HARSHBERGER'S PHYTOGEOGRAPHIC SURVEY OF NORTH AMERICA.

M. L. Fernald.

When it was announced that a great series of monographs upon geographic botany was to be issued under the editorship of Engler and Drude botanists felt that, with so distinguished a taxonomist as Engler and so experienced a phytogeographer as Drude standing as sponsors, a series of authoritative works might be expected which would be not merely encyclopedias of accurate information but valuable treatises upon plant distribution. Several volumes already issued are apparently satisfactory fulfilments of this hope; and now comes the volume upon the flora of North America by Professor Harshberger.[1] In appearance the work is like others of the series, a sumptuous book with excellent paper and type and numerous illustrations, filling in all 790 pages besides 12 pages of the ordinary introductory matter and a 50 page "German Extract" by Drude. The main portion of the volume consists of four parts: "History and Literature of the Botanic Works and Explorations of the North American Continent"; "Geographic, Climatic and Floristic Survey," "Geologic Evolution, Theoretic Considerations and Statistics of the Distribution of North American Plants"; "North American Phytogeographic Regions, Formations, Associations."

That the author approached his task seriously and felt himself called to it is shown by the remarks in his preface where he states, that he, "at the suggestion of the editors of 'Die Vegetation der Erde,' undertook ten years ago to write a sketch of the Vegetation of North America, and this volume is the outcome of the study of American vegetation, begun over twenty years ago." This study has resulted, we are told, in a "work which the author has spared no pains to make as accurate, as the existing state of information and the unfortunate confusion in nomenclature would permit." In other words, the book represents the most accurate work which the author is capable of producing. Whether it is of the grade of work which American botanists should demand or by which we wish our European contemporaries to judge us can be seen only by an examination of some portions in detail; and since the author states that "no one region

[1] Engler and Drude: Die Vegetation der Erde, xiii. Phytogeographic Survey of North America. A Consideration of the Phytogeography of the North American Continent, including Mexico, Central America and the West Indies, together with the Evolution of North American Plant Distribution by John W. Harshberger, A. B., B. S., Ph.D. Leipzig (Wilhelm Engelmann), 1911. Large 8vo. pp. lxiii + 790, 1 map, 18 plates, 32 figs. Price unbound, 52 marks (Subscription price 40 M.); bound, 53.50 M. (Subscription price 41.50 M.).

in North America has been more carefully studied botanically than New England" the reviewer may appropriately confine his judgment of the book largely to this and the adjacent regions which, in view of the availability of information, should be among the most accurately described areas discussed in the book.

The first part contains chapters on History and Bibliography. Many familiar names appear in this portion which, although it is by no means complete, will give some impression of the amount of work done by others, and may possibly be suggestive to those who wish to carry the subject to something like completeness. But it is singular that there should be enumerated among the most important students of the New England flora Charles E. Hamlin (a geologist whose name wandered into certain botanical papers because of his geological and physiographic work upon Mt. Katahdin) and some others who at most have published only one or two very minor notes; while no mention either in the historical sketch or the bibliography is made of such critical and scholarly students of the New England flora as Bicknell, F. S. Collins, Dame, Davenport, A. A. Eaton, E. H. Eames, Evans, C. B. Graves, Isaac Holden, Harger, Nichols, Thaxter, Webster and Wiegand. All such omissions are probably meant to be covered by the statement that owing to the number of workers and papers "it is incumbent on the writer to refer to only the most important." But by what judgment, we may ask, is it decided that the botanical works of Charles E. Hamlin (the geologist) and some who are enumerated as important students of the flora of the White Mountains are of more importance as botanical contributions than Bicknell's critical studies of the flora of Nantucket, F. S. Collins's authoritative publications on the Algae and his capital accounts of Cape Cod, Clinton's *Ustilagineae of Connecticut*, Dame & Collins's *Middlesex Flora*, Dame & Brooks's trustworthy *Handbook of the Trees of New England*, Evans & Nichols's *Bryophytes of Connecticut* and their many critical discussions of New England Bryophytes, or the Connecticut Botanical Society's exemplary *Catalogue of the Flowering Plants and Ferns of Connecticut* by Graves, Eames, Bissell, Harger and others? Had the author been more familiar with the painstaking work of these energetic students and had he realized the need of emulating their accuracy and critical judgment the unfortunate volume which is now before us might never have been written.

