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° SOURCES OF THE OHIO FLORA.

BY A. D. SELBY AND J. W. T. DUVEL.

In this discussion, it is the aim of the authors to present a very brief survey of the Ohio Flora, viewed by the light of the direction of origin, after first considering its present elements. In this respect, the method of study pursued is analogous to that of Coulter and Thompson in their "Origin of the Indiana Flora."

Broadly speaking, the State of Ohio is divided into a south-southeastern, hilly or mountain region, comprising about one-third the total area, partially covered by drift at the southwest, and a north-northwestern glaciated area, which is more level though often rolling. The first named has an Appalachian character of plants, both as to probable origin and as to ecological composition. The topography is rugged in most parts, and while there are various soils, accordingly as derived from different underlying strata, it does not seem clear that a division of the region can be easily made, at present; a subdivision may finally be found along the sub-carboniferous out-crop, through Ross, Pike and Scioto counties.

The glaciated or drift area of the state, from the general aspect of which we find marked topographical deviations in several parts, certainly admits of division, though first attempts are necessarily more or less tentative. We have made an effort to bring out regions showing a characteristic flora. At the north, excluding the lake beaches, etc., the separation appears to follow the out-crop of the Huron shale, and this holds true southward to Fairfield County. The western portion of the State appears to have a more uniform flora from north to south, than is found in the eastern.

THE PLANT REGIONS OF OHIO.

The division of any state into regions which are characterized by certain peculiar or typical species of plants is by no means an easy task. Such regions if properly and correctly drawn must conform to the boundaries of the spheres of operation of the causes leading to the final results we now discover in Ohio. Brevity is imposed upon all the discussions of this paper; what is stated, therefore, must be without any considerable illustration. We have endeavored to study the Ohio

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Flora as it is, and have been influenced in the work by what appear to have been the general conditions of plant distribution on our continent. If the method of study be correct, then any errors in the detailed lists will certainly be corrected. Such errors and especially omissions will doubtless present themselves to many.

The discussion of the geology and topography of Ohio is largely excluded, and we may only refer to some very general features.* The western half, exclusive of a limited area in the extreme northwest, is underlaid by various limestone formations with accompanying shales from the Lower Silurian to the Devonian in age; bordering this on the northwest and extending on the east almost through the state, are the shale deposits of Devonian age; on these in turn are superposed the subcarboniferous and the coal bearing strata; the latter characterize much of eastern Ohio. The Ohio river and its tributaries drain the larger part of the area, while the minor drainage is by the Maumee and various smaller streams into Lake Erie. The areas of former glacial activity have already been indicated.

Out of all the past changes within our boundary comes the Ohio of botanical study, and we shall expect to perceive marks of past conditions upon every side. The state may apparently be divided into the four plant regions which follow. Geological and climatic conditions appear for the most part to have been potent factors; topography is certainly not wanting in influence. No part of our area is deficient in rainfall; many situations exhibit plants adapted to periods of dryness.

1. *The Region of Hills--Neo-Appalachian.*

This region includes the unglaciated south-southeastern portion of the state as well as the glaciated hills along the Ohio river in the southwest. The entire region is much broken and broadly speaking is the Ohio Valley Hill Region, limited at the northeast by the glacial advance.

2. *The Northeastern Highland Region--Neo-Transition.*

The region thus named is glaciated, often dotted by small lakes, and has, for its almost median line, the Lake Erie watershed. It extends westward to the Huron river and follows the Huron shale southward till this is approached by the glacial moraine in northern Fairfield County; thence to Pennsylvania

*The reader who would pursue the matter further is referred to the Reports of the Ohio Geological Survey, especially to Vol. VII, 1893, which contains a small geological map of Ohio.

the line of separation follows near the moraine, north and slightly east to northeast Knox County and then in a north-bending curve to the state line. Extreme northwestern Ohio may also fall in this region.

3. *The Lake Erie Region—The Lacustrine.*

This region includes the present inlets, marshes, and beaches of Lake Erie, also the ancient beaches or deep sands of the Oak-openings now some distance from the lake. Such sands are found in Fulton, Lucas and Henry; they are continued across Ohio in Sandusky, Erie, Lake and other counties.

4. *The Western Region—The Calcareous.*

The western region includes almost half the state, all glaciated, extending from Erie, Crawford, Morrow, Delaware, Franklin and Pickaway counties westward to Indiana and southward to Highland and Hamilton. The prairie plants are chiefly limited to this western region. There follow short lists of the indigenous plants of these regions:

Typical Species of the Neo-Appalachian Region.

<i>Pinus Virginiana</i> ,	<i>Tilia heterophylla</i> ,
<i>Pinus rigida</i> ,	<i>Ascyrum hypericoides</i> ,
<i>Uniola latifolia</i> ,	<i>Aralia spinosa</i> ,
<i>Panicularia nervata</i> ,	<i>Azalea lutea</i> ,
<i>Habenaria peramœna</i> ,	<i>Rhododendron maximum</i> ,
<i>Corallorhiza Corallorhiza</i> ,	<i>Kalmia latifolia</i> ,
<i>Betula nigra</i> ,	<i>Oxydendrum arboreum</i> ,
<i>Betula lenta</i> ,	<i>Chionanthus Virginica</i> ,
<i>Castanea pumila</i> ,	<i>Gentiana villosa</i> ,
<i>Quercus nigra</i> ,	<i>Ampelanus albidus</i> ,
<i>Phoradendron flavescens</i> ,	<i>Vincetoxicum gonocarpos</i> ,
<i>Silene rotundifolia</i> ,	<i>Trichostema dichotomum</i> ,
<i>Alsine pubera</i> ,	<i>Dasystema lævigata</i> ,
<i>Trollius laxus</i> ,	<i>Bignonia crucigera</i> ,
<i>Liquidambar Styraciflua</i> ,	<i>Triosteum angustifolium</i> ,
<i>Porteranthus stipulatus</i> ,	<i>Lobelia puberula</i> ,
<i>Stylosanthes biflora</i> ,	<i>Chrysopsis Marlana</i> ,
<i>Acalypha ostryæfolia</i> ,	<i>Coreopsis major</i> ,
<i>Ilex opaca</i> ,	<i>Coreopsis auriculata</i> .

Northern and southern forms are here mingled. Many of the typical plants of this region are included in the list of plants from the south and southeast, while not a few have a northeastern range.

Typical Species of the Neo-Transition Region.

<i>Pinus Strobus</i> ,	<i>Vagnera trifolia</i> ,
<i>Larix laricina</i> ,	<i>Habenaria Hookeriana</i> ,
<i>Potamogeton amplifolius</i> ,	<i>Habenaria blephariglottis</i> ,
<i>Potamogeton lonchites</i> ,	<i>Corylus rostrata</i> ,
<i>Potamogeton perfoliatus</i> ,	<i>Betula lutea</i> ,
<i>Potamogeton foliosus</i> ,	<i>Blitum capitatum</i> ,
<i>Potamogeton obtusifolius</i> ,	<i>Sagina procumbens</i> ,
<i>Oryzopsis juncea</i> ,	<i>Nymphæa Kalmiana</i> ,
<i>Cinna latifolia</i> ,	<i>Coptis trifolia</i> ,
<i>Scirpus subterminalis</i> ,	<i>Aconitum Noveboracense</i> ,
<i>Scirpus debilis</i> ,	<i>Aconitum uncinatum</i> ,
<i>Scirpus Torreyi</i> ,	<i>Adlumia fungosa</i> ,
<i>Eriophorum vaginatum</i> ,	<i>Sarracenia purpurea</i> ,
<i>Eriophorum polystachyon</i> ,	<i>Geum strictum</i> ,
<i>Eriophorum gracile</i> ,	<i>Sorbus sambucifolia</i> ,
<i>Carex oligosperma</i> ,	<i>Polygala paucifolia</i> ,
<i>Carex scabrata</i> ,	<i>Illicioides mucronata</i> ,
<i>Carex limosa</i> ,	<i>Hypericum ellipticum</i> ,
<i>Carex pallescens</i> ,	<i>Conioselinum Chinense</i> ,
<i>Carex conoidea</i> ,	<i>Hydrocotyle Americana</i> ,
<i>Carex pedunculata</i> ,	<i>Cornus Canadensis</i> .
<i>Carex tenella</i> ,	<i>Pyrola asarifolia</i> ,
<i>Carex sterilis</i> ,	<i>Pyrola secunda</i> ,
<i>Carex canescens</i> ,	<i>Oxycoccus Oxycoccus</i> ,
<i>Carex trisperma</i> ,	<i>Viburnum alnifolium</i> ,
<i>Calla palustris</i> ,	<i>Viburnum cassinoides</i> .

