

ART. XVI.—*Statistics of the Flora of the Northern United States;*
by ASA GRAY.

WHILE engaged in the preparation of a second edition of the *Manual of the Botany of the Northern United States*, I was requested by an esteemed correspondent, upon whose judgment I place great reliance, to exhibit, in a compendious and convenient form, the elements of the flora I was occupied with. I accede to this request only because I may be presumed to possess considerable facilities for collecting and correcting a portion of the required data. But I cannot command the time needed for a proper elaboration and discussion of these materials, nor have I any special aptitude for this kind of research. I may, however, collect and arrange the principal data; for the use of those better qualified to discuss them, and to indicate their bearings upon many questions of the highest scientific interest, respecting the geographical distribution, the mutual relations, the nature, and the origin of the existing species of plants;—questions some of them so speculative or so difficult that they are not likely to be conclusively answered in our day; others more nearly within our reach; but all perhaps capable of some elucidation from the critical comparison of the flora of any one considerable region with the vegetation of other parts of the world.

The work,* which forms the basis of the following statistics of the botany of the Northern United States, has now been extended in geographical area beyond the limits of the Northern States, politically so called; inasmuch as this area includes Virginia and Kentucky, and stretches westward to the Mississippi River. The southern boundary of 36° 30' has been adopted (instead of Mason and Dixon's line) because it coincides better than any other direct geographical line with the natural division between the cooler-temperate and the warm-temperate vegetation,—between the flora of the northern and of the southern Atlantic states. Few characteristically southern plants advance to the north of it, and those chiefly on the coast of the low southeastern corner of Virginia, in the Dismal Swamp, and the environs of Norfolk. Could we vary the line where it intersects the longitude of Washington, carrying it north until it reaches James River, and thence due east again, the small quadrangle thus excluded would exclude nearly all the properly southern indige-

* *Manual of the Botany of the Northern United States; second edition; including Virginia, Kentucky, and all east of the Mississippi; arranged according to the Natural System; by ASA GRAY, (the Mosses and Liverworts by W. M. SULLIVANT).* With 14 plates, illustrating the Genera of the Cryptogamia. New York: George P. Putnam & Co., 1856.

nous plants now comprised in the volume,* and mark the true division eastward between our southern and our northern botanical regions, namely, at the northern limit of the Live Oak, the Long-leaved Pine, and the Black Moss (*Tillandsia usneoides*), which grows pendent from their boughs.

On the Mississippi, the plant most southern in character which crosses the parallel is *Jussiaea repens*. This sparingly extends up the Ohio to lat. 38°, where also the *Taxodium* reaches about as far north as on the Atlantic coast.

In the elevated region through which the middle of our southern boundary passes, great numbers of northern plants are of course found to extend much farther southward.

Our western boundary, the Mississippi River, while it takes in a considerable prairie-region, excludes nearly all the plants peculiar to the wide western woodless plains, which stretch from the Saskatchewan to Texas and New Mexico, and approach our borders in Minnesota and Iowa. A list of the plants which we may be said to have derived from this region will be given hereafter.

The northern boundary, being that between the United States and British America, varies through about five degrees of latitude, and nearly embraces Canada proper on the east and on the

* It would apparently exclude from the flora of the Northern States the following species:—

Gordonia Lasianthus.
Stuartia Virginica.
Zanthoxylum Carolinianum.
Berchemia volubilis.
Viburnum obovatum.
Mitreola petiolata.
Liatris odoratissima.
 " *paniculata.*
Sericocarpus tortifolius.
Chrysopsis gossypina.
Baccharis glomeruliflora.
Kalmia hirsuta.
Ilex Cassine.
 " *myrtifolia.*
 " *Dahoon.*
Gelsemium sempervirens.
Forsteronia difformis.
Olea Americana.
Fraxinus platycarpa.

Benzoin melissifolium.
Tetranthera geniculata.
Stillingia sylvatica.
Quercus virens.
 " *cinerea.*
Sagittaria falcata.
Burmannia biflora.
Tillandsia usneoides.
Smilax Walteri.
 " *lanceolata.*
Zygadenus glaberrimus.
Mayaca Michauxii.
Pæpalanthus flavidus.
Lachnocaulon Michauxii.
Vilfa Virginica.
Ctenium Americanum.
Uniola paniculata.
Paspalum distichum.
 " *Digitaria.*

Probably a good many more southern species inhabit this corner of Virginia, of which I have as yet no indications. There is little doubt that the long-leaved Pine crosses the line, and perhaps an arborescent *Yucca* grows on the sea-shore.—Of characteristically southern trees that have found their way still farther northward on the coast, even beyond Virginia, I can only mention two, namely, the Red Bay (*Persea Carolinensis*) and the Bald Cypress (*Taxodium distichum*), both found in Delaware, a little beyond lat. 38° 30'. Two other characteristic trees, viz., the Palmetto and *Magnolia grandiflora*, stop about as far short of our line as the two former pass beyond it.

west; so that the volume in question probably contains nearly all the plants of Canada East, south of the St. Lawrence and of lat. 47°, and of Canada West, south of lat. 46°, or perhaps 45°. Our northern boundary rises highest at its western extremity, even to lat. 49°. But the botany of the district beyond Fond du Lac, lat. 47°, is little known. Probably many plants of the northwestern plains are to be found there, which are otherwise strangers to our region, as well as all or most of the species known to occur on the northern but not on the southern shore of Lake Superior.*

A list of the additional Canadian species, as far as now known, is appended.†

The simplicity of our flora, as a purely northern temperate one, is preserved by the absence throughout our limits of high mountains and of any considerable extent of elevated land, es-

* The following Phænogamous plants, contained in Prof. Agassiz's published list of the plants gathered on the north shore of Lake Superior, in his expedition made in 1848, are not included in the Botany of the Northern States, viz :

Ribes oxyacanthoides.

Lonicera involucrata.

Corispermum hyssopifolium.

Tofieldia calyculata vel palustris.

Carex Vahlil.

To which I may add, that obscure and ambiguous Grass, the *Aira melicoides*, Michx., (*Grappheporum Beauv.*). The last two, viz., *Tofieldia palustris* and *Carex Vahlil.*, with an interesting Fern, *Allosorus acrostichoides*, are in Prof. Whitney's list (in Messrs. Foster and Whitney's Report on the Geology of the Lake Superior Land District, 1851), and having been gathered on Isle Royale, strictly claim admission into our Flora. But I was not aware in time that Isle Royale fell within the limits of the United States; and, seeing that in any case it geographically and botanically pertains to the northern shore, where the vegetation begins to display a subalpine character, which it does not upon the south side, I determined to take the southern shore of the lake for our boundary.

† This list includes the few just enumerated as found on the immediate coast of Lake Superior, although only one of the seven, viz., *Ribes oxyacanthoides*, is truly Canadian. Three of them come from the northwest and west, and three from the Hudson's Bay country. I exclude the introduced species, reckoning among these *Hesperis matronalis*, *Sisymbrium Sophia*, &c.: also all those mentioned as Canadian by Pursh, which have not been confirmed by later observers.

Aquilegia vulgaris (*A. brevistyla*, Hook.). *Aster Cornuti.*

Turritis patula.

" *retrofracta.*

Thlaspi alpestre (?)

Linum perenne.

Oxytropis Lamberti (?)—the plant of

Quebec, so-called.

Ribes oxyacanthoides.

Lonicera involucrata.

Hieracium vulgatum.

Nardosmia frigida.

Matricaria inodora.

Gentiana acuta.

Polemonium cæruleum.

Corispermum hyssopifolium.

Elæagnus argentea.

Tofieldia palustris.

Goodyera (*Spiranthes*, Hook.) *decipiens.*

Carex Vahlil.

Grappheporum melicoides. (Pœ sp.?)

Elymus Europæus, ex Hook.

Allosorus acrostichoides.