There is no branch of the botanical field which so much as phytogeographic work demands thorough training in exact taxonomic detail accompanied by the most discriminating judgment and prolonged and painstaking field-study. That the author of the *Phytogeographic Survey of North America* has satisfactorily met these requirements must be doubted by many close students of our flora. Only a brief perusal of the book shows that for the most part it is composed of extracts

from or summaries of papers and notes selected undiscriminatingly from many authors — good, bad, and very bad — and that too often the identifications for which the author acknowledges responsibility are hopelessly wrong. It is also obvious, as one glances over the delimitations of areas and the lists of "typic" (the author studiously avoids the normal *al* ending of adjectives) plants, that we here have a book written without a full appreciation of the axiomatic truth that a work on phytogeography should be based on a clear understanding of identities and of the geographic ranges of plants.

The extracts which have been taken literally from our best observers are of course good as extracts; but the uncritical character of the author's judgment of what he has found printed and his inadequate grasp of the subject with which he has attempted to deal are clearly shown by the following passages copied from almost consecutive pages of the book, with the reviewer's comments bracketed.

[p. 354] "*Strand Formation*. . . . The strand flora of Newfoundland consists of Plantago maritima, Ligusticum scot[h]icum, ... while the waves roll in tangled masses of Vallisneria spiralis."

[There are many peculiar features about the Newfoundland flora but even there, just as on our mainland coast, the Eelgrass of the sea-margin is *Zostera marina*. *Vallisneria*, it seems superfluous to state, is a plant of fresh water and is unknown in Newfoundland as the author himself implies when he states elsewhere (p. 316) that it occurs only south of latitude 48°. The original author (John Bell) from whom Harshberger has apparently copied the statement about *Vallisneria* (as well as several other errors) was describing the head of Bay St. George in latitude 48°, 30′. A safer man to copy would have been Bachelot de la Pylaie, who in describing Bay St. George wrote: "Le zostera forme dans les anses des prairies sousmarines, à quelques décimètres au-dessous du niveau des basses eaux des marées de lune; ses longues feuilles graminiformes flottent alors couchées à la surface de la mer." (la Pylaie, *Voyage à l'Ile de Terre-Neuve*, 70).].—

[p. 354] "*Coniferous Forest Formation of Newfoundland*. . . . the higher ground inland may bei [be] covered with bushes of *Juniperus communis, Taxus canadensis, Lyonia* (*Chamaedaphne*) *calyculata* (Juniperus-Taxus Association)."

[Certainly not a very cordial "Association"! For in Newfoundland the only representative of *Juniperus communis* is the var. *montana*, growing ordinarily on the dry rocky or sandy areas or on bleak mountain ledges; *Taxus canadensis* there, as elsewhere, is a shrub chiefly of deep rich woodlands and by the distinguished Newfoundland geologist, the late Alexander Murray, was considered an indicator of the best land on the island; and *Chamaedaphne* is a typical shrub of wet bogs and flooded pond-margins. In other words, this "Juniperus-Taxus Association" of "the higher ground" is largely imaginary and is made up of plants which rarely if ever associate.]

[p. 354] "Remarkable herbaceous plants of the forest [in Newfound-

land] are. . . . Trillium recurvatum, ... Goodyera (Peramium) pubescens, Smilacina (Vagnera) stellata, ... Secondary woody species: . . . . Viburnum lentago, V. acerifolium."

"In drier woods Mitchella repens, Epigaea repens occur. The edge of the forest along rocky hills is fringed with Juniperus virginiana var. humilis."