The plants of this region given above as typical, are north and northeastern in range. *Pinus strobus* and *Larix laricina* are here indigenous, while numerous species of high latitudes are found in the deep ravines and about the small lakes and tamarack swamps peculiar to this part of our glaciated area. The typical species and the general aspects of the region resemble quite closely those of northeastern Indiana. Extreme northwestern Ohio will doubtless disclose there, upon thorough investigation, many of the plants in this list.

Typical Species of the Lacustrine Region.

<i>Equisetum littorale</i> ,	<i>Salix amygdaloides</i> ,
<i>Juniperus communis</i> ,	<i>Salix glaucophylla</i> ,
<i>Potamogeton prælongus</i> ,	<i>Polygonum ramosissimum</i> ,
<i>Potamogeton Hillii</i> ,	<i>Polygonella articulata</i> ,
<i>Potamogeton Friesii</i> ,	<i>Anemone cylindrica</i> ,
<i>Potamogeton interruptus</i> ,	<i>Ranunculus ovalis</i> ,
<i>Sporobolus cryptandrus</i> ,	<i>Cakile edentula</i> ,
<i>Ammophila arenaria</i> ,	<i>Potentilla arguta</i> ,
<i>Calamovilfa longifolia</i> ,	<i>Potentilla paradoxa</i> ,
<i>Sieglingia purpurea</i> ,	<i>Potentilla Anserina</i> ,
<i>Eragrostis pectinacea</i> ,	<i>Prunus cuneata</i> ,
<i>Cyperus Schweinitzii</i> ,	<i>Lathyrus maritimus</i> ,
<i>Juncus Gerardi</i> ,	<i>Lathyrus ochroleucus</i> ,

Geranium Robertianum,
Polygala cruciata,
Polygala polygama,
Euphorbia polygonifolia,
Viola lanceolata,
Proserpinaca palustris,

Arctostaphylos Uva-Ursi,
Lithospermum hirtum,
Melampyrum lineare,
Lonicera oblongifolia,
Artemisia Canadensis.

The marine species of our flora are found on the lake shores and beach sands. Many of the typical species are found throughout the great lakes. Many boreal plants grow in this region.

Typical Species of the Calcareous Region.

Thuja occidentalis,
Triglochin palustris,
Sporobolus heterolepis,
Eatonia obtusata,
Kœleria cristata,
Bromus Kalmii,
Cladium mariscoides,
Carex siccata,
Trillium nivale,
Erysimum asperum,
Potentilla fruticosa,

Kraunhia frutescens;
Meibomia Illinoensis,
Ceanothus ovatus,
Dodecatheon Meadia,
Verbena bracteosa,
Clinopodium glabrum,
Lactuca pulchella,
Solidago Ohioensis,
Aster azureus,
Leptilon divaricatum.

The greater number of the typical species for the western region are southwestern and western in range. The eastward limitation of a large number of species is noted by Moseley in his Sandusky Flora now in press. It must appear to all that this is the least satisfactory of the typical lists.

WHENCE CAME THE PLANTS OF OHIO?

Taking the Ohio Flora as a whole, we may properly consider it in the light of its sources, or origin, as indicated by the range of its species.

The identity of many genera and species of the North American Flora, with those of Europe and Eastern Asia was long the subject of careful investigation by Dr. Asa Gray (I, II, III, IV). A study of his work must not be omitted if we would become familiar with the elements of our Flora, considered in this relation. He has shown (II and IV) that in the number of identical genera and species of forest trees the Flora of the Atlantic United States approaches more nearly to that of Eastern Asia than to the Pacific Slope. After discussing the striking differences in the present forests of Europe and Western America on the one hand, compared with those of the Atlantic United States and Eastern Asia on the other, he continues as follows (IV, 188): "Extending the comparison to shrubs and herbs it more than appears that the

forms and types which we count as peculiar to our Atlantic region, when we compare them as we first naturally do, with Europe and our west, have their close counterparts in Japan and North China; some in identical species (especially among herbs) often in strikingly similar ones, not rarely as sole species of peculiar genera or related generic types. Evidences of this remarkable relationship have multiplied year after year, until what was long a wonder has come to be so common that I should now not be greatly surprised if a *Sarracenia* or a *Dioncea*, or their like, should turn up in Eastern Asia. Very few of such isolated types remain without counterparts. It is, as if Nature when she had enough species of a genus to go around, dealt them fairly, one at least to each quarter of our zone; but when she had only two of some peculiar kind, gave one to us and the other to Japan, Manchuria or the Himalayas; when she had only one, divided this between the two partners on the opposite sides of the table."

As a more complete illustration of this relationship we give the following table extracted from the appendix of Dr. Gray's Dubuque address (IV) and from his paper On the Botany of Japan. It is supplemented by a list of species occurring in Ohio, Asia and Japan and also found in Europe.

LIST OF EXTRA-EUROPEAN PLANTS OCCURRING IN OHIO AND IN
NORTHEASTERN ASIA, REPRESENTED BY IDENTICAL
OR STRICTLY REPRESENTATIVE SPECIES.

1. In Ohio.

Lycopodium lucidulum,
Lycopodium dendroideum (L. ob-
scurum L.),
Adiantum pedatum,
Asplenium acrostichoides,
Camptosorus rhizophyllus,
Onoclea sensibilis,
Osmunda cinnamomea,
Osmunda Claytoniana,
Botrychium Virginicum,
Thuja occidentalis,
Tsuga Canadensis,
Pinus Strobus,
Taxus minor,
Avena striata,
Zizania aquatica,
Carex stipata,
Eriophorum cyperinum,
Abama Americana,
Erythronium Americanum and
Albidum,

2. In Northeastern Asia—Japan
to Altai Mountains.

Lycopodium lucidulum,
Lycopodium dendroideum,
Adiantum pedatum,
Asplenium acrostichoides,
Camptosorus Sibiricus,
Onoclea sensibilis,
Osmunda cinnamomea,
Osmunda Claytoniana,
Botrychium Virginicum,
Thuja Japonica,
Tsuga Tsuga, etc.,
Pinus excelsa,
Taxus cuspidata,
Avena callosa,
Zizania=*Hydrophyrum latifolium*,
Carex stipata,
Eriophorum cyperinum,
Abama Asiatica,
Erythronium grandiflorum,

Vagnera (Smilacina) trifolia,
Vagnera (Smilacina) racemosa,
Vagnera (Smilacina) stellata,
Polygonatum commutatum,
Clintonia borealis,
Disporum (Prosartes) lanuginosum,
Chamælorium luteum,
Trillium grandiflorum,
Trillium erectum,
Smilax hispida,
Smilax herbacea,
Iris cristata,
Alettris farinosa,
Habenaria flava,
Leptorchis (Liparis) liliifolia,
Pogonia ophioglossoides,
Symplocarpus foetidus (Spathyema Raf),
Arisaema 3 spp.,
Corylus rostrata,
Juglans cinerea,
Urticastrum (Laportea) divaricatum,
Adicea (Pilea) pumila,
Saururus cernuus,
Lindera Benzoin,
Polygonum arifolium,
Polygonum sagittatum,
Phylotacca decandra,
Asarum Canadensis,
Brasenia purpurea,
Nelumbo (Nelumbium) luteum,
Magnolia acuminata,
Anemone Pennsylvanica,
Oxygraphis Cymbalaria,
Ranunculus Pennsylvanicus,
Trautvetteria Carolinensis,
Hydrastis Canadensis,
Aconitum uncinatum,
Actæa rubra,
Actæa alba,
Cimicifuga racemosa,
Menispermum Canadense,
Arabis lyrata,
Caulophyllum thalictroides,
Jeffersonia diphylla,
Capnoides aureum,
Ribes Cynosbati,
Ribes lacustre,
Ribes prostratum,
Tiarella cordifolia,
Sorbus (Pyrus) sambucifolia,
Rubus Americanus,
Rubus strigosus,