So far as we know at present, therefore, only 22 indigenous Phænogamous species and Ferns (of which 12 are also European) would therefore be added, by comprising Canada proper, that is, the country bordering the north of the St. Lawrence and of the Great Lakes.

pecially at the north, and the consequent paucity of truly alpine or even subalpine species. We have an alpine region indeed; but it is restricted to a few isolated mountain-tops in the northern part of New England and New York, between or near lat. 44° and 45°. The White Mountains of New Hampshire furnish far the larger part, viz., the range strictly so called, with six or seven square miles (taken horizontally) of alpine region, of which the highest point slightly exceeds 6200 feet in elevation, and its lower limit is about 4500 feet above the level of the sea, and Mount Lafayette (reaching to 5200 feet) along with other smaller patches, together making up almost as much more. Mount Katahdin in Maine (about 5300 feet high) may furnish a square mile or so of alpine region. The Green Mountains of Vermont (with a maximum elevation of 4360 feet) present mere vestiges of alpine vegetation in one or two places; and two or three summits of the Adirondack Mountains of northeastern New York (with a maximum elevation said to exceed 5400) are of a more decidedly alpine character, but apparently of small extent and far from rich in species.

The southern shore of Lake Superior affords no alpine and perhaps no strictly subalpine species; nor do any occur in the Alleghany Mountains, although they rise to above 5000 feet at one point in the south of Virginia,* and to 6000 and about 6300 in North Carolina. *Scirpus cæspitosus*, *Lycopodium selago*, *Andræa petrophila*, and *Cetraria Islandica*, are the most nearly alpine species known in the Alleghany Mountains. As will be seen by the list on a following page, the number of our truly alpine species does not equal that of the southern plants which have extended into the low southeastern corner of Virginia.

After that of Europe, no northern temperate flora of equal extent, and perhaps no flora of any large region, is so well known as that of the Northern United States, at least as to its Phanerogamia and highest Cryptogamia: and although very much still remains to be done, yet we are now in condition profitably to compare our vegetation with that of Europe, and also, though less critically, with that of other parts of the northern temperate zone.

The following tables exhibit the principal elements of our flora, and some of its relations to the European, &c.

† * The White Top Mountain in Virginia, just within its southern boundary, is commonly said to be about 6000 feet in elevation; but this is probably an exaggeration.

List of the Natural Orders of the Flora of the Northern United States, with the number of Genera and Species comprised in them,—distinguishing the introduced and the indigenous Species,—and of the indigenous Species common to this district and to Europe.

CLASS I. DICOTYLEDONÆ S. EXOGENÆ.

Orders.	Whole No. of Genera.	No. of Genera with Indigenous Species.	No. of Introduced (naturalized and adventive) Species.	Whole No. of Species.	No. of Indigenous Species.	No. of our Indigenous Species common to Europe.
SUBCLASS. I.						
ANGIOSPERMÆ.						
Ranunculaceæ,	21	20	6	55	49	10
Magnoliaceæ,	2	2		6	6	
Anonaceæ,	1	1		1	1	
Menispermaceæ,	3	3		3	3	
Berberidaceæ,	5	5	1	6	5	
Nelumbiaceæ,	1	1		1	1	
Cabombaceæ,	1	1		1	1	
Nymphæaceæ,	2	2		3	3	1
Sarraceniaceæ,	1	1		2	2	
Papaveraceæ,	6	2	5	7	2	
Fumariaceæ,	4	3	1	7	6	
Cruciferæ,	20	16	14	60	46	11
Capparidaceæ,	1	1		1	1	
Resedaceæ,	1		1	1		
Violaceæ,	2	2	1	19	18	1
Cistaceæ,	3	3		7	7	
Droseraceæ,	1	1		4	4	2
Parnassiaceæ,	1	1		3	3	1
Hypericaceæ,	3	3	1	19	18	
Elatinaceæ,	1	1		1	1	
Caryophyllaceæ,	19	11	17	47	30	13
Portulacaceæ,	4	3	1	5	4	
Malvaceæ,	9	7	6	15	9	
Tiliaceæ,	1	1		2	2	
Camelliaceæ,	2	2		2	2	
Linaceæ,	1	1		2	2	
Oxalidaceæ,	1	1		3	3	2
Geraniaceæ,	2	1	2	5	3	1
Balsaminaceæ,	1	1		2	2	
Limnanthaceæ,	1	1		1	1	
Rutaceæ,	2	2		3	3	
Anacardiaceæ,	1	1		6	6	
Vitaceæ,	2	2		7	7	
Rhamnaceæ,	4	4	1	7	6	
Celastraceæ,	2	2		3	3	
Sapindaceæ,	4	4	1	11	10	
Polygalaceæ,	1	1		13	13	
Leguminosæ,	36	33	14	105	91	4
Rosaceæ,	18	17	5	76	71	16

CLASS I—continued.

Orders.	Whole No. of Genera.	No. of Genera with Indigenous Species.	No. of Introduced (naturalized and adventive) Species.	Whole No. of Species.	No. of Indigenous Species.	No. of our Indigenous Species common to Europe.
Calycanthaceæ,	1	1		3	3	
Melastomaceæ,	1	1		3	3	
Lythraceæ,	4	4	1	8	7	1
Onagraceæ,	9	9		36	36	10
Loasaceæ,	1	1		1	1	
Cactaceæ,	1	1		1	1	
Grossulaceæ,	1	1		7	7	1
Passifloraceæ,	1	1		2	2	
Cucurbitaceæ,	3	3		3	3	
Crassulaceæ,	3	3	1	6	5	
Saxifragaceæ,	11	11		22	22	5
Hamamelaceæ,	3	3		3	3	
Umbelliferæ,	26	21	5	42	37	2
Araliaceæ,	1	1		6	6	
Cornaceæ,	2	2		11	11	
Caprifoliaceæ,	7	7		27	27	3
Rubiaceæ,	9	9	1	24	23	4
Valerianaceæ,	2	2	1	8	7	
Dipsacæ,	1		1	1		
Compositæ,	83	67	27	300	273	9
Lobeliaceæ,	1	1		12	12	1
Campanulaceæ,	2	2		5	5	1
Ericaceæ,	27	27		62	62	19
Galacineæ,	1	1		1	1	
Aquifoliaceæ,	2	2		10	10	
Styracaceæ,	3	3		5	5	
Ebenaceæ,	1	1		1	1	
Sapotaceæ,	1	1		2	2	
Plantaginaceæ,	1	1	2	8	6	1
Plumbaginaceæ,	1	1		1	1	1
Primulaceæ,	11	10	1	17	16	6
Lentibulaceæ,	2	2		12	12	4
Bignoniaceæ,	4	2	2	4	2	
Orobanchaceæ,	4	4		5	5	
Scrophulariaceæ,	26	24	11	65	54	10
Acanthaceæ,	2	2		3	3	
Verbenaceæ,	4	2	3	10	7	
Labiatae,	83	21	22	71	49	4
Borraginaceæ,	11	5	9	25	16	3
Hydrophyllaceæ,	4	4		11	11	
Polemoniaceæ,	4	4		12	12	1
Convolvulaceæ,	7	5	5	20	15	1
Solanaceæ,	6	2	6	10	4	
Gentianaceæ,	9	8	3	27	24	2
Apocynaceæ,	3	3		4	4	
Asclepiadaceæ,	5	4	1	22	21	

CLASS II—continued.

Orders.	Whole No. of Genera.	No. of Genera with Indigenous Species.	No. of Introduced (naturalized and adventive) Species.	Whole No of Species.	No. of Indigenous Species.	No of our Indigenous Species common to Europe.
Oleaceæ,	5	4	1	10	9	
Aristolochiaceæ,	2	2		6	6	
Nyctaginaceæ,	1	1		1	1	
Phytolaccaceæ,	1	1		1	1	
Chenopodiaceæ,	9	7	11	21	10	6
Amarantaceæ,	6	5	9	14	5	
Polygonaceæ,	4	3	10	32	22	6
Lauracæ,	4	4		5	5	
Thymeleaceæ,	1	1		1	1	
Elæagnaceæ,	1	1		1	1	
Santalacæ,	2	2		3	3	
Loranthacæ,	1	1		1	1	
Saururaceæ,	1	1		1	1	
Ceratophyllaceæ,	1	1		1	1	1
Callitrichaceæ,	1	1		3	3	3
Podostemaceæ,	1	1		1	1	
Euphorbiaceæ,	9	9	5	33	28	
Empetraceæ,	2	2		2	2	1
Urticaceæ,	11	10	4	19	15	1
Platanaceæ,	1	1		1	1	
Juglandaceæ,	2	2		9	9	
Cupuliferæ,	6	6		25	25	1
Myricaceæ,	2	2		3	3	1
Betulaceæ,	2	2		10	10	4
Salicaceæ,	2	2	4	28	24	3
Subcl. II.						
. GYMNOSPERMÆ.						
Coniferæ,	8	8		20	20	2
Total,	622	522	223	1713	1490	180

CLASS II. MONOCOTYLEDONEÆ seu ENDOGENÆ.

