

the Amentaceae by several more Willows, a Poplar, and one or two more Birches;—no additional orders nor genera.

If we take in the Atlantic United States, east of the Mississippi, and compare this area with Europe, we should find the species and the types increasing as we proceed southward, but about the same numerical proportion would hold.

But, more interesting than this numerical preponderance—which is practically confined to the trees and shrubs—will be the extra-European types, which, intermixed with familiar old-world forms, give peculiar features to the North American flora,—features discernible in Canada, but more and more prominent as we proceed southward. Still confining our survey to the Atlantic district, that is, without crossing the Mississippi, the following are among the notable points:

1. Leguminous Trees of peculiar types. Europe abounds in leguminous shrubs or under-shrubs, mostly of the Genisteous tribe, which is wanting in all North America, but has no leguminous tree of more pretense than the *Cercis* and *Laburnum*. Our Atlantic forest is distinguished by a *Cercis* of its own, three species of *Locust*, two of them fine trees, and two *Money Locusts*, the beautiful *Cladrastis*, and the stately *Gymnocladus*. Only the *Cercis* has any European relationship. For relatives of the others we must look to the Chino-Japanese region.

2. The great development of the Ericaceae (taking the order in its widest sense), along with the absence of the Ericaceous tribe, that is, of the Heath's themselves. We possess on this side of the Mississippi 30 genera and not far from 90 species. All Europe has only 17 genera and barely 50 species. We have most of the actual European species, excepting their *Rhododendrons* and their *Heaths*,—and even the latter are represented by some scattered patches of *Calluna*, of which it may be still doubtful whether they are chance introductions or sparse or scanty survivals; and, besides, we have a wealth of peculiar genera and species. Among them the most notable in an ornamental point of view are the *Rhododendrons*, *Azaleas*, *Kalmias*, *Andromedas* and *Clethras*; in botanical interest, the endemic *Monotropeae*, of which there is only one species in Europe, but seven genera in North America, all but one absolutely peculiar; and in edible as well as botanical interest, the unexampled development and diversification of the genus *Vaccinium* (along with the allied American type, *Gaylussacia*) will attract attention. It is interesting to note the rapid falling away of Ericaceae westward in the valley of the Mississippi as the forest thins out.

3. The wealth of this flora in Compositae is a most obvious feature; one especially prominent at this season of the year, when the open grounds are becoming golden with *Solidago*, and the earlier of the autumnal *Asters* are beginning to blossom. The Compositae form the largest order of Phenogamous plants in all temperate floras of the northern hemisphere, are well up to the average in Europe, but are nowhere so numerous as in North America, where they form an eighth part of the whole. But the contrast between the Composite of Europe and Atlantic North America is striking. Europe runs to *Thistles*, to *Inuloides*, to *Anthemideae*, and to *Cichoriaceae*. It has very few *Asters* and only two *Solidagoes*, no *Sunflowers* and hardly anything of that tribe. Our Atlantic flora surpasses all the world in *Asters* and *Solidagoes*, as also in *Sunflowers* and their various allies, is rich in *Eupatoriaceae*, of which Europe has extremely few, and is well supplied with *Vernoniaceae* and *Helenoideae*, of which she has none; but is scanty in all the groups that predominate in Europe. I may remark, that if our larger and most troublesome genera, such as *Solidago* and *Aster*, were treated in our systematic works even in the way that Nyman has treated *Hieracium* in Europe, the species of these two genera (now numbering 78 and 124 respectively) would be at least doubled.

4. Perhaps the most interesting contrast between the flora of Europe and that of the eastern border of North America is in the number of generic and even ordinal types here met with which are wholly absent from Europe. Possibly we may distinguish these into two sets of differing history. One will represent a tropical element, more or less transformed, which has probably acquired or been able to hold its position so far north in virtue of our high summer temperature. (In this whole survey the peninsula of Florida is left out of view, regarding its botany as essentially Bahaman and Cuban, with a certain admixture of northern elements.) To the first type I refer such trees and shrubs as *Asimina*, sole representative of the *Anonaceae* out of the tropics, and reaching even to lat. 42°; *Chrysobalanus*, representing a tropical suborder; *Pinckneya* representing as far north as Georgia the *Cinchoneous* tribe; the *Baccharis* of our coast, reaching even to New England; *Cyrilla* and *Cliftonia*, the former actually West Indian; *Bumelia*, representing the tropical order *Sapotaceae*; *Bignonia* and *Tecoma* of the *Bignoniaceae*; *Forestiera* in *Oleaceae*; *Persea* of the *Laurineae*; and finally the *Cactaceae*. Among the herbaceous plants of this set, I will allude only to some of peculiar orders. Among

them I reckon *Sarracenia* (of which the only extra-North American representative is tropical-American, the *Melastomaceae*, represented by *Ilhexia*; *Passiflora* (our species being herbaceous), a few representatives of *Loasaceae* and *Turneraceae*, also of *Hydrophyllaceae*; our two genera of *Burmanniaceae*; three genera of *Hemodorraceae*; *Tillandsia* in *Bromeliaceae*; two genera of *Pontederiaceae*; two of *Commelynnaceae*; the outlying *Mayaca* and *Nyris*, and three genera of *Eriocaulonaceae*. I do not forget that one of our species of *Eriocaulon* occurs on the west coast of Ireland and in Skye, wonderfully out of place, though on this side of the Atlantic it reaches Newfoundland. It may be a survival in the Old World; but it is more probably of chance introduction.

The other set of extra-European types, characteristic of the Atlantic North American flora, is very notable. According to a view which I have much, and for a long while, insisted on, it may be said to represent a certain portion of the once rather uniform flora of the arctic and less boreal zone, from the late Tertiary down to the incoming of the Glacial period, and which, brought down to our lower latitudes by the gradual refrigeration, has been preserved here in eastern North America, and in the corresponding parts of Asia, but was lost to Europe. I need not recapitulate the evidence upon which this now generally accepted doctrine was founded; and to enumerate the plants which testify in its favor would amount to an enumeration of the greater part of the genera or subordinate groups of plants which distinguish our Atlantic flora from that of Europe. The evidence, in brief, is that the plants in question, or their moderately differentiated representatives, still co-exist in the flora of eastern North America and that of the Chino-Japanese region, the climates and conditions of which are very similar; and that the fossilized representatives of many of them have been brought to light in the late tertiary deposits of the arctic zone wherever explored. In mentioning some of the plants of this category I include the *Magnolias*, although there are no nearly identical species, but there is a seemingly identical *Liriodendron* in China, and the *Schizandras* and *Illiciums* are divided between the two floras; and I put into the list *Menispermum*, of which the only other species is eastern Siberian, and is hardly distinguishable from ours. When you call to mind the series of wholly extra-European types which are identically or approximately represented in the eastern North American and in the eastern Asiatic temperate floras, such as *Trautvetteria* and *Hydrastis* in *Ranunculaceae*; *Caulophyllum*,