Vagnera (Smilacina) trifolia,
Vagnera (Smilacina) Japonica,
Vagnera (Smilacina) Davarica,
Polygonatum commutatum,
Clintonia udensis,
Disporum (Prosartes) lanuginosum,
Chamælorium luteum,
Trillium obovatum,
Trillium erectum var.,
Smilax Lieboldii,
Smilax herbacea=Nipponica,
Iris tectorum=cristata,
Alettris Japonica,
Habenaria fuscens,
Leptorchis (Liparis) liliifolia,
Pogonia ophioglossoides,
Symplocarpus foetidus and Lysichiton Camschatcense,
Arisaema 9 spp.,
Corylus rostrata var Mandechuriana,
Juglans Mandechuriana, stenocarpa,
Urticastrum (Laportea) evitata,
Adicea (Pilea) pumila,
Saururus Loureiri,
Lindera hypoglauca,
Polygonum perfoliatum,
Polygonum sagittatum, Lieboldii,
Phylotacca Kumpferi,
Asarum caulescens and Lieboldii,
Brasenia purpurea,
Nelumbo (Nelumbium) speciosum,
Magnolia, 8 to 12 spp.,
Anemone dichotoma=Pennsylvanica,
Oxygraphis (Ranunculus) Cymbalaria,
Ranunculus Pennsylvanicus,
Trautvetteria Carolinensis,
Hydrastis Jesoensis,
Aconitum uncinatum,
Actæa rubra,
Actæa alba,
(Cimicifuga, 3 spp.),
Menispermum Dahariane,
Arabis lyrata,
Caulophyllum thalictroides,
Jeffersonia=Plagiorhegnea dubium,
Capnoides (Corydalis) aureum,
Ribes Cynosbati,
Ribes lacustre,
Ribes laxiflorum,
Tiarella polyphylla,
Sorbus (Pyrus) sambucifolia,
Rubus Americanus var Japonicus,
Rubus strigosus,

Amelanchier Canadensis var,
Gleditschia triacanthos,
Æsculus glabra,

Acer spicatum,
Acer Pennsylvanicum,
Rhus Vernix,
Rhus radicans,
Vitis Labrusca,
Ampelopsis cordata,
Triadenum (*Hypericum*) petiolatum
Triadenum (*Hypericum*) Virginicum

Viola Canadensis,
Cornus Canadensis,
Cornus florida,
Cornus stolonifera,
Aralia spinosa,
Aralia racemosa,
Panax quinquefolium,
Heracleum lanatum,
Sium cicutæfolium,
Deringa (*Cryptotania*) Canadensis,
Washingtonia (*Osmorrhiza*) longis-
tylis,

Pyrola elliptica.
Gaultheria procumbens,
Epigæa repens,
Chiogenes hispidula,
Monotropa uniflora,
Menyanthes trifoliata,
Lithospermum officinale,
Teucrium Canadense,
Phlox subulata,
Veronica Virginica,
Tecoma radicans,
Lycopus Virginicus,
Phryma Leptostachya,
Mitchella repens,
Viburnum lantanoides,
Artemisia Canadensis,
Artemisia biennis.

Amelanchier Canadensis var,
Gleditschia Chinensis, etc.,
Æsculus Chinensis and Hippocasta-
num,

Acer spicatum var,
Acer legmentosum,
Rhus Vernix ? (vernificera)
Rhus radicans,
Vitis Labrusca,
Vitis humifolia,
Triadenum (*Hypericum*) petiolatum,
Triadenum (*Hypericum*) Virginicum,

Viola Canadensis var.,
Cornus Canadensis,
Benthamia, spp.,
Benthamia alba,
Aralia spinosa var.,
Aralia edulis, etc.,
Aralia (*Panax*) Ginseng, etc.,
Heracleum lanatum,
Sium cicutæfolium,
Deringa (*Cryptotania*) Canadensis,
Washingtonia (*Osmorrhiza*) longis-
tylis,

Pyrola elliptica.
Gaultheria pyrolloides,
Epigæa Asiatica,
Chiogenes hispidula,
Monotropa uniflora,
Menyanthes trifoliata,
Lithospermum officinale,
Teucrium Japonicum,
Phlox Sibirica,
Veronica Virginica,
Tecoma grandiflora,
Lycopus parviflorus,
Phryma Leptostachya,
Mitchella undulata,
Viburnum lantanoides,
Artemisia Canadensis=commutata,
Artemisia biennis.

SPECIES COMMON TO OHIO, EUROPE AND NORTHEASTERN ASIA.

In Ohio.

Ophioglossum vulgatum,
Osmunda regalis,
Dryopteris (*Lashea*) dilatata,
Polypodium vulgare,

In Europe and Northeastern Asia.

Ophioglossum vulgatum,
Osmunda regalis,
Dryopteris (*Lashea*) dilatata,
Polypodium vulgare,

Juniperus communis,
 Alopecurus geniculatus,
 Phalaris arundinacea,
 Poa pratensis,
 Poa serotina,
 Milium effusum,
 Savastana odorata,
 Panicularia (*Glyceria*) fluitans,
 Carex filiformis,
 Eriophorum gracile,
 Scirpus lacustris,
 Juncus effusus,
 Streptopus amplexifolium,
 Fagus Americana,
 Alsine uliginosa,
 Caltha palustris,
 Coptis trifolia,
 Hepatica Hepatica and acuta,
 Ranunculus sceleratus,
 Arabis hirsuta,
 Roripa palustris,
 Drosera rotundifolia,
 Agrimonia mollis (A. Eupatoria),
 Geum strictum,
 Comarum (*Potentilla*) palustris,
 Potentilla Anserina,
 Spiraea salicifolia,
 Aruncus Aruncus,
 Lathyrus palustris,
 Hamamelis Virginica,
 Chrysosplenium Americanum,
 Circæa alpina,
 Cornus Amonum (C. sericea),
 Pyrola rotundifolia,
 Moneses uniflora,
 Oxycoccus Oxycoccus,
 Menyanthes trifoliata,
 Polemonium reptans,
 Myosotis arvensis,
 Stachys palustris,
 Stachys aspera,
 Utricularia intermedia,
 Veronica Anagallis-aquatica,
 Viburnum Opulus,
 Sambucus pubens,
 Galium triflorum,
 Synosma (*Cacalia*) suaveolens.

Juniperus communis,
 Alopecurus geniculatus,
 Phalaris arundinacea,
 Poa pratensis,
 Poa serotina,
 Milium effusum,
 Savastana odorata,
 Panicularia (*Glyceria*) fluitans,
 Carex filiformis,
 Eriophorum gracile,
 Scirpus lacustris,
 Juncus effusus,
 Streptopus amplexifolium,
 Fagus sylvatica,
 Alsine uliginosa,
 Caltha palustris,
 Coptis trifolia,
 Hepatica Hepatica,
 Ranunculus sceleratus,
 Arabis hirsuta,
 Roripa palustris,
 Drosera rotundifolia,
 Agrimonia mollis,
 Geum strictum,
 Comarum (*Potentilla*) palustris,
 Potentilla Anserina,
 Spiraea salicifolia,
 Aruncus Aruncus,
 Lathyrus palustris,
 Hamamelis Japonica (Asia),
 Chrysosplenium Americanum,
 Circæa alpina,
 Cornus sanguinea,
 Pyrola rotundifolia,
 Moneses uniflora,
 Oxycoccus Oxycoccus,
 Menyanthes trifoliata,
 Polemonium cœruleum,
 Myosotis arvensis,
 Stachys palustris,
 Stachys aspera,
 Utricularia intermedia,
 Veronica Anagallis-aquatica,
 Viburnum Opulus,
 Sambucus pubens,
 Galium triflorum,
 Synosma (*Cacalia*) suaveolens.

This tabulation shows that 112 indigenous species of Ohio plants are represented in Japan and Northeast Asia by identical or allied species, while 51 are thus represented in both Northeast Asia and Europe. Had we at command a late enumeration of the Asiatic plants it is possible that these figures would require revision.