[These plants would indeed be remarkable in such habitats in Newfoundland. *Trillium recurvatum* is unknown east of Ohio and Tennessee (see Britton, *Man.*; Small, *Flora*; Gray's *Man.* ed. 7). *Goodyera pubescens* is unknown east of central Maine (see Rhodora, i. 5), the Newfoundland plant formerly reported under that name being *G. tesselata*. *Smilacina stellata* in Newfoundland, as in Labrador and eastern Canada, is a species of the sea-strand or of other gravelly or sandy shores or of light alluvium in intervales; *Viburnum Lentago* and *V. acerifolium* are unknown from east of western New Brunswick (see Macoun, *Cat. Can. Pl.*; Sargent, *Silva*; Britton, *Man.*; Hough, *Handb. of Trees*; etc.). Professor Harshberger has doubtless confused them (as did Dr. John Bell who reported them from Newfoundland before him) with the common *V. cassinoides* and *V. pauciflorum*. *Mitchella repens*, too, is apparently unknown from Newfoundland (see Macoun, *Cat.*; Britton, *Man.*; etc.). though it was once reported by a careless writer who did not realize that *Mitchella* is really quite different from the "Partridge Berry" of Newfoundland. In both Newfoundland and Labrador "Partridge Berry" is *Vaccinium Vitis-Idaea*, var. *minus* (see Waghorne, Proc. & Trans. N. S. Inst. Sci. ix. 383; etc.). In Newfoundland as in eastern Quebec *Epigaea repens* is a plant of the bogs and wet woods — not the "drier woods" (see Rhodora, xiii. 97); and no form of *Juniperus virginiana* is known from east of the Kennebec valley in Maine. The author may have had in mind the common *J. horizontalis*, which he speaks of in other parts of his book, sometimes as *J. Sabina*, sometimes as *J. Sabina*, var. *procumbens*, apparently unaware that so far as North America is concerned these names (used at different times and by various authors) all apply to one and the same shrub.]

[p. 354] "*Sea Cliff Formation.* The sea coast of Newfoundland presents an irregular line of cliffs, beaches and headlands on which are *Alnus viridis* (= *A. alnobetula*), *Viburnum pauciflorum*, *Cornus stolonifera*, *Ribes prostratum*, *Empetrum nigrum*, various species of *Rubus* and *Vaccinium*."

[The "*Alnus viridis*" of Newfoundland is *A. mollis* Fernald (see Rhodora, vi. 162; Britton. *Man.* ed. 2, 1062; Gray, *Man.* ed. 7). Neither this nor *Viburnum pauciflorum*, *Cornus stolonifera*, any *Rubus* or *Vaccinium* are, in western Newfoundland (the only section personally familiar to the reviewer) characteristic of *sea cliffs*. A very slight experience there is sufficient to show that there are plants really growing in the crevices of sea cliffs: such as *Puccinellia* spp., *Cerastium* spp., *Draba* spp., *Cochlearia officinalis*, *Sedum roseum*, *Saxifraga caespitosa*, *Oxytropis campestris*, var. *caerulea*, *Ligusticum scothicum*, *Statice* (*Armeria*) sp., *Primula farinosa*, var. *macropoda*, and *Plantago decipiens*.]

[p. 361] "**a) New Brunswick Area.**"

"This area territorially covers Nova Scotia, New Brunswick and that portion of Quebec south of the subarctic forest.....It comprises the Laurentian highlands south of 50° N. L. The northern portions of Maine, New Hampshire and Vermont (including their mountain ranges) are part of this area, its southern boundary being determined by the southern limit of *Pinus Banksiana* (= *P. divaricata*), *Picea alba* (= *P. canadensis*), as well, as the northern limit of the tulip poplar, *Liriodendron tulipifera.*"

[This delimitation is certainly a very remarkable one, since the southern limit of *Pinus Banksiana* is indicated by a line running from the east side of Penobscot Bay to the Rangeley Lakes, thence, with a slight dip southward at the western edge of the White Mountains, across northern Vermont (see Sargent, *Silva*; Dame & Brooks, *Handb. Trees N. E.*; Hough, *Handb. Trees.*; etc.); the southern limit of *Picea canadensis* extends from Casco Bay to northernmost New Hampshire and northeastern Vermont (see Sargent, Dame & Brooks, Hough, etc.); but the northern limit of *Liriodendron* is marked by a line running from the southeastern corner of Worcester County, Massachusetts (see R. M. Harper, RHODORA, ii. 122) to the southwestern corner of Vermont (see Brainerd, Jones & Eggleston, *Fl. Vt.*; also Sargent, Dame & Brooks, Hough, etc.). Thus, if the southern limits of *Pinus Banksiana* and *Picea canadensis* are taken as the southern boundary of the New Brunswick area, most of the White Mountain region is excluded; if, on the other hand, the northern limit of *Liriodendron* is the boundary, then eastern and central Massachusetts and essentially all of Vermont with their forests of *Quercus alba* and *velutina*, *Castanea*, *Carya*, *Juglans*, etc., become a part of the New Brunswick area.]

