hypnoides* (Lam.) B.S.P. and *E. reptans* (Michx.) Nees were dioecious. Bush¹ established the genus *Neeragrostis* partly on the character of unisexual spikelets. Usually, in dioecious grasses, there is a difference in the aspect of the inflorescence between the staminate and pistillate plants and it would seem that a correlation should be established in *E. hypnoides* between the difference in the sexes and the aspect of the inflorescence. An examination of more than 100 sheets of specimens of the species throughout its range from eastern United States to Brazil showed without exception that the flowers were perfect. The anthers are surprisingly small, only 0.2 mm. long, but in good condition and pollen-bearing. This result led to an investigation of the statement that the plants were dioecious. Lamarck in his original description of *Poa hypnoides*, the basis of *Eragrostis hypnoides*, says nothing about this matter. However, in the floras of the United States the species has been going under the name of *Eragrostis reptans* until 1888 when the specific name *reptans* was replaced by the earlier *hypnoides* in the Preliminary Catalogue of New York plants.

I turned to the original description of *Poa reptans* by Michaux (1803), who was a careful observer, and found that he stated, as a part of the description, "floribus subaristato-acuminatis, dioicis." The locality is given as Illinois. Several years ago I had the opportunity of examining the grasses of the Michaux Herbarium at Paris. I

¹ Trans. Acad. St. Louis 13: 178. 1903.

therefore consulted my note book in which I had recorded notes on these grasses. My notes stated that there were two sheets, one of staminate plants and one of pistillate. I also had a photograph of the specimens, which were collected at Kaskaskia [in Illinois, opposite St. Louis].

The conflict of evidence and of statements was now cleared away. Michaux's specimens did not belong to *E. hypnoides* but were the same as what Nuttall later described as *Poa capitata* (1837).

An examination of the material of that species showed that it was uniformly dioecious and that there is a difference in aspect between the pistillate and staminate inflorescences and in the shape of the florets. Bush, in the article referred to above, illustrates the two kinds of spikelets. In strong contrast to *E. hypnoides*, the anthers are large, about 2 mm. long, thus being 10 times as long and probably 200 times as great in mass. This increased size of the anthers has probably developed as a coördinated necessity along with the separation of the sexes.

Flowers perfect; anthers 0.2 mm. long.....*E. hypnoides*.
Flowers unisexual; plants dioecious; anthers 2 mm. long.....*E. reptans*.

ERAGROSTIS HYPNOIDES (Lam.) B.S.P.

Poa hypnoides Lam. Tabl. Encycl. **1**: 185. 1791.

Megastachya hypnoides Beauv. Ess. Agrost. 74, 167, 175. 1812.

Eragrostis hypnoides B.S.P. Prel. Cat. N. Y. 69. 1888.

Neeragrostis hypnoides Bush, Trans. Acad. St. Louis **13**: 180. 1903.

The species was originally described by Lamarck "Ex America merid. Comm. D. Richard." Its range is from Quebec to Washington, south through Mexico and the West Indies to northern Argentina.

ERAGROSTIS REPTANS (Michx.) Nees

Poa reptans Michx. Fl. Bor. Amer. **1**: 69. pl. 11. 1803.

Megastachya reptans Beauv. Ess. Agrost. 74, 167, 175. 1812.

Eragrostis reptans Nees, Agrost. Bras. 514. 1829.

Poa capitata Nutt. Trans. Amer. Phil. Soc. n. ser. **5**: 146. 1837.

Eragrostis capitata Nash in Britton, Man. 1042. 1901.

Neeragrostis weigeltiana Bush, Trans. Acad. St. Louis **13**: 178. 1903.

Eragrostis weigeltiana Bush, Trans. Acad. St. Louis **13**: 180. 1903.

Poa capitata was described from "the sandy beaches of the Arkansas." The species ranges from Kentucky to South Dakota and Texas; Dutch Guiana. Bush (loc. cit.) also cites specimens from

northern Mexico. A specimen from Bolivia (Rusby 230) cited by Bush is *E. hypnoides*.

Bush (loc. cit.) takes up the name *Neeragrostis weigeltiana* (Reichenb.) Bush, for the species that had been called *Eragrostis capitata* Nash, basing the name on *Poa weigeltiana* Reichenb. (in Trin. Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 1: 410. 1830). The latter name, however, is mentioned by Trinius only as a synonym of *Eragrostis reptans* Michx., and thus is not effectively published. The Weigelt specimen, collected in Surinam [Dutch Guiana] in 1827, bears a printed label as follows: "POA WEIGELTIANA Rchb. Eragrostis: repens cespitosa, vaginis ad oras ciliatis, paniculae (vix pollicaris) spiculis lineari-lanceolatis 15-20 floris glumis (hyalinis viride-) trinerviis acutis.—Affinis *P. thalassinae* K. H. B. sed. paniculata. Surinam leg. et exsicc. Weigelt. 1827. determ. Rchb." Some botanists would consider this to be effective publication. I do not know the date of distribution of the set. Bush (loc. cit.) quotes the description and gives a photograph of the specimen. In his key Bush distinguishes *Neeragrostis weigeltiana* from *N. hypnoides*, stating that the former is dioecious and the latter monoecious, but in his description of *N. hypnoides* he says, "spikelets dioecious."

Through the courtesy of Dr. Greenman, Curator of the herbarium of the Missouri Botanical Garden, I have had the opportunity of examining the specimen of *Poa weigeltiana* upon which Bush bases his description of *Neeragrostis weigeltiana*. This specimen belongs to *Eragrostis capitata* (*E. reptans*) as indicated by Bush. The specimen consists of two plants, one pistillate, the other staminate, both of which agree in all respects with *Eragrostis reptans* as found in the United States. This is the only collection known outside of the range from northern Mexico to South Dakota, and presents a problem in distribution.