Araceæ,	6	6		7	7	2
Typhaceæ,	2	2		7	7	6
Lemnaceæ,	1	1		5	5	4
Naiadaceæ,	5	5		16	16	12
Alismaceæ,	5	5		12	12	4
Hydrocharidaceæ,	3	3		3	3	2
Burmanniaceæ,	1	1		1	1	
Orchidaceæ,	17	17		51	51	10
Amaryllidaceæ,	4	4		4	4	
Hæmodoraceæ,	3	3		4	4	
Bromeliaceæ,	1	1		1	1	
Iridaceæ,	2	2		6	6	
Dioscoreaceæ,	1	1		1	1	
Smilaceæ,	3	3		18	18	

CLASS I—continued.

Orders.	Whole No. of Genera.	No. of Genera with Indigenous Species.	No of introduced (naturalized and adventive) species.	Whole No. of Species.	No. of Indigenous Species.	No. of our Indigenous Species common to Europe.
Liliaceæ,	12	9	4	28	24	5
Melanthaceæ,	12	12		21	21	1
Juncaceæ,	3	3		26	26	14
Pontederiaceæ,	3	3		4	4	
Commelynaceæ,	2	2		6	6	
Xyridaceæ,	2	2		4	4	
Eriocaulonaceæ,	3	3		5	5	1
Cyperaceæ,	16	16	1	214	213	48
Gramineæ,	65	55	32	194	162	32
	172	159	37	638	601	141
Total Phænogamous Plants. }	794	681	260	2351	2001	321

CLASS III. ACROGENÆ.

Equisetaceæ,	1	1		10	10	8
Filices,	20	20		49	49	20
Lycopodiaceæ,	2	2		12	12	6
Hydropterides (Marsileaceæ), }	2	2		4	4	1
	25	25	0	75	75	35

CLASS IV. ANOPHYTA.

Musci,	80	80	0	394	394	255
Hepaticæ,	38	38	0	108	108	65
Total,	118	118	0	502	502	320
Total Cryptogamia, Cl. 3 and 4, }	143	143	0	577	577	355
Total of the 4 Classes, }	937	824	260	2928	2668	676

It is plain enough that the numbers in this tabular view must be essentially influenced throughout by one's views as to the limitation of species and genera. In the hands of a few botanists, the flora of the Northern States might exhibit a somewhat smaller number of species than it here does; but with most, there would undoubtedly be a stronger tendency in the opposite direction. As it is obviously impossible at present to reduce the various ideas and shades of difference that prevail respecting species to one common standard, all that can be done is to indicate the bias, or what astronomers call the *personal equation*, of each author, which must be duly considered when different

floras are to be compared. This is not the place to discuss the principles involved in the general question, nor to explain or defend any conclusions to which I may have arrived;—except to say that my determination of species in each particular case has been based on the evidence before me as irrespective of all theoretical considerations as possibly could be. It is necessary to state, however, that, so far as I can judge, the authors of the principal and most esteemed recent European Floras, if in my place, would be likely to increase the present number of our Phænogamous plants and Ferns about five per cent. One school, indeed, would doubtless add at least ten or twelve per cent. to the species here received, and give results quite incommensurable with my own. I can only say, on my own part, that an enlarged experience certainly inclines one to take broader views of species than those which prevail among the generality of European botanists.

The numerical comparison of our Phænogamous with our Cryptogamous species, however interesting it might become in a complete flora, is here of little moment; only the higher Cryptogamia being included. Moreover, it should be noted that the *Musci* and *Hepaticæ* enumerated in the above table are those of a geographical area about twice that of the higher or Acrogenous Cryptogamia and the Phænogamia. For the distinguished American muscologist who elaborated these two orders for our 'Botany of the Northern States,' anxious to afford facilities for the study of our mosses throughout the country, has included all known to him within the whole United States east of the Mississippi, and even some as yet found only to the north and west of these limits. It is evident, also, that the number of forms admitted as species is proportionally larger in these two orders than in the rest of the work. On the other hand it is to be considered how little our mosses have as yet been collected and studied, and how likely it is, in view of their general wide range, that most of these outlying species may yet be detected within the Northern States, including Virginia and Kentucky.

We naturally restrict our attention mainly to the Phænogamous vegetation, as best known in all countries and affording the most precise data for comparison. And we exclude at once the 260 *introduced* species, most if not all of which have become denizens of our country since its settlement by Europeans, and in consequence of that settlement;—leaving the question of their origin, introduction; &c., for future consideration. Their admission into the account in the comparing our flora with that of Europe, as has been done, seriously vitiates our conclusions.*

* Thus Mr. Watson, as cited by Alph. DeCandolle (*Geogr. Bot.* p. 511) enumerates 602, out of 1428 phænogamous British plants, as common to Great Britain and America. I count only 321 out of 2091 phænogamous species *indigenous* to the Northern United States as indigenous also to Europe.

The numerical elements of our Phænogamous flora, considered as to classes, are, as the tabular view shows:

Dicotyledonæ or Exogenæ,	1490 species in 522 genera.
Monocotyledonæ or Endogenæ,	601 " 159 "
Total Phænogamous indigenous plants,	2091 " 681 "

Or about $2\frac{1}{2}$ Dicotyledonous to one Monocotyledonous species.

Their distribution among the 132 Natural Orders represented in our flora (*Resedaceæ* and *Dipsaceæ* of the above table being excluded, as having no indigenous representatives), is shown in the following:

List of the principal Phænogamous Natural Orders represented in the flora of Northern United States, arranged according to the number of indigenous species they severally comprise.

	Species,		Species.
Compositæ,	273	Liliaceæ,	24
about $\frac{1}{4}$ th of the 2091 Phanerogamia.		Rubiaceæ,	23
Cyperaceæ, about $\frac{1}{10}$ th,	213	Saxifragaceæ,	22
Gramineæ, about $\frac{1}{3}$ th,	162	Polygonaceæ,	22
Leguminosæ, about $\frac{1}{4}$ th,	91	Asclepiadaceæ,	21
Rosaceæ, about $\frac{1}{8}$ th,	71	Melanthaceæ,	21
Ericaceæ,	62	Coniferæ,	20
Scrophulariaceæ,	54	Violaceæ, Hypericaceæ, and	
Orchidaceæ,	51	Smilacæ, each	18
Ranunculaceæ,	49	Primulaceæ, Borraginaceæ,	
Labiataæ,	49	and Naidaceæ, each	16
Crucifereæ,	46	Convolvulaceæ and Urticaceæ,	
Umbelliferæ,	37	each,	15
Onagraceæ,	36	Polygalaceæ,	13
Caryophyllaceæ,	30	Lobeliaceæ, Lentibulaceæ, Pole-	
Euphorbiaceæ,	28	moniaceæ, and Alismaceæ, each,	12
Caprifoliaceæ,	27	Cornaceæ, and Hydrophyllaceæ,	
Juncaceæ,	26	each,	11
Cupuliferæ,	25	Sapindaceæ, Aquifoliaceæ, Che-	
Salicaceæ,	24	nopodiaceæ, and Betulaceæ,	
Gentianaceæ,	24	each,	10

Only 46 of our orders have 10 or more indigenous species: 63 orders have from 2 to 9 species, and 23 orders are represented each by a single species. The average allows 15.09 species to an order.