[p. 366] "*Dry barrens* [of the New Brunswick Area]. The dry barrens, or Moor-Formation are characteristically treeless, but are surrounded by pine [spruce?] forests and on such areas grow lichens, mosses and ericaceous bushes, forming a heather. Here grow *Ledum latifolium*, *Vaccinium macrocarpon*, *Andromeda polifolia*, *Kalmia glauca*, *Betula pumila*, *Lonicera oblongifolia* with *Eriophorum vaginatum*, *Carex oligosperma* and Orchids, *Medeola*, *Linnaea*, *Mitella nuda.*"

"The great valley of the St. John River and its tributaries has a flora far more southerly in character than that of northern New Brunswick."

[The author of the *Phytogeographic Survey* has certainly had some unique experiences, for no botanist who has spent years exploring northern New England and eastern Canada would expect to find the woodland *Mitella nuda* in a Cranberry (*Vaccinium macrocarpon*) bog; and he would certainly be astonished if he went to pick Cranberries and found the heath-bog inhabited by *Medeola* of the rich woods. Incidentally it is difficult to think of any habitat in the "New Brunswick Area" (except in alpine and subalpine regions) where one can collect *Ledum latifolium*, *Andromeda glaucophylla* (*A. polifolia* of Harshberger), *Kalmia glauca*, *Betula pumila*, *Lonicera oblongifolia* and

Carex oligosperma without getting his feet wet. Such "dry barrens" as the author seems to have in mind are *dry*, in the ordinary sense, only during periods of drouth.

The prosperous people of "the Aroostook" who are making their fortunes out of the soil (see Rhodora, xii. 111, 115) would be amazed to know that their region ("the great valley of the St. John River and its tributaries") is a "dry barren." However, Harshberger is right in stating that the region has a more southerly flora than some other places, but surely not than "northern New Brunswick," for two of the most important tributaries of the St. John — the Madawaska and the St. Francis — rise *north* of northern New Brunswick. The list of "more southerly" plants given (p. 366) to illustrate this point contains, furthermore, such unfortunate examples as *Aspidium aculeatum*, var. *Braunii* (*Polystichum Braunii*) which is unknown in New England south of the hills of western Maine, the White Mountains, and Mt. Greylock; *Thalictrum dioicum* and *Anemone virginiana*, which reach their northeastern limits in the lower Penobscot Valley, 100 miles southwest of the St. John (see Rhodora, i. 50, ii. 232; Gray, *Man.* ed. 7); and *Vaccinium caespitosum*, which occurs on the mountains of Labrador and northern New England, but is quite unknown south of the northern New England states. Had the author listed *Cyperus esculentus*, *Waldsteinia fragarioides*, *Panax quinquefolium*, *Sanicula gregaria*, *Fraxinus pennsylvanica*, *Scrophularia leporella*, *Phryma Leptostachya*, *Triosteum aurantiacum* and *Lobelia siphilitica*, his illustrations would have been convincing.]

[p. 366] "Several plants are peculiar to this river [the St. John]: Oxytropis (Aragallus) campestris, Astragalus alpinus, Hedysarum boreale, Tanacetum huronense."

