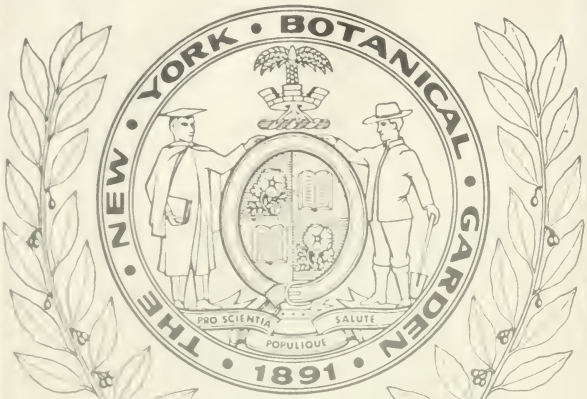

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* SOURCES OF THE OHIO FLORA.

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 spoaking, 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 outcrop, 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

* Read in part before the Ohio State Academy of Science, December, 1898.

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.

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

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.

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

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.

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

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 Dionœa, 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.*	2. *In Northeastern Asia—Japan to Altai Mountains.*
Lycopodium lucidulum,	Lycopodium lucidulum,
Lycopodium dendroideum (L. obscurum L.),	Lycopodium dendroideum,
Adiantum pedatum,	Adiantum pedatum,
Asplenium acrostichoides,	Asplenium acrostichoides,
Camptosorus rhizophyllus,	Camptosorus Sibiricus,
Onoclea sensibilis,	Onoclea sensibilis,
Osmunda cinnamomea,	Osmunda cinnamomea,
Osmunda Claytoniana,	Osmunda Claytoniana,
Botrychium Virginicum,	Botrychium Virginicum,
Thuja occidentalis,	Thuja Japonica,
Tsuga Canadensis,	Tsuga Tsuga, etc.,
Pinus Strobus,	Pinus excelsa,
Taxus minor,	Taxus cuspidata,
Avena striata,	Avena callosa,
Zizania aquatica,	Zizania=Hydrophyrum latifolium,
Carex stipata,	Carex stipata,
Eriophorum cyperinum,	Eriophorum cyperinum,
Abama Americana,	Abama Asiatica,
Erythronium Americanum and Albidum,	Erythronium grandiflorum,