BUREAU OF PLANT INDUSTRY, Washington, D. C.

TWO SUMMERS BOTANIZING IN NEWFOUNDLAND

M. L. FERNALD

(Continued from page 111)

Next day we felt no enthusiasm to start through the flies up the trail again and it was almost noon when we crawled listlessly up "Helix Slide" to the rocks above. Wiegand, Gilbert and Hotchkiss

started northward, to get at the outer escarpments if possible; Long and I struck due east to see what might turn up. The tableland (plate 154, fig. 1) stretched for miles to the east and three or four miles back a saddle extended south, connecting there with the northern side of the west-to-east tableland of Doctor Hill. Everywhere the surface was shattered angular rock with only the rarest of small erratics, thus indicating only trivial glaciation. At first it looked as if our impression of the night before was completely justified, but when we got to the top of a dome a splendid prospect was before us. For miles the tableland stretched to the north, northeast and east toward the distant Bluey Hills and Hummocky Hills, but in the foreground, separating the dome we were on from a broad flat dome to the east and southeast ("the Plains of Waterloo" of the local guides, because of the "great slaughters" of caribou which used to occur there) there was a deep gorge (Deer Pond Gulch) descending from a high basin to the east (Deer Pond), its brook tumbling by cascades for perhaps a mile, then swinging abruptly southward through a cañon and disappearing in the direction of Doctor Brook. Hastening toward this gulch we were soon on carpets of *Phyllodoce caerulea* (L.) Bab., one of the rarest alpine plants of Newfoundland, and we soon came to a tributary stream (Mans Humbug) which dashed precipitately into Deer Pond Brook. The thicket was full of the Shickshock *Streptopus oreopolus*, which we had got on Ha-Ha Mountain and Schooner Island; and with *Vaccinium ovalifolium* was the equally abundant and very distinct *V. nubigenum* Fern., another species supposed to be endemic to the Shickshock Mountains. *Carex stylosa* was so abundant that we were soon indifferent to it; and, stopping to eat a hasty lunch, we pulled from the wet moss of the rill the arctic *Deschampsia atropurpurea* (Wahlenb.) Scheele, new to Newfoundland, and *Epilobium palustre* var. *lapponicum* Hausskn., which Haussknecht records from Labrador but which we had never seen. The mossy bed of Mans Humbug brook was covered by a dense and almost uninterrupted carpet of *Epilobium Hornemannii*, the individual clumps often a foot or more across and very beautiful with their thousands of flesh-pink flowers.

The dripping slopes of Deer Pond Gulch were carpeted with continuous turf of *Saxifraga rivularis* L., interspersed with *Arabis alpina* and various Poas, the Saxifrage gigantic for this species, 1.5 dm. high, with leaves often 2 cm. across. *Gnaphalium norvegicum* Gunn., with

wands of purple-black or bronze heads, one of the arctic-alpine specialties of the Shickshocks, and the arctic-alpine *Epilobium lactiflorum* Hausskn., also new to Newfoundland, soon appeared; and we were puzzled by the big green *Angelica* which massed itself along the brook. Collections made later in the season both here and on Cape Onion show it to be an undescribed species nearest related to *A. ampla* Nels. of the Rocky Mountains. The *Conioselinum* of the brook-side seems to be *C. Gmelini* (Bray) Steud. of arctic Europe; and the great clumps of finely cut fronds belonged to *Athyrium alpestre* (Hoppe) Rylands, var. *americanum* Butters, one of the rare alpine ferns of western North America, heretofore known in the East only from the Shickshock Mts. This was as satisfactory as we could ask for and at 5 o'clock, realizing that we had a long tramp back to the trail, we set a limit beyond which we must not ascend, a dripping wall with rills breaking out every few feet. The rills were full of a *Montia* and from its habitat we hoped that we had true *M. fontana* L., but, alas, it is nothing but the same old *M. lamprosperma* Cham. which abounds all along the coast; but there was no mistake about *Saxifraga stellaris* var. *comosa* Poir. This high-arctic plant, with an extreme southern station on Mt. Katahdin, here formed little rows at the crests of the dripping shelves and it took much manoeuvring to get it without precipitating ourselves into the gorge. But it is beautiful material, showing the greatest diversity of habit and size of bulblets and a system of stolons such as we had never imagined.

We positively had to quit, but our emotions had undergone a remarkable change since noon; and when, after sliding through the nettles (*Urtica* sp.), *Epilobium boreale* Hausskn. (another Alaskan and Shickshock Mt. specialty new to Newfoundland) and *Helix hortensis* below timberline, we got back to the house at 10:30, our respect for Bard Harbor Hill was further increased. Wiegand's party had got to the base of the upper escarpment and had brought back *Asplenium viride*, *Cryptogramma Stelleri* (Gmel.) Prantl, *Salix vestita*, *Draba arabisans* Michx., *Saxifraga aizoon*, *Potentilla nivea* L. and the other conventional lime-types; and, best of all, they had *Astragalus Blakei* Eggleston, new to Newfoundland, a species supposed to be endemic to cliffs of northern New England.