[This statement represents the condition of our knowledge in 1861 and indicates that the author who today perpetuates it has ignored or never known of the perfectly authenticated occurrence of one or more of these plants along other valleys of the New Brunswick Area — for instance, the St. Lawrence, Bonaventure, Donglastown, Grand and Grand Cascapedia in Quebec; the Eel, Nepisiguit, Petitcodiac and Restigouche in New Brunswick; the Kennebec in Maine; and the Connecticut in New Hampshire and Vermont. Real illustrations of plants confined to the St. John valley would have been *Kobresia elachycarpa* (see Rhodora, v. 251; Britton, *Man.* ed. 2; Gray, *Man.* ed. 7), *Pedicularis Furbishiae* (see Gray, *Syn. Fl.* & *Man.* ed. 7; Macoun, *Cat.*; etc.) and *Prenanthes mainensis* (see Gray, *Syn. Fl.* and *Man.* ed. 7).]

[p. 366] "The rare plants of the New Brunswick phytogeographic area are Dryopteris (Aspidium) fragrans, Woodsia glabella, Woodsia hyperborea, Oenothera (Onagra) Oakesiana, Hieracium praealtum, Goodyera pubescens, Tanacetum huronense, Viola primulaefolia."

[Just why this meagre list should be selected it is difficult to see unless perhaps the author was compiling from such papers as he happened upon without getting any real insight into his subject. But in passing it may be noted that *Oenothera Oakesiana* is unknown east of Massachusetts (see Vail

in Macdougal, Vail and Shull, *Mutations, Variations and Relationships of Oenotheras*, 70; Gray, *Man.* ed. 7); *Goodyera pubescens* is unknown east of central Maine (see RHODORA, i. 5); and the plants which in New Brunswick have passed, by error of determination, as the "King Devil Weed," *Hieracium praealtum*, are *H. florentinum*, *H. pratense*, and *H. floribundum*, all European weeds recently introduced into our flora and now unfortunately too common (rather than *rare*) in the regions they infest. Rarity in a plant is purely relative, but to those who have explored the regions of Bic and of the Gaspé Peninsula in Quebec (small portions of the "New Brunswick Area") it will be a surprise to learn that *Dryopteris fragrans* and *Woodsia hyperborea* are "rare." But this term might without question be applied to some scores of species which Harshberger does not mention in his list of rare plants of the area: such species as *Cystopteris montana*, *Phegopteris Robertiana*, *Woodsia scopulina*, *Calamagrostis purpurascens*, *Carex lagopina*, *Sagina occidentalis*, *Arabis Holboellii*, *Draba aurea*, *Dracocephalum parviflorum*, *Physalis grandiflora*, and *Arnica gaspensis*, species which as yet are known from only one or two stations in the New Brunswick Area.]

[p. 376]

[In the list of Alpine plants of New Hampshire *Dryas integrifolia* Vahl appears just as if it had full claim to the title, although it was shown in 1903 that its record as a New Hampshire plant was a mistake (see RHODORA, v. 281). And surely Professor Harshberger can find no European support for his assertion that *D. integrifolia* grows in Europe or that *Betula glandulosa* is European — unless "Europe" is stretched to cover Greenland, Kamtschatka and the Altai Mountains.]

[p. 378] "**b) New England Area.**"

"The flora of this area is characterized by the absence of *Picea alba*, *Pinus Banksiana* and by the presence of *Pinus s[S]trobus* and other trees found in the New Brunswick area, but its chief characterization depends on the presence of such trees as *Quercus alba*, *Q. prinoides*, *Q. coccinea*, *Juniperus virginiana* and *Castanea dentata*."

[This definition is practically as ineffective as that of the New Brunswick Area; for, since the author begins his first two subdivisions (Sea Islands and Sea Coasts) with Mt. Desert Island and eastern Maine, it is difficult to reconcile the discussion with the definition. Surely *Picea canadensis* (*alba*) is abundant on Mt. Desert Island and follows the coast to Casco Bay (see Rand & Redfield, *Fl. Mt. Desert*, Sargent, Dame & Brooks, etc.), and *Pinus Banksiana*, though not common on Mt. Desert, is abundant on the adjacent mainland (see Rand, RHODORA, i. 135; Sargent, Dame & Brooks, etc.). But singularly enough none of the trees which *characterize* the New England area as defined are found on Mt. Desert and the adjacent coast (See Rand & Redfield; also A. H. Graves, RHODORA, xii. 173). In fact, the northeastern limit of *Quercus alba* is in south-central Maine (see Sargent, Dame & Brooks, etc.), the most northerly station being at or near Waterville; *Quercus prinoides* (never a *tree* in New England) is unknown in Maine, its northeastern limit being in the region of Manchester, New Hampshire; *Quercus coccinea* is