Alphonse De Candolle and others have remarked that in almost every flora of the temperate zone which is pretty thoroughly known, the eight or nine largest families comprise half of its Phænogamous plants. In the present case the first nine families, having 1026 species, lack nineteen of making half; the sum of ten families exceeds the moiety by thirty. The result is nearly the same as that brought out by De Candolle from a similar schedule, tabulated by him from Beck's Botany of the Northern

and Middle States, north of Virginia, 1833, although the elements are considerably different and the ten largest orders are not the same throughout.*

Moreover, our ten predominant families do not properly correspond with the ten mentioned by De Candolle as generally predominant in the temperate regions of the northern hemisphere: viz. "of the first rank, *Compositæ*, *Gramineæ*, *Cyperaceæ*, *Leguminosæ*; then the *Cruciferæ*, *Umbelliferæ*, and *Caryophyllaceæ*, and then, though less decidedly, the *Labiataæ*, *Rosaceæ*, and *Scrophulariaceæ*."† Nor would they do so if, by dividing the *Ericaceæ* into smaller orders, we were to exclude that family from the list of those (eleven in number) which severally comprise not less than two per cent of our phænogamous species. The three most predominant families accord indeed with De Candolle's conclusion, only the *Cyperaceæ* with us are remarkable for surpassing the *Gramineæ*. But the next three in our list are quite different, even if we omit *Ericaceæ*, being *Rosaceæ*, *Scrophulariaceæ*, and *Orchidaceæ*; and all three of De Candolle's second rank fall below our first ten; and one of them, the order *Caryophyllaceæ* would fall still lower, if it were not reinforced by the *Illecebreæ*, so generally regarded as a distinct family.

It is easy to see that these differences are owing to the unusual richness of our flora in *Cyperaceæ* (chiefly in *Carices*), and to our poverty in *Cruciferæ*, *Umbelliferæ*, *Caryophyllaceæ*, and *Labiataæ*, especially in the second and fourth, at least as compared with corresponding parts of Europe.

* The schedule drawn from Beck's Botany is as follows:

<i>Compositæ</i> ,	265	} =1066 species out of 2125 Phænogamous . plants.
<i>Gramineæ</i> ,	169	
<i>Cyperaceæ</i> ,	157	
<i>Rosaceæ</i> ,	97	
<i>Amentaceæ</i> ,	94	
<i>Leguminosæ</i> ,	80	
<i>Labiataæ</i> ,	59	
<i>Ranunculaceæ</i> ,	50	
<i>Scrophulariaceæ</i> ,	48	
<i>Orchidaceæ</i> ,	47	

The differences are readily to be accounted for. 1. The substitution of *Amentaceæ* in this list for *Ericaceæ* in the other, results from the former Jussieuan order having been preserved entire by Beck, but distributed into several in the present work; while I have admitted the order *Ericaceæ* in its most extensive sense. 2. The precedence of *Cyperaceæ* to *Gramineæ* in my list,—which appears not to be the case in corresponding floras of the Old World,—is wholly owing to the great increase in the number of *Carices*, in which the Northern United States are absolutely very rich; which increase has resulted from the remarkable attention and repeated elaboration this genus has received since Dr. Beck's time, from several hands, and perhaps also from a minuter discrimination of the species than in other families. 3. The order *Rosaceæ*, which strangely takes precedence of the *Leguminosæ*, is unduly expanded by a crowd of nominal or traditional species, and has four times as many introduced species as the latter family. 4. The naturalized plants being included, alters the proper proportion of most of these orders, and swells the number of the Phænogamous plants to 2125, while we count only 2091 truly indigenous species within an area about one-half larger and now much more thoroughly known.

† Alph. De Candolle: Geogr. Bot., p. 1245.

I must not stop here to compare our flora with that of Europe as respects the proportions of the *predominant* families. The data on our part for such comparison are recorded above. I pass on to notice some *characteristic* features which depend upon positive differences in the families.

The orders represented in the N. European flora and not in ours are the *Resedaceæ*, *Frankeniaceæ*, *Tamariscineæ*, *Zygophyllaceæ*, *Dipsaceæ*, *Globulariaceæ*, and *Butomaceæ*;—all very small orders; five of the seven are not represented at all by indigenous species in North America; two of them are represented on our continent in what answers to the Mediterranean region.

Of our 132 orders none is peculiar to our district, and only two are restricted to the United States; namely, *Limnanthaceæ*, of one species in the Northern States and one or two in California, and *Galacineæ*, of one genus and species,—a *genus incertæ sedis*, rather than an order.

Our orders peculiar to America are the following:—

Sarraceniaceæ,	Cactaceæ,	Hydrophyllaceæ,
Limnanthaceæ,	Galacineæ,	Bromeliaceæ;
Loasaceæ,		

all of which, except *Galacineæ* and perhaps *Bromeliaceæ*, are also represented on the western side of our continent. Besides these the following 19 orders are extra-European. Those which have known representatives in western North America, that is, in Oregon and California, are repeated in the second column; those known in corresponding parts of eastern Asia, i. e. in Japan, China, and the Himalayas, in the third column.

Extra-European Orders not peculiar to America.

Extra-European Orders of the Flora of the Northern States.	Also represented in Western N. America.	Represented in Japan, China, or Himalayas.
Magnoliaceæ.		Magnoliaceæ.
Anonaceæ.		Anonaceæ.
Menispermaceæ.		Menispermaceæ.
Nelumbiaceæ.		Nelumbiaceæ.
Cabombaceæ.		Cabombaceæ.
Calycanthaceæ.		Calycanthaceæ.
Melastomaceæ.		Melastomaceæ.
Passifloraceæ.		Passifloraceæ.
Hamamelaceæ.		Hamamelaceæ.
Sapotaceæ.		Sapotaceæ.
Bignoniaceæ.	Bignoniaceæ (Martynia) ?	Bignoniaceæ.
Nyctaginaceæ.	Nyctaginaceæ.	Nyctaginaceæ ?
Phytolaccaceæ.	Phytolaccaceæ.	Phytolaccaceæ.
Saururaceæ.	Saururaceæ.	Saururaceæ.
Podostemaceæ.		Podostemaceæ.
Burmanniaceæ.		Burmanniaceæ.
Hæmodoraceæ.		
Commelynaceæ.		Commelynaceæ.
Xyridaceæ.		Xyridaceæ.

Thus it appears, 1, that, of our 19 extra-European orders not peculiarly American, only 3 or 4 are represented on the western or Pacific side of the United States, while all but one are represented in the corresponding parts of Eastern Asia;—indicating a curious analogy in the vegetation of the eastern sides of the two great continental masses in the northern hemisphere, which is also borne out, though not so strikingly, in a comparison of the genera.

2. That the flora of the Northern United States is remarkably rich in ordinal types, as compared with Europe, which, (exclusive of the Mediterranean region, furnished with two or three), has only seven orders that we have not, while we have 26 that are wholly unknown to the European flora.

3. And it is worth noticing that our additional or characteristic orders are all of warm-temperature or sub-tropical general character (which is the more remarkable when the lower mean temperature of the year as compared with that of Western Europe is considered): all of these 26 orders have their principal development in the tropical regions, excepting six of the smaller ones; and three of these have tropical or sub-tropical representatives.

4. But the peculiar and extra-European families do not predominate, nor overcome the general European aspect of our vegetation, on account of the fewness of their species. Of the largest in our flora (*Hydrophyllaceæ*) we count only 11 species; and the whole 26 orders give us only 64, or barely three per cent of our phænogamous species.

Our Phænogamous genera, 681 in number, average three species apiece. Far the largest genus is *Carex*, with 132 species. On the other hand one half of our genera are represented by single species; and about 92 of these are *monotypic*, having only a single known species.

The genera which are strictly confined within the geographical limits of this work are only three, namely, *Napæa*, *Sullivantia*, and *Hemianthus* (the last a dubious genus); and all three are monotypic.

The number of our genera which have no indigenous representatives in Europe appears to be 353, or twelve more than half of our whole number, (the naturalized plants being of course excluded), belonging to 95 families. In the following table (which is hastily prepared, and likely to contain not a few errors), our extra-European Phænogamous genera are enumerated, under their respective families, and their distribution in longitude is attempted to be given in the two parallel columns.

Phænogamous Genera of the Flora of the Northern United States not common to Europe, with indications of their distribution westward, and in Eastern Temperate Asia.