Vagnera (*Smilacina*) trifolia,
Vagnera (*Smilacina*) racemosa,
Vagnera (*Smilacina*) stellata,
Polygonatum commutatum,
Clintonia borealis,
Disporum (*Prosartes*) lanuginosum,
Chamælirium luteum,
Trillium grandiflorum,
Trillium erectum,
Smilax hispida,
Smilax herbacea,
Iris cristata,
Aletris farinosa,
Habenaria flava,
Leptorchis (*Liparis*) liliifolia,
Pogonia ophioglossoides,
Symplocarpus fœtidus (*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,
Chamælirium luteum,
Trillium obovatum,
Trillium erectum var,
Smilax Lieboldii,
Smilax herbacea=Nipponica,
Iris tectorum=cristata,
Aletris Japonica,
Habenaria fucescens,
Leptorchis (*Liparis*) liliifolia,
Pogonia ophioglossoides,
Symplocarpus fœtidus 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.),
Menispernum 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,	Amelanchier Canadensis var,
Gleditschia triacanthos,	Gleditschia Chinensis, etc.,
Æsculus glabra,	Æsculus Chinensis and Hippocastanum,
Acer spicatum,	Acer spicatum var,
Acer Pennsylvanicum,	Acer legmentosum,
Rhus Vernix,	Rhus Vernix ? (vernicifera)
Rhus radicans,	Rhus radicans,
Vitis Labrusca,	Vitis Labrusca,
Ampelopsis cordata,	Vitis humifolia,
Triadenum (*Hypericum*) petiolatum	Triadenum (*Hypericum*) petiolatum,
Triadenum (*Hypericum*) Virginicum	Triadenum (*Hypericum*) Virginicum,
Viola Canadensis,	Viola Canadensis var.,
Cornus Canadensis,	Cornus Canadensis,
Cornus florida,	*Benthamia*, spp.,
Cornus stolonifera,	Benthamia alba,
Aralia spinosa,	Aralia spinosa var.,
Aralia racemosa,	Aralia edulis, etc.,
Panax quinquefolium,	Aralia (*Panax*) Ginseng, etc.,
Heracleum lanatum,	Heracleum lanatum,
Sium cicutæfolium,	Sium cicutæfolium,
Deringa (*Cryptotænia*) Canadensis,	Deringa (*Cryptotænia*) Canadensis,
Washingtonia (*Osmorrhiza*) longistylis,	Washingtonia (*Osmorrhiza*) longistylis,
Pyrola elliptica.	Pyrola elliptica.
Gaultheria procumbens,	Gaultheria pyroloides,
Epigæa repens,	Epigæa Asiatica,
Chiogenes hispidula,	Chiogenes hispidula,
Monotropa uniflora,	Monotropa uniflora,
Menyanthes trifoliata,	Menyanthes trifoliata,
Lithospermum officinale,	Lithospermum officinale,
Teucrium Canadense,	Teucrium Japonicum,
Phlox subulata,	Phlox Sibirica,
Veronica Virginica,	Veronica Virginica,
Tecoma radicans,	Tecoma grandiflora,
Lycopus Virginicus,	Lycopus parviflorus,
Phryma Leptostachya,	Phyrma Leptostachya,
Mitchella repens,	Mitchella undulata,
Viburnum lantanoides,	Viburnum lantanoides,
Artemisia Canadensis,	Artemisia Canadensis=commutata,
Artemisia biennis.	Artemisia biennis.

SPECIES COMMON TO OHIO, EUROPE AND NORTHEASTERN ASIA.

In Ohio.	*In Europe and Northeastern Asia.*
Ophioglossum vulgatum,	Ophioglossum vulgatum,
Osmunda regalis,	Osmunda regalis,
Dryopteris (*Lashea*) dilatata,	Dryopteris (*Lashea*) dilatata,
Polypodium vulgare,	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,
Spiræa 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,
Spiræa 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 planst 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,
Potamogeton obtusifolius,
Stipa spartea,
Sporobolus heterolepis,
Agrostis exarata,
Cyperus Schweinitzii,
Carex aristata,
Carex durifolia,
Carex teretiuscula prairea,
Carex Muskingumensis,
Allium cernuum,
Asarum acuminatum,
Polygonum amphibium,
Polygonum Hartwrightii,
Atriplex argentea,
*Alsine longifolia,
Arabis dentata,
Erysimum inconspicuum,
Chrysosplenium alternifolium,
†Ribes lacustre,
Hydrophyllum Virginicum,
Steironema quadriflorum,
Lonicera glaucescens,
Valeriana edulis,
Lactuca pulchella,
Helianthus lætiflorus,
Artemisia biennis.

Plants from the North.

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

†Equisetum scirpoides,
†Lycopodium obscurum,
†*Lycopodium annotinum,
†*Lycopodium clavatum,
†*Lycopodium complanatum,
†*Juniperus communis,
Taxus minor,
†Sparganum 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 fœnea,
†*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 xanthophysum,
*Milium 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 Tuckermani,
Carex Pseudo-Cyperus,
Carex Goodenovii,
Carex prasina,
Carex costellata,
Carex formosa,
Carex arctata,
Carex tenuis,
*Carex pallescens,
Carex flava,