After getting the material all through the first run of driers and into fresh driers and ventilators, we crossed Thursday evening to St. John's Island, to be ready for the "Home," which was due on Friday,

and there we enjoyed the hospitality of Mr. Haliburton, who comes for the summer from Bonne Bay for the cod-fishing, and Miss Haliburton, who had come on from Boston for a vacation. Luckily for us, news trickled along the coast that on Friday morning the "Home" had not yet left Rocky Harbor. Consequently, from breakfast-time to early evening we had an opportunity to explore the southern end of St. John's Island, keeping always where we could see the smoke of the steamer when she passed Pointe Riche and went into Port au Choix, an hour's run from us. St. John's Island is 3 miles across, a great doming plain of horizontal limestone, wooded in spots, but with much of the area an open barren deeply mantled with the finest of angular gravel, so deep and undisturbed that, although, where the cliffs have been washed by the sea (plate 154, fig. 2), the talus has been removed, where they have not been touched by the sea, the talus has accumulated from the bases quite to the tops of the cliffs (plate 154, fig. 3)—a condition strongly contrasting with that in regions which were denuded of their weathered rock-mantle during the Wisconsin glaciation.

If St. John's Island had been our first landing place in western Newfoundland, our day there would rank with the spectacular visit to Burnt Cape. We saw only a small area, perhaps one-tenth of the island, but the array of good things in that small patch was amazing. Surely, all but the most blasé would find interest in a flora containing *Puccinellia coarctata* Fern. & Weath., *Carex bicolor*, *C. lepidocarpa* Tausch and *C. microglochin*, *Juncus albescens*, *Salix reticulata* and *arctophila*, *Rumex occidentalis*, *Lesquerella arctica*, *Potentilla alpestris*, *Epilobium davuricum*, *Primula egaliksensis*, *Gentiana nesophila* and *Senecio pauperculus* var. *firmus* Greenm. But these were not all. *Cochlearia*, *Draba*, *Euphrasia* and *Antennaria*, as usual, gave us new problems; we got one *Arnica* which had now become familiar, *A. chionopappa*, but from a turfy slope a mile away Wiegand brought in another which is certainly *A. Griscomi* Fern., the very distinct thick-leaved species of the Mt. Logan Range in Gaspé. *Artemisia borealis* Pall., which we had known in Newfoundland only from the Port-à-Port area, was abundant; *Agrostis paludosa* Scribn., a local species described from the north side of the Straits, was here; but, as in three of its stations on the Labrador, it belied its name and grew on the driest of barrens. In a springy run in the gravel we got a most singular *Carex*, which I take to be the European *C. Oederi* var.

subglobosa (Mielich.) Richter, a plant Wiegand had found on Pointe Riche in 1910. Thoroughly typical *Botrychium Lunaria* grew side-by-side with var. *onondagense* (Underw.) Clute. The former was healthy and green, the latter much dried-out or scorched, as if frost or a drying wind had injured it; in other words, as if the southern var. *onondagense* were more sensitive than the usually more boreal *B. Lunaria*. It was late for *Taraxacum* but in the deep rain-swashed gravel we found one tiny species, dead-ripe, with red achenes nearly 5 mm. long, resembling *T. ammophilum* Nels. of Wyoming but with corniculate involucre bracts, the stipe of the mature pappus barely longer than the achenes and the latter decidedly larger than in the Wyoming plant. Again, as on Burnt Cape, Ha-Ha Point and Bard Harbor Hill, we hated to leave when we were only just beginning to clear away the species already familiar to us and to find the endemics or the epibiotics¹; but we promised ourselves another visit three weeks later, when we should come back for further exploration of the Highlands of St. John under the guidance of Caleb Chambers.

The next move was to the extreme eastern end of the Straits, with Quirpon and Cape Bauld as the ultimate objectives. Profiting by our mistake on the Cape Norman trip, we took the selection of a skipper and boat into our own hands; and, after hearing from several independent sources that "Al Rose has the best boat on the Straits and the skipper is as reliable as his boat," negotiations were opened; and on Tuesday, August 4, with Albert Rose at the engine and his brother, Rev. Mackinlay Rose (home for a vacation before going to Montreal for graduate study) at the stern, we started for our second trip down the Straits. There was no balking at wind and tide (in fact the wind was hailed with glee and a sail run up to reinforce the engine), and, after calling in at Big Brook to ask Mrs. Diamond for a hot dinner, we put in to Cook Harbor in the afternoon for gasoline (65c. per gallon), stopped for the night at the comfortable home of Isaac Warren, and next morning Wiegand, Gilbert and Hotchkiss landed at Raleigh to explore Piton Point, the head of Ha-Ha Bay and the shores of Isthmus Cove, south of Burnt Cape; and Long and I returned to Ha-Ha Point and Burnt Cape. Our object was, in part, to secure mature material of many of the species found before, but our parties brought in a few novelties: *Salix cryptodonta* from another

¹ "species which are the survivals of a lost flora—for these I propose the name *Epibiotics*, which signifies survivors"—H. N. Ridley, Journ. Bot. lxi. 182 (1925).

station; *Lathyrus maritimus* var. *aleuticus* Greene, the arctic and sub-arctic extreme with capillary stems and small leaflets, the first south of Labrador; *Viola renifolia* Gray, new to Newfoundland; and gigantic *Arnica pulchella* from the slopes of Ha-Ha Mountain, known at Raleigh as "Sun Flower"; and, of course, a full quota of puzzling *Euphrasias*.

After spending Thursday forenoon putting up our specimens in the big storehouse of Thomas Elliott, whose hospitality we enjoyed at Raleigh, we started in the afternoon for Quirpon (now-a-days pronounced Kar-poon). Before we reached Cape Onion a solid blanket of fog enwrapped us and until we reached Jacques Cartier Island, at the entrance to Quirpon Harbor, we saw almost no sign of shore. Quirpon is really a summer camp of fishermen and boasts no hotel; but we were fortunate in being allowed to camp at the big "room" of Mr. H. G. Maddock of Carbonear, who, with his storekeeper and housekeeper, occupied a little three-room bungalow. There was scarcely space for all of us, so the boys, Al and Kin Rose, Gilbert and Hotchkiss, camped and cooked their meals on Mr. Maddock's schooner; and the "old men," Wiegand, Long and I, were sumptuously entertained at the bungalow. Quirpon was one of La Pylaie's stamping-grounds. North of the channel lies Quirpon Island with high trap and slate hills, the highest, Cap Dégrat, rising 505 feet, the northern point of the island being Cape Bauld. South of Quirpon the hills are almost as high; and we began at once a preliminary exploration back of Little Quirpon (the Maddock establishment), next day explored Quirpon Island and Saturday the hills toward Griguët ("Cricket").