Orders.	Extra-European Genera of Eastern N. America.	Also occurring in W. N. America, i. e., in Oregon and California.	Occurring in E. Asia, i. e., in Japan, China, or Himalayas.
<i>Ranunculaceæ.</i>	Trautvetteria. Zanthorhiza. Hydrastis. Cimicifuga.	Trautvetteria. Cimicifuga.	Trautvetteria. Cimicifuga.
<i>Magnoliaceæ.</i>	Magnolia. Liriodendron.		Magnolia.
<i>Anonaceæ.</i>	Asimina.		
<i>Menispermaceæ.</i>	Menispermum. Cocculus. Calycocarpum.		Cocculus.
<i>Berberidaceæ.</i>	Caulophyllum. Diphylleia. Jeffersonia. Podophyllum.		Podophyllum.
<i>Nelumbiaceæ.</i>	Nelumbium.		Nelumbium.
<i>Cabombaceæ.</i>	Brasenia.		Brasenia.
<i>Sarraceniaceæ.</i>	Sarracenia.		
<i>Papaveraceæ.</i>	Stylophorum. Sanguinaria.		Stylophorum.
<i>Fumariaceæ.</i>	Adlumia. Dicentra.	Dicentra.	Dicentra.
<i>Cruciferae.</i>	Iodanthus. Leavenworthia.		
<i>Capparidaceæ.</i>	Polanisia.		Polanisia.
<i>Violaceæ.</i>	Solea.		
<i>Cistaceæ.</i>	Hudsonia. Lechea.		
<i>Hypericaceæ.</i>	Ascyrum. Elodea.		
<i>Caryophyllaceæ.</i>	Anychia. Mollugo.	Mollugo.	Mollugo.
<i>Portulaccaceæ.</i>	Sesuvium. Talinum. Claytonia.	Sesuvium. Talinum. Claytonia.	
<i>Malvaceæ.</i>	Callirrhœe. Napæa. Sida. Kosteletzkya.	Sida. Kosteletzkya.	Sida.
<i>Camelliaceæ.</i>	Gordonia. Stuartia.		Gordonia. Stuartia.
<i>Limnanthaceæ.</i>	Floerkea.		
<i>Rutaceæ.</i>	Zanthoxylum. Ptelea.		Zanthoxylum.

Table continued.

Orders.	Extra-European Genera of Eastern N. America	Also occurring in W. N. America, i. e. in Oregon and California.	Occurring in E. Asia, i. e. in Japan, China, or Himalayas.
<i>Vitaceæ.</i>	Ampelopsis.		Ampelopsis?
<i>Rhamnaceæ.</i>	Berchemia.		Berchemia.
	Ceanothus.	Ceanothus.	
<i>Sapindaceæ.</i>	Æsculus.	Æsculus.	Æsculus.
	Negundo.	Negundo.	Negundo.
<i>Leguminosæ.</i>	Crotalaria.		Crotalaria.
	Dalea.	Dalea.	
	Petalostemon.	Petalostemon.	
	Amorpha.	Amorpha.	
	Robinia.		
	Wistaria.		Wistaria.
	Tephrosia.		Tephrosia.
	Æschynomene.		Æschynomene.
	Desmodium.		Desmodium.
	Lespedeza.		Lespedeza.
	Stylosanthes.		
	Apios.		
	Rhynchosia.		Rhynchosia.
	Galactia.		
	Amphicarpæa.		
	Clitoria.		Clitoria.
	Centrosema.		
	Baptisia.		
	Cladrastis.		
	Cassia.		Cassia.
	Gymnocladus.		
	Gleditschia.		Gleditschia.
	Desmanthus.	Desmanthus.	Desmanthus.
	Schrankia.		
<i>Rosaceæ.</i>	Gillenia.		
	Dalibarda.		
<i>Calycanthaceæ.</i>	Calycanthus.	Calycanthus.	
<i>Melastomaceæ.</i>	Rhexia.		
<i>Lythraceæ.</i>	Ammannia.	Ammannia.	Ammannia.
	Nesæa.		
	Cuphea.		
<i>Onagraceæ.</i>	Ænothera.	Ænothera.	
	Gaura.	Gaura.	
	Jussiaea.		Jussiaea.
	Proserpinaca.		
<i>Loasaceæ.</i>	Mentzelia.	Mentzelia.	
<i>Cactaceæ.</i>	Opuntia.	Opuntia.	
<i>Cucurbitaceæ.</i>	Sicyos.	Sicyos.	Sicyos.
	Echinocystis.		
	Melothria.		
<i>Crassulaceæ.</i>	Penthorum.		Penthorum.
<i>Saxifragaceæ.</i>	Astilbe.		Astilbe.

Table continued.

Orders.	Extra-European Genera of Eastern N. America.	Also occurring in W. N. America, i. e. in Oregon and California.	Occurring in E. Asia, i. e. in Japan, China, or Himalayas.
	Boykinia.	Boykinia.	
	Sullivantia.		
	Heuchera.	Heuchera.	
	Mitella.	Mitella.	Mitella.
	Tiarella.	Tiarella.	Tiarella.
	Itea.		
	Hydrangea.		Hydrangea.
	Philadelphus.	Philadelphus.	Philadelphus.
<i>Hamamelaceæ.</i>	Hamamelis.		Hamamelis.
	Fothergilla.		
	Liquidambar.		Liquidambar.
<i>Umbelliferae.</i>	Crantzia.		
	Polytænia.		
	Archemora.		Archemora.
	Tiedemannia.		
	Thaspium.	Thaspium.	
	Zizia.		
	Discopleura.		
	Cryptotænia.		Cryptotænia.
	Osmorhiza.	Osmorhiza.	Osmorhiza.
	Eulophus.		
	Erigenia.		
<i>Cornaceæ.</i>	Nyssa.		
<i>Caprifoliaceæ.</i>	Symphoricarpus.	Symphoricarpus.	
	Diervilla.		Diervilla (Weigela).
	Triosteum.		
<i>Rubiaceæ.</i>	Spermacoce.		
	Diodia.		
	Cephalanthus.	Cephalanthus.	
	Mitchella.		Mitchella.
	Oldenlandia.		Oldenlandia.
	Mitreola.		Mitreola.
	Spigelia.		
	Polypremum.		
<i>Compositæ.</i>	Vernonia.		Vernonia.
	Elephantopus.		Elephantopus.
	Sclerolepis.		
	Liatris.		
	Kuhnia.		
	Mikania.		
	Conoclinium.		
	Adenocaulon.	Adenocaulon.	
	Sericocarpus.	Sericocarpus.	
	Diplopappus.	Diplopappus.	Diplopappus.
	Boltonia.		
	Brachychæta.		
	Bigelovia.		

Table continued.

Orders.	Extra-European Genera of Eastern N. America.	Also occurring in W. N. America, i. e. in Oregon and California.	Occurring in E. Asia, i. e. in Japan, China, or Himalayas.
	Chrysopsis.	Chrysopsis.	
	Pluchea.		Pluchea.
	Baccharis.	Baccharis.	
	Polymnia.		
	Chrysogonum.		
	Silphium.		
	Parthenium.		
	Iva.		
	Tetragonotheca.		
	Eclipta.		Eclipta.
	Borrichia.		
	Heliopsis.		
	Echinacea.		
	Rudbeckia.	Rudbeckia.	
	Lepachys.		
	Helianthus.	Helianthus.	
	Actinomeris.		
	Coreopsis.	Coreopsis.	
	Verbesina.		
	Dysodia.		
	Hymenopappus.	Hymenopappus.	
	Helenium.	Helenium.	
	Leptopoda.		
	Baldwinia.		
	Marshallia.		
	Erechthites.		
	Cacalia.		Cacalia.
	Krigia.		
	Cynthia.		
	Nabalus.		
	Troximon.	Troximon.	
	Pyrrhopappus.		
<i>Ericaceæ.</i>	Gaylussacia.		
	Chiogenes.		
	Epigæa.		
	Gaultheria.	Gaultheria.	
	Leucothoë.		
	Oxydendrum.		
	Clethra.		Clethra.
	Kalmia.	Kalmia.	
	Menziesia.	Menziesia.	
	Rhodora.		
	Leiophyllum.		
	Pterospora.	Pterospora.	
	Schweinitzia.		
<i>Galacineæ.</i>	Galax.		
<i>Aquifoliaceæ.</i>	Nemopantes.		

Table continued.