The relation of the Flora of the Northeastern United States to that of Europe is very marked; Ohio as a member of this region, which has gradually come to be called the "Manual Range" (latterly extended west to the 100th meridian) partakes likewise of this similarity in its Flora.

There are, (Gray I), of indigenous plants, 180 species of dicotyls, 141 species of monocotyls and 20 species of ferns common to the Northeastern United States and Europe or 341 species in all three classes of plants; of these 150 species of phanerogams and 16 species of ferns and allies are found in Ohio.

According to views held generally by naturalists these relationships between the Flora of Eastern North America, including Ohio, and those of Europe and Asia as already pointed out, indicate that in the past histories of the floras of these regions, there has been a common source from which the plants of the several countries have arisen. Allowing for the relation between allied forms and like topographical, geological and climatic conditions there yet remains the disposition everywhere shown by naturalists, to refer identity of form to similarity of origin. By this is meant not only to similar conditions under which alone these resemblances would be maintained if once possessed, but to refer the plants to identical progenitors. Or to state it in another way, it is held that the effect of environment is to modify pre-existing forms, not to create new ones outright. When, therefore, similarity or identity of species is found, as in the case cited, like conditions of growth alone will not explain their occurrence. Community of origin is likewise called for.

For us in the present instance, this means that at one time the progenitors of the plants of Japan, North China, and the progenitors of the plants of Ohio, or a large number of them, grew together in the North Polar region, whence they were forced southward by the gradual change of climate which was here during the glacial epoch. The studies of palæontologists have shown similar fossil plants in deposits within the Artic Circle, and there is abundant evidence of the former existence of a flora like our present one in these high latitudes. Assuming that such plants were driven to new conditions they would be modified by ecological adaptations. Furthermore, plants from the north have met those typical of more southerly situations; the former have receded with returning warmth and have carried the latter with them. Our flora appears clearly to have been the meeting point of plants from the northeast and from the northwest. These have been met in turn by plants from the east, often originally from the northeast, from the

south and from the west—the latter the more recent of our accessions. In the lists which are to follow the various components will appear.

It may be said that the topography exerts a great influence. All appreciate this; at the same time must we not consider the effects of pre-glacial and interglacial drainage when we would write a full history of the Ohio plants? As the glacial advance must have forced plants south of us, which upon the glacial recession again returned, so likewise must there have been carried forward the plants which grew beside our President's great, pre-glacial, north-flowing river of this region; some of them in turn come back to us as plants from the south. Liquidambar and Phoradendron spring into mind at once. They also represent two different means by which the migration of land plants are effected. The Ohio plants, like the people who followed them, by reason of the eastern gateway which the settlers found to the vast Valley of the Mississippi, are cosmopolitan in character. Ecology and Ethnology alike make record of these blended races.

Some few words of explanation will probably be necessary in order that the classification as to direction of migration of plants may be fully understood. In making up these lists it has been our aim to take only those plants concerning which there can be little doubt as to the direction of their movement; yet, we may have included some that might well have been omitted and conversely. We have also indicated those which occur in Europe, etc. Introduced or naturalized plants are collected in a separate list; the number of these may doubtless be as much of a surprise to others as it was to us.

Topographical and hydrographical features have been considered in making the lists. Thus, for example, we may have plants extending from Nova Scotia to Michigan and south in the mountains to Georgia or Alabama, yet these plants appear to have come to us from the northeast, as their southern limits are confined to the mountain districts. Again, we may have plants ranging from Texas to Florida and along the coast to New Jersey, or probably even to Massachusetts. Where such plants have made their way into our state we naturally conclude that they are southern, having made their advance along the river valleys and not across the mountains.

As for plants from the east and southeast we have taken only those of a limited area; those of a more extended range being classed with the plants from the northeast and south respectively.

In making up the lists of plants that have come in from the north, we met with many difficulties, owing to the fact that

such a vast number of our northern plants have a wide range, some even from the Atlantic to the Pacific, thus making it impossible, in many cases, to determine whether they were strictly northern or whether they should be listed as having come from the northeast or northwest. The list of northern plants, therefore, has probably been unduly increased at the expense of those from the northeast and northwest, for in the majority of cases they undoubtedly have moved in one or the other of these directions at the time of two great glacial advances along these lines. We also believe them to be northeastern or northwestern in so much as many of them are to be found in Europe or Asia. However, in either case, they will be designated throughout the lists, so that the reader may readily distinguish them.

The order in which the plants are arranged and the nomenclature used is that given by Britton and Brown in their *Illustrated Flora of the Northern States and Canada*. Ranges have been obtained from available sources. The *Catalogue of Ohio Plants* by Kellerman and Werner has been the usual source of information concerning distribution in the state. Other sources are indicated in the list of works.

Plants found also in Europe are marked with an asterisk *; plants having a northern range from the Atlantic to the Pacific are marked with a dagger †.

Plants from the Northwest.

Potamogeton amplifolius,	Atriplex argentea,
Potamogeton obtusifolius,	*Alsine longifolia,
Stipa spartea,	Arabis dentata,
Sporobolus heterolepis,	Erysimum inconspicuum,
Agrostis exarata,	Chrysosplenium alternifolium,
Cyperus Schweinitzii,	†Ribes lacustre,
Carex aristata,	Hydrophyllum Virginicum,
Carex durifolia,	Steironema quadriflorum,
Carex teretiuscula prairea,	Lonicera glaucescens,
Carex Muskingumensis,	Valeriana edulis,
Allium cernuum,	Lactuca pulchella,
Asarum acuminatum,	Helianthus lætiflorus,
Polygonum amphibium,	Artemisia biennis.
Polygonum Hartwrightii,	

Plants from the North.

†*Ophioglossum vulgatum,	†*Dryopteris spinulosa dilatata,
†*Botrychium lanceolatum,	†Phegopteris Dryopteris,
†*Onoclea Struthiopteris,	†*Equisetum arvense,
†*Woodsia glabella,	†*Equisetum sylvaticum,
†*Dryopteris spinulosa,	†*Equisetum fluviatile,
†*Dryopteris spinulosa intermedia,	*Equisetum variegatum,

- †Equisetum scirpoides,
- †Lycopodium obscurum,
- †*Lycopodium annotinum,
- †*Lycopodium clavatum,
- †*Lycopodium complanatum,
- †*Juniperus communis,
- †Taxus minor,
- †Sparganium eurycarpum,
- †Potamogeton Robbinsii,
- †*Triglochin palustris,
- †Oryzopsis asperifolia,
- †*Cinna latifolia,
- †Avena striata,
- †Phalaris arundinacea,
- *Poa flava,
- †*Panicularia fluitans,
- †Scirpus subterminalis,
- †*Eriophorum vaginatum,
- †Rynchospora capillacea,
- †Carex utriculata,
- †Carex filiformis,
- †*Carex aquatilis,
- †*Carex limosa,
- †Carex viridula,
- †Carex digitalis copulata,
- †Carex aurea,
- †*Carex teretiuscula,
- †*Carex tenella,
- †*Carex canescens,
- *Carex tenuiflora,
- †Carex fenea,
- †*Juncus filiformis,
- †*Juncus Balticus,
- †*Juncus articulatus,
- †Juncus Richardsonianus,
- †Juncoides pilosum,
- †Tofieldia glutinosa,
- †Zygadenus elegans,
- †Vagnera trifolia,
- †Orchis rotundifolia,
- †Habenaria orbiculata,
- †Corallorhiza Corallorhiza,
- †Populus balsamifera,
- †Populus tremuloides,
- †Salix candida,
- *Blitum capitatum,
- *Alsine longipes,
- †Castalia tuberosa,
- †Cardamine purpurea,
- †Arabis brachycarpa,
- †Ribes oxyacanthoides,
- †Phaca neglecta,
- †Vicia Cracca,
- †Vicia Americana,
- †*Lathyrus palustris,
- *Hypericum Ascyron,
- †Pyrola asarifolia,
- †Moneses uniflora,
- †Andromeda Polifolia,
- †Menyanthes trifoliata,
- †Galium lanceolatum,
- †Mentha Canadensis,
- †*Veronica Anagallis-aquatica,
- †Gerardia paupercula,
- †Viburnum Opulus,
- †Lonicera cœrulea,
- *Campanula rotundifolia,
- †Aster longifolius.