When we left Saturday evening, with many hills necessarily still unexplored, we had at least a representative collection. Many of the calcicolous specialties which abound from Burnt Cape southwestward had dropped out, and the comparatively southern flora of eastern and central Newfoundland had made its way quite to the extreme northern tip of the island: *Isoëtes Tuckermanni* A. Br., of southern New England, growing in a pool with the arctic *Sparganium hyperboreum* Laested. and the splendid *Eriophorum Chamissonis* var. *aquatile* (Norman) Fernald,¹ at its first known station outside arctic Scandinavia; *Potamogeton Oakesianus* Robbins of the Pine Barrens of New Jersey and of New England and the southern *Callitriche heterophylla* Pursh in pools bordered by *Juncus stygius* var. *americanus* Buchenau and

¹ Fernald, RHODORA, xxvii. 207 (1925).

Drosera anglica Hudson; and so on until we had new northern limits for *Glyceria nervata* var. *stricta* Scribn., *Carex tenuiflora* Wahlenb. (farther north in Europe, etc.), *Carex leptoneuria* Fernald, *Betula Michauxii* Spach and *Empetrum Eamesii* Fern. & Wieg. *Hordeum boreale* Scribn. & Sm., known only from the North Pacific and Bering Sea region and the Straits of Belle Isle, was abundant; *Carex Halleri* Gunn., new to Newfoundland, was a dominant turf-plant with *C. stylosa*; and on the inner slope of Cap Dégrat a tall and stiffish brown-topped *Carex* was pretty clearly a new hybrid, of *C. atratiformis* and *C. Halleri*. On the springy slope back of Little Quirpon typical *Carex glareosa* Wahlenb., one of the rarest of plants, abounded; and by a brook slightly to the eastward the arctic *C. bipartita* All. (*C. Lachenalii* Schkuhr),¹ another species "new to Newfoundland," was in perfect development. On springy slopes both on the mainland and the island *Senecio pauciflorus* Pursh, another novelty, and *Barbarea orthoceras* Ledeb. were common with *Epilobium davuricum* and the ubiquitous *Alchemilla vulgaris* var. *filicaulis* (Buser) Fern. & Wieg. On the exposed crests of both mainland and island *Draba nivalis* hid in the gravel with *Carex glacialis*; on the top of Cap Dégrat we got *Saxifraga rivularis* and *Astragalus alpinus*; and in the thicket back of Little Quirpon the puzzling *Hieracium* of Big Brook, here in splendid development, a plant exactly matching material sent by Porsild from Greenland as *H. groenlandicum* Almq. It was obvious that La Pylaie did not exhaust the possibilities of Quirpon and equally obvious that we had merely got a glimpse of the region; but our schedule called for Sunday at Ship Cove in the lee of Cape Onion and after supper we moved westward to Cape Onion.

Ship Cove lies east of the tip of Cape Onion and opens upon Sacred Bay. We there had a splendid home with the family of Mr. and Mrs. Henry Decker and when it was time to leave on Wednesday morning we were as sorry to say good-bye to the Decker family as we were to leave Cape Onion. We had had fine botanizing, an intelligent home and delicious food, and in the evening, as we worked over our presses, we had greatly enjoyed the conversation and the limitless anecdotes of Mr. Decker. He is a born *raconteur*, enthusiastic, graphic and with a keen sense of humor; and we were inclined to let our evening work prolong itself unduly as we listened to his vivid accounts of the fights on this "treaty coast," when, years ago, the French fishermen attempted

¹ See Mackenzie, Bull. Torr. Bot. Cl. 1. 348 (1923).

to claim their treaty rights. We constantly wished that we had a phonograph to record these stirring tales and especially to catch the full charm of the Newfoundland fisherman's dialect. One simple item will give some idea of the latter: "Hit's a fonny t'ing about dese 'ere tonnerbolt. W'y, one o' dem feller 'e struck de church over 'ere to Karpoon; 'e busted t'ru de doe han' den 'e went right out de back o' 'e."

We had planned too much for our limited time and actually did not get to the tip of Cape Onion. On the exposed crests between there and Ship Cove the dwarf *Euphrasias* were perplexing, some probably referable to the White Mountain *Euphrasia Williamsii* Robinson, with chocolate-colored corollas, others as small but with greenish yellow corollas, and others pink or white. Our presses were already so full, from Isthmus Cove, Burnt Cape, Ha-Ha Point and the Quirpon region, that it was necessary to spend half our time simply catching up on drying; but Monday afternoon we crossed over to Great Sacred Island and got some good things, including *Salix myrtillifolia* var., *brachypoda* Fern. of Table Mt., Port-à-Port Bay, *Epilobium lactiflorum* and *Gnaphalium norvegicum*; and, new to Newfoundland, *Parnassia Kotzebuei* C. & S. On Tuesday, Wiegand, Long and I went to Anse aux Sauvages on the Pistolet Bay side of the Cape, where we had seen from the boat a promising cove with high talus and springy swales. In crossing the "mesh" from Sacred Bay we were interested in a *Carex* with long pendulous spikes. The material proves to be quite identical with authentic specimens of a hybrid of *C. aquatilis* and *C. salina* var. *pseudofilipendula* (Blytt) Kükenth. The latter extreme variety, recorded only from northern Norway, has been collected on the northern shore of the Straits (Blanc Sablon, 1910, *Fernald & Wiegand*, no. 2818) and in Gaspé (Cape Rosier, July 28, 1882, *J. Macoun*) and its presence in northern Newfoundland may safely be surmised. At one very wet stretch there was an abundance of *C. tenuiflora* and *C. vesicaria* var. *Raeana* (Boott) Fern., the latter rare in Newfoundland. We were attracted to a dryish swale because of a *Hieracium*, but very promptly Long detected the arctic-alpine *Botrychium lanceolatum* (Gmel.) Ångstr. and then *B. matricariaefolium* A. Br., both new to Newfoundland.