Orders.	Extra-European Genera of Eastern N. America.	Also occurring in W. N. America, i. e. in Oregon or California.	Occurring in E. Asia, i. e. in Japan, China, or Himalayas.
<i>Styracaceæ.</i>	Halesia.		
	Symplocos.		Symplocos.
<i>Sapotaceæ.</i>	Bumelia.		
<i>Primulaceæ.</i>	Dodecatheon.	Dodecatheon.	
<i>Bignoniaceæ.</i>	Tecoma (also Catalpa.)		Tecoma (also Catalpa.)
	Bignonia.		
<i>Orobanchaceæ.</i>	Epiphegus.		
	Conopholis.		
	Aphyllon.	Aphyllon.	
<i>Scrophulariaceæ.</i>	Collinsia.	Collinsia.	
	Chelone.	Chelone.	
	Pentstemon.	Pentstemon.	
	Mimulus.	Mimulus.	
	Conobea.		
	Herpestis.	Herpestis.	Herpestis.
	Ilysanthes.		Ilysanthes.
	Hemianthus.		
	Synthyris.	Synthyris.	
	Buchnera.		Buchnera.
	Seymeria.		
	Gerardia.		
	Schwalbea.		
	Gelsemium.		Gelsemium.
<i>Acanthaceæ.</i>	Dianthera.		
	Dipteracanthus.		Dipteracanthus.
<i>Verbenaceæ.</i>	Lippia.		
	Callicarpa.		Callicarpa.
	Phryma.		Phryma.
<i>Labiataæ.</i>	Trichostema.	Trichostema.	
	Isanthus.		
	Cunila.		
	Pycnanthemum.	Pycnanthemum.	
	Hedeoma.		Hedeoma.
	Collinsonia.		
	Monarda.		
	Blephilia.		
	Lophanthus.	Lophanthus.	Lophanthus.
	Cedronella.		
	Synandra.		
	Physostegia.	Physostegia.	
<i>Borraginaceæ.</i>	Onosmodium.		
<i>Hydrophyllaceæ.</i>	Hydrophyllum.	Hydrophyllum.	
	Nemophila.	Nemophila.	
	Ellisia.	Ellisia.	
	Phacelia.	Phacelia.	
<i>Polemoniaceæ.</i>	Phlox.	Phlox.	Phlox.

Table continued.

Orders.	Extra-European Genera of Eastern N. America.	Also occurring in W. N. America, i. e. in Oregon and California.	Occurring in E. Asia, i. e. in Japan, China, or Himalayas
<i>Convolvulaceæ.</i>	Pyxidantha. Stylisma. Dichondra.		
<i>Gentianaceæ.</i>	Sabbatia. Fraseria. Halenia. Bartonia. Obolaria.	Fraseria.	Halenia.
<i>Apocynaceæ.</i>	Amsonia. Forsteronia.		Amsonia.
<i>Asclepiadaceæ.</i>	Asclepias. Acerates. Enslenia. Gonolobus.	Asclepias.	
<i>Oleaceæ.</i>	Chionanthus. Forrestiera.		
<i>Nyctaginaceæ.</i>	Oxybaphus.	Oxybaphus.	Oxybaphus.
<i>Phytolaccaceæ.</i>	Phytolacca.		
<i>Chenopodiaceæ.</i>	Cycloloma.		
<i>Amarantaceæ.</i>	Montelia. Acnida. Iresine. Frœlichia.		
<i>Lauraceæ.</i>	Persea. Sassafras. Benzoin, Tetranthera.	Tetranthera.	Benzoin. Tetranthera.
<i>Thymeleaceæ.</i>	Dirca.		
<i>Elæganaceæ.</i>	Shepherdia.		
<i>Santalaceæ.</i>	Comandra. Hamiltonia.	Comandra.	
<i>Loranthaceæ.</i>	Phoradendron.	Phoradendron.	
<i>Saururaceæ.</i>	Saururus.		Saururus.
<i>Podostemaceæ.</i>	Podostemon.		
<i>Euphorbiaceæ.</i>	Cnidioscolus. Acalypha. Tragia. Stillingia. Croton. Crotonopsis. Phyllanthus. Pachysandra.	Acalypha. Croton.	Acalypha. Stillingia. Croton. Phyllanthus. Pachysandra.
<i>Urticaceæ.</i>	Laportea. Pilea. Behmeria. Planera.		Behmeria.
<i>Juglandaceæ.</i>	Carya.		

Table continued.

Orders.	Extra-European Genera of Eastern N. America.	Also occurring W. N. America, i. e. in Oregon and California.	Occurring in E. Asia, i. e. in Japan, China, or Himalayas
<i>Myricaceæ.</i> <i>Coniferæ.</i>	Comptonia. Taxodium.		
<i>Araceæ.</i>	Thuja. Arisæma. Peltandra.	Thuja.	Thuja. Arisæma.
<i>Alismaceæ.</i> <i>Hydrocharidaceæ.</i> <i>Burmanniaceæ.</i> <i>Orchidaceæ.</i>	Symplocarpus. Orontium. Echinodorus. Limnobium.	Symplocarpus.	Symplocarpus.
<i>Amaryllidaceæ.</i>	Burmattia. Arethusa. Pogonia. Calopogon. Tipularia. Bletia. Aplectrum. Pancratium.		Burmattia.
<i>Hæmodoraceæ.</i>	Agave. Hypoxys. Lachnanthes. Lophiola. Aletris.		
<i>Bromeliaceæ.</i> <i>Iridaceæ.</i> <i>Smiliaceæ.</i>	Tillandsia. Sisyrinchium. Trillium.	Sisyrinchium. Trillium.	Trillium.
<i>Liliaceæ.</i>	Medeola. Clintonia. Yucca.	Clintonia. Yucca.	Clintonia.
<i>Melanthaceæ.</i>	Uvularia. Prosartes. Melanthium. Zygadenus. Stenanthium. Amianthium. Xerophyllum. Helonias. Chamælirium.	Prosartes. Xerophyllum.	Uvularia ? Zygadenus.
<i>Pontederiaceæ.</i>	Pontederia. Heteranthera. Schollera.		
<i>Commelynaceæ.</i>	Commelyna. Tradescantia.		Commelyna. Tradescantia.
<i>Xyridaceæ.</i>	Mayaca. Xyris.		Xyris.
<i>Ericaulonaceæ.</i>	Pæpalanthus. Lachnocaulon.		

Table continued.

Orders.	Extra-European Genera of Eastern N. America.	Also occurring in W. N. America, i. e. in Oregon and California.	Occurring in E. Asia, i. e. in Japan, China, or Himalayas.
<i>Cyperaceæ.</i>	Kyllingia. Dulichium. Hemicarpha. Fuirena. Psilocarya. Dichromena. Ceratoschænus. Scleria.		Kyllingia. Fuirena. Scleria.
<i>Gramineæ.</i>	Zizania. Vilfa. Sporobolus. Muhlenbergia. Brachyelytrum. Aristida. Ctenium. Bouteloua. Gymnopogon. Leptochloa. Tricuspis. Diarrhena. Eatonia. Bryzopyrum. Uniola. Arundinaria. Gymnostichum. Amphicarpum. Paspalum. Cenchrus. Tripsacum. Sorghum.	Vilfa. Sporobolus. Muhlenbergia. Bouteloua. Brizopyrum. Cenchrus.	Vilfa. Sporobolus. Aristida. Leptochloa. Arundinaria. Paspalum. Cenchrus. Sorghum.
	353	87	101

That is, 87 of our 353 extra-European phænogamous genera, or 24 per cent are common to Western North America, and 101, or 28 per cent to Eastern temperate Asia. Four per cent more of our characteristic genera are shared with an antipodal region than with the neighboring district of W. N. America. And the number is likely to increase; for we know far less of the flora of Japan and China than of California and Oregon. Drs. Hooker and Thomson's large Himalayan collections, now in the course of distribution and publication, will probably add several more to the list. Twenty-nine of these genera, or 8 per cent, are common to all three of these regions.

Our 194 genera which are neither European, N. W. American, nor E. Asiatic in temperate regions, require further discussion to show which are characteristic of Eastern North America. We will here barely notice that:

3 Belong also to Western temperate Asia, viz., *Menispermum*, *Planera*, and *Zizania*; two of these being peculiar to that district and to ours.