unknown east of the lower Androscoggin (see Sargent, Dame & Brooks, etc.); *Juniperus virginiana* is of very doubtful occurrence east of the Kennebec valley (see Dame & Brooks); and *Castanea dentata* is known in Maine only in the southern corner (see Sargent, Dame & Brooks, etc.). Therefore a large part of the region described by Harshberger as belonging to the New England Area is by the definition excluded from it!]

[p. 379] "Thickets of *Alnus maritima* also occur according to Harshberger's observations" [on Peaks Island, Portland Harbor].

[It is fortunate that the authority for this remarkable observation is stated. The many discriminating New England botanists who have been on Peaks Island have never seen *Alnus maritima* there. In fact, the reviewer inclines to the belief that Professor Harshberger must have mistaken something else for *A. maritima*, for that unique species is not recognized by other students of the trees from any region of our eastern states outside of Delaware and Maryland (see Sargent, Hough, Britton, etc.)]

[p. 385] "*Bog Formation.* This formation is characterized by the abundance of *Sphagnum* species which form a dense growth over the surface. . . . They may be called islands of northern plants with many ericaceous species. The plants of this formation in eastern Massachusetts are:

Calla palustris L.
Clintonia borealis Raf.
Habenaria lacera R. Br.
Pogonia ophioglossoides Ker.
Calopogon pulchellus R. Br. (= Limodorum tuberosum L. [i. e of Authors, not L.]).
:
:

Sarracenia purpurea L.
:
Utricularia cornuta Michx.
Epilobium lineare Muhl. (=E. densum Raf.).
Vaccinium macrocarpon Ait.
" o[O]xycoccus L.
:
Andromeda polifolia L.
:
Rhododendron Rhodora Don.
:

[Just why *Habenaria lacera* (which rarely grows in *Sphagnum* bogs in Massachusetts) and *Epilobium densum*, with a range from Alabama to southern Newfoundland, *Pogonia ophioglossoides* and *Utricularia cornuta*, ranging from Florida to Newfoundland, and *Sarracenia purpurea*, which extends from Florida to southern Labrador, should be considered peculiarly *northern* it is difficult to make out. And surely the author must have seen some other plant than *Clintonia borealis*, for in eastern Massachusetts *Clintonia* occurs in cool rich woods (see J. Robinson, *Fl. Essex Co.*; Knowlton, Cushman, Deane and Harrison, Rhodora, x. 130).

It is unfortunate longer to inform our unsuspecting European friends that *Andromeda polifolia* grows in Massachusetts bogs. The plant of New England is *A. glaucophylla* Link (see Rhodora, v. 67–71; Gray, *Man.* ed. 7).]

[p. 385] "The cold sphagnum bogs of Vermont have. . . . these

typic bog plants." [Then follows a list including] "Calypso borealis Salisb (= C. bulbosa L. [i. e. (L.) Oakes]);....Orchis rotundifolia Pursh,....Eleocharis pauciflorus Link."

[These plants, however, behave in Vermont, apparently, as they do in Maine, New Brunswick and Quebec, where they are not in *Sphagnum*. Wherever the present reviewer has seen *Calypso* it has grown in a rich carpet of some *Hypnum* or other moss, not *Sphagnum*, and generally on decayed logs or stumps of *Thuja*; *Orchis rotundifolia* is also typical of Arbor Vitae swamps where it grows in wet hollows among true mosses and liverworts; and *Scirpus pauciflorus* (*Eleocharis pauciflora*) is found in wet but hardly sphagnous shores or banks or on dripping limy cliffs.]