Plants from the Northeast.

- *Botrychium matricariæfolium,
- Woodsia Ilvensis,
- Dryopteris cristata Clintoniana,
- Dryopteris Goldieana,
- Asplenium acrostichoides,
- Pinus Strobus,
- Larix laricina,
- Tsuga Canadensis,
- Thuja occidentalis,
- Potamogeton Vaseyi,
- Panicum xanthophyllum,
- *Miliun effusum,
- *Ammophila arenaria,
- *Deschampsia flexuosa,
- Poa debilis,
- Poa alsodes,
- Panicularia obtusa,
- Panicularia elongata,
- Panicularia pallida,
- Panicularia acutiflora,
- Cyperus dentatus,
- Eleocharis interstincta,
- Eleocharis olivacea,
- *Scirpus sylvaticus,
- Scirpus cyperinus,
- Eriophorum Virginicum album,
- *Rynchospora fusca,
- Carex oligosperma,
- Carex Tuckermanni,
- Carex Pseudo-Cyperus,
- Carex Goodenovii,
- Carex prasina,
- Carex costellata,
- Carex formosa,
- Carex arctata,
- Carex tenuis,
- *Carex pallescens,
- Carex flava,

- Carex conoidea*,
Carex Careyana,
Carex setifolia,
Carex pedunculata,
Carex pedicellata,
Carex pelicellata Wheeleri,
Carex Novæ-Angliæ,
Carex chorderhiza,
Carex rosea radiata,
Carex interior capillacea,
Carex straminea,
Carex straminea mirabilis,
Allium tricoccum,
Lilium Philadelphicum,
Lilium tigrinum,
Trillium erectum,
Cypripedium acaule,
Cypripedium reginæ,
Habenaria blephariglottis,
Habenaria grandiflora,
Habenaria psycodes,
Arethusa bulbosa,
Gyrostachys plantaginea,
Comptonia peregrina,
Populus grandidentata,
Salix humilis,
Salix sericea,
Salix petiolaris,
Betula populifolia,
Betula pumila,
Castanea dentata,
Quercus nana,
Chenopodium polyspermum,
Sagina procumbens,
Sagina apetala,
Tissa rubra,
Castalia tuberosa,
Aconitum Noveboracense,
Hepatica acuta,
[†]*Thalictrum purpurascens*,
Ranunculus fascicularis,
Ranunculus scleratus,
Anemone quinquefolia,
Capnoides aureum,
Cardamine flexuosa,
Saxifraga Virginensis,
Saxifraga Pennsylvanica,
Tiarella cordifolia,
Parnassia Caroliniana,
Sarracenia purpurea,
Ribes Cynosbati,
Ribes floridum,
Ribes rubrum,
Rubus odoratus,
Dilibarda repens,
Potentilla Canadensis,
Waldsteinia fragarioides,
Rosa blanda,
Prunus cuneata,
Lathyrus myrtifolius,
Ilicoides mucronata,
Acer Pennsylvanicum,
Hypericum ellipticum,
Helianthemum Canadense,
Viola ovata,
Viola rotundifolia,
Viola rostrata,
Myriophyllum tenellum,
Aralia nudicaulis,
Aralia hispida,
Conioselinum Chinense,
Sanicula trifoliata,
Cicuta bulbifera,
Hydrocotyle Americana,
Cornus alternifolia,
Cornus circinata,
Cornus candidissima,
Pyrola rotundifolia,
Rhododendron maximum,
Vaccinium atrococcum,
Oxycoccus Oxycoccus,
Trientalis Americana,
Fraxinus nigra,
Asclepias quadrifolia,
Asclepias Syriaca,
^{*}*Myosotis arvensis*,
Monarda didyma,
^{*}*Veronica officinalis*,
Galium verum,
Galium palustre,
Viburnum alnifolium,
Viburnum acerifolium,
Viburnum dentatum,
Viburnum cassinoides,
Diervilla Diervilla,
Dipsacus sylvestris,
Leontodon autumnale,
Hieracium Canadense,
Solidago hispida,
Solidago uliginosa,
Solidago Virgaurea,
Solidago juncea ramosa,
Aster Novi-Belgii,
Aster prenanthoides,
Gnaphalium uliginosum,
Erigeron annuus,
Carduus odoratus.

Plants from the East.

*Typha angustifolia,	Polygonella articulata,
Panicum pubescens,	Silene Caroliniana,
Poa brevifolia,	Thalictrum polygamum,
Carex bullata,	Bicuculla eximia,
Carex æstivalis,	Cardamine arenicola,
Carex alata,	Cardamine rotundifolia,
Disporum lanuginosum,	Meibomia sessilifolia,
Salix alba cœrulea,	Linum Virginianum,
Salix purpurea,	Vitis bicolor,
Betula lutea,	Pimpinella Saxifraga,
Quercus Prinus,	Seriocarpus asteroides,
Bœhmeria cylindrica,	Dœllingeria infirma.
Polygonum Carey,	

Plants from the Southeast.

Panicum elongatum,	Vincetoxicum obliquum,
Eatonia nitida,	Phlox ovata,
Sedum telephioides,	Scutellaria saxatilis,
Sedum ternatum,	Stachys cordata,
Spiræa corymbosa,	Houstonia purpurea,
Hypericum prolificum,	Houstonia tenuifolia,
Lechea Leggettii,	Galium latifolium,
Azalea lutea,	Solidago erecta,
Vaccinium pallidum,	Silphium trifoliatum.

Plants from the South.

Asplenium pinnatifidum,	Carex decomposita,
Polypodium polypodioides,	Carex Muhlenbergii Xalapensis,
Pinus Virginiana,	Tradescantia pilosa,
Erianthus alopecuroides,	Juncus scirpoides,
Andropogon Virginicus,	Stenanthium robustum.
Chrysopogon nutans,	Melanthium Virginicum,
Panicum microcarpon,	Trillium recurvatum,
Panicum commutatum,	Trillium sessile,
Panicum dichotomum,	Smilax ecirrhata,
Panicum flexile,	Smilax Pseudo-China,
Zizaniopsis miliacea,	Smilax Bona-nox,
Sporobolus asper,	Dioscorea villosa,
Sporobolus vaginæflorus,	Iris cristata, (<i>Japan</i>)
Trisetum Pennsylvanicum,	Pogonia divaricata,
Sieglingia seslerioides,	Hicoria laciniosa,
Eragrostis capillaris,	Castanea pumila,
Melica mutica,	Quercus Marylandica,
Uniola latifolia,	Phoradendron flavescens,
Poa autumnalis,	Iresine paniculata,
Arundinaria tecta,	Silene rotundifolia,
Cyperus ovularis,	Silene regia,
Kyllinga pumila,	Magnolia acuminata,
Rynchospora corniculata,	Clematis Viorna,
Carex Frankii,	Trautvetteria Carolinensis,
Carex amphibola,	Roripa sessiliflora,
Carex styloflexa,	Arabis Virginica,
Carex Crus-Corvi,	Hydrangea arborescens,

Liquidambar Styraciflua,
 Malus angustifolia,
 Baptisia leucantha,
 Psoralea pedunculata,
 Robinia viscosa,
 Robinia hispida,
 Stylosanthes biflora,
 Meibomia viridiflora,
 Meibomia arenicola,
 Lespedeza repens,
 Oxalis recurva,
 Polygala brevifolia,
 Tilia heterophylla,
 Triadenum petiolatum,
 Viola hastata,
 Passiflora lutea,
 Enothera laciniata,
 Gaura Michauxii,
 Myriophyllum pinnatum,
 Aralia spinosa,
 Ligusticum Canadense,
 Nyssa aquatica,
 Oxydendrum arboreum,
 Chioanthus Virginica,
 Gentiana villosa,
 Obolara Virginica,
 Vincetoxicum gonocarpos,
 Cuscuta indecora,
 Phlox paniculata,
 Phacelia dubia,
 Lippia lanceolata,
 Synandra hispidula,
 Stachys tenuifolia,
 Salvia lyrata,
 Clinopodium glabellum,

Koellia cristata,
 Lycopus rubellus,
 Physalis viscosa,
 Pentstemon Pentstemon,
 Conoclea multifida,
 Buchnera Americana,
 Bignonia crucigera,
 Tecoma radicans,
 Catalpa Catalpa,
 Ruellia ciliosa,
 Houstonia tenuifolia,
 Spermacoce glabra,
 Valerianella Woodsiana,
 Legouzia biflora,
 Lobelia puberula,
 Lobelia leptostachys,
 Adopogon Dandemon,
 Lactuca villosa,
 Nabalus virgatus,
 Vernonia glauca,
 Vernonia gigantea,
 Elephantopus Carolinianus,
 Eupatorium serotinum,
 Eupatorium coelestinum,
 Kuhnia eupatorioides,
 Chrysopsis graminifolia,
 Aster hirsuticaulis,
 Silphium terobinthinaceum pinna-
 tidium,
 Brauneria purpurea,
 Helianthus microcephalus,
 Verbesina occidentalis,
 Coreopsis major,
 Carduus Virginianus.