73 Extend southward beyond the limits of the United States and into tropical regions, or recur in the southern hemisphere.

120 Are characteristic Eastern United States genera.

As already stated, only three genera are actually restricted to the geographical area comprised in our 'Botany of the Northern United States'. If, however, we allow our area to embrace Canada, which naturally belongs to it, and also include those plants which extend southward much beyond lat. 36° 30' only in the Alleghanies or cool upper country of the Southern States, we may enumerate 37 genera peculiar to this flora; viz.—

Zanthorhiza.	Echinocystis.	Pyxidantha.
Hydrastis.	Sullivantia.	Dirca.
Caulophyllum.	Zizia.	Hamiltonia.
Diphylleia.	Erigenia.	Comptonia.
Jeffersonia.	Brachychæta.	Arethusa.
Adlumia.	Chiogenes.	Tipularia.
Solea.	Oxydendrum.	Aplectrum.
Huds ϱ ia.	Rhodora.	Medeola.
Napæa.	Leiophyllum.	Helonias.
Cladrastis.	Schweinitzia.	Chamælirium.
Gymnocladus.	Galax.	Amphicarpum.
Gillenia.	Nemopantes.	
Dalibarda.	Hemianthus.	

To show, however, how slight an influence, after all, these 37 characteristic genera exert upon our flora, we have only to remark that they comprise altogether only 39 of our species:—that is, they have only one species apiece, except *Hudsonia* and *Gillenia*, which have two each. The characteristics of our flora of the Northern States merge in those of the flora of Eastern North America, and these again into those of the North American flora generally; and no idea can be formed of the real features of a flora like ours from such a dissection, and piecemeal presentation, or from an exhibition of what is strictly peculiar to each part, rather than what is predominant,—at least as respects generic forms.

Returning now to the species,—the real exponents of vegetation;—these have already been considered as regards their numerical proportions in the several classes and orders of the flora of the Northern States: it remains to note some facts respecting their geographical distribution.

As appears from the tabular view commencing on p. 208, there are common to Europe,

180 Dicotyledonous species out of 1490, or 12 per cent.
141 Monocotyledonous species out of 601, or 23·4 “
321 Phænogamous Species out of 2091 or 15·3 “
35 Acrogenous Cryptogamia out of 75 or 46·6 “
320 Musci and Hepaticæ out of 502 or 63·7 “
355 Cryptogamous species out of 577 or 61·5 “

in accordance with the general fact that the lower the class the wider the geographical area occupied by the species.

In the following table I have attempted to exhibit the particular range of our indigenous phænogamous species of each natural order in longitude, through the northern temperate zone. The table has been hastily prepared, and must be often erroneous in details; but the general results are probably very near the truth.

The Indigenous Phænogamous Species of the Northern United States, viewed as to their geographical distribution around the northern temperate zone.

Natural Orders.	Whole number of species in the northern United States.	East'n N. American: not extending westward beyond the Rocky Mountains.	Extending westward to the Pacific coast or near it.	Extending into Asia.	Inhabiting Asia, but not in N.W. America.	Inhabiting Asia, but not in Europe.	Extending into Europe.	Inhabiting Europe, but not in Eastern Asia.
Class I.								
DICOTYLEDONEÆ, seu EXOGENÆ.								
Ranunculaceæ,	49	26	20	13	1	5	0	2
Magnoliaceæ,	6	6						
Anonaceæ,	1	1						
Menispermaceæ,	3	3						
Berberidaceæ,	5	5						
Nelumbiaceæ,	1	1						
Cabombaceæ,	1			1	1	1		
Nymphæaceæ,	3	1	2	1			1	
Sarraceniaceæ,	2	2						
Papaveraceæ,	2	2						
Fumariaceæ,	6	5	1					
Cruciferæ,	46	31	13	11	2		11	
Capparidaceæ,	1	1						
Violaceæ,	18	15	3	1			1	
Cistaceæ,	7	7						
Droseraceæ,	4	2	1	1			2	1
Parnassiaceæ,	3	2	1	1			1	
Hypericaceæ,	18	18						

CLASS I.—*continued.*

Natural Orders.	Whole number of species in the north-ern United States.	East'n N. American: not extending westward beyond the Rocky Mountains.	Extending westward to the Pacific coast or near it.	Extending into Asia.	Inhabiting Asia, but not in N. W. America.	Inhabiting Asia, but not in Europe.	Extending into Europe.	Inhabiting Europe, but not in Eastern Asia.
Elatinaceæ,	1	1						
Caryophyllaceæ,	30	14	15	12			13	1
Portulacaceæ,	4	4						
Malvaceæ,	9	9						
Tiliaceæ,	2	2						
Camelliaceæ,	2	2						
Linaceæ,	2	2						
Oxalidaceæ,	3	1	2	2			2	
Geraniaceæ,	3	1	1	1			1	
Balsaminaceæ,	2	2						
Limnanthaceæ,	1	1						
Rutaceæ,	3	3						
Anacardiaceæ,	6	5	1					
Vitaceæ,	7	7						
Rhamnaceæ,	6	6						
Celastraceæ,	3	2	1					
Sapindaceæ,	10	10						
Polygalaceæ,	13	13						
Leguminosæ,	91	84	7	4			4	
Rosaceæ,	71	43	23	17	3	2	16	1
Calycanthaceæ,	3	3						
Melastomaceæ,	3	3						
Lythraceæ,	7	5	1	1	1		1	
Onagraceæ,	36	26	10	10			10	
Loasaceæ,	1	1						
Cactaceæ,	1	1						
Grossulaceæ,	7	5	2	1			1	
Passifloraceæ,	2	2						
Cucurbitaceæ,	3	3						
Crassulaceæ,	5	5						
Saxifragaceæ,	22	15	4	4	2	2	5	3
Hamamelaceæ,	3	3						
Umbelliferæ,	37	28	9	4	3	2	2	
Araliaceæ,	6	5		1	1	1		
Cornaceæ,	11	10	1					
Caprifoliaceæ,	27	19	7	3	1		3	
Rubiaceæ,	22	18	4	3	1		4	1
Valerianaceæ,	7	6	1					
Compositæ,	273	233	29	11		2	9	
Lobeliaceæ,	12	11					1	1
Campanulaceæ,	5	3	2	1			1	
Ericaceæ,	62	35	21	18	2	1	19	2

CLASS I—continued.

Natural Orders.	Whole number of species in the northern United States.	East'n N. American: not extending westward beyond the Rocky Mountains.	Extending westward to the Pacific coast or near it.	Extending into Asia.	Inhabiting Asia, but not in N.W. America.	Inhabiting Asia, but not in Europe.	Extending into Europe.	Inhabiting Europe, but not in Eastern Asia.
Galacineæ,	1	1						
Aquifoliaceæ,	10	10						
Styracaceæ,	5	5						
Ebenaceæ,	1	1						
Sapotaceæ,	2	2						
Plantaginaceæ,	6	4	2	1			1	
Plumbaginaceæ,	1		1	1			1	
Primulaceæ,	16	8	8	6			6	
Lentibulaceæ,	12	8	2	4			4	
Bignoniaceæ,	2	2						
Orobanchaceæ,	5	2	3					
Scrophulariaceæ,	54	38	15	10	1		10	
Acanthaceæ,	3	3						
Verbenaceæ,	7	5	1	1	1	1		
Labiatae,	49	42	7	4			4	
Borraginaceæ,	16	12	4	3			3	
Hydrophyllaceæ,	11	9	2					
Polemoniaceæ,	12	11	1	1			1	
Convolvulaceæ,	15	14	1	1			1	
Solanaceæ,	4	4						
Gentianaceæ,	24	22	2	2			2	
Apocynaceæ,	4	3	1					
Asclepiadaceæ,	21	21						
Oleaceæ,	9	9						
Aristolochiaceæ,	6	6						
Nyctaginaceæ,	1	1						
Phytolaccaceæ,	1	1						
Chenopodiaceæ,	10	4	5	5	1		6	6
Amarantaceæ,	5	5						
Polygonaceæ,	22	14	7	6	1		6	
Lauraceæ,	5	5						
Thymeleaceæ,	1	1						
Eæignaceæ,	1		1					
Santalaceæ,	3	2	1					
Loranthaceæ,	1	1						
Saururaceæ,	1	1						
Ceratophyllaceæ,	1		1	1			1	
Callitrichaceæ,	3		3	3			3	
Podostemaceæ,	1	1						
Euphorbiaceæ,	28	25	3					
Empetraceæ,	2	1	1	1			1	
Urticaceæ,	15	13	2	1			1	

CLASS I—continued.