But Anse aux Sauvages itself was the choice spot. It looked so full of possibilities that we realized at once that unless we ate them promptly we should soon forget about our lunches. So we sought a dry bank

and proceeded to sit down on *Arabis Drummondi* var. *connexa* (Greene) Fern., a Rocky Mountain plant which we had not had from Newfoundland; after that we wasted little time over lunch. The trap cliffs of Anse aux Sauvage are as fine as any on the coast, high and vertical, but with extensive talus and enough chimneys and pockets to support the best of species; and if we had come to them a few days sooner we should have counted this as one of the greatest localities, on account of *Draba nivalis*, *Ranunculus pedatifidus* var. *leiocarpus*, *Parnassia Kotzebuei*, *Carex Halleri*, and many of the other choice species. The springy swale at the bases of the cliffs is as rich and fascinating as that on Ha-Ha Point and the great specialty there is the Kamtchatkan *Stellaria florida* Fischer, which we had known in America only from the Shickshock Mountains.

One of the younger Deckers had shown us a piece of soapstone picked up at the "bottom" (what we should call the head) of Mauve or Noddy Bay, so when we left on Wednesday morning we proceeded to Mauve Bay, again hoping to find an outcrop of serpentine or, at least, of soapstone. But there was not enough to support a distinctive flora. On a springy slope at the head of the bay, however, we got two species new to the island: *Epilobium brevistylum* Barbey, the first time east of the Rockies, and *Galium Brandegei* Gray, another cordilleran species but already known in the East, in northern Maine and Gaspé. *Senecio pauciflorus* was abundant and on the slaty talus of Cape Raven it was accompanied by *Erigeron borealis* (Vierh.) Simmons, a species of arctic Norway and Greenland, which Dr. Huntsman had already collected at Quirpon Harbor. Stopping over at Cook Harbor and Cape Norman for more material of some of the specialties, we left the former place at 1.30 p.m. and, maintaining a steady rate of nine miles an hour and calling in to visit no cousins, were back at Flower Cove for supper.

Albert Rose could not take us on the next trip but, although this was a great disappointment to us, we were wholly satisfied, in fact quite delighted with our next skipper. Leaving Flower Cove with John Whalen and his motor-boat on Wednesday, August 19, we were at Bard Harbor in the early afternoon and, accompanied by him and by Caleb Chambers, as guide, had established a camp in Deer Pond Gulch by Thursday noon. Starting in where we had left off three weeks earlier, we explored Bard Harbor Hill for three days, from the Overfall of Deer Pond Brook on the south to Southwest Gulch on the

north and the foot of the upper escarpment on the west; and, when we came down Saturday night, we had at least ten additions to the Newfoundland flora: *Poa laxa* Haenke, *Carex lenticularis* var. *albi-montana* Dewey, *Salix herbacea* L. and two other willows (one of them described in Part III), *Cerastium cerastioides* (L.) Britton, *Sibbaldia procumbens* L., *Cassiope hypnoides* (L.) D. Don, *Veronica alpina* var. *unalascensis* C. & S., and a new species of *Lactuca* from the northern limit of the genus in eastern America. Not actually new to Newfoundland, but previously known from only one or a few stations were *Woodsia alpina* (Bolton) S. F. Gray, *W. glabella* R. Br., *Carex bipartita*, *Habenaria viridis* var. *bracteata* (Muhl.) Gray, *Oxyria digyna* (L.) Hill, *Arabis Drummondii* Gray, *Alchemilla vulgaris* var. *vestita* (Buser) Fern. & Wieg., *Galium kamtschaticum* Steller and *Solidago lepida* DC.; and we had materially extended northward the ranges of *Pteritis nodulosa* (Michx.) Nieuwl., *Osmunda Claytoniana* L. and *O. cinnamomea* L., *Nemopanthus mucronata* (L.) Trel., *Eupatorium maculatum* var. *foliosum* (Fern.) Wieg. and *Lactuca spicata* (Lam.) Hitchc. *Streptopus oreopolus*, which had never been known in fruit, was loaded with cherry-red slightly elongate berries; and *Vaccinium nubigenum* proved to have the richest and most grape-like fruit we had ever tasted in the genus, its near relative, *V. ovalifolium*, having berries of decidedly disagreeable flavor, known to Caleb Chambers as "Mathers." We had had a most interesting trip, and if we could have taken care of the specimens, should have stayed on to collect dozens of other novelties. And we had been greatly interested in the abundance among the broken rocks of the tableland of the Rock Ptarmigan, a bird which was new to us; and we were specially indebted for fresh meat to a weasel which lived about our camp, for the very first morning when we came out of our tents we found at our front door a fine big rabbit dead, but still warm, with a tell-tale incision at the throat. Another semi-botanical item, besides the luscious quality of the fruit of *Vaccinium nubigenum*, which interested us, was the smoking tobacco used by Chambers. We had noticed, whenever the wind wafted us a whiff from his pipe, a most unusual sweetish and rather fascinating fragrance. This, he explained, was from "Pitnagen" which he was smoking; and when he gathered some and brought it to us with the explanation that he had learned it from the famous Micmac guide, Mattie Mitchell, we recognized it as *Aster puniceus*, var. *oligocephalus* Fern. Probably the variety is not significant, and smokers may try any form of *A. puniceus*.