Plants from the Southwest.

Korycarpus diandrus,
 Juncus Torreyi,
 Veratrum Woodii,
 Toxylon pomiferum,
 Acnida tamariscina,
 Delphinium tricornis,
 Porteranthus stipulatus,
 Baptisia australis,
 Falcata Pitcheri,
 Euphorbia dentata,
 Euphorbia obtusata,
 Esculus octandra,
 Rhamnus lanceolata,
 Hypericum gymnanthum,

Ammannia coccinea,
 Eulophus Americanus,
 Ipomoea lacunosa,
 Convolvulus repens,
 Phacelia bipinnatifida,
 Verbena Canadensis,
 Ruellia strepens,
 Nabalus asper,
 Vernonia fasciculata,
 Aster oblongifolius,
 Erigeron Bellidistrum,
 Helianthus mollis,
 Verbesina helianthoides,
 Senecio lobatus.

Plants from the West.

Panicum Liebergii,	Vioia pedatifida,
Bouteloua curtipendula,	Asclepias Sullivantii,
*Koeleria cristata,	Cuscuta paradoxa,
Eragrostis trichodes,	Lithospermum angustifolium,
Hordeum nodosum,	Verbena bracteosa,
Juncus brachycephalus,	Clinopodium glabrum,
Allium stellatum,	Physalis lanceolata,
Lilium umbellatum,	Azelia macrophylla,
Habenaria leucophæa,	Lactuca Ludoviciana,
Silene alba,	Ambrosia psilostachya,
Delphinium Carolinianum,	Solidago rigidiuscula,
Stylophorum diphyllum,	Solidago Riddellii,
Erysimum asperum,	Leptilon divaricatum,
Polanisia graveolens,	Helianthus annuus,
Sullivantia Sullivantii,	Helianthus grosse-serratus,
Trifolium stoloniferum,	Helianthus doronicoides,
Kuhnistera purpurea,	Bidens aristosa,
Meibomia Illinoensis,	Mesadenia atriplicifolia,
Lechea stricta,	Mesadenia tuberosa.

A List of Plants Naturalized in Ohio, with Source.

[Those naturalized in Australia as shown by Hooker (II, 1859) and Moore (1893), are marked A.]

Syntherisma sanguinalis.....Eu.	A. Bromus hordeaceus.....Eu.
Syntherisma linearis..... "	Bromus secalinus.....Eu.-Asia
Panicum Crus-galli..... "	Bromus racemosus..... " "
Ixophorus verticillatus..... "	A. Lolium perenne..... " "
Ixophorus glaucus..... "	Agropyron repens..... " "
Ixophorus viridis..... "	Carex muricata.....Eu.
Ixophorus Italicus..Eu.-Asia-Afr.	Hemerocallis fulva....Eu.-Asia
A. Phalaris Canariensis.....Eu.	Allium vineale.....Eu.
A. Anthoxanthum odoratum.... "	Lilium tigrinum....China-Japan
Phleum pratense..... "	Ornithogalum umbellatum...Eu.
A. Alopecurus pratensis..... "	Muscari botryoides.....Eu.-Asia
Agrostis alba..... "	Asparagus officinalis.....Eu.
A. Holcus lanatus..... "	Populus alba.....S. Eu.-Asia
A. Avena fatua.....Eu. or Asia.	Salix fragilis.....Eu.
Arrhenatherum elatius.....Eu.	Salix alba..... "
Capriola Dactylon..... "	A. Salix Babylonica.....Asia
Eleusine Indica...Eu.-Asia-Afr.	Salix purpurea.....Eu.
Eragrostis Eragrostis.....Eu.	Morus alba.....Eu.-Asia-Afr.
Eragrostis pilosa..... "	Broussonetia papyrifera.Eu.-Asia
Eragrostis major..... "	A. Cannabis sativa..... "
A. Dactylis glomerata..... "	A. Urtica dioica..... " "
A. Poa annua.....Eu.-Asia	A. Rumex crispus..... " "
Poa compressa..... " "	A. Rumex Acetosella.... " "
Poa trivialis.....Eu.	Rumex sanguineus.....Eu.
Festuca ovina.....Eu.-Asia	Rumex obtusifolius...Eu.-Asia
Festuca elatior.....Eu.	Fagopyrum Fagopyrum " "
Bromus tectorum..... "	Polygonum lapathifolium—
A. Bromus sterilis.....Eu.-Asia	Eu.-Asia
	Polygonum Persicaria.....Eu.

- Polygonum Hydropiper.....Eu.
 Polygonum orientale.....India
 Polygonum littorale—
 Western U. S.
 A. Polygonum Convolvulus—
 Eu.-Asia
 A. Chenopodium album.... “ “
 A. Chenopodium glaucum.....Eu.
 Chenopodium polyspermum. “
 Chenopodium urbicum..... “
 A. Chenopodium murale..... “
 Chenopodium Botrys...Eu.-Asia
 A. Chenopodium ambrosioides—
 Trop. Amer.
 Chenopodium anthelminticum—
 Eu.
 A. Atriplex hastata...Western U. S.
 Salsola Tragus.....Eu. or Asia
 Amaranthus retroflexus—
 Trop. Amer.
 Amaranthus hybridus—
 Trop. Amer.
 A. Amaranthus spinosus—
 Trop. Amer.
 Amaranthus blitoides—
 Western U. S.
 Amaranthus crispus...Unknown
 Amaranthus græcizans—
 Trop. Amer.
 Mollugo verticillata—
 Warmer U. S.
 Claytonia perfoliata—
 Western U. S.
 A. Portulaca oleracea—
 S. Western U. S.
 A. Agrostemma Githago. Eu. N. Asia
 Silene vulgaris.....Eu.-Asia
 Silene Armeria.....Eu.
 Silene noctiflora..... “
 Silene conica..... “
 Silene dichotoma..... “
 Lychnis alba..... “
 Lychnis Coronaria..... “
 Saponaria officinalis..... “
 A. Dianthus prolifer..... “
 Dianthus Armeria..... “
 A. Alsine media.....Eu.-Asia
 Alsine graminea..Can.-Eu.-Asia
 Cerastium viscosum.....Eu.
 A. Cerastium vulgatum..... “
 Holosteum umbellatum. Eu.-Asia
 A. Arenaria serpyllifolia—
 Eu.-N. Asia
 Scleranthus annuus.....Eu.
 A. Spergula arvensis.....Eu.
 Tissa rubra.....Eu.-Asia
- Aquilegia vulgaris.....Eu.
 A. Delphinium Consolida..... “
 Delphinium Ajacis..... “
 A. Ranunculus acris..... “
 Ranunculus bulbosus..... “
 Ranunculus repens..... “
 Berberis vulgaris.....Eu.-Asia
 Papaver somniferum—
 Mediterranean region
 Papaver Rhœas.....Eu.
 A. Papaver dubium..... “
 A. Argemone Mexicana. Trop. Amer.
 Chelidonium majus.....Eu.
 A. Fumaria officinalis..... “
 Lepidium campestre..... “
 A. Lepidium rudemale..... “
 Thlaspi arvense....Eu.-N. Asia
 Alliaria Alliaria.... “ “
 A. Sisymbrium officinale “ “
 Sinapis alba.....Eu.-Asia
 Brassica nigra.....Eu.-C. Asia
 A. Brassica arvensis.....Eu.
 A. Brassica campestris..... “
 Coringia orientalis..... “
 A. Raphanus Raphanistrum—
 Eu.-N. Asia
 Raphanus sativus.....Asia
 Barbarea Barbarea.....Eu.
 Roripa sylvestris....Eu.-N. Asia
 A. Roripa Nasturtium.. “ “
 Roripa Armoracia.....Eu.
 A. Bursa Bursa-pastoris..... “
 Camelina sativa..... “
 Draba verna.....Eu.-W. Asia
 Alyssum alyssoides.....Eu.
 Hesperis matronalis...Eu.-Asia
 Reseda lutea.....Eu.
 Sedum Telephium..Eu.-W. Asia
 Sedum acre.....Eu. N. Asia
 Potentilla recta.....Eu.-Asia
 A. Rosa rubiginosa.....Eu.-C. Asia
 Sorbus Americana... N. E. Am.
 Malus Malus.....Eu.-W. Asia
 Crataegus Oxyacantha. Eu.-Asia
 A. Prunus Persica.....Asia
 A. Medicago sativa.....Eu.
 A. Medicago lupulina....Eu.-Asia
 A. Medicago denticulata.. “ “
 A. Melilotus alba..... “ “
 A. Melilotus officinalis.... “ “
 A. Trifolium agrarium.....Eu.
 A. Trifolium procumbens..... “
 Trifolium incarnatum..... “
 A. Trifolium arvense...Eu.-N. Asia
 A. Trifolium pratense.. “ “
 A. Trifolium repens....Eu.-Siberia