[p. 386] "The same Ericaceae [as in Vermont bogs] are noted from Massachusetts bogs, without Rh[odendron] Rhodora, the same Sarracenia, Geum, and the following trees, shrubs and perennials:"

[Then follows a list containing the following which other explorers of Massachusetts bogs would delight to see: *Lonicera oblongifolia*, *Aster junceus*, *Senecio Robbinsii*, *Pyrola uliginosa* and *Valeriana septentrionalis*. This is a most interesting list but before it is accepted at its face value it should be most rigidly verified, for not one of the army of Massachusetts botanists from Menasseh Cutler to the energetic explorers of the present day have ever found any of these plants in the state. And in view of our brilliant bogs of late April and May it is astounding to be told that Rhodora does not grow in Massachusetts bogs (only one page back we are told that it does).]

[p. 387] "*Mud Pond Formation.* This formation exists in ponds and slow-flowing streams with mucky, clay bottom."

[The fourteen plants listed as typical include such extremely rare species as *Marsilia quadrifolia*, *Potamogeton crispus*, and *Podostemum ceratophyllum* — rare because in New England *Marsilia* is locally introduced into a few ponds only, outside the traditional Bantam Lake station; *Potamogeton crispus*, similarly, is known in New England only very locally, in brick-yard pools and adjacent waters about Cambridge, Massachusetts, where it was undoubtedly introduced from Europe (see Morong, Mem. Torr. Bot. Cl. iii. 37; Gray, *Man.* ed. 7, etc.); and *Podostemum ceratophyllum* grows, as is well expressed in the *Catalogue of Flowering Plants and Ferns of Connecticut*, "on rocks, stones and gravel in shallow running water," and is therefore a rather unsatisfactory species to represent the New England "Mud Pond Formation."]

These numerous illustrations from Harshberger's descriptions of the flora of the "Labrador District" and the "Maritime District" (including the "New Brunswick Area" and the "New England Area") of his larger "St. Lawrence-Great Lake Region," although among the most inaccurate passages, are, it is regretted, by no means all on these pages. But the present reviewer, fearing that his own twenty-five years of active field-work in these two Districts might have made him hypercritical, has gone somewhat outside the areas with which he is personally familiar in order to check the result. The

next district treated by Harshberger is the "Lake District," "the region west of Lake Champlain and the Ottawa River representing the drainage basin of the Great Lakes," and its first subdivision is the "Interlacustrine Area....the country immediately surrounding the Great Lakes and other glacial lakes west of the Ottawa River" (from which it is inferred that the author classes the Great Lakes as "glacial lakes"). Certainly the flora of the Great Lake country ought to be so well known that no serious stumbling is possible. But when we read the first page of discussion we find an even more surprising inaccuracy than in the treatment of the more easterly areas.

In 1868, in one of his discussions of the Canadian flora, Dr. A. T. Drummond, comparing the plants of Quebec and Ontario as a unit (Canada of that day) with the northern United States as a unit, said: "Common to Ontario and Quebec [as a unit] on the one hand, and to the Northern United States on the other, there are no less than 1,591 flowering and filicoid plants.....There are....eighty-five species which are without representatives across the border. Of these, however, it should be specially observed nineteen are manifestly introduced and there are therefore only sixty-six indigenous plants which, as between the two provinces [as a unit] and the Northern States, are peculiar to the former." The striking feature about Drummond's list was that it consisted chiefly of plants known only from cold sea-cliffs or mountain summits of Gaspé, Anticosti, the Mingan Islands or the Straits of Belle Isle or from the shores of Hudson Bay, areas which for the most part belong in Harshberger's "Sub-Arctic Forest Region," "Labrador District" and "Hudson-Bay-Keewatin District." But Harshberger, seizing upon Drummond's list of sea-cliff and alpine plants which had been found (or were supposed by Drummond to have been found) somewhere in Quebec or Ontario, reproduces it under his "Forest Formations" of the "Interlacustrine Area" as a list of the forest species of the Great Lake region!

[p. 391] "In the north and northwest [regions of Ontario] the species are identic with those found in Quebec....Common to Ontario and Quebec are eighty-five species not found south of the Interlacustrine Area. The indigenous species include the following:"

[Then follows Drummond's list of plants (with interpolations which hardly increase its accuracy), a list of plants which actually *do not grow* within hundreds of miles of the "Interlacustrine Area," and for the most part are not found in both Ontario and Quebec. The list is too long for reproduction here. However, the fact that it is anything but representative of the forests of the Great Lake region is sufficiently evident from a few examples.]