Doctor Hill, the southern mass of the Highlands of St. John has, near the northern end of its west wall, a very striking gash or chimney (plate 155, fig. 1) extending from the summit-tableland two-thirds the way down the precipitous escarpment and visible from a long distance. From the time Wiegand and I first saw this dripping chimney in 1910 we had felt that it must be a good place, but difficult to reach. We now learned that it was "John Kanes's Ladder," from the circumstance that that veracious gentleman, a pioneer in the region, claimed to have ascended the mountain by this precipitous route (plate 155, fig. 3). No one had done so since and when Long, Chambers and I started for it we had no intention of doing anything to take the lustre from John Kanes's glory. But botanically the western escarpment of Doctor Hill was a great place, and many days of further exploration there will be necessary to bring together all its relic and endemic species. Starting in at the base of the slope, a little to the south of Doctor Brook we promptly found *Equisetum pratense* Ehrh. and *Osmorhiza divaricata* Nutt., common enough in Gaspé but not recorded from Newfoundland; and in mossy glades in the woods, while following up puzzles in *Corallorhiza*, *Orobanche* and *Monotropa Hypopithys* L., we came upon fruiting *Calypso bulbosa* (L.) Oakes, very rare and scattered but new to Newfoundland. It was a long and tough pull through scrub-forest below the big escarpment (plate 155, fig. 2) and when we finally reached the calcareous talus it was mid-afternoon. We promptly condemned our own stupidity in not having brought blankets and food, for we had struck a rich alpine garden, full of the choice things of calcareous rock and talus, but mostly now familiar: *Woodsia alpina*, *Polystichum Lonchitis*, *Cryptogramma Stelleri*, *Draba rupestris*, *Parnassia Kotzebuei*, *Potentilla nivea* var. *macrophylla* Ser., *Oxytropis campestris* var. *johannensis*, unusually luxuriant (with leaves more than 2 dm. long), *Gentiana propinqua*, gigantic *Solidago multiradiata* Ait. (4.5 dm. high, with corymbs 1 dm. high and nearly as broad) and *Senecio pauciflorus*. And when we began to find species which we had not known from north of Bay of Islands, the Humber or the Exploits, *Anemone multifida* var. *hudsoniana* DC., *Potentilla pectinata* Raf. and *Hedysarum alpinum* var. *americanum* Michx., for example, and *Draba pycnosperma* Fern. & Knowlt., heretofore known only from Percé at the tip of the Gaspé Peninsula, we naturally regretted that we had time only to snatch the most obvious plants and these from only one extremely limited

area of cliff and talus. Traveling was difficult, walking and tumbling in the bushy talus or along the half-inch shelves of the cliff; and when we finally got around to John Kanés's Ladder, a dripping slaty wall, vertical and covered with vegetation, it was already late and we must travel rapidly if we were to reach the shore-trail before dark. But we had to stop long enough to get the *Epilobium* which, spire-like or savin-like, stood on the wet lower end of the Ladder. It was quite strange to us, not only in its peculiar fastigiate branching but in its very fleshy leaves; and by the beautiful fleshy bulbs at the bases of its stems it at once showed its affinity. It is a new species nearest related to the rare Rocky Mountain *E. saximontanum* Hausskn.

There are very many more endemics or epibiotics in the region of John Kanés's Ladder and the limestone escarpments of Doctor Hill; but the party which goes to find them will do well to profit by our experience and take a tent and food enough for two or three days. And it is hoped that they will be early enough to get in flower and young fruit the willow of the talus which so much interested us. In 1865, the great student of willows, Andersson, described *Salix Barclayi*, **S. latiuscula*,¹ as a subspecies of the Alaskan shrub, with "*Hab.* in Terra Nova (DE LA PYLAIE)." It is said to appear intermediate between *S. lucida* and *S. cordata*, having the oval subcordate leaves 1½ inches long, 1 in. broad, lustrous, short-acuminate, etc., and differing from the Alaskan species in its oval leaves and in having sparingly tomentose capsules. La Pylaie had but a single specimen; it is not known just where he got it; and *S. Barclayi*, **S. latiuscula* has remained a puzzle. On the talus of Doctor Hill, and likewise on the escarpment of Bard Harbor Hill, is a beautiful shrub which in foliage matches Andersson's description but we need young material. The few battered and weather-worn capsules which we secured are now quite glabrous, but that may be the result of hard usage. The identity of the shrub is now a problem; and it is not clear that La Pylaie actually visited Doctor Hill. In describing Ingornachio Bay he wrote: "*mais on la peut néanmoins reconnaître par les deux hautes collines situées dans l'intérieur des terres au nord-est, qui dominent toutes les autres parties plus avancées, et se coupent d'une manière très-brusque à leur extrémité: on les appelle les montagnes ou hauteurs Saint-Jean;*" and again he referred to "*l'embouchure d'une rivière assez considérable, surtant d'un lac situé au midi des hauteurs de*

¹ Anderss. Mon. Sal. 165 (1865).

Saint-Jean.”² La Pylaie explored for eight days in this region, but whether he actually ascended the hills and whether our shrub is what he collected as the basis of *Salix Barclayi*, ^{*}*S. latiuscula* are still unsettled questions.