- A. *Vicia hirsuta*..... Eu.-Asia
A. *Vicia sativa*..... Eu.
Geranium columbinum—
..... Eu.-N. Asia
Geranium dissectum..... Eu.
Geranium pusillum..... “
A. *Geranium molle*..... “
A. *Erodium cicutarium*..... “
A. *Linum usitatissimum*..... “
Ailanthus glandulosa..... China
Croton capitatus.. Western U. S.
A. *Euphorbia Helioscopia*—
..... Eu.-Asia-Afr.
Euphorbia marginata—
..... Western U. S.
A. *Euphorbia Peplus*..... Eu.
Euphorbia platyphylla..... “
Euphorbia Cyparissias..... “
Cardiospermum Halicacabum
..... Trop. Amer.
A. *Malva sylvestris*..... Eu.
A. *Malva rotundifolia*.. Eu.-W. Asia
Malva moschata..... Eu.
Callirrhoe involucrata—
..... Western U. S.
Abutilon Abutilon..... S. Asia
Hibiscus Trionum..... S. Eu.
Hypericum perforatum.. Eu.-Asia
Viola tricolor..... Eu.
Opuntia humifusa.. Western U. S.
Clarkia pulchella.. “ “
A. *Daucus Carota*..... Eu.-Asia
Caucalis Anthriscus..... Eu.
A. *Pastinaca sativa*..... “
Æthusa Cynapium..... “
Pimpinella Saxifraga..... “
Conium maculatum..... “
Carum Carui..... “
Ægopodium Podagraria..... “
Lysimachia Nummularia..... “
A. *Anagallis arvensis*..... “
Vinca minor..... “
Cynanchum nigrum..... “
Quamoclit Quamoclit—
..... Trop. Amer.
Quamoclit coccinea—
..... Trop. Amer.
Impomœa purpurea.. Trop. Amer.
Impomœa hederacea “ “
Convolvulus arvensis.. Eu.-Asia
Cuscuta Epilinum..... “ “
A. *Cuscuta Epithymum*..... Eu.
Heliotropium Indicum..... India
Cynoglossum officinate.. Eu.-Asia
A. *Lappula Lappula*..... “ “
Myosotis palustris..... “ “
A. *Lithospermum arvense*.. “ “
Lithospermum officinale.. Eu.-Asia
Symphytum officinale.. “ “
Echium vulgare..... “ “
Ajuga reptans..... Eu.
A. *Marrubium vulgare*..... Eu.-Asia
A. *Nepeta Cataria*..... “ “
Prunella vulgaris..... “ “
Galeopsis Tetrahit..... “ “
Leonurus Cardiaca..... “ “
Lamium amplexicaule.. “ “
Lamium purpureum... “ “
Lamium maculatum... “ “
Lamium album..... Eu.
A. *Melissa officinalis*..... “
Satureia hortensis..... “
A. *Origanum vulgare*..... Eu.-Asia
Thymus Serpyllum... “ “
Lycopus Europeus..... Eu.
A. *Mentha spicata*..... Eu.-Asia
Mentha piperita..... Eu.
Mentha longifolia..... “
Mentha aquatica..... “
Mentha arvensis..... “
Mentha sativa..... “
A. *Physalodes physalodes*.... Peru
Solanum rostratum—
..... Western U. S.
Solanum Dulcamara... Eu.-Asia
Lycium vulgare..... Eu.
Hyoscyamus niger..... “
A. *Datura Stramonium*—
..... Tropical Asia
A. *Datura Tatula*..... Trop. Amer.
A. *Verbascum Thapsus*... Eu.-Asia
A. *Verbascum Blattaria*... “ “
A. *Elatinoides Elatine*... “ “
A. *Linaria Linaria*..... “ “
Veronica arvensis..... “ “
Veronica agrestis..... “ “
Veronica Byzantina... “ “
Veronica hederæfolia.. “ “
Martynia Louisiana.. Miss. Valley
A. *Plantago major*..... Eu.
A. *Plantago lanceolata*... Eu.-Asia
Plantago aristata.. Western U. S.
Plantago arenaria..... C. Eu.
Galium verum..... Eu.-Asia
A. *Galium Aparine*..... Eu.
Lonicera Caprifolium..... “
Valerianella Locusta..... “
Dipsacus sylvestris..... Eu.-Asia
Campanula rapunculoides... Eu.
A. *Cichorium Intybus*..... “
Lapsana communis..... “
Leontodon autumnale.. Eu.-Asia
Tragopogon pratensis..... Eu.
A. *Tragopogon porrifolius*..... “

A. Taraxacum Taraxacum—	Anthemis arvensis.....Eu.
.....Eu.-Asia	Anthemis nobilis.....“
A. Sonchus arvensis.....Eu.-Asia	Anthemis tinctoria....Eu.-Asia
A. Sonchus oleraceus... ..Eu.	Chrysanthemum Leucanthemum
A. Sonchus asper.....“	Eu.-Asia
Lactuca Scariola.....“	A. Chrysanthemum Parthenium—
Crepis tectorum.....“	Eu.
Crepis biennis.....“	Chrysanthemum Balsamita—
Hieracium aurantiacum....“	Eu.-Asia-Afr.
A. Xanthium spinosum...Eu. or Asia	Matricaria Chamomilla.....Eu.
A. Xanthium strumarium “ “	Matricaria matricarioides—
Gutierrezia Texana—	Pacific coast
.....S. Western U. S.	A. Tanacetum vulgare.....Eu.
Amphiachyris dracunculoides—	Artemisia Absinthium.....“
.....S. Western U. S.	Artemisia Abortanum.....“
Grindelia squarrosa—	Artemisia annua.....Asia
.....Western U. S.	Artemisia vulgaris....Eu.-Asia
Inula Helenium.....Eu.-Asia	Tussilago Farfara.....Eu.
Parthenium hysterophorus—	A. Senecio vulgaris.....“
.....S. Western U. S.	Arctium Lappa.....“
Eclipta alba.....Trop. Amer.	Arctium minus.....“
Rudbeckia hirta...Western U. S.	A. Carduus lanceolatus...Eu.-Asia
A. Galinsoga parviflora. Trop. Amer.	A. Carduus arvensis.....Eu.
Helenium nudiflorum—	A. Onopordon Acanthium. Eu.-Asia
.....Western U. S.	Centaurea Cyanus.....Eu.
Helenium tenuifolium—	Centaurea nigra.....“
.....Western U. S.	Centaurea Jacea.....“
Dysodia papposa. S. Western U. S.	Cnicus benedictus.....S. Eu.
A. Anthemis Cotula.....Eu.	

The naturalized plants of Ohio number at present 304 species, of which 99 also flourish in Australia. With respect to sources of these later migrants 145 are European, and 103 are common to Europe and Asia, 15 are indigenous in Asia alone, while 22 are from western and south-western United States, 15 from tropical America and a few from various other countries.