Carex conoidea,
Carex Carevana,
Carex setifolia,
Carex pedunculata,
Carex pedicellata,
Carex pelicellata Wheeleri,
Carex Novæ-Angliæ,
Carex chordorhiza,
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 sceleratus,
Anemone quinquefolia,
Capnoides aureum,
Cardamine flexuosa,
Saxifraga Virginiensis,
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,
Ilicioides 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,
Hydroctoyle 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,
Panicum pubescens,
Poa brevifolia,
Carex bullata,
Carex æstivalis,
Carex alata,
Disporum lanuginosum,
Salix alba cœrulea,
Salix purpurea,
Betula lutea,
Quercus Prinus,
Bœhmeria cylindrica,
Polygonum Careyi,
Polygonella articulata,
Silene Caroliniana,
Thalictrum polygamum,
Bicuculla eximia,
Cardamine arenicola,
Cardamine rotundifolia,
Meibomia sessilifolia,
Linum Virginianum,
Vitis bicolor,
Pimpinella Saxifraga,
Seriocarpus asteroides,
Dœllingeria infirma.

Plants from the Southeast.

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

Plants from the South.

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

Liquidambar Styraciflua,
Malus angustifolia,
Baptisia leucantha,
Psoralea pedunculata,
Robinia viscosa,
Robinia hispida,
Stylosanthes biflora,
Meibomia virdiflora,
Meibomia arenicola,
Lespedeza repens,
Oxalis recurva,
Polygala brevifolia,
Tilia heterophylla,
Triadenum petiolatum,
Viola hastata,
Passiflora lutea,
Œnothera laciniata,
Gaura Michauxii,
Myriophyllum pinnatum,
Aralia spinosa,
Ligusticum Canadense,
Nyssa aquatica,
Oxydendrum arboreum,
Chioanthus Virginica,
Gentiana villosa,
Obolaria Virginica,
Vincetoxicum gonocarpos,
Cuscuta indecora,
Phlox paniculata,
Phacelia dubia,
Lippia lanceolata,
Synandra hispidula,
Stachys tenuifolia,
Salvia lyrata,
Clinopodium glabellum,
Kœllia cristata,
Lycopus rubellus,
Physalis viscosa,
Pentstemon Pentstemon,
Conobea multifida,
Buchnera Americana,
Bignonia crucigera,
Tecoma radicans,
Catalpa Catalpa,
Ruellia ciliosa,
Houstonia tenuifolia,
Spermacoce glabra,
Valerianella Woodsiana,
Legouzia biflora,
Lobelia puberula,
Lobelia leptostachys,
Adopogon Dandelion,
Lactuca villosa,
Nabalus virgatus,
Vernonia glauca,
Vernonia gigantea,
Elephantopus Carolinianus,
Eupatorium serotinum,
Eupatorium cœlestinum,
Kuhnia eupatorioides,
Chrysopsis graminifolia,
Aster hirsuticaulis,
Silphium terebinthinaceum pinnatifidum,
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 tricorne,
Porteranthus stipulatus,
Baptisia australis,
Falcata Pitcheri,
Euphorbia dentata,
Euphorbia obtusata,
Æsculus octandra,
Rhamnus lanceolata,
Hypericum gymnanthum,
Ammannia coccinea,
Eulophus Americanus,
Ipomœa lacunosa,
Convolvulus repens,
Phacelia bipinnatifida,
Verbena Canadensis,
Ruellia strepens,
Nabalus asper,
Vernonia fasiculata,
Aster oblongifolius,
Erigeron Bellidiastrum,
Helianthus mollis,
Verbesina helianthoides,
Senecio lobatus.

Plants from the West.

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

A List of Plants Naturalized in Ohio, with Source.

[Those naturalized in Australia as shown by Hooker (II, 1859) and Moore (1883), are marked A.]