Wiegand, Gilbert and Hotchkiss had followed up Doctor Brook; and during the next two days, when the sea was altogether too rough for us to cross to St. John’s Island, as we had earnestly hoped to do, we scoured the lower levels and also got at the lower escarpment of Bard Harbor Hill. Nothing spectacular was found, but Gilbert and Hotchkiss extended southward the range of *Ranunculus hyperboreus* by finding it in a beaver-pond near the Yellow Marsh; and we established new northern limits for *Cystopteris bulbifera* (L.) Bernh., *Onoclea sensibilis* L., *Muhlenbergia racemosa* (Michx.) BSP., *Alopecurus aequalis* Sobol., *Rhynchospora alba* (L.) Vahl., *Carex Crawfordii* Fern., *C. projecta* Mackenzie, *Juncus effusus* var. *Pylaei* (Laharpe) Fern. & Wieg., *Ranunculus Macounii* Britton and *Epilobium nesoophilum* Fern.

Our time being exhausted and St. John’s Island now out of the question, we returned to Flower Cove on the 27th, stopping to collect the better things from Dog Peninsula, for which Long and I had a morbid sentiment after the grounding of the “Glencoe” there; and in passing through Derby’s Tickle we landed to explore Otter Pond, a large shallow pond covering limestone pavement, there securing remarkably fine fruiting material of *Myriophyllum alterniflorum* DC. and *M. exalbescens* Fern. As soon as the specimens were cared for we allowed ourselves one more day in the field. Long and I went out locally for mature material of various things and Wiegand and Hotchkiss proceeded to East Brook, entering St. Barbe Bay, for aquatics. They got a splendid collection, including three of the most local species of Newfoundland, *Potamogeton Friesii* Rupr., *Zannichellia palustris* var. *major* (Boenn.) Koch and *Callitriche hermaphrodita* L.; and, new to Newfoundland, though long expected, *Potamogeton vaginatus* Tausch. Soon everything was packed and ready for the return home, but during a last constitutional walk to the swimming pond, south of the Rock Marsh, Long and I had our turn with *Potamogeton vaginatus*, but that was mild sport compared to the collecting of a strange pondweed with large winter-buds, for this proves to be the extremely rare *P. Hillii* Morong, a species previously

² La Pylaie, *Voyage a l’Ile de Terre-Neuve*, 73–75 (1825).

known from western New England to the Great Lake region, of which the winter-buds have been unknown.

Thus, on our last walk, after the trunks were packed, we were finding species "new to Newfoundland." Our summer was over and Wednesday afternoon, September 2, the water being calm, John and Wallace Whalen took us and our baggage by motor-boat across the Straits to "the Labrador" to catch the "North Shore," which would sail early Sunday morning from Bradore for Quebec. It was necessary to be forehanded for at this season the weather is most uncertain and, as it proved, that was the last day for a week in which a small boat could cross the Straits. To Wiegand and me it was a particularly enjoyable crossing for we were returning to the Grant's at Blanc Sablon, where Kidder and I had spent a most happy week in 1910 and where Wiegand had enjoyed the hospitality over a week-end. And the hospitality has in no way lessened. Mr. Edwin Grant, now claiming to be an old man, has retired from the active management of the big fishery but he is as alert and apparently as energetic as ever; and the active management has devolved upon his son, Mr. Sam. Grant. The three and a half days of our visit at Blanc Sablon, the renewal of botanizing at this fascinating corner of Labrador, the evenings of music and radio with Mr. and Mrs. Sam. Grant, and the hospitality shown our party by Mr. and Mrs. Hubert Cashman and by Mr. Butts, the Customs officer, will never be forgotten; but, forming no real part of our Newfoundland exploration, they can simply be mentioned here.

In 1924, Long and I estimated that, in order merely to take the cream from the flora of western Newfoundland, ten expert botanists would need fifty seasons. Our work of 1924, with three botanists, and of 1925, with five to seven (average six) has only slightly reduced the necessary time. We left Burnt Cape, Ha-Ha Point, Quirpon, Cape Onion, Boat Harbor, Big Brook, 4-Mile Cove, St. John's Island, Bard Harbor Hill and Doctor Hill always with keen realization that there was plenty more to do. Every time we landed on the shore of the Straits we found new specialties; the islands near St. John's Island have not been touched; Caleb Chambers tempted us with descriptions of the Bluey Hills, the Hummocky Hills and other regions east of the Highlands of St. John; and we did not once set foot on the great tablelands of the Long Range. There is plenty to do; the region, retaining a large remnant of the ancient flora which elsewhere



NORTHWESTERN NEWFOUNDLAND.

- FIG. 1 (upper). Rock-mantle on tableland of Bard Harbor Hill. FIG. 2. (left). Horizontal limestones, washed by the sea, St. John's Island. FIG. 3. (right). Horizontal limestones, with undisturbed talus, St. John's Island.



NORTHWESTERN NEWFOUNDLAND.

FIG. 1 (upper). John Kanes's Ladder and escarpment to the south, Doctor Hill. FIG. 2 (left). Limestone escarpment of Doctor Hill, northeast of John Kanes's Ladder. FIG. 3 (right). Looking up John Kanes's Ladder, with rotted rock-walls.

across America was mostly destroyed by the advances of Pleistocene ice, is full of endemics and epibiotics. We have brought back in two seasons more than 175 species never before known from Newfoundland, but there are hundreds of others yet to be found; and many of them, like many already known, will throw a vivid light upon the relative ages and the rate of evolution of species.