Natural Orders.	Whole number of species in the northern United States.	East'n N. America: and extending westward beyond the Rocky Mountains.	Extending westward to the Pacific coast or near it.	Extending into Asia.	Inhabiting Asia, but not in N.W. America.	Inhabiting Asia, but not in Europe.	Extending into Europe.	Inhabiting Europe, but not in Eastern Asia.
Platanaceæ,	1	1						
Juglandaceæ,	9	9						
Cupuliferæ,	25	23	1	1	1		1	
Myricaceæ,	3	2	1	1			1	
Betulaceæ,	10	6	2	4	2		4	
Salicaceæ,	24	18	6	4	1		3	
Coniferæ,	20	13	7	2			2	
Class II.								
MONOCOTYLEDONÆ, seu ENDOGENÆ.								
Aracæ,	7	5		2	2		2	
Typhaceæ,	7	1	3	5			6	1
Lemnaceæ,	5	1		4			4	
Naiadaceæ,	16	4	4	9	5		12	3
Alismaceæ,	12	5	7	4			4	
Hydrocharidaceæ,	3	1		1	1		2	1
Burmanniaceæ,	1	1						
Orchidaceæ,	51	36	13	9	2	1	10	2
Amaryllidaceæ,	4	4						
Hæmodoraceæ,	4	4						
Bromeliaceæ,	1	1						
Iridaceæ,	6	5	1					
Dioscoreaceæ,	1	1						
Smilacæ,	18	17	1					
Liliaceæ,	24	14	7	5	1	1	5	1
Melanthaceæ,	21	15	6	1			1	
Juncaceæ,	26	6	16	14	4		14	
Pontederiaceæ,	4	4						
Commelynaceæ,	6	6						
Xyridaceæ,	4	4						
Eriocaulonaceæ,	5	4					1	1
Cyperaceæ,	213	155	37	37	3	2	48	13
Graminæ,	162	114	44	33	1	4	32	2
Total Monocotyledonæ, }	601	408	143	124	19	8	141	25
Dicotyledonæ,	1490	1168	273	184	26	17	180	13
Phænogamia,	2091	1576	416	308	45	25	321	38

The data are not at hand for extending this table through the higher Cryptogamia, except for the highest class, and that imperfectly. The four orders of *Vascular* or *Acrogenous Cryptogamia* give the following results; the columns being homologous with those of the last table.

Equisetaceæ,	10	2	8	8	8	3	8	
Filices,	49	26	13	23	8	2	20	
Lycopodiaceæ,	12	4	6	7	1	2	6	1
Hydropterides,	4	2	1	1	1		1	
	75	34	28	39	10	5	35	1

These tables necessarily include the species of our small alpine region, which, being chiefly Arctic, might properly be regarded rather as intruded members of the Arctic flora. Being mostly diffused all round the world, they increase somewhat unduly the numbers of our species common to Europe and to Asia; but they are not sufficiently numerous with us to require to be formally eliminated. The following are all the Phænogamous species which, within our limits, are found *only* in our small alpine region, namely, on the summits of the White Mountains of New Hampshire, of Mount Katahdin, Maine, and the highest peaks of the Green Mountains, Vermont, and the Adirondack Mountains in Northern New York:—

Cardamine bellidifolia.
 Viola palustris.
 Silene acaulis.
 Sibbaldia procumbens.
 Dryas integrifolia, (fide Pursh).
 Potentilla frigida.
 Epilobium alpinum, var. majus.
 Saxifraga rivularis.
 Gnaphalium supinum.
 Nabalus Boottii.
 Nabalus nanus.
 Vaccinium cæspitosum.
 Arctostaphylos alpina.
 Phyllodoce taxifolia.
 Rhododendron Lapponicum.
 Veronica alpina.
 Diapensia Lapponica.

Oxyria reniformis.
 Betula nana.
 Salix phylicifolia.
 Salix Uva-Ursi.
 Salix repens.
 Salix herbacea.
 Luzula arcuata.
 Luzula spicata.
 Juncus trifidus.
 Carex capitata.
 Carex atrata.
 Phleum alpinum.
 Calamagrostis Pickeringii.
 Poa laxa.
 Aira atropurpurea.
 Hierochloa alpina.

Of these 33 species, two (*Nabalus Boottii* and *Calamagrostis Pickeringii*) are peculiar to our own alpine region, so far as is now known, but they are most likely to occur further north; and two (*Nabalus nanus* and *Vaccinium cæspitosum*) are peculiarly North American. All the rest are European, and with two or three exceptions also Asiatic. No one of our vascular Cryptogamous species is wholly alpine, *Lycopodium Selago* comes the nearest to being so.

The following are with us subalpine species; they occur in our alpine region (to which most of them properly belong), but also out of it, at least in one or two places.

Alsine Grœnlandica.	Empetrum nigrum.
Geum radiatum.	Platanthera obtusata.
Arnica mollis.	Scirpus cœspitosus.
Vaccinium uliginosum.	Carex scirpoidea.
Euphrasia officinalis.	Carex capillaris.
Polygonum viviparum.	Trisetum subspicatum.

All of these except *Geum radiatum*, *Arnica mollis*, and *Carex scirpoidea*, are also European. The last grows in Greenland.

The following European species have not been detected in any properly alpine habitat with us (where they might be expected to occur), but elsewhere, three of them (*Saxifraga aizoides* and *Carex gynocrates*) in stations not even subalpine:

Saxifraga oppositifolia.	Artemisia borealis.
Saxifraga aizoides.	Juncus Stygius.
Saxifraga Aizoon.	Carex gynocrates.

Two Ferns might be added to the subalpine list, viz:—*Wood-sia glabella* and *Aspidium fragrans*.

The Phænogamous species whose range, so far as is now known, falls wholly within the limits of the 'Manual of the Botany of the Northern United States' are the following:

DICOTYLEDONOUS.

Dentaria maxima.
 Vesicaria Shortii.
 Napæa dioica.
 Sida Napæa.
 Psoralea stipulata.
 Astragalus Robbinsii?
 Ludwigia polycarpa.
 Tillæa simplex.
 Sullivantia Ohionis.
 Galium concinnum.
 Fedia Fagopyrum.
 " umbilicata.
 " patellaria.
 Eupatorium pubescens.
 " resinosum.
 Solidago Ohioënsis.
 " Houghtonii.
 " neglecta.
 " Muhlenbergii.
 " linoides.
 " Shortii.
 " rupestris.

MONOCOTYLEDONOUS.

Lemna perpusilla.
 Potamogeton Robbinsii.
 " Tuckermani.
 Trillium nivale.
 Veratrum Woodii.
 Helonias bullata.
 Narthecium Americanum.
 Juncus Greenii.
 Cyperus Grayii.
 Eleocharis rostellata.
 " compressa.
 " Robbinsii.
 Psilocarya scirpoides.
 Rhynchospora capillacea.
 Carex exilis.
 " Sartwellii.
 " sychnocephala.
 " Crawei?
 " formosa.
 " Careyana.
 " retrocurva.
 " Sullivantii.

DICOTYLEDONOUS.

Rudbeckia speciosa.
Coreopsis bidentoides.
Cirsium pumilum.
Nabalus Boottii.
Gaylussacia brachycera.
Utricularia clandestina.
 " resupinata.
Hemianthus micranthemoides.
Pycnanthemum clinopodioides.
 " Torreyi.
Asclepias Sullivantii.
 " Meadii.
Blitum maritimum.
Polygonum Careyi.
Ulmus racemosa.
 37 species.

MONOCOTYLEDONOUS.

Carex mirata.
 " Grayii.
Sporobolus compressus.
 " serotinus.
Calamagrostis confinis.
 " Pickeringii.
 " brevipilis.
Dupontia Cooleyi.
Glyceria acutiflora.
Poa alsodes.
 " debilis.
Amphicarpum Purshii.

34 species = 71.

(To be continued.)