"Anemone narcissiflora L."

[A species of the Alaskan region, following the Rocky Mountains very locally to Colorado; not found in either Ontario or Quebec (see Macoun, *Cat. Can. Pl.*; Gray, *Syn. Fl.*: etc.). In some of the earlier publications (for example, Reeks, *Flowering Plants & Ferns of Newfoundland*) it was reported

from the Gulf of St. Lawrence where *A. parviflora* was mistaken for it. In fact, on p. 192, Harshberger himself (by the use of symbols) states that *A. narcissiflora* does not occur in eastern North America.]

"Thalictrum alpinum L."

[Known from Arctic Alaska, thence south on the mountains to California, Nevada, and Utah; also in easternmost Quebec on cliffs about the Gulf of St. Lawrence. Quite unknown from Ontario.]

"Ranunculus affinis R. Br. (= R. pedatifidus J. E. Smith)."

[Surely not *R. pedatifidus*. The plant of eastern Quebec which long passed as *R. affinis* is *R. Allenii* Robinson (see RHODORA, vii. 219–222), a species known only from Labrador and the highest mountains of eastern Quebec; not from Ontario].

"Vesicaria arctica Rich. (= Lesquerella arctica DC. [i. e. Watson])."

[*Lesquerella arctica* is known from Greenland and the Arctic coast of America, extending slightly southward on the outer coast of Labrador. It is entirely unknown in either Ontario or Quebec, but on Anticosti Island is represented by var. *Purshii* Watson, the plant Drummond undoubtedly had in mind.]

"Cochlearia tradactylites Banks."

[Another arctic species, unknown south of Labrador, but formerly confused with *C. anglica* of the sea-cliffs of Anticosti and the Straits of Belle Isle.]

"Cassiope (Andromeda) tetragona L. [i. e. (L.) Don]."

[Another arctic type, extending south to northern Labrador and along the mountains to Oregon, but unknown in either Ontario or Quebec.]

[p. 392] "Dryas octopetala L."

[Known in America only from Arctic Alaska south along the northern Rocky Mountains, but formerly not distinguished from the very different *D. integrifolia* of Anticosti, the Gaspé Peninsula, Newfoundland, Labrador, and Greenland. *D. octopetala* is quite unknown from eastern America.]

"Dryas Drummondii Rich."

[This unique species is abundant throughout the region of the Canadian Rocky Mountains, extending south into Montana; also on the limy river-gravels of Anticosti Island and the Gaspé Peninsula, Quebec; and it has been reported from Slate Island, Lake Superior (see Macoun, *Cat.*). This distribution, however, does not make it a characteristic woodland plant of the "Interlacustrine Area." In fact, on page 190 we are informed that *Dryas Drummondii* is "found on the Rocky Mountains and the GASPÉ PENINSULA," on p. 191 (the opposite page) that it is endemic in the Rocky Mountains, and on p. 392 it is made a woodland species "common to Ontario and Quebec."]

These are a sufficient indication of the arctic-alpine plants which Harshberger considers to be common to the forest formation of Ontario and Quebec,— a list which could have been used in such a connection only through lack of familiarity with the "Interlacustrine Area" and its flora.

Similar divisions of North America into zones, sections, regions, districts, areas, formations, etc., occupy the greater part of the volume, and, though the reviewer would like to believe that the regions with which he is personally unfamiliar are better treated than the Northeast, it is feared that only when the treatment is taken unaltered from the writings of some painstaking student will it prove to be anything but inaccurate. And what can be the character of the "consideration" and statistics based upon such variegated data? Obviously, the less said the better. But the greatest pity is, that to the Old World botanist who is unfamiliar with North America and to the American botanist whose primary work is in other lines the book is apt to be judged, not by its disheartening array of inaccuracies and blunders, but by the fact that it is one of the volumes of Engler and Drude's series, *Die Vegetation der Erde*; and any conclusions which may be innocently based by the unwary upon this "Survey" will always be open to doubt.

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