EXPLANATION OF PLATES 153-155

Pl. 153. Fig. 1 (upper). Western spur of Ha-Ha Mountain, showing ancient weathering and lack of recent planing by an ice-sheet. Fig. 2 (left). Deeply weathered limestone rock-barren back of Savage Cove, characteristic near sea-level in northwestern Newfoundland, the rotted rock-mantle not removed by a recent ice-sheet. Vegetation here occupies the deep fissures, but in areas where the mantle has disintegrated into fine gravel and clay the plants are more numerous and are generally dispersed. Fig. 3 (right). Bayard Long collecting *Ranunculus pedatifidus* var. *leiocarpus*, western face of Ha-Ha Mountain.

Pl. 154. Fig. 1 (upper). On the tableland of Bard Harbor Hill, deeply mantled with angular blocks and gravel; Doctor Hill to the south. Fig. 2 (left). Horizontal limestones, washed by the sea, St. John's Island. Fig. 3 (right). Horizontal limestones, beyond the reach of the sea, St. John's Island; the talus not removed by sea nor glacier.

Pl. 155. Fig. 1 (upper). John Kanes's Ladder and limestone escarpment to the southwest, Doctor Hill. Note the great accumulation of talus. Fig. 2 (left). Escarpment of Doctor Hill, northeast of John Kanes's Ladder. Note the high talus. Fig. 3 (right). Looking directly up John Kanes's Ladder. Note the long-weathered and rotted rock-wall.

(To be continued.)

A NEW NORTH AMERICAN VARIETY OF *CYSTOPTERIS FRAGILIS*.

C. A. WEATHERBY.

CYSTOPTERIS FRAGILIS (L.) Bernh., var. **laurentiana**, n. var., planta plerumque valida, frondibus 3.5-4.8 dm. altis, laminis 19-34 cm. longis, 7-13 cm. latis, rarius minoribus; stipitibus rubro-tinctis; pinnulis et saepe earum lobis obtusis, indusiis et saepe rhachibus pinnarum subtus minute glandulosis; paleis rhizomatis eglandulosis.

Usually a large plant, the fronds 3.5-4.8 dm. high, their blades 19-34 cm. long, 7-13 broad, only occasionally smaller; pinnules and often their segments obtuse; stipes tinged with red; indusia and frequently the rachis of the pinnae beneath, minutely glandular; scales of the rhizome not glandular-margined.—NEWFOUNDLAND: shaded limestone rocks in woods on southwestern slope of Bard Harbor Hill, Highlands of St. John, July 27, 1925, *Fernald, Wiegand, Long, Gilbert & Hotchkiss*, no. 27,214; wooded steep shady slope of

Mt. Moriah, Bay of Islands, Aug. 11, 1924, *Fernald, Long & Dunbar*, no. 26,152; wet shaded rock, Birchy Cove (Curling), Humber Arm, July 6, 1910, *Fernald, Wiegand & Kittredge*, no. 2329; ravine, Green Gardens, Cape St. George, July 22, 1922, *Mackenzie & Griscom*, no. 11086. QUEBEC. RIMOUSKI COUNTY: shaded or wet limestone, limestone-conglomerate, and sandstone ledges, Bic, July, 1907, *Fernald & Collins*, nos. 803, 811, 814; limestone-conglomerate cliffs, headland north of Baptiste Michaud's, Bic, July 18, 1904, *Fernald & Collins*, 2 sheets, TYPE in Gray Herb. MATANE COUNTY: hornblende-schist ledges along Cap Chat River, Joffre, July 20, 1922, *Fernald & Pease*, no. 24,790. GASPE COUNTY: calcareous cliffs, gorge of River Ste. Anne des Monts, Aug. 15, 1906, *Fernald & Collins*, no. 285; falaises de la Montagne St. Alban, alt. env. 250 m., July 19, 1923, *Marie-Victorin, Rolland-Germain, Brunel & Rousseau*, no. 17040; blocs isolés de conglomérat, Ile Bonaventure, Percé, July 28, 1923, same collectors, no. 17042. MAGDALEN ISLANDS: dans les rochers de gypse, Cap-aux-Meules, Sept. 8, 1919, *Marie-Victorin & Rolland-Germain*, no. 9333. CAPE BRETON ISLAND: dolomite ledges west of Dingwall, Aug. 18, 1914, *Nichols*, no. 974; moist sink-holes in plaster, South Ingonish, Aug. 6, 1914, *Nichols*, no. 678.

The variety here proposed adds one more to the many endemic forms detected by Prof. Fernald and his co-workers in the region about the Gulf of St. Lawrence. From all other east-American forms of *C. fragilis*, it is at once distinguished by its glandular indusia. The glands are small and tend to occur toward the base of the indusium, and are sometimes hard to see in dried material; but examination of a few indusia under the binocular will reveal them. From typical *C. fragilis*, which grows with it in the Laurentian area, and into which it passes, it can usually be readily distinguished by its greater size and blunt pinnules, characters which, Prof. Fernald states, give it in the field the aspect of a *C. bulbifera* without the long apex of the frond. *C. fragilis* var. *sempervirens* Moore (var. *canariensis* (Willd.) Milde) of the Azores and Canary Islands also has glandular indusia, but, though attaining the dimensions of var. *laurentiana*, it is more slender, the stipes are always pale, the scales of the rhizome are glandular-margined, and the leaf-form, though more or less variable, is never that of the American plant.

Schinz & Thellung, following Chiovenda¹ and Farwell,² write *Cystopteris Filix fragilis*, for the reason that the trivial name is printed "*F. fragile*" in the first edition of the Species Plantarum and that the same abbreviation is there used for the universally accepted

¹ Ann. di Bot. i. 210 (1904). Passage not seen; citation from Schinz & Thellung

² Ann. Rep. Mich. Acad. Sci. vi. 200 (1904).



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