The tabulated species, including only those shown by the summary table, constitute a little above 40 per cent. of the flowering plants, ferns and fern allies known to grow spontaneously in Ohio. The larger number have such a wide range that they have been at present omitted. The lists are collected in the following summary table, the percentages being computed upon the basis of approximately 1960 * species for Ohio :

* Professor W. A. Kellerman writes that the new list of Ohio plants contains 2,025 numbers. This basis will change the percentages slightly.

SUMMARY OF SOURCES OF THE OHIO FLORA.

Direction of Source.	Number of Species.	Proportion to State Flora.			
From Northwest.....	27	1.4	per cent.		
From North.....	80	4.1	" "		
From Northeast.....	145	7.4	" "	12.9	per cent.
From East.....	25	1.3	" "		
From Southeast.....	18	0.9	" "	15.1	" "
From South.....	122	6.2	" "		
From Southwest.....	28	1.4	" "	7.6	" "
From West.....	38	2.0	" "	2.0	" "
Naturalized	304	15.5	" "	15.5	" "
	<hr/> 787	<hr/> 40.2			

The composite character of the plants of Ohio is thus evident to any who may investigate the statistics of the area. The northern elements are larger than any other determined components. A study of the ranges of all plants found in the state as to extent north or south beyond Ohio will possibly increase the evidence heretofore offered in support of a northern origin for much of our flora.

Yet interesting as floristic studies may prove, the physiological adaptations of the plants to their present situations is equally enticing, and on the whole, better adapted for many reasons to meet the demands of both the local collector and the laboratory investigator. The time is certainly ripe for ecological studies in Ohio.

SOME WORKS RELATING TO THE GEOGRAPHICAL DISTRIBUTION OF NORTH AMERICAN PLANTS.

(Manuals and General Floras not Included.)

- BEAL, DR. W. J.—Geographical Distribution of the Grasses of North America. *Proc. Amer. Assn. Adv. Sci.* XXXIX. (1890), pp. 312-319.
- BENTHAM, GEORGE.—Notes on the Classification, History and Geographical Distribution of Compositæ. *Jour. Linn. Soc. Botany* XIII. (1873), 335-577.
- BRITTON, Prof. N. L.—On the Geographical Distribution of North American Plants. *Proc. Amer. Assn. Adv. Sci.* XXXIX. (1890), 322-327.

COULTER, PROF. JNO. M.—Geographical Distribution of North American Umbelliferae. Proc. Amer. Assn. Adv. Sci. XXXIX. (1890), 292-298.

Geographical Distribution of North American Cornaceae. Proc. Amer. Assn. Adv. Sci. XXXIX. (1890), 319-922.

COULTER, PROF. JNO. M. AND THOMPSON, HARVEY.—

The Origin of the Indiana Flora. Indiana Department Geology and Natural History. 15th Report, pp. 253-282.

GRAY, DR. ASA.—I. Statistics of the Flora of the Northern United States. Amer. Jour. Sci. 2, XXII, pp. 204-232 (1856).

II. Diagnostic Character of New Species of Phanerogamous Plants, collected in Japan by CHARLES WRIGHT, Botanist of the U. S. North Pacific Exploring Expedition (Published by request of CAPTAIN JOHN ROGERS, Commander of the Expedition). With Observations upon the Relations of the Japanese Flora to that of North America, and other Parts of the North Temperate Zone. By ASA GRAY, M. D. Memoirs of the Amer. Acad. Arts and Sci., Vol. VI., New series, published 1859.

First part pp. 377-423.

Tables of last part, pp. 424-426.

Added Observations on last 436-449. Usually quoted as "Gray on Botany of Japan."

III. Sequoia and its History. President's Address, Amer. Assn. Adv. Sci., Dubuque, 1872. Proc. Amer. Assn. Adv. Sci. XXI. (1872), pp. 1-31 (Including two appendices).

IV. Forest Geography and Archæology. Amer. Jour. Sci. XVI. (1878), pp. 85-94, 183-196.

V. Characteristics of the North American Flora. An Address to the Botanists of the British Association at Montreal, 1884. Amer. Jour. Sci. 3, XVIII., pp. 323-334. Report British Assn., 1884 (pp.14).

GRAY AND HOOKER.—The Vegetation of the Rocky Mountain Region. Bul. Geol. Survey West of the 100th Meridian (Hayden). Vol. VI., 1. pp. 77 (1880).

HOOKE, SIR J. D.—I. On the Flora of Australia; being an Introductory Essay to the Flora of Tasmania, 1859.

II. On Insular Floras. An address before British Assn. Adv. Sci. at Nottingham, Aug., 1860.

MACMILLAN, PROF. CONWAY.—I. Metaspermæ of the Minnesota Valley, 1892.

II. Notes for Teachers on the Geographical Distribution of Plants. Jour. School Geography I. (No. 4) Apr., 1897.

MOORE, CHAS.—Handbook of the Flora of New South Wales, 1893.

SCHIMPER, DR. A. W. F.—Pflanzengeographie, 1898.

SPALDING, PROF. VOLNEY M.—The Distribution of Plants. American Naturalist, XXIV. (1890), 819-831.

UNDERWOOD, PROF. LUCIEN M.—The Distribution of Hepaticæ of North America. Proc. Amer. Assn. Adv. Sci., XXXIX. (1890), pp. 298-304.

WATSON, DR. SERENO.—The Relation of the Mexican Flora to that of the United States (Abstract) Proc. Amer. Assn. Adv. Sci XXXIX. (1890) pp. 291-2.

PUBLICATIONS RELATING TO THE DISTRIBUTION OF PLANTS
IN OHIO.

BEARDSLEE, DR. H. C.—Catalogue of the Plants of Ohio. Ohio Agricultural Report, 1877, pp. 346-363.

BIGELOW, J. M.—Florula Lancastriensis, 1841. pp. 62 (Not seen).

CLARK, JOSEPH—Catalogue of Flowering Plants and Ferns observed in the vicinity of Cincinnati, 1852, pp. 30 (Not seen).

FOLTZ, DR. KENT O.—The Phænogamic Flora of Summit County. Report Ohio State Academy of Science, 1893, pp. 21-31.

GOODRICH, MISS S. F.—Wild Plants of Ashtabula County. Western Reserve School Journal, Nov., 1892, to April, 1893.

JONES, H. L.—Catalogue of the Phænogams and Ferns of Licking County, Ohio, 1892, pp. 103 and one map. (Bulletin Scientific Laboratories of Denison University, Vol. VII).

- KELLERMAN, PROF. W. A. AND WERNER, W. C.—Catalogue of Ohio Plants, Vol. VII., Geology of Ohio, Part II. (1893), pp. 350. A Bibliography of Ohio Botany to 1893, is included in this work.
- LEA, THOS. G.—Catalogue of Plants * * of Cincinnati, 1849. (Not seen).
- MOSELEY, E. L.—Sandusky Flora. Special Paper, No. 1, Ohio State Academy of Science, 1899, pp. (about 160.) [Advance sheets through page 140 have been consulted, through kindness of the author].
- NEWBERRY, DR. JNO. S.—Catalogue of the Flowering Plants and Ferns of Ohio. Ohio Agricultural Report, 1859, pp. 235-273. [The earliest of our State Catalogues].
- RIDDELL, JNO. L.—I. Catalogue of Plants * * of Franklin County and Central Ohio, 1834 [Medical Gazette, Vol. II.]. (Not seen).
II. Synopsis of the Flora of the Western States (1835).
III. Supplementary Catalogue of Ohio Plants, 1836. The II. and III. were published in the Western Journal of the Medical and Physical Sciences, Vols. VII. and IX.
- SELBY, A. D. AND CRAIG, MOSES.—Preliminary list of the Plants of Franklin County. Journal, Columbus Horticultural Society, 1890, pp. 19.
- SULLIVANT, WM. S.—Catalogue of Plants * * of Columbus, Ohio, pp. 62, 1840.
- WRIGHT, PROF. A. A.—I. Preliminary List of the Flowering and Fern Plants of Lorain County, pp. 30, 1889.
II. Supplement to I., pp. 11, and one map, 1893.

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