Syntherisma sanguinalis.....Eu.
Syntherisma linearis..... "
Panicum Crus-galli..... "
Ixophorus verticillatus..... "
Ixophorus glaucus..... "
Ixophorus viridis..... "
Ixophorus Italicus..Eu.-Asia-Afr.
A. Phalaris Canariensis.....Eu.
A. Anthoxanthum odoratum.... "
Phleum pratense..... "
A. Alopecurus pratensis.. ..... "
Agrostis alba.. ..... "
A. Holcus lanatus..... "
A. Avena fatua.....Eu. or Asia.
Arrhenatherum elatius.....Eu.
Capriola Dactylon..... "
Eleusine Indica....Eu.-Asia-Afr.
Eragrostis Eragrostis.....Eu.
Eragrotis pilosa..... "
Eragrostis major..... "
A. Dactylis glomerata..... "
A. Poa annua.....Eu.-Asia
Poa compressa..... " "
Poa trivialis.....Eu.
Festuca ovina.....Eu.-Asia
Festuca elatior.....Eu.
Bromus tectorum..... "
A. Bromus sterilis.....Eu-Asia
A. Bromus hordeaceus.....Eu.
Bromus secalinus.....Eu.-Asia
Bromus racemosus..... " "
A. Lolium perenne..... " "
Agropyron repens..... " "
Carex muricata.....Eu.
Hemerocallis fulva.....Eu.-Asia
Allium vineale.....Eu.
Lilium tigrinum....China-Japan
Ornithogalum umbellatum...Eu.
Muscari botryoides.....Eu.-Asia
Asparagus officinalis.....Eu.
Populus alba.....S. Eu.-Asia
Salix fragilis.....Eu.
Salix alba..... "
A. Salix Babylonica.....Asia
Salix purpurea.....Eu.
Morus alba.....Eu.-Asia-Afr.
Broussonetia papyrifera.Eu.-Asia
A. Cannabis sativa..... " "
A. Urtica dioica..... " "
A. Rumex crispus..... " "
A. Rumex Acetosella..... " "
Rumex sanguineus.....Eu.
Rumex obtusifolius....Eu.-Asia
Fagopyrum Fagopyrum " "
Polygonum lapathifolium—
.....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 ruderale..... "
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
Cratægus 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 pussillum..... "
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..... "
Æthusia 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 officinaleEu.-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 Serphyllum... " "
Lycopus Europæus.....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— .....Eu.-Asia
A. Sonchus arvensis.....Eu.-Asia
A. Sonchus oleraceus.....Eu.
A. Sonchus asper..... "
Lactuca Scariola..... "
Crepis tectorum..... "
Crepis biennis..... "
Hieracium aurantiacum..... "
A. Xanthium spinosum..Eu. or Asia
A. Xanthium strumarium " "
Gutierrezia Texana— .....S. Western U. S.
Amphiachyris dracunculoides— .....S. Western U. S.
Grindelia squarrosa— .....Western U. S.
Inula Helenium.....Eu.-Asia
Parthenium hysterophorus— .....S. Western U. S.
Eclipta alba..... Trop. Amer.
Rudbeckia hirta...Western U. S.
A. Galinsoga parviflora. Trop. Amer.
Helenium nudiflorum— .....Western U. S.
Helenium tenuifolium— .....Western U. S.
Dysodia papposa. S. Western U. S.
A. Anthemis Cotula.....Eu.
Anthemis arvensis.....Eu.
Anthemis nobilis..... "
Anthemis tinctoria.....Eu.-Asia
Chrysanthemum Leucanthemum .....Eu.-Asia
A. Chrysanthemum Parthenium— .....Eu.
Chrysanthemum Balsamita— .....Eu.-Asia-Afr.
Matricaria Chamomilla.....Eu.
Matricaria matricarioides— .....Pacific coast
A. Tanacetum vulgare.....Eu.
Artemisia Absinthium..... "
Artemisia Abortanum..... "
Artemisia annua.....Asia
Artemisia vulgaris.....Eu.-Asia
Tussilago Farfara.....Eu.
A. Senecio vulgaris..... "
Arctium Lappa..... "
Arctium minus..... "
A. Carduus lanceolatus....Eu.-Asia
A. Carduus arvensis.....Eu.
A. Onopordon Acanthium. Eu.-Asia
Centaurea Cyanus.....Eu.
Centaurea nigra..... "
Centaurea Jacea..... "
Cnicus benedictus.....S. 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:

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* 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 " "
	787